



TRC9302

## **Recommended Species for Roadside Management**

Gerald L. Klingaman, G. Laurin Wheeler, A. E. Einert,  
John W. King, Ron E. Talbert, Herbert J. Huneycutt

Final Report

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# **Recommended Species for Roadside Management**

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## Forward

The authors would like to acknowledge the financial support of the Arkansas State Highway and Transportation Department in completion of this project. While the report will not answer every plant related question posed by the Department, it should serve as a valuable reference tool chronicling information needed for plant selection, establishment and maintenance along Arkansas roadways.

The authors would also like to acknowledge the support of the following students in completing this work: David Ruff (Ph-D, 1993), Jane Gregory (M.S. 1994) and Pam Johnson.

## INTRODUCTION

This document represents a review of the plant materials that have a place in the rights of ways of Arkansas' highways. It is intended as a reference work addressing the specific and unique plant related needs of the Arkansas Highway and Transportation Department. Although not designed to prioritize plants for specific uses and sites, it does provide a means of comparison for specific, preselected plants. The manual is broken down into five major plant sections in order to facilitate easy comparison; trees, shrubs, grasses, wildflowers and legumes.

To facilitate quick reference the plant discussion follow the same format. Common and Latin names are both in use in the nursery trade, and both are given here. A brief description of the plant form is given with emphasis placed on characteristics which make it desirable. Plant hardiness, both in Arkansas and nationwide, is given along with information about the site requirements for the plant. When specific site information is not given, such as pH or soil drainage requirements, the plant should be considered tolerant of a wide range of soil conditions. The landscape uses and unique maintenance requirements of the plants are given in separate sections. These sections attempt to focus on the perceived needs of the Department. Related species and cultivars are also given to facilitate comparisons.

All of the trees, shrubs, grasses and legumes are available in the nursery trade in sufficient supply to be useful for highway planting use. Cultivars and natural varieties are included in the reference because these have unique horticultural or agronomic characteristics which make them useful in their own right. While all possible cultivars are not included, the most common and readily available are given here.

The nursery industry is increasingly moving towards the production of cultivars and away from "seedling runs". Only in shade tree production are seedling populations in wide use, and even there more emphasis is being placed on cultivar production. This is occurring with such common trees as maples, sweetgum, birches, and magnolias. Flowering trees such as dogwoods, crabapples and crapemyrtle are almost exclusively produced as cultivars. Oaks and pines, because of difficulties in propagation, are almost exclusively seed produced.

Cultivars usually are selected for superior ornamental appeal, however, many possess improved disease resistance as well. For example crabapples and crapemyrtles show tremendous cultivar differences in susceptibility to leaf diseases. The cultivar lists presented here will help identify better plants for planting.

The wildflowers presented here are not all commercially available in quantities needed for right of way planting, but they are native to the state and can be expected to reestablish

in suitable sites if appropriate conditions exist.

This manual attempted to focus on native plants, but exotic plants that had proven their adaptability through a long history of cultivation are also included. Nativity should not be the sole criterion used when selecting species for right of way use. Many of the exotics are extremely well adapted and have proven themselves completely hardy under Arkansas conditions.

A brief section is included on maintenance and establishment procedures which represents sound horticultural and agronomic practices. Many of the maintenance and installation practices used by AHTD are a result of the time and financial demands placed on the organization by the extensive roadway network throughout the state. Where practical, the suggestions of this section should be given serious consideration.

Species not included in the manual should not be dismissed as completely unworthy for right of way use, but were excluded here because they were not native, were not considered tolerant exotics, or were not considered to be produced in sufficient quantity in the nursery trade to make them useful for widespread plantings. Additionally, species which are slow growing and/or very expensive in the nursery trade are excluded.

## ECOLOGICAL IMPACTS AND PURPOSES OF MOWING

From an ecological standpoint mowing practices favor certain species and discourage others. Unfortunately, many of the more prized native species are not compatible with right of way mowing practices and are eliminated by the practice. Species that tolerate, and in fact thrive with the mowing practices used along Arkansas highways, are species with rhizomatous root systems (sumac, various wild plums, blackberries, bermudagrass, johnsongrass) or species which produce seed during some other period than the summer and fall when mowing is most thoroughly practiced (winter weeds, tall fescue).

Woody plants that sucker freely from the ground when cut off are primarily pioneer species such as silver maples, black cherry, mimosa, and various elms. These woody species will survive year after year being "bush hogged" to the ground. Coniferous species (pines, junipers and bald cypress) will not survive such mowing practices.

Many summer flowering plants produce their seeds during late summer and fall and are eliminated from seed reproduction if mowing is done during the 10 to 12 weeks following flowering. Unfortunately this seed maturation phase of growth often is not the most attractive period for the plants. The pressure to mow to "control the mess" is highest during this period.

That dramatic shifts in species composition of roadside vegetation result from the mowing program is readily apparent. Planting a species that will be killed out in year or two by the mowing program is wasteful. Coordinating species composition of seed mixtures for given areas with the planned mowing program can reduce costs of seed and mowing and enhance function and appearance.

The purposes of the mowing program need to be questioned and clearly defined. Is the purpose to keep vegetation low enough to avoid obstructing motorists sight-lines at intersections, abutments, and safety berms? Could this need for mowing be eliminated or greatly reduced by (1) planting bahiagrass, Tifway bermuda or buffalograss alone, (2) planting common bermudagrass with common white clover, hop clovers, or crimson clover, or (3) a herbicide program? Is the purpose of mowing vegetation to (1) facilitate biomass decay?, (2) improve appearance of next years growth?, (3) control volunteer trees?, and/or (4) reduce a fire hazard? Could hay (poor quality) be harvested every third year? Will the clippings smother many smaller plants? Would "mulching" mowers do enough of a better job to be a worthwhile investment? Could controlled burning be practiced occasionally? Can certain areas just be planted and left alone? These and similar questions need to be considered to minimize costs and maximize appearance. Obviously, AHTD managers frequently ask these and related questions.

Mowing program variables include height, frequency, and timing of cutting relative to the growth stage of desired species. These variables can affect the species composition of roadside plant stands.

The height of the growing points of plants relative to the height of mowing and the amount of green leaves remaining are major determinates of the stress to the mowed plants. The crown buds of most grasses are at or near the soil line so they withstand mowing well. The growing points of some of the large grasses become elevated several inches by late summer so mowing too low at that time removes many meristems. Broadleaf plants have apical meristems so mowing removes most of the growing points. Broadleaf species vary in their ability to form secondary meristems in leaf axils. Some species may not survive mowing. Height of mowing as well as the height or growth habit of the plant also affects the severity of defoliation. The more green leaf tissue remaining after mowing the more likely the survival of the plant. In dense stands the lower leaves are often shaded to death, thus mowing may leave only a stubble. Any regeneration of foliage after mowing requires considerable energy and weaker plants may not regenerate. Roadside mowing equipment can be adjusted to cut at about a 4 to 10" height. The higher the cutting height the more species that will survive.

The frequency of mowing affects stress to plants because carbohydrates reserves of the plant are required to regenerate growth. Repeated mowing would exhaust many wildflower species. But, because highway mowing is so infrequent along the rights of way, carbohydrate depletion is not an important factor affecting species composition of the vegetation.

Timing of mowing is a very important factor affecting species composition of roadside vegetation. Mowing before seeds mature will greatly reduce the seed supply in the soil for re-seeding. This applies especially to annual species. Species may be roughly grouped as cool-season and warm-season flowering. Thus preferred mowing time for these two groups of species are late spring to early summer and fall. Dividing of seed mixtures into spring flowering and summer and fall flowering species of legumes and wildflowers may be one desirable option. Another alternative may be to select species to flower in a particular month. Another possibility is to select species to flower in say May and September at a given site. By grouping the species together with similar flowering times it would be possible to manage mowing in the area to foster seed crop development.

It is desirable to allow seed of perennial species to mature so natural re-seeding can occur. Grasses can be mowed anytime but it is better to mow before seedhead stems begin to elongate or after seeds mature. Mowing after killing frost or during the winter will minimize any adverse effects of mowing on species composition. Coordinating seed mixtures for selected areas with mowing schedules can maximize beauty and cost effectiveness.



## MOWING PROGRAMS/PLANT SPECIES INTERACTIONS

Interstate highway mowing programs can be divided into three zones and timing(s) of mowing. Zone 1 is the immediate safety berm. It would be mowed at a height of 6" in May-June and probably again in September-October. Thus Zone 1 grass species must be low growing and produce relatively dense stands or sod. Any interseeded legumes and wildflowers must be relatively short, say less than 15" tall, flower before early May, be able to withstand late spring mowing and flower later, and/or produce a significant proportion of their seed below the 6" mowing height.

Zone 2 is between the safety berm and the drainage swale. It would be mowed at a 9" height in July-August. Zone 2 grass species can be of intermediate height. Interseeded legumes and wildflowers may be up to say 2' tall and flower before early June and/or produce seed below the 9" height. A key point in Zone 1 and 2 mowing is to allow some seed of chosen species, especially legumes and wildflowers, to fully mature so continual reseeding occurs naturally.

Zone 3 is the backslope away from the drainage swale. It would be mowed after killing frost and through the winter and early spring at a 12" mowing height. Any and all grasses, legumes, and wildflowers may be grown in this Zone 3, but it would seem desirable to give emphasis to larger sized and summer and late fall blooming plants. A confusing number of variations on this outline of mowing/plants interaction schemata are possible.

One variation is that the median between the safety berms on superhighways can be managed by choice as Zone 1, 2, or 3 on an area-by-area basis. Herbicidal control of broadleaf "weeds" (includes all dicot plants in this case) can broaden the window of appropriate mowing timing or even greatly reduce the need to mow at all if the grass is bermudagrass, bahiagrass or buffalograss on the safety berm and mid sized "prairie" grasses away from roadway (see sections reasons for mowing and herbicidal vegetation management). On state highways the Zone 1 program is likely to extend to the drainage swale.

The area outside the drainage swale may be managed as Zone 1, 2, or 3. To increase the number of species surviving the Zone 1 and 2 mowing programs alternate months of mowing area-by-area year-by-year. Thus one year an area would be mowed May and September and the next year in June and October. This extension of seed maturation time in alternate years would allow seed of more species to be present for reseeding. If the more ragged appearance can be tolerated, Zone 2 and 3 could be mowed on alternate years to minimally control volunteer trees. Perhaps other variations on the Zone 1, 2, and 3 scheme are possible.

Species for the Zone 1 May-June mowing program include bermudagrasses, buffalograss, bahiagrass, redtop, and tall

fescue. The seedheads of tall fescue would have to be controlled by mowing or growth regulators. Common bermudagrass allows interseeding of many plants. Bahiagrass and buffalograss grow too densely and tall fescue may be somewhat allelopathic (known to be so against Crimson clover) against interseeded plants. Legume species for Zone 1, especially in bermuda, include large hop clover or common white clovers and Marion lespedeza and purple prairie clover on limestone soils of the Ozark region and partridge pea on sandy soils. These last three species can withstand May-June mowing and flower in the summer. It would seem appropriate to choose large hop clover or common white clover for unified color and one of the legumes for summer color in Zone 1. Several small wildflowers might also survive in the Zone 1 program. But some precaution against planting too many species in Zone 1 seems advisable.

Species for the Zone 2 July-August mowing program include the grasses used for Zone 1 with the same limitations on interseeding and also Old World bluestem, Virginia wildrye, or Florida paspalum where adapted. (September-October mowing of little bluestem, splitbeard bluestem, and side-oats grama is undesirable.) Legume species, especially in bermudas, include large hop clover or common white clover and Crimson clover, Red clover, or hairy vetch on good soils with pH above 6, purple prairie clover and blue false indigo on limestone soils of the Ozarks, long-bracted wild indigo especially on infertile, acid soils, or white wild indigo especially on wet soils.

Several medium sized, spring to early summer blooming wildflowers, including Virginia bluebells, Indian paintbrush, lanceleaf coreopsis, pale purple, yellow and purple coneflowers, Missouri evening primrose, and Penstemon spp., should survive well in the Zone 2 mowing program. It is appropriate to carefully select the species to plant by size, time succession and/or color of bloom and their adaption to soil or other site specific conditions and limit the number planted to less than 10 species in any given area. Over time more wildflower species may establish naturally.

Any of the species described in this book (and others) may be used in the Zone 3 backslope after-frost mowing program. By using good imagination within landscape design principles and the species selection criteria outlined above, beautiful roadside landscapes can be created. As one example, imagine the beauty from May to December of a few miles of Indiangrass interseeded with purple coneflowers and sericea lespedeza and punctuated with large patches of Maximilian and tickseed sunflowers. Such special feature landscaped areas could be repeated at intervals over Arkansas' roadsides.

Where groves or groupings of trees or shrubs are planted mowing would not be done (or perhaps only with small mowers and especially careful operators), but periodic herbicidal spot spraying of seedlings or hand cutting and basal stump herbicidal

treatment would be needed to control volunteer unwanted tree species. A red cedar tree with saplings growing up through its canopy is certainly unattractive.

The challenge is to balance the needs of safety, a degree of neatness, allowing time for seed maturation so continual reseeding occurs, spreading the use of mowing equipment out efficiently over most of the year, determining an integration with any herbicidal weed control programs, and determining the landscape architectural appearance desired. Landscape architects, mowing scheduling planners, weed control specialists, managers and policy makers must work through on an area-by-area and acreage basis all the compromises necessary to optimize safety and beauty within your budget.

#### A MOWING POLICY

A uniform mowing standard that would apply to the various districts should be considered. Maintain the mowed escape area adjacent to the roadbed as now practiced is a logical maintenance need. The areas that are inaccessible to mowers, either because of steepness of grade, wetness, or the presence of large trees are left by mowing crews to fend for themselves.

The right of way area where mowing practices could be easily changed is the easily accessible areas outside of escape area and the inaccessible areas. A management plan to foster the most diverse species mix of wildflowers for this portion of the right of way would require that mowing be accomplished only once during the year, after the first killing frost in the area. Mowing with this frequency would prevent trees from taking over the site and would insure a bountiful supply of seeds for reestablishment. The cost of roadside maintenance would be reduced by such a practice.

Undoubtedly, such a practice would raise the ire of many Arkansas citizens who have become accustomed to the more manicured appearance of our roadways. For such a program to be successful, it would have to be accompanied by a major advertising blitz to let the public know what is being done. Also, the practice should be phased in with about 20% of the roadway area added each year.

If such a policy were unworkable from a public relations and/or political standpoint, mowing no more than twice could be successful. The first mowing would follow the blooming of the cool season annuals and be before the majority of the late spring and early summer flowers come into bloom. The ideal window for mowing during this period would be from mid June until early July. The second mowing would be delayed until after frost.

## ESTABLISH A VEGETATION MANAGEMENT (HERBICIDE) PROGRAM

It is beyond the scope of our present task to make herbicide "recommendations" for Arkansas highway right-of-ways. We, the six authors, hold opinions ranging from prudent positive to negative about herbicide use.

Decisions about where or whether to use herbicides along highway right-of-ways are complex technologically and economically as well as politically. Soil stabilization and erosion control, motorist and worker safety, and the landscape planting designs and appearance(s) desired, coupled with available budget, are prime considerations affecting herbicide use. The greater safety risks to motorists, vehicles, worker personnel, and roadside environment by mowing versus appropriate herbicide use must be considered as well as the higher cost of mowing. The risks of operating mowers, thrown debris and rocks, cars hitting tractors, etc., tend to be "accepted", but the risks from herbicide spraying, actually primarily the possibility of injuring desired plants, tend to be "perceived" as much greater than any accident or health records would support. A few individuals go to great efforts to make any herbicide use or mishap into "news". All of us enjoy beautiful landscapes, including appropriate use of the plant materials described in this book. Therefore, personnel planning herbicide programs and mixing and applying herbicides must be highly trained, careful individuals. Ultimately all related factors must be considered to maximize benefits relative to risks and costs.

Weeds are defined as plants out of place. Thus "weeds" definitely include any tall growing plants which obstruct motorist's sight-lines at intersections and on safety berms or obstruct view of bridge and culvert abutments and guardrails. Mowing or herbicides are the two main "tools" for controlling this vegetation. I believe a compelling worker safety and economic case can be made for spot spraying around guardrail and abutments. But planting low growing grasses, such as buffalograss sod initially, could reduce the need for mowing or herbicides at these locations. I believe an excellent safety and economic case can be made for spraying broadleaf "weed" controlling herbicides periodically on safety berms and even much of the area on down to the drainage swale and in superhighway medians and portions of the backslopes. Thus the higher (about 3x) costs of mowing these areas to control volunteer shrubs and trees in locations where they would eventually "closein" the countryside landscape could be saved. The neat, uniform appearance of such areas is attractive up to the point that monotony sets in. Some of the monotony of shorter grasses could be relieved by planting more interesting "prairie" grasses in the medians and backslopes. I also believe that about a quarter to a third of median and backslope areas need to be "enriched" by planting more interesting grasses, legumes, wildflowers, shrubs and trees into especially pleasing landscape designs. (The point of this whole book!) Regardless of what is planted anywhere,

many volunteer species will become established. Many of these may enrich the landscape, but eventually undesired trees, shrubs, and other tall plants may need to be controlled in many locations. In the roadside setting once we get beyond safety and erosion control functional considerations, much of what defines a "weed" is an aesthetic question. Is a Maximilian sunflower a "weed" or a "stately wildflower"? The answer depends on whether it is "a plant out of place".

Herbicides may be classified in various ways, including selective vs. non-selective, broadleaf vs. grass controlling, post- vs. pre-emergence application timing, contact vs. systemic, very short (hours) vs. longer (months) residual activity, biochemical modes of activity, and by toxicity levels. Most all herbicides having utility in right-of-way vegetation management programs have toxicity levels similar to table salt or less and human exposure is nil; nevertheless, careful handling is mandatory. Each herbicide's label contains information on proper use and precautions, is a legal document specifying usage, and must obviously be studied thoroughly.

Herbicides are available which perform various tasks of vegetation management, including control of existing vegetation prior to planting more desirable species, control of broadleaf (dicot) plants within stands of grasses, control of grasses within stands of broadleaf plants, control of certain grasses within stands of other grasses, control of certain broadleaf species within stands of other broadleaf species, control of "winter weeds" when bermudagrass or other warm season grasses are dormant, and control of undesired trees, tree seedlings, or stumps on a spot treating basis. This paragraph gives a broad outline of usages of herbicides rather than the details of which species are controlled by specific herbicides and the timing(s) and rate(s) of application. A high level of knowledge of herbicides and plant materials is needed to plan and carry out herbicide programs successfully.

Perhaps these thoughts will stimulate discussions among teams of AHTD personnel and help lead to pleasing solutions to vegetation management problems along Arkansas roadside landscapes. Decisions should be made on the basis of the landscape appearance desired in fairly specific areas, coupled with safety, function and cost considerations. The current terminology for accomplishing all this is INTEGRATED VEGETATION MANAGEMENT (IVM).



## **Planting Trees and Shrubs**

Plants are available from nurseries in three primary forms - 1) balled and burlapped, 2) container grown and 3) bare root. Each form of production has minor variations in which the product is presented for sale. For example, bare root plants commonly are marketed in plastic sleeves, plastic bags, as machine balled plants or as potted plants. The principle differences between the three methods of marketing is price and the kinds of plants available.

Survivability of nursery grown plants is, at least to an extent, dependant on the method of production. This becomes more important as the follow-up maintenance is lessened. Generally speaking, balled and burlapped plants have the best survivability in a neglectful environment while container grown plants have the poorest chance of survival. Bare root plants behave more like balled and burlapped plants and generally survive stress well. However, if the plants are not handled correctly before receipt at the job site, are not planted at the correct time and are not provided reasonable after-planting care, any plant production system can give poor results.

### **Balled and Burlapped Plants**

Balled and burlapped plants are the most expensive with price dependant on the kind of plant and the size of the plant. Usually plants are marketed with balls ranging in size from 12 inches to 24 inches in diameter. The size ball required for a specific size tree has been specified by guidelines established by the American Association of Nurserymen. Ball diameter should be 10 to 12 inches for each inch of trunk diameter as measured 6 inches above the ground. For trees larger than 4 inches in diameter, measurement is made at 12 inches above the ground. The ball should be 60 to 66% as deep as wide. For example, a shade tree with a 2 inch diameter stem should have a rootball 20 to 24 inches wide and about 15 inches deep. This ball would weigh approximately 300 pounds. Generally speaking, there is little benefit in specifying planting material larger than 2 inches in trunk diameter. Larger plants are significantly more expensive and, after 3 to 5 seasons, there is little difference between a 2 inch tree and a 4 inch tree.

Balled and burlapped plants are primarily available during the spring following their fall and winter harvest. It is recommended that the AHTD bid requirements stipulate that balled and burlapped plants be planted during the winter season with the trees not in leaf. If planting is required during other seasons, planting of winter-dug trees can be successful during the following growing season; however, the maintenance needs of the new planting are significantly increased. Summer-dug trees should not be allowed for right of way use.

When planting a balled and burlapped plant, begin by digging

a hole large enough to adequately accommodate the root system. There is no advantage in digging a deep hole, in fact, deep holes can work to the disadvantage of the tree. Figure 1 gives an ideal planting configuration for shade trees. Notice that the ball itself is sitting on undisturbed soil and that the top of the rootball is at the same height the plant was originally growing in the field. Roots usually do not grow down when planted but instead grow out horizontally or at a slight angle to the surface where the soil oxygen, water and fertility are usually better. The width of the rootball hole should be 1 1/2 to 2 times as wide as the ball being planted. For the 2 inch tree mentioned above, the planting hole should be, at a minimum, 30 inches across.

The rootball should be placed in the hole and inspected to make sure that it is not planted deeper than it was originally growing in the field. Once the correct height is established, remove all rope from around the stem of the plant and fold the burlap back from the top of the ball. Burlap may be the common tan colored fabric or it may be green in color which is an indication it was treated with a copper preservative to prevent decay. Single sheets of untreated burlap will decay in 4 to 6 weeks; treated burlap will persist 6 to 8 months in the soil. Multiple thicknesses of treated burlap will persist longer. Today, synthetic (plastic) twine is used to hold burlap on the ball. This material will persist for at least as long as the tree will survive; therefore, it is critical that it be cut away from the trunk to prevent girdling the stem as growth occurs. It is not necessary to completely remove the burlap. Attempting to do so will usually result in loosening of the rootball and could increase the chance of plant loss. If the ball is supported by a wire basket, common on machine-dug balls, use wire cutters and remove as much of the wire as practical once the tree is in place in the hole.

With the ball in place, it is now time to fill the hole. Horticultural writers have recommended backfill amendments as far back as ancient Rome. Recommendations typically have consisted of replacing 20 to 35% of the hole's volume with some organic amendment such as peat moss, pine bark or compost. This amendment is then blended with the soil taken from the hole.

In the past two decades a great deal of research has been done to determine the ideal ingredient to add to the soil to speed establishment and growth. However, researches such as Whitcomb (Oklahoma) and Corley (Georgia), have studied the practices used today and have shown little benefit to soil amendments. In fact, their data suggests slight decrease in growth when peat moss and pine bark are amended at the usual rates. These differences diminish as plants became established and were not statistically detectable after 3 years.

Another practice sometimes suggested when planting trees is to replace the "bad" soil of the planting hole with "good"

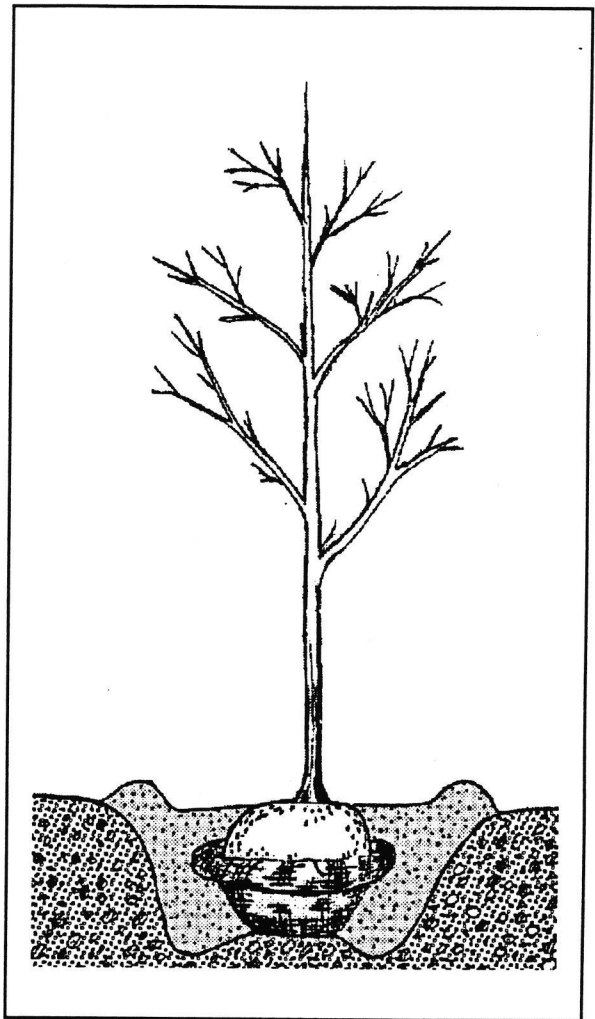


topsoil. This technique sounds like a good idea, but often results in the death of the newly planted plants. The "bad" soil most common in landscape sites in Arkansas is poorly drained clay soil. When the planting hole is dug a "bathtub" is created. If the bathtub is filled with good, well drained topsoil, more water will enter the topsoil fill, but because water movement out of the "bathtub" is slow, the roots will often drown.

With all things considered, the best backfill amendment is to simply use the same soil that was taken from the planting hole. Application of granular fertilizer to the backfill should be avoided. Several companies produce slow release fertilizer products that can be safely added to the planting hole at the time of planting. These products provide up to two years of nutrition and are advertized to speed early growth.

After the hole is backfilled, an earthen dam should be constructed around the planting hole to serve as a reservoir when watering. If the plants are installed in an irrigated site, this step is unnecessary. The saucer should be filled with 3 to 4 inches of organic mulch such as pine bark, shredded hardwood bark, cypress bark or similar materials. Maintain the mulched area for at least two growing seasons. When the bark is in place, water the tree thoroughly. Fill the saucer, allow the water to penetrate and then water again. New plantings should receive at least 1 inch of water per week, either through rainfall or irrigation for the first two growing seasons.

Staking newly planted trees is commonly required, especially when the planting is in an open area subject to strong winds. Stakes may be either a pair wooden stakes driven beside the ball or three guy wires (see figure 2). The wooden stakes are confined to the mulched planting area and cause less mowing maintenance headache than the guy wires. Guy wires, especially



**Figure 1.** A properly planted balled and burlapped tree will be planted at the same level the tree was grown in the field. The hole should be 1 1/2 to 2 times as wide as the ball.



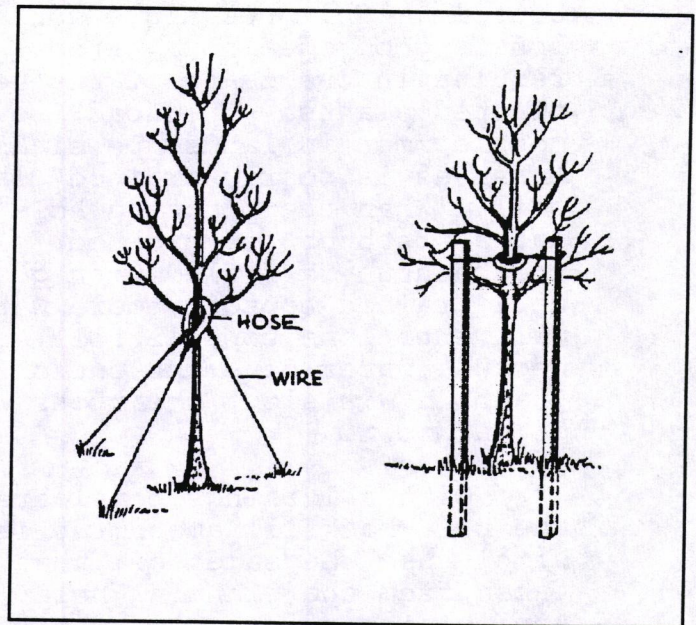
in right of way areas, cause increased maintenance because of the needed trim work around the guy wires. When attaching wires to the trunk of a tree, a short section of garden hose should be used to protect the trunk. Allow enough space in the loop around the trunk for two seasons' growth. The wires should be kept taught to prevent movement injury to the trunk. Stakes should remain in place for the first two growing season, at which time the wires should be removed from the tree trunk.

Trunk wrap (see figure 3) should be applied at planting to protect smooth-trunked trees. The wrap should be applied up the trunk to the bottom branches.

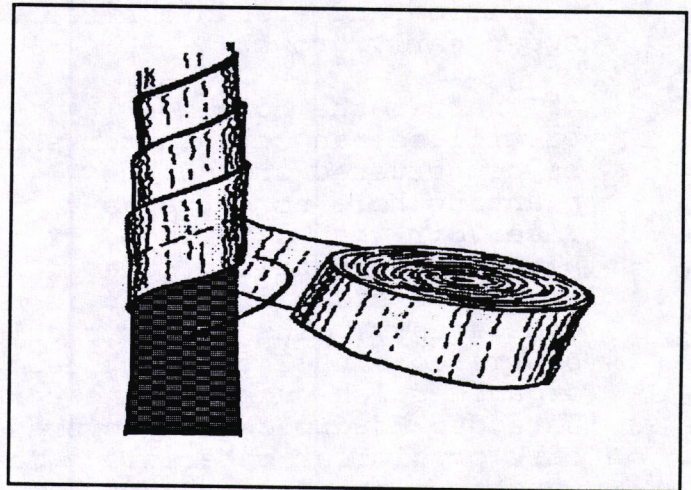
### Planting Bare Root Plants

Bare root plants are available from nursery outlets only during early spring. These plants must be planted more promptly than other types of nursery stock. Usually only relatively small, inexpensive plants are sold bare roots. Examples of plants sold by this means include pine seedlings, crabapples, deciduous flowering shrubs and tree liners.

Plants sold as bare root items are packaged in several ways including: 1) bare root in a bundle, 2) bare root in a plastic sleeve filled with wood fiber, 3) machine balled and 4) potted. Machine balled and potted plants have soil packed around the roots, thus extending the safe planting period for the plants. Although these plants look like traditional balled and burlapped



**Figure 2.** The two most common types of tree staking procedures are shown. The stakes should not be driven through the rootball.



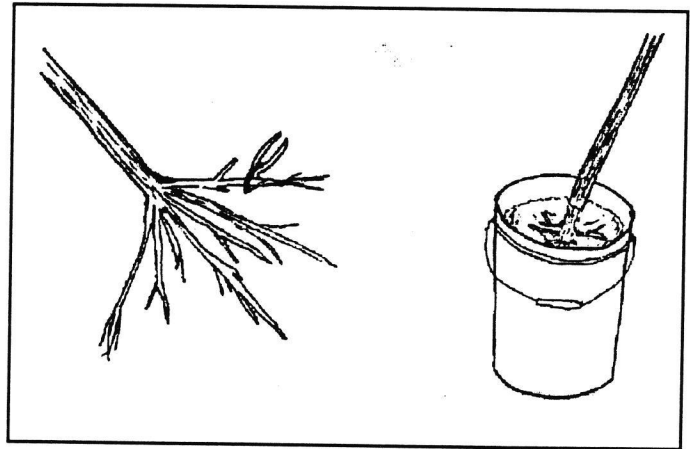
**Figure 3.** Trunks of shade trees should be protected the first two growing seasons. Specially designed tree wraps are available from nurseries.



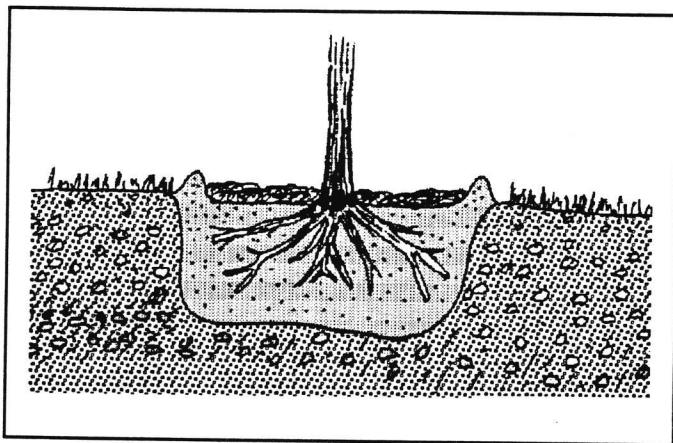
plants or container grown plants, they are not. Their cost is usually intermediate between bare root plants and container grown plants. They should be planted as described for balled and burlapped or container grown plants. Some machine balled bare root plants are sold in plastic bags. These should be positioned in the hole and then the sides cut away and removed. Many potted bare root plants are sold in so called "plantable" containers made of recycled cardboard. These containers will seriously restrict root growth, especially if any of the container wall is above ground level. These plants should be placed in the planting hole to determine proper height. With this done, the container should be knocked apart and as much of it removed as possible without destroying the integrity of the new roots growing into the potting soil.

Bare root plants are available from suppliers after the first of December. The plants may be planted as soon as the soil is workable during the spring but planting must be complete before the plants begin to leaf out. This usually occurs in mid March in south Arkansas to mid April in the northern part of the state. Planting after growth begins decreases the chance of survival. Bare root

planting does provide a cost effective means of establishing extensive right of way plantings. It is most suitable for AHTD purposes for fast growing flowering shrubs (forsythia, spiraea, beauty bush) and for seedling trees such as pines and oaks.



The planting procedure for bare root plants is straightforward. The most critical aspect of bare root planting is to remember that the root system must never dry out. Even relatively short periods of exposure to the sun and wind will dry roots and decrease survival. When the plant is removed from the protective packaging material, the root system should be inspected for signs of damage. Trim away any dead or broken roots. (See figure 4). Inspect the top of the plant for broken branches, branch dieback or obvious defects in plant form such as narrow crotches. Prune as needed. Following root pruning, soak the root system in a pail of water for 30 minutes to 2 hours. Avoid soaking roots longer than 12 hours. The planting hole should be large enough to accommodate the roots without causing malformation of the root system. The hole should be 1 1/2 to 2 times as wide as the root system. In most cases the plant should be positioned in the hole so it is at the same level it originally grew in the field. Position the roots in the hole so that they have a natural spread and none are up-turned on the ends. Fill in with soil and firmly pack the soil around the



**Figure 4.** When planting bare root plants, begin by inspecting and trimming the root system. Soak the roots before planting the plant at the level it originally grew in the field.

planting.

The practice of cutting back the tops of bare root plants following planting to compensate for root loss has been investigated by several researchers in recent years. They have not been able to demonstrate better survival when plants are cut back, in fact there is some evidence suggesting that cutting back may actually decrease early root growth. In some cases, for example with roses and apples, severe pruning may be warranted to alter the natural branching habit of the plant. Most ornamental plants should only be pruned back to correct structural defects or major injury.

Once the plants are planted, they should be staked, mulched and protected with tree wrap as described above. Watering should be practiced for at least the first two season following planting.

### **Planting Container Grown Plants**

Container grown plants are the most common means of merchandising nursery stock today. The principal advantage of this method of production is relatively low cost and year-round planting opportunities. The major disadvantage is that only relatively small plants are available in containers in most nurseries and they will dry out more quickly once outplanted. Follow-up watering is crucial with all newly planted nursery stock, but it is critical with container grown plants.

Container grown plants may be planted at any season so long as the soil is not frozen and the plants can be watered after planting. If planting times were ranked from best to poorest,

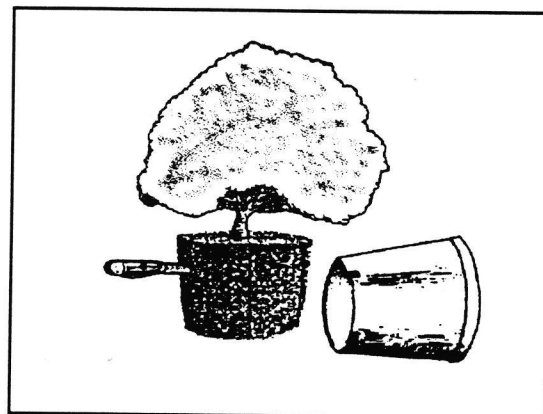
roots. When the hole is nearly filled, flood with enough water to saturate the hole. When the water penetrates, finish filling the hole and construct an earthen dam for future waterings as described above.

Year old seedling liners are often planted with a dibble bar, permitting rapid planting of many trees. If such a procedure is used, the crew should be instructed to avoid forcing the tree into the planting hole and creating a "J-hooked" root system. Such trees will not grow normally after

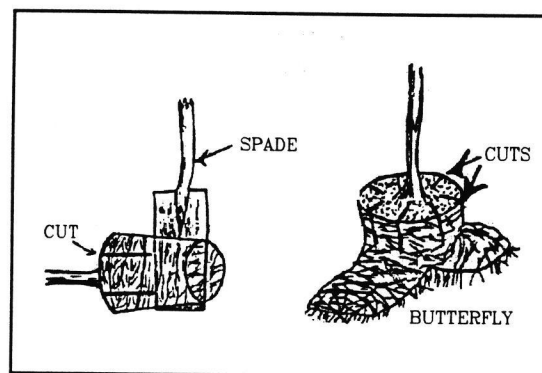
fall would be best, spring second best, winter third choice and summer last. Plants subject to winter injury such as evergreen magnolias and crapemyrtles are best planted in the spring.

Nursery plants growing in containers often develop circling roots leading to a condition called "root bound" or "pot bound". Unless these circling roots are disturbed, roots will not grow into the surrounding soil. Figure 5 gives several procedures for insuring that the circling roots are eliminated.

Dig the hole 1 1/2 to 2 times as wide as the container and, if the plants are planted individually, backfill the hole with the unamended soil from the site. Sometimes container grown plants are planted in beds where the entire bed is worked up. If this is done, then soil amendments may be made to the entire area without disrupting water movement or drainage. The tops of container grown plants should only be pruned to correct obvious structural defects or remove damage branches. Following planting, a uniform cover of 3 to 4 inches of mulch should be applied.



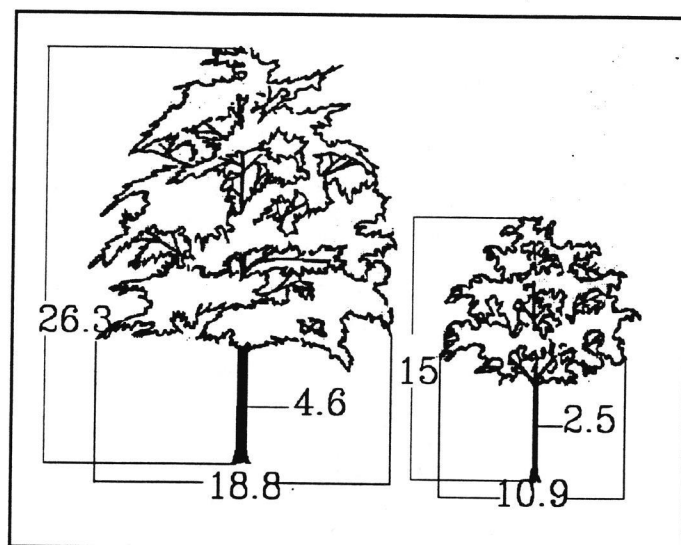
**Fertilizing Newly Planted Landscape Plants:** Many garden references discourage fertilizing newly planted trees and shrubs because of the possibility of causing salt injury to the plant. If fertilization is done with a degree of care, the chance of injury is minimal. The effects of fertilization are not as apparent with woody plants as with fast growing lawns and flowers. Trees usually show no response to fertilization until 2 years after treatment, therefore, patience is required.



**Figure 5.** Disturb the rootball before planting container grown plants. The more severely disturbed the rootball at planting, the more care required for early watering.

Tree growth can be increased considerably by fertilization, as shown in Figure 6. A recent 10 year long study reported the effectiveness of several fertilizer application methods on the growth of shade trees in a landscape situation. The workers found that trees had a one third larger crown spread and had one third larger trunks when fertilized. On average fertilized trees were 15% taller than unfertilized trees. The workers also

compared surface application of fertilizer to fertilizer placed in holes in the root zone. They found that trees fertilized by the surface application method were significantly larger than trees fertilized by the hole method. Regardless of how fertilizer was applied, trees did not show a response to fertilization until two or three years after application.



**Figure 6.** The size difference between a fertilized and unfertilized honey locust after 10 years.

**Determining fertilization rate by trunk diameter method:** A common and convenient method is to base the rate of application on the diameter of the tree trunk at breast height for large shade trees or at 12 inches above the ground for smaller trees. Trees should receive 1 to 2 lbs. of complete fertilizer (10-20-10 or 13-13-13) per inch of trunk diameter. The higher rate should be used for trees that have not been receiving fertilizer; the lower rate is appropriate for ongoing fertilization. The fertilizer should be broadcast uniformly under the tree and 20% beyond the outer drip line. If only one fertilizer application is to be made per year, late fall or early spring is the best time. Spring applications after the tree has leafed out is also an acceptable time. The most effective way of applying fertilizer is to split the rate and apply half in the fall and half in the spring.

Using this method, a 6 inch diameter tree that has been recently transplanted should receive 12 pounds of fertilizer. Half of this would be applied in the fall and half in the spring. If a tree is planted in a fertilized lawn area, additional fertilization is usually not necessary. Be sure not to over-fertilize newly planted trees.

**Fertilizing plants grown in beds:** Plants growing in beds also respond to fertilization. The most convenient method of fertilizing these plants is to apply a complete fertilizer such as 13-13-13 as a broadcast application over the entire bed. Application rates should be in the range of 1 to 2 pounds of nitrogen per 1000 square feet per year. Ideally this rate should be split with half applied in early spring before growth begins and about 4 weeks after the spring growth flush. To determine the actual amount of fertilizer needed for a bed, use the following formula:

$$\frac{(\text{sq. ft. of bed} / 1000) \times \text{rate}}{\% \text{ nitrogen}} = \text{amount of fertilizer}$$



For example, how much 13-13-13 would be needed to apply 1 pound of nitrogen/1000 sq. ft. for a bed 10 feet wide and 65 feet long?

Substituting into the formula we get:

$$\frac{((10 \times 65) / 1000) \times 1}{.13} = 5 \text{ lbs. of 13-13-13}$$

Azaleas and hollies benefit from fertilization with an acid forming fertilizer such as ammonium sulfate or one of the specialty acidic fertilizers.












### **Hardiness Zones**

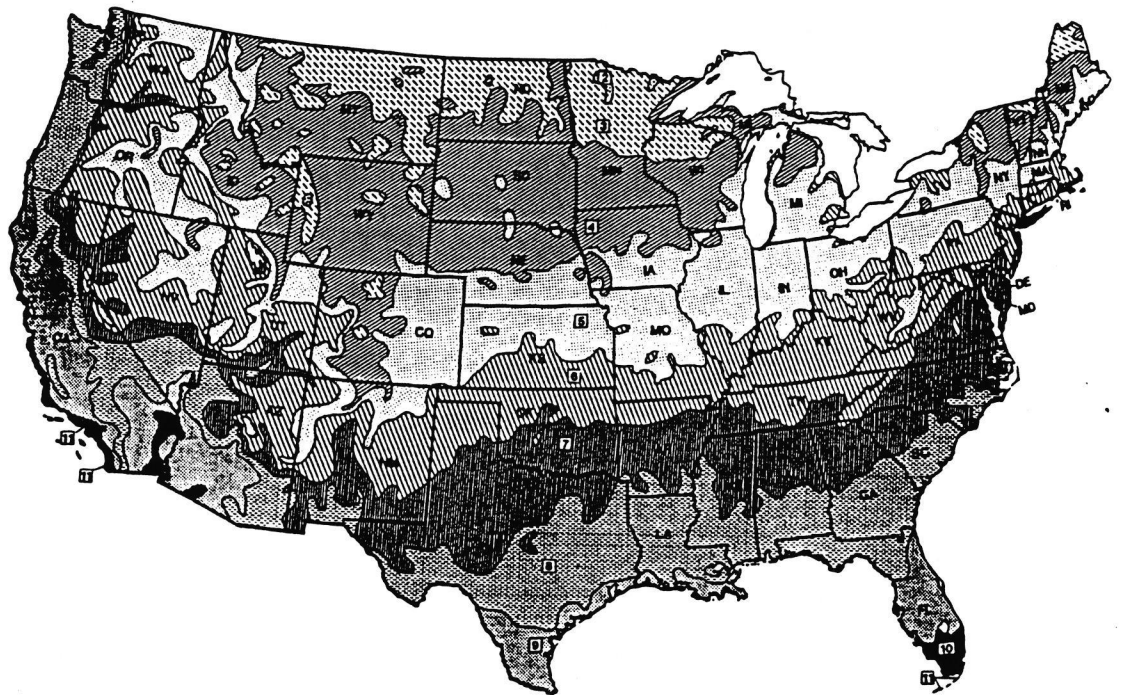
Plant hardiness is described in this manual based on the system used by the United States Department of Agriculture. The USDA's most recent hardiness map, published in 1990, breaks the United States into 11 zones, with Zone 1 having minimum winter temperatures below -50°F and zone 11 having minimum winter temperatures above 40°F. The National zone map is given on the following page. Arkansas, shown on the page following that, is contained in three hardiness zones, USDA zone 6, 7 and 8.

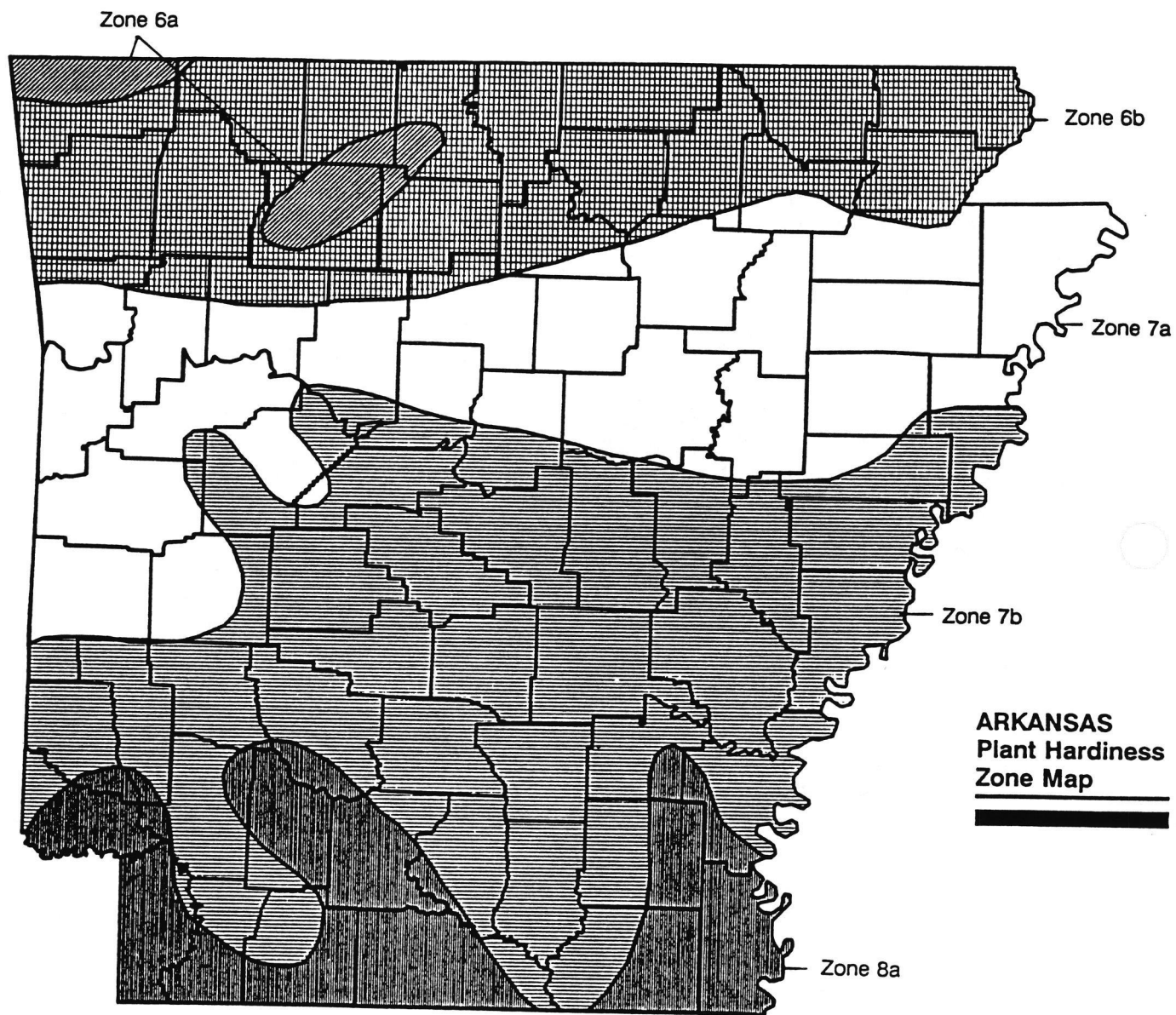
Plant hardiness cannot be based on minimum winter temperatures. An attempt is made in this manual to give the southern limits of hardiness. In the southern end of a plants' hardiness zone, excessive summer heat, humidity and lack of sufficient winter chilling limit distribution.

# USDA Plant Hardiness Zone Map

RANGE OF AVERAGE ANNUAL MINIMUM TEMPERATURES FOR EACH ZONE

ZONE 1	BELOW -60°F	
ZONE 2	-60° TO -40°	
ZONE 3	-40° TO -30°	
ZONE 4	-30° TO -20°	
ZONE 5	-20° TO -10°	
ZONE 6	-10° TO 0°	
ZONE 7	0° TO 10°	
ZONE 8	10° TO 20°	
ZONE 9	20° TO 30°	
ZONE 10	30° TO 40°	
ZONE 11	ABOVE 40°	





## *Trees For Planting Arkansas Highways*

Trees, along with the grasses, make up the most significant part of the highway landscape. Their function in the right of way landscape extends beyond their aesthetic benefits. Trees provide erosion control, wind breaks, screening of unsightly views and shelter for wildlife and birds. From an aesthetic viewpoint, they are the most massive element in the right of way landscape and provide mass, continuity and scale to the landscape scene.

Using trees in the right of way should be first based on environmental concerns of the site, especially erosion. Trees do an excellent job of preventing erosion, especially sheet erosion. Tree roots are not as fibrous as grass roots but they are widespreading in the soil profile. Unlike often assumed, tree roots are not usually very deep in the soil but extend only as deep as oxygen will readily penetrate. Thus in heavy clay soils or wet soils, trees tend to be very shallow rooted. Tree roots extend beyond the drip line of the tree, usually to a distance equal to or greater than the height of the tree. The zone within drip line of the tree, and about 20% beyond, tends to be matted with roots and provides a difficult area for the establishment of other plants. Tree roots tend to be wider ranging when trees grow in solid stands.

From an aesthetic standpoint, trees should be used to provide mass and scale to the linear landscape of the highway. The trees should only be planted in naturalistic, random groupings. Usually these random groupings will consist of trees in odd number groups of 1, 3, 5 or 7. When the number exceeds a dozen, the use of odd numbers in plantings becomes immaterial. Trees should never be planted in straight lines. Naturalistic plantings in irregular groups give a much more appealing appearance and result in a more attractive long term landscape appearance. Row-planted trees invariably will have a few fatalities. These planting gaps become more obvious as the trees get larger.

Trees planting should reflect the terrain through which the roadway passes. If the terrain is prairie-like, such as seen in the Grand Prairie region of eastern Arkansas or in parts of western Arkansas, tree planting should be minimal and the right of way should reflect the natural characteristics of the site. In much of the mountainous areas of the state, broadleaf trees dominate. Here plantings should be geared to supplement the existing stand. Native plants should be selected where possible to give as undisturbed a look as is possible to a roadway.

Planting programs should occur at interchanges, but not be limited to interchanges and roadways that cross the interstate. A criticism of highway plantings from other states is that there tends to be a concentration of flowering plants around

interchanges. Often these flowering plants are exotic. Better design would occur if the large area occupied by the interchange reflected the nature of the surrounding terrain. Where oak trees dominate, oaks should be replanted. Where pines are the dominant vegetation, they should be planted. Flowering trees should be planted as an adornment to the mass planting of larger trees, not as the majority of the planting.

The intent of tree plantings in rights of ways should be to harmonize the roadway with the existing terrain. Features such as overpasses and interchanges should be harmonized by the use of tree plantings, not made to stand out. A workable approach is to plant trees in random groupings around these features and then add additional plantings periodically along the roadway between these features.

The on-center spacing given trees in the landscape plan should be based on the design intent of the project. If trees are to function as individual specimens where their crowns do not touch at maturity, spacings should be at least 15% greater than the width of the tree. For example, if a tree is 50 feet tall and has a rounded crown, the width of the crown will equal 50 feet. Individual tree spacings should be at least 58 feet on centers.

More common though is to have the tree planting form a stand where the canopies merge and become one - much as occurs in the woods. This encourages the trees to grow taller and to lose more of its lower limbs due to shading. Tree spacing in this situation is more subjective but usually is from 60 to 80% of the natural spread. Again, if a tree has a round crown and spreads 50 feet in width, spacing would be from 35 to 40 feet on center.

The following page gives 10 of the best trees for right of way use in the three major geographic sections of Arkansas.

### Selected Trees for the Mountainous Regions of Arkansas

<i>Acer saccharum</i>	Sugar Maple
<i>Cercis canadensis</i>	Redbud
<i>Fraxinus pennsylvanica lanceolata</i>	Green Ash
<i>Koelreuteria paniculata</i>	Golden Raintree
<i>Malus sp.</i>	Crabapple
<i>Nyssa sylvatica</i>	Black Gum
<i>Pinus echinata</i>	Shortleaf Pine
<i>Quercus palustris</i>	Pin Oak
<i>Quercus shumardii</i>	Shumard Oak
<i>Sassafras albidum</i>	Sassafras

### Selected Trees for the Delta Region of Arkansas

<i>Acer rubrum</i>	Red Maple
<i>Cercis canadensis</i>	Redbud
<i>Fraxinus pennsylvanica lanceolata</i>	Green Ash
<i>Koelreuteria paniculata</i>	Golden Raintree
<i>Magnolia virginiana</i>	Sweetbay magnolia
<i>Malus sp.</i>	Crabapple
<i>Pinus taeda</i>	Loblolly Pine
<i>Quercus nigra</i>	Water Oak
<i>Quercus phellos</i>	Willow Oak
<i>Taxodium distichum</i>	Bald Cypress

### Selected Trees for the Coastal Plains Region of Arkansas

<i>Acer rubrum</i>	Red Maple
<i>Cercis canadensis</i>	Redbud
<i>Koelreuteria paniculata</i>	Golden Raintree
<i>Lagerstroemia indica</i>	Crape myrtle
<i>Magnolia grandiflora</i>	Southern Magnolia
<i>Magnolia virginiana</i>	Sweetbay magnolia
<i>Malus sp.</i>	Crabapple
<i>Pinus taeda</i>	Loblolly Pine
<i>Quercus nigra</i>	Water Oak
<i>Quercus phellos</i>	Willow Oak



**Amur Maple*****Acer ginnala* (Aceraceae)**

**Description:** A low growing, low branched maple reaching 20 feet at maturity with an oval outline. The glossy green leaves are to 3 inches long, three lobed and orange-red in the fall. Heavy clusters of red seeds are produced in mid summer that give the tree an interest appearance during the summer months.

**Site Requirements:** Hardy from USDA zones 2 to 8, but better adapted in cooler areas of Arkansas than the Coastal Plain. Grows over a wide range of soil pH's, but performs best in moist rather than dry sites.

**Use in Right of Way:** Used as a mass planting in the right of way, at interchanges, where fall color would be desirable, or as a small specimen.

**Planting/Seeding Requirements:** Transplants easily in the fall or spring. Tolerates severe pruning if necessary. Because of low branching should not be planted too close to the roadway surface.

**Maintenance Requirements:** Not seriously affected by insects or diseases. Trees do not reseed under Arkansas conditions. Not a long lived species, with life span 25 - 50 years.

**Cultivars:** 'Flame' was selected by the Soil Conservation Service for its consistently bright red fall color. It is propagated by seed, therefore some variation in growth form and fall color can be anticipated.

**Comments:** Originally native to northern China, Manchuria and northern Japan.

**Chalk Maple, White Bark Maple*****Acer leucoderma* (Aceraceae)**

**Description:** A native tree on the southern slope of the Ouachita Mountains in Arkansas and a few other localities in the coastal plain. Trees are to 30 feet tall with an oval outline much like the sugar maple. Leaves are three or occasionally five lobed to 5 inches long and three inches wide. Fall color is yellow to orange or red.

**Site Requirements:** Hardy from USDA zones 5 to 9 and useful throughout Arkansas with the exception of the delta region. In its native haunts it occurs as an understory tree but will grow well in full sun. It is usually found in droughty sites on south or west facing slopes. Once established chalk maples have a high degree of drought tolerance.

**Use in Right of Way:** A useful tree where a typical oval tree form is desired such as near interchanges or for mass planting where effective fall color displays are needed. This species should be used in the southern half of Arkansas whereas the sugar maple is better suited in the northern half of the state.



**Planting/Seeding Requirements:** Transplants easily in the fall or spring. Plants are intolerant of severe pruning or trunk damage caused by mower or string-line weed trimmers. Trunk damage predisposes the tree to attack by boring insects.

**Maintenance Requirements:** Not seriously affected by insects or diseases but damage to the trunk while young could predispose the plants to attack by borers. Trees will produce seed and in an ideal site could be expected to reseed; however, it would never become a weedy species. This is a long lived species but it is slow growing especially on the more difficult sites.

**Cultivars:** None are available. The tree is only sparingly available in the nursery trade but can be obtained from dealers in native plants.

**Comments:** Many taxonomists consider this species a southern variant of the sugar maple (*Acer saccharum*)

### **Red Maple, Scarlet Maple**

***Acer rubrum* (Aceraceae)**

**Description:** A moderately fast growing shade tree with a round form that reaches 60 feet in height. It occurs naturally throughout the state especially in moist locations. Leaves are 3 (to 5) lobed and to 4 inches long, often with a petiole as long as the leaf blade. Fall color is variable, ranging from yellow-brown to bright red. Named cultivars have been selected for good fall color production. In late winter and early spring the flowers appear as small red clusters along the stem. Though individual flowers and fruit are not showy, in mass they give an appealing appearance.

**Site Requirements:** Hardy USDA zones 3 to 9, but generally performance is better when seed sources are obtained from the same geographic region where the tree will grow. Trees perform best in moist to even wet sites; however, once established they will tolerate drought. To do well this species requires a better soil than more drought tolerant species such as *Acer leucoderma* or *A. saccharum*.

**Use in Right of Way:** As a large shade tree near interchanges, in center medians and anywhere an effective fall color presentation is desired. Especially useful in moist areas where other species of maples known for good fall color production would not perform.

**Planting/Seeding Requirements:** Transplants easily in the fall or spring and widely available as bare root, balled and burlapped or container grown nursery stock.

**Maintenance Requirements:** Easily established, but in a drier site, summer watering will be required until the plants become established. The thin bark of the species makes it susceptible to sunscald injury following transplanting; tree wrap is recommended to protect the trunk two years following transplanting.



**Cultivars:** There are more than 25 cultivars of red maple found in the nursery trade but 'Red Sunset' and 'October Glory' account for 95% or more of the red maple clones sold. Most of these clones were selected in the upper midwest. 'Edna Davis' is a new selection out of Georgia which may be superior in the southern half of Arkansas.

'Armstrong' is a columnar cultivar that grows 5 or 6 times as tall as it is wide. Trees planted in Fayetteville have reached 30 feet in height in 12 years with a spread of less than 6 feet. Fall color is usually red but not as spectacular as it is further north.

'Autumn Flame' is a northern selection of red maple that colors about two weeks earlier than other species. With deep red fall color and oval form, it is best suited for northern counties.

'October Glory' is a round headed selection commonly available in the nursery trade. It has good red fall color but seems better suited in the northern half of the state.

'Red Sunset' is an upright branched, oval to deltoid shaped tree with brilliant red fall color. It is one of the most highly rated cultivars of red maple and has performed well in most areas of the state.

**Comments:** A much faster growing maple than the sugar maple, and if the proper cultivar is selected, producing comparable fall color.

Hybrids of *Acer rubrum* x *A. saccharinum* (red maple by silver maple) - also called *A. freemannii* are now available in the nursery trade. The hybrids are said to have the superior drought tolerance of the silver maple and the red to orange fall color of red maple. Also, the hybrids are not as fast growing, hence weak wooded, as the silver maple. Cultivars in the trade include: 'Autumn Blaze' a 50 foot tall tree with an oval outline and orange fall color. 'Autumn Spire', a more upright form with a more narrow crown. 'Autumn Fantasy' more closely resembles the silver maple parent than the red maple parent, but fall color is orange-red. 'Celebration' is another hybrid with foliage similar to silver maple and even yellow fall color. It is upright to 45 feet tall with a crown spread of 25 feet at maturity.

## **Sugar Maple, Hard Maple**

*Acer saccharum* (Aceraceae)

**Description:** A slow growing upright to oval tree reaching 80 feet with a spread of half that. Native throughout the Ozarks and Ouachita mountains, the tree is widely planted in north Arkansas as a lawn or shade tree. Leaves are 3 (to 5) lobed to 4 inches long and wide with spectacular orange to red fall color.

**Site Requirements:** Hardy USDA zones 4 through 8, but better suited for the northern part of Arkansas. Tolerant of dry, exposed sites once established but growth will be slow under such conditions. In more fertile sites, trees make a significant contribution to the landscape after about 10 years.

**Use in Right of Way:** Should be used in the northern half of the state where fall color displays are of primary importance. They would be a natural addition along the new I-71 corridor being developed through the Ozark mountain range.

**Planting/Seeding Requirements:** Transplant readily as bare root or balled and burlapped trees in the fall or spring. The thin bark of this species makes it susceptible to sun scald injury or injury from equipment. Trunk wraps should be used for 2 years following transplanting.

**Maintenance Requirements:** Easily maintained once established and tolerant of drought. Aphids sometimes occur in the spring and fall but are of little consequence. Borers are a problem on trees suffering from transplant shock or which have sustained bark injury. Verticillium wilt occurs in moist sites but is rare in dry, well drained locations. Trees are relatively long lived, attaining an age of around 75 years in Fayetteville before beginning to decline. Reseeding would be expected but should not represent a problem with maintenance.

**Cultivars:** Many are listed but few nurseries carry grafted forms. Seedling trees produce good fall color but, only through the use of cultivars, is it possible to attain a uniform color. Uniformity in fall color display is probably not an important feature in right of way plantings.

'Bonfire' is one of the most popular cultivars but several authorities report it does not live up to its reputation of having good vivid red fall color.

"Caddo", though not an official cultivar, this group of trees is being used in western Oklahoma, Texas and Kansas in extremely droughty sites with good success. The trees are from a disjunct population of trees found growing in Red Rock State Park in west-central Oklahoma.

'Columnare' or 'Newton Sentry' are fastigiate forms 5 to 6 times as tall as wide. Fall color is yellow-orange and often unspectacular in the South.

'Green Mountain' has dark leathery green leaves and yellow or orange-red fall colors, depending on local conditions. This cultivar is a supposed hybrid of *Acer saccharum* x *A. nigrum* and is more resistant to environmental extremes than the species.

**Comments:** In southern Arkansas *A. leucoderma* should provide similar fall color to this species in northern Arkansas.

**Serviceberry, Sarvis, Juneberry**      ***Amelanchier arborea* (Rosaceae)**

**Description:** This species, in a typical year, is the earliest flowering tree in the woodlands of the state. It is found statewide and usually grows as a small understory tree to 25 feet tall with an oval outline with smooth, light gray bark and numerous twiggy branches. Flowers are white, 5 petaled and in clusters at the ends of stems, thus creating a dense cluster. Leaves are alternate and elliptic to 3 inches long with finely serrated margins. Fall color is yellow to orange; attractive but not stunning. Berries are edible, red-turning-blue multiseeded fruit that ripen in April and May and an important source of food for songbirds.

**Site Requirements:** Hardy USDA zones 4 to 9 and statewide in Arkansas. Though found on rocky hillsides as an understory tree, serviceberry grows best in open situations with fertile soils.

**Use in Right of Way:** This could be used as a mass planting or as individual specimens along the right of way or at interchanges. It would be a good addition to areas where dogwoods and redbuds are to be planted because it would extend the season of bloom.

**Planting/Seeding Requirements:** Should be transplanted balled and burlapped, or container grown if available. It is best planted in a fertile, moderately moist but well drained site with an acid pH (5.5 - 6.5 pH).

**Maintenance Requirements:** Somewhat slower growing than other spring flowering trees, serviceberry may require 5 or more years to make an effective display following transplanting. Plants tend to be low branching. Branches should be left on to add to the overall blooming display. Pruning is seldom needed or desired. Pests are rare.

**Cultivars:** Over a dozen cultivars are listed, but they are not especially common in the nursery trade. This area is changing rapidly and cultivars will become increasingly common in nursery channels for this under-used spring flowering tree.

**Comments:** Because of their early spring bloom, the serviceberry should be used more commonly in roadway plantings. Though slower growing than dogwoods and redbuds, this tree will make a longer-lasting addition to highway right of way plantings. Serviceberry are more expensive, because they are less commonly grown and slower growing, than redbuds and dogwoods.

## Red Buckeye

*Aesculus pavia* (Hippocastanaceae)

**Description:** Small, slow growing, clump forming trees or large shrubs reaching 18 feet in height and forming colonies not unlike sumac. Leaves are palmately arranged with 5 leaflets to 6 inches long. Flowers are red, in some populations yellow, and produced in an erect spike to 8 inches long in mid spring.

**Site Requirements:** Hardy USDA zones 4-8 and statewide in Arkansas. This species will grow in high shade or full sun. It is native in all areas of Arkansas except the western Ozarks. It should have fertile, well drained soil with a pH of 6 to 7.5.

**Use in Right of Way:** Because this plant is slow growing, it is not readily available in the nursery trade. Use the plant in high impact areas where an unusual spring flowering plant is needed such as near rest areas or scenic overlooks.

**Planting/Seeding Requirements:** Transplant container grown plants during the dormant season.

**Maintenance Requirements:** Because it is slow growing, the major maintenance problem will be to keep it out of harms way (mowers) until large enough to protect itself.

**Related Species:** *A. glabra*, Ohio Buckeye, is hardy zones 3 to 7 and is found in the western mountains of Arkansas. It is a tree, reaching 30 to 35 feet in height with an oval crown. Leaves are compound as described above. Flowers are greenish yellow and produced in spikes to 7 inches long. A slow growing species; a plant on campus is 15 years old and is now 15 feet tall with a 5 inch trunk.

*A. parviflora*, Bottlebrush Buckeye, is a clump forming eastern American native reaching 10 feet in height with colonies often 30 to 50 feet wide. The plant forms a sumac-like colony when mature but it, like most buckeyes, is slow growing. Hardy USDA zones 4 to 8 and statewide in Arkansas. White panicles of 12 inch long blooms are produced in early summer. Certainly the most beautiful of the shrubby buckeyes, but slow growing and expensive.

**Devil's Walkingstick**

*Aralia spinosa* (Araliaceae)

**Description:** A clump forming small tree or large shrub growing to 25 feet in height at the edge of woods in most of Arkansas. Trees are sparsely branched with stems armed with stout spines. Leaves are bipinnately compound and to 3 feet in length. White, open panicles of small flowers are produced in mid summer in clusters to 2 feet long. Purple-black 1/4 inch in diameter berries appear by late summer.

**Site Requirements:** Hardy USDA zones 4 to 9 and statewide in Arkansas. The tree appears at the edge of woods or in some shade in a wide array of soil conditions. It tolerates drought well.

**Use in Right of Way:** Best used as part of the mass planting in rights of way where its stoloniferous habit will not be a nuisance.

**Planting/Seeding Requirements:** Transplants readily while young during the dormant season.

**Maintenance Requirements:** Will sucker after being cut down. Can be grown as a small tree by pruning or as a colony, as it is usually seen.

**Paw-paw**

*Asimina triloba* (Annonaceae)

**Description:** Small deciduous tree reaching 18 feet in height with an oval form. Leaves are simple, entire and to 10 inches long and held along the branches in a distinctive, drooping fashion making the plant almost appear wilted. Flowers are brown, to 1 inch across and produced in early spring. They are not visible from a distance. Fruit are edible, yellow changing to brown and to 3 inches long. They are a favorite of the wildlife.

**Site Requirements:** Hardy USDA zones 4 to 9 and statewide in Arkansas. Trees are typically found on shelves in the woods in fertile soils. They will grow in full sun, in fact they are best suited to such conditions. They require a well drained, fertile site to do well.

**Use in Right of Way:** A good plant for rest areas or for mass planting along the right of way.

**Planting/Seeding Requirements:** Transplant container grown plants in the spring.

**Maintenance Requirements:** Easily maintained once established.

## River Birch

*Betula nigra* (Betulaceae)

**Description:** A fast growing, upright to oval tree reaching 50 feet in height with cinnamon brown peeling bark. On old trees, the bark will turn red-brown with deep ridges. Leaves are alternate with deeply serrate margins and to 3 inches long and 2 inches wide. Fall color is yellow but is unpredictable. Flowers are of little interest. The exfoliating bark makes this tree more appealing in the winter than summer.

**Site Requirements:** Hardy USDA zones 4 to 9, statewide in Arkansas. Though typically found growing along streams and waterways, the river birch has a degree of drought tolerance. It requires free water for seed germination but, when planted as a landscape tree, will tolerate much drier sites. The best pH is between 5.5 and 6.5; alkaline soils should be avoided.

**Use in Right of Way:** A good choice for moist locations where the winter form of the tree can be seen and enjoyed. Planted in front of a background of pines, the winter form can be effectively displayed.

**Planting/Seeding Requirements:** Transplant fall or spring as a bare root (small sizes only), balled and burlapped or container grown specimen.

**Maintenance Requirements:** Requires little maintenance once established. Any pruning should be done during the summer months since the birches are heavy bleeders if pruned in the winter. Aphids are sometimes troublesome in the spring and cause leaf distortion and some leaf drop. Spraying is not usually necessary. Leaf spot diseases are reported but are seldom serious. In normal years river birches will drop some of their inner leaves in August as a response to drought conditions, retaining their outer leaves. This does not seem to adversely affect the tree.

**Cultivars:** 'Heritage' is an improved selection of river birch which has a light salmon colored bark that exfoliates cleanly instead of in patches like the typical river birch. This creates a bark appearance similar to the white barked birches seen further north. In addition to the bark difference, this species has darker, glossier green leaves and grows about 50% faster than typical seedling river birches. It performs well in southern sites.

**Comments:** White barked birches, such as those seen in the upper midwest and New England states, are not generally adapted to southern conditions. In northern counties of Arkansas they will grow but seldom attain greater than 20 years in age. Two birches may have possibility in Arkansas plantings as white barked birches but, before extensive plantings are made, further testing is required. The birches are:



*B. platyphylla* 'Whitespire' a medium size tree reaching 40 feet in height is a native of Japan. It is reported to be resistant to the bronze birch borer, the major killer of white barked birches in landscape settings.

*B. maximowicziana*, the Monarch Birch, is another Japanese white barked species which can reach 60 feet when mature. It too is reportedly resistant to the bronze birch borer.

**Ironwood, American Hornbeam      *Carpinus caroliniana* (Betulaceae)**

**Description:** A small to medium size deciduous tree reaching 30 feet in height, and occasionally more, that is native statewide. The form is round-headed in outline. The trunk and large stems are smooth gray, fluted structures that resemble the muscles of your arm, hence the common name "musclewood". It has alternate, finely serrate leaves that are approximately 3 inches in length. Flowers are not showy. Fall color is typically yellow, but occasionally orange.

**Site Requirements:** Hardy USDA zones 3 to 9 and statewide in Arkansas. Typically the tree is seen as an understory tree along streams and on the north face of mountains. It does best in slightly acid (pH 6 - 6.5), moist, deep fertile sites but will tolerate calcareous soils and other adverse conditions. It will tolerate occasional flooding and wet soils. In the right of way plantings, some shade is preferable.

**Use in Right of Way:** Best use is in a mixed stand where an attempt is being made to recreate a natural stand. There could be some use near exchanges where screening is desirable. The slow growth of the tree makes it unsuitable where quick effect is desired or excessive competition with grass is likely.

**Planting/Seeding Requirements:** Difficult to transplant and should be moved as either container grown or balled and burlapped tree. While not readily found in the nursery trade, some specialty growers in the eastern states do offer it.

**Maintenance Requirements:** The slow growth (a 10 year old tree will be 8 to 10 feet tall) of this tree makes maintenance necessary to keep grass and other competing tree species under control while it is growing. Once established, little attention is required. This species does not tolerate pruning (shearing) as does the European hornbeam.

**Related Species:** *Carpinus betulus*, the European Hornbeam and its cultivar 'Fastigiata', are more commonly seen in the nursery trade than the native species. 'Fastigiata' is considered one of the best small to medium shade trees, ultimately reaching 35 feet in height with an oval to fan-shaped outline. It is faster growing than the native species and does well throughout the state. This tree resembles in size and form the Bradford pear, but it lacks the weak structure of the pear. Overall an

excellent tree that would be worth using in interchanges where a medium tree could be used for beauty and screening.

**Comments:** Of the two species, the European hornbeam has a more formal appearance while the American hornbeam is more naturalistic in outline and form. The European species is faster growing than the native species.

#### **Pecan**

*Carya illinoensis* (Juglandaceae)

**Description:** Large, stately, medium growth rate, deciduous trees reaching 100 feet or more in height in good sites. This common tree is grown for its edible nuts which range in size from 1 inch long up to 3 inches for some of the "improved" selections. Leaves are compound with 8 to 12 leaflets per leaf. There is rarely significant fall color.

**Site Requirements:** Hardy USDA zones 4 to 9, hardy statewide in Arkansas. Pecans require a well drained, bottomland situation to achieve their full stature.

**Use in Right of Way:** Very limited. It probably would not be good policy to plant pecans along the right of way and encourage people to stop in the fall to pick up the nuts. If used, only "native" pecans should be planted, not the grafted selections.

**Planting/Seeding Requirements:** Pecans and their close relatives the hickories have deep tap roots and are very difficult to transplant. Pecans are in the nursery trade but none of the hickories are commercially grown. Pecans are transplanted during the dormant season as bare root trees or occasionally from deep specialty containers.

**Maintenance Requirements:** Pecans are bothered by a wide array of pest problems. The phyloxera and webworms are perhaps the most injurious to the appearance of the trees.

**Cultivars:** Many, but not recommended for highway planting use.

#### **Northern (Western) Catalpa**

*Catalpa speciosa* (Bignoniaceae)

**Description:** A large deciduous columnar tree reaching 65 feet in height with a spread of 20 to 25 feet. Leaves are large, ovate in outline with an entire margin and sometimes reach 12 inches in length. White, 2 inch long bell-like flowers appear in early to mid May in terminal clusters after the leaves are produced. Fall color is minimal, but when it does occur it is yellow. In the winter the foot long bean pods dangle from the tree giving the tree a distinctive, and not unpleasant winter form.

**Site Requirements:** Hardy USDA zones 4 to 8, and statewide in Arkansas. The tree is native in the midwest, including northern Arkansas where it usually grows along streams or in fertile, deep soils. Catalpas grow best in fertile, deep soils with a pH of 6



to 6.5 but will tolerate calcareous soils and drought once established.

**Use in Right of Way:** Though this tree is considered too coarse for most residential plantings, it is a tree that has a place in right of way plantings. The trees are very showy when in flower and they flower about 3 to 4 weeks later than most other spring blooming trees, hence extending the season. Also their large size makes them fit well in the highway scale. They could be used as specimen plants, preferably in clusters, around interchanges or periodically in informal clusters along the right of way.

**Planting/Seeding Requirements:** Trees are slow to establish following transplanting. Move only small trees (under 1 1/2 inch) during the spring as a balled and burlapped tree.

**Maintenance Requirements:** Once established the tree will fend for itself. Ice or wind breakage may be a problem during some years but the affected limbs are usually small in size with the main column of the tree unaffected. In some areas verticillium wilt is a problem; probably a condition that will become more prevalent in southern and southeastern counties.

**Related Species:** *Catalpa bignonioides*, Southern Catalpa or Indianbean, is similar to Northern Catalpa and, according to Smith, most of the species in the state are of this species. However, most nurseries offer the Northern Catalpa. From a right of way perspective, the two species are interchangeable. The Southern Catalpa is hardy USDA zones 5 to 9 or statewide in Arkansas.

**Comments:** Useful for adding color to right of way plantings.

**Hackberry, Western Hackberry**                      *Celtis occidentalis* (Ulmaceae)

**Description:** A round-headed deciduous tree to 55 feet in height and spread. Leaves are simple, alternate with serrate margins and to 4 inches in length. Flowers are insignificant. Fruit are maroon, edible berries that only opossums seem to love. Fall color is yellow but trees sometimes defoliate early in severe drought years. The bark is warty, rough textured and interesting but significant only on close inspection

**Site Requirements:** Hardy USDA zones 2 to 9 and statewide in Arkansas. This species is extremely tolerant of poor sites and is an excellent, though little used street tree. It will grow in acid or alkaline soils or moist or dry sites. It is not tolerant of standing water. Like most trees it will perform best in good soils, reaching 25 feet in 10 years in most situations.

**Use in Right of Way:** A good filler tree in a mixed stand of trees, especially in disturbed sites such as roadside cuts. In better sites, oaks would probably be a better choice.

**Planting/Seeding Requirements:** Transplants reasonably well bare root (up to 1 1/2 inch) or balled and burlapped. Spring or fall planting is acceptable.

**Maintenance Requirements:** Little maintenance is required once established. Trees tend to be low branched, so limbing up will be required as the trees mature. Witches brooms and assorted kinds of gall insects affect the tree causing disfigurement but these would not be visible at highway speeds.

**Related Species:** *Celtis laevigata*, Southern Hackberry or Sugarberry, is similar to the above species but is less winter hardy (USDA zones 5 to 9, statewide in Arkansas) and has almost entire leaf margins. This species is not as commonly available in the nursery trade as Western Hackberry, a tree commonly used in the Great Plains states as a street and shade tree. Southern Hackberry is resistant to the witches broom problem and many of the leaf gall problems found on Western Hackberry. Southern Hackberry tolerates wet soil and often grows in semi-swampy conditions. In areas of the Delta, only the Southern Hackberry should be considered for most sites.

**Comments:** The Western Hackberry is more commonly seen in the nursery trade, primarily because the main market for the trees is from South Dakota to Kansas. The Southern Hackberry is the better ornamental of the two species, except when the site is droughty and the soil much disturbed.

#### **Redbud**

*Cercis canadensis* (Leguminosae)

**Description:** A small, round-headed deciduous flowering tree reaching 25 to 30 feet in height. While often low branching, the tree can be trained to a single stem with a crown 6 feet off of the ground. Leaves are heart shaped to 5 inches long with fall color unpredictable but a clear yellow when it does occur. The small pea-like flowers appear before the leaves in early spring and are lavender in color. Flowers are congested along the length of the stems and branches, sometimes even main trunk. The numerous pods hang on the plants all winter creating a distinctive winter appearance.

**Site Requirements:** Hardy USDA zones 4 to 9 and statewide in Arkansas. Redbuds grow in a wide array of soil types including upland and lowland sites; sun or shade and moist or dry sites. They will tolerate alkaline soils but are usually best suited to slightly acid soils (pH 6.0 -6.5). They will not survive poorly drained locations or in soils prone to be permanently wet.

**Use in Right of Way:** Excellent for mass planting or mixing in with existing trees. Good for use in locations near interchanges where seasonal color is desired.

**Planting/Seeding Requirements:** Transplant balled and burlapped in smaller sizes only or container grown plants during the spring

or fall. Small redbuds usually establish quickly and outgrow larger trees.

**Maintenance Requirements:** Easily maintained with little care needed once established. Under roadside conditions, provided mowing is not excessive, reseeding should occur. Not a long lived tree; 25 to 30 years is maximum.

**Cultivars:** Many cultivars are listed but only three are common. They are:

f. *alba*, the White Redbud, is a naturally occurring white form which many people prefer to the typical purple of the species. Other than flower color, it is like the species.

'Forest Pansy', Purple Leaf Redbud, is like the species except it has purple leaves that fade to green as the summer progresses. This tree looks much better in May when it is leafing out than in August when the leaves turn a purplish green.

'Oklahoma', really a selection of *C. reniformis*, the Texas Redbud, has deep purplish maroon flowers and bright, glossy green leaves. Trees grow to 20 feet in height.

#### **Fringe Tree**

***Chionanthus virginicus* (Oleaceae)**

**Description:** A native small deciduous tree or large shrub reaching 20 feet in height and spread. Leaves are opposite, simple and entire and to 7 inches in length. Fall color is yellow but usually not outstanding. White flowers in drooping panicles appear after the leaves in late spring, usually appearing in mid April in south Arkansas, mid May in northern counties. Plants are dioecious; female plants are more showy than males. The fruit is a purple berry.

**Site Requirements:** Hardy USDA zones 3 to 9, and statewide in Arkansas. This species occurs in a diversity of sites, but moist, cool woods as an understory is most common. In the Ozarks, it is usually found associated with a stream or spring. However, it will grow in drier sites and probably only requires moisture for seed germination. The preferred soil is an acidic (ph 5.8 - 6.5 pH), well drained fertile site. Full sun is ideal but plants will tolerate some shade.

**Use in Right of Way:** An attractive spring flowering tree for massing near interchanges or in front of evergreens.

**Planting/Seeding Requirements:** Plants have a reputation for being difficult to grow but this probably does not relate to nursery grown plants. Balled and burlapped or container grown trees may be moved in the fall or spring.

**Maintenance Requirements:** Little maintenance is required once established. pruning should be avoided. The tree is low

branching and seldom makes a crown high enough for a tractor to mow under. Reseeding is unlikely.

**Related Species:** *Chionanthus retusus*, Chinese Fringetree, is similar to the *C. virginicus* but the Asian species is slightly larger in all characters and is generally considered more ornamental. It has good heat and drought tolerance, doing well as far west as Wichita, KS. Mature plants are often broader than tall and multi-trunked.

**Comments:** Neither species is widely available in the nursery trade because of problems in propagation. *C. retusus* can be propagated by cuttings (at least by good propagators) whereas *C. virginicus* cannot. Seed propagation is slow and requires at least two years.

#### **Yellowwood**

*Cladrastis lutea* (Leguminosae)

**Description:** A tall, oval to rounded deciduous tree to 50 feet in height. Leaves are compound with 7 to 9 leaflets and to 12 inches in length. Fall color is a brownish yellow. Flowers are fragrant, white, pea-shaped and borne in pendulous clusters in late spring. Flower production does not seem to occur every year. The fruit is a tan colored drooping legume pod to 4 inches long.

**Site Requirements:** Hardy USDA zones 4 to 8, statewide in Arkansas except for wet locations in the delta. Generally better adapted to cooler areas of the state. The tree occurs in the Ozarks and Ouchitas, primarily along limestone cliffs. Though found in alkaline soils, it is equally at home in acidic sites with a pH as low as 5.5. Trees should have good drainage and moderately fertile soils.

**Use in Right of Way:** This species could be used as single specimens along the roadway or at interchanges or be included in mass plantings with an array of species. It should not be used in droughty or difficult sites.

**Planting/Seeding Requirements:** Transplant in the fall or spring as a balled and burlapped tree. Small trees transplant easier than larger specimens.

**Maintenance Requirements:** Little maintenance is required once established. Pruning, which should be minimal, should only be done during the summer when trees are in leaf because of excessive pruning if performed in the dormant season. Narrow crotches and weak branch angles are sometimes troublesome with this species, making it susceptible to winter injury.

**Comments:** Primarily available from midwestern nurseries as a balled and burlapped tree.

## **Dogwood**

*Cornus florida* (Cornaceae)

**Description:** A small deciduous flowering tree reaching heights of 25 feet with a round crown at maturity. Leaves are opposite, simple and entire to 5 inches in length. Fall color ranges from red to purple and is consistently produced. Flowers are white and extremely showy, marking this species as the most popular flowering tree in the southeastern US. Blooming begins during late March in south Arkansas; late April in northern areas of the state. The red fruit in the fall and winter are attractive to a variety of birds.

**Site Requirements:** Hardy USDA zones 5 to 9, statewide in Arkansas. Although a native tree, this species has one of the most demanding site requirements of all landscape trees. Dogwoods must have excellent drainage. Poor drainage probably kills more dogwoods than all other causes combined. Plants should have a fertile soil with a northern exposure for best conditions. Though the tree usually occurs as an understory tree in the wild, few flowers are produced under such situations. Dogwoods will tolerate full sun if the tree is mulched or if it is located on a northern slope or if the tree receives sufficient water in the summer. Dogwoods are not drought tolerant and will not tolerate extreme drought conditions; however, once established they will tolerate normal drought years.

**Use in Right of Way:** Dogwoods are ideal for high visibility areas such as interchanges and rest areas. Because of the difficulty of keeping trees watered along roadways, natural reseeding can be a practical means of establishment if mowing is controlled.

**Planting/Seeding Requirements:** Transplant container grown or balled and burlapped trees in the fall or spring. Small trees often outgrow larger trees following transplanting. Balled and burlapped dogwoods are intolerant of broken root balls, drying out or freezing.

**Maintenance Requirements:** Once established, maintenance is minimal. Poor drought tolerance necessitate watering newly transplanted trees at least two seasons following planting. Borers are a problem on newly transplanted trees. They can be avoided by the use of trunk wraps. Dogwood anthracnose has not yet been confirmed in Arkansas, and hopefully it will not soon be a problem. Should it enter Arkansas, widespread preventative treatments are probably not warranted unless 1) a more effective treatment is identified or 2) the political climate mandates that "something must be done".

**Cultivars:** Many cultivars have been selected. The most common, readily available, or otherwise unique, are given below. The dogwood cultivars listed below are all budded; the rootstock will often sucker and must be pruned out by hand from red or pink flowered forms.



'Apple Blossom' has pink flowers fading to white in the center.

'Barton' is a large flowered white selection that is precocious and produces a heavy crop of blooms while young. It is well suited to southern parts of the state.

'Cherokee Chief', the most common of the so-called red dogwoods, has ruby-red flowers. It is a smaller, slower growing plant than most redbuds.

'Cloud 9' is perhaps the most common of the white dogwood cultivars. It is precocious with large, overlapping blooms but is slower growing than seedlings and not as large at maturity.

'First Lady', 'Rainbow' and 'Welchii' are variegated forms with yellow variegated leaves giving the plants a chlorotic look from a distance. In the large landscape, such as the right of way of a road, such color variant could be effective if used as an occasional specimen. Flowers are white. Variegated forms should have partial shade.

var. *rubra*, the pink dogwood, is one of the best of the non-white dogwoods for planting. It is faster growing and attains a larger size than most of the other red and pink dogwoods.

**Comments:** A valuable tree in the landscape but a species that must be given minimal maintenance when planted. Natural reseeding will permit significant dogwood populations throughout Arkansas if mow is controlled to avoid their removal. Dogwoods are especially showy when planted beneath an open canopy of loblolly pine.

### **Japanese Dogwood**

***Cornus kousa* (Cornaceae)**

**Description:** An erect branched deciduous tree to 25 feet with a similar width. Older trees take on a more horizontal branching pattern. Trees produce a mass of white, 4-bracted flowers two to three weeks after the native dogwood. Our dogwood blooms before the leaves appear; this species blooms after the leaves. Flowers are pointed at the end instead of the notched indentation found on *C. florida*. Leaves are shiny green to 4 inches long. Fall color is red to orange. The fruit is a large pendulous cluster of drupes maturing in late summer. The bark of old specimens is exfoliating.

**Site Requirements:** Hardy USDA zones 5 to 8 and statewide in Arkansas. Plants require acidic, well drained sites. An organic sand is an ideal medium. Plants appear to have more drought and heat tolerance than our native species, even surviving in large urban parking lots surrounded by concrete.

**Use in Right of Way:** As a specimen near interchanges or rest areas. From a usage perspective this species is interchangeable with our native dogwood, but the blooming season is later.



**Planting/Seeding Requirements:** Transplant with a ball of soil or from containers in the fall or spring.

**Maintenance Requirements:** Once established supplemental watering is usually not required. This species is considered resistant to dogwood anthracnose (*Disculus sp.*).

**Cultivars:** Though nearly two dozen are listed only a couple are of importance. They include:

var. *chinensis* is similar to the species but has larger flowers, slightly larger size and is reportedly faster growing.

'Milky Way' is a selection with early production of blooms and heavy flowering. It is more compact than the species.

**Comments:** If this species has a place in the right of way planting program it will probably be as a result of the introduction of dogwood anthracnose. Dr. Orton at Rutgers is hybridizing *C. florida* and *C. kousa* with the aim of extending resistance to a plant with our native dogwood's overall appearance.

#### **Cornelian Cherry**

***Cornus mas* (Cornaceae)**

**Description:** A small deciduous multistemmed tree to 20 feet with brown, flaky bark when young. Flowers are yellow and produced in great profusion in early spring, making this one of the first species to flower each season. Flowers are without bracts and consist of dense umbels at the ends of branches. Red berries are produced each summer.

**Site Requirements:** Hardy USDA zones 4 to 8 and statewide in Arkansas. Better adapted in the Ozark and Ouachita highlands but still will grow in all areas of the state. Grows in average soil conditions with a slightly acidic pH so long as not permanently wet. Best in full sun or part shade.

**Use in Right of Way:** Useful in mass plantings along interchanges where a very early season of color is desired.

**Planting/Seeding Requirements:** Transplant in the fall or spring as a balled and burlapped or container grown tree. Of the dogwood trees, this species is one of the easiest to transplant.

**Maintenance Requirements:** Once established, little additional maintenance is required.

**Comments:** An effective landscape plant that few would think of as a dogwood because of the small yellow flowers. Little else is in flower when this plant blooms.

**American Smoketree, Chittamwood *Cotinus obovatus* (Anacardiaceae)**

**Description:** A small, round to oval headed deciduous tree to 25 feet in height which is native to the Ozark highlands in Arkansas. Leaves are alternate, ovate with entire margins and to 5 inches in length. Fall color is excellent and ranges from shades of maroon, red, orange to yellow. The flowers appear in late May and June in large terminal panicles to 10 inches in length. Plants are dioecious with the males showier than the females. The plants do not have as smokey an appearance as their Asian counterpart, yet they are very effective in bloom. The gray bark is flaky, exfoliating and attractive on close inspection.

**Site Requirements:** Hardy USDA zones 4 to 8 and statewide in Arkansas. This species occurs along dry, exposed limestone bluffs throughout the Ozark highlands and in certain of the southeastern states. Although usually found in alkaline sites, the plants will grow in acidic soils with a pH as low as 6.0. The species is intolerant of poor drainage but otherwise is not particular about soils.

**Use in Right of Way:** Best use in the right of way is as small specimens near high visibility locations such as interchanges and rest areas or in mass plantings along exposed roadside cuts. The species would be an effective addition to a planting designed around fall color display.

**Planting/Seeding Requirements:** Best transplanted as balled and burlapped or container grown plants in the spring or fall. Plants are tolerant of drought stress once established; however, they are slow growing. They should be protected from mower injury until of sufficient size to be readily seen by mower operators.

**Maintenance Requirements:** Little additional maintenance is required once established. Pruning should be minimal. Plants will sucker from the ground if accidentally cut off.

**Related Species:** *Cotinus coggygria*, Smoketree, is an Asian species that is much more common in landscapes and in the nursery trade than the American smoketree. Purple-leaved selections such as 'Royal Purple' and 'Nordine' are more common than green leafed forms. They tend to be low branched and spreading whereas the American smoketree tends to be more upright and treelike. The purple color forms are difficult to use in a naturalistic settings such as along the highway right of way. If used, the Smoketree is best suited for use as a specimen.

**Comments:** The American smoke tree is available in the nursery trade but has not caught on in general use. It should.

## Hawthorns

*Crataegus* sp. (Rosaceae)

**Description:** A number of small, spreading deciduous flowering trees 20 to 30 feet in height make up this group. Hawthorns primarily have white flowers with the exception of one or two cultivars. Leaves are alternate, simple, either entire with serrate margins or 3 to 5 lobed and shiny above and lighter green beneath. Fall color is lacking or unpredictable. Flowers are white, 5 petaled with numerous stamens and borne in dense terminal clusters. Fruit are red, mostly under 1/2 inch in diameter and multiseeded. The heavy fruit load in the fall makes an effective display and the fruit are relished by certain birds. Stems are usually armed with thorns of varying lengths.

**Site Requirements:** Hardy USDA zones 3 to 7 or 8; better suited in the mountainous portions of the state and even then diseases are a serious problem. Tolerant of a wide variety of soil conditions with the pH ranging from acidic to mildly alkaline. Good drainage is a requirement; as with most tree species, hawthorns perform best in more fertile soils. Plants should have full sun.

**Use in Right of Way:** Best as mass plantings where the early spring flowers can be appreciated or if a dense, brushy screen is needed. Hawthorns should not be actively planted in most situations but, should natural stands exist, they could be protected and enhanced by removing competing trees.

**Planting/Seeding Requirements:** Transplant during the dormant season with bareroot, balled and burlapped or as container grown plants.

**Maintenance Requirements:** Hawthorns have a high degree of drought tolerance once established. Unfortunately they are susceptible to a wide array of leaf diseases including cedar - hawthorn gall, scab, and fire blight. Lacebug is a serious pest on *Crataegus phaenopyrum*. Partial to complete defoliation is common with some species by late summer due to assault by insects and diseases. Preventative measures are impractical under most right of way planting regimes. Surprisingly, as rough as the plants may look after a series of years with extreme disease pressure, they tolerate premature defoliation quite well but it does slow their growth.

Growth of the native species tends to be slow and plants may take several years to attain sufficient stature to ward off mowing equipment. Most of the hawthorns will sucker from the roots if accidentally mowed down; some even form colonies.

**Related Species:** Depending on the authority, there are as many as 18 species of hawthorns native in Arkansas. Of these only *C. crus-galli* is planted to any extent and then it is only infrequently encountered. The most common and readily available hawthorns are:

*C. crus-galli*, Cockspur Hawthorn, is a native, low branched species reaching 30 feet in height with 2 inch long thorns arming the stems. Plants have oblong-ovate leaves with serrate margins without prominent lobes. Fruit are a dull red. Of the native species, this probably has the most disease problems.

*C. laevigata* 'Paul's Scarlet', English Hawthorn, is grown in the nursery trade and is one of the most attractive spring flowering trees but it should be sparingly planted, if at all. Flowers are double, deep rose and completely cover the compact tree in early spring. Diseases frequently defoliate the plant by midsummer.

*C. phaenopyrum*, Washington Hawthorn, is the most common of the native hawthorns in the nursery trade and the most ornamental. Though reportedly native in north Arkansas a century ago, no wild stands are now known. It does extend in its native range into the Missouri Ozarks. This species produces 3 to 5 lobed leaves and twiggy branches with short spines. The plants are typically covered with clusters of drooping red fruit during the fall and early winter. This species suffers from lacebug injury and leaf diseases, but defoliation does not occur every year. Of the hawthorns, this is the best species for use along right of way plantings.

*C. viridis* 'Winter King', Green Hawthorn, is another Arkansas native that has limited potential in highway planting programs. Plants are vase shaped to 30 feet high with good, bright green leaves during the summer. This selection is relatively resistant to leaf diseases and keeps its foliage during most years. The fruit are larger than most hawthorns, averaging 1/2 inch in diameter and effective during most of the winter. This species is available from certain midwestern nurseries and is one of the better hawthorns for ornamental plantings.

**Comments:** Though the hawthorns are tough, their disease susceptibility restricts their utility in ornamental plantings. Of the species, *C. phaenopyrum* and *C. viridis* 'Winter King' are probably the only species to seriously consider planting.

**Leyland False Cypress x *Cupressocyparis leylandii* (Cupressaceae)**

**Description:** A large, fast growing, erect, columnar coniferous evergreen that has of recent years moved onto the southeastern US landscape scene. Plants are to 60 feet in height with a spread to 15 or less. Leaves are scale-like and evergreen; some cultivars have yellow or blue foliage.

**Site Requirements:** Hardy USDA zones 6 to 10 and statewide in Arkansas. Plants require sunny to partially shaded sites but otherwise have few specific requirements. Leyland Cypress will tolerate acidic or moderately alkaline sites and droughty or moderately moist conditions. Growth is more rapid in deep, fertile sites but growth in Georgia in "a poor soil" have average over 48 feet in 15 years from cuttings. Drought susceptibility of newly planted material is more severe in the southwestern portion of the state than other areas; once established plants have high drought tolerance.

**Use in Right of Way:** This species will not look like a part of the native landscape. If used, it is best relegated to use as a screen planting or where a dense evergreen mass is required.

**Planting/Seeding Requirements:** Best transplanted from container grown plants in the dormant season.

**Maintenance Requirements:** Once established, plants survive without additional watering attention. If shearing is used for shaping or creating a controlled hedge, prune as often as needed but pruning back beyond green growth is not recommended. Plants can be maintained as a hedge of almost any height. At this time this species is uncommon in Arkansas, but it is likely that bagworms will be a pest of the species.

**Cultivars:** Common ones include:

'Castlewellan Gold' is a selection that has yellow foliage. Probably not suitable for general use in right of way plantings.

'Green Spire' is a narrow, green leafed form that is otherwise similar to the species. Plants could be used as screening material.

'Naylor's Blue' has glaucous gray-green foliage and is the most common of the gray types. This foliage color is compatible with adjacent plant material and could be used as a fast growing screen. 'Silver Dust' is similar.

**Comments:** This plant will be entering the nursery trade in greater numbers as it becomes better known. The native *Juniperus virginiana* is probably a more appropriate plant for roadside plantings.

## Arizona Cypress

*Cupressus arizonica* (Cupressaceae)

**Description:** A dense, compact, conical, evergreen conifer reaching 40 feet in height with a form similar to the Eastern Redcedar but with foliage usually gray-green in appearance. Needles are scalelike. The fruit is a round cone to 1 1/4 inch in diameter. The bark of older trees has an attractive peeling orange color.

**Site Requirements:** Plants are hardy in USDA zones 7 to 9; in Arkansas in all except the Ozark region. Interestingly, they survived in Fayetteville to make 12 inch diameter trees but were killed in 1984 by the severe winter. At its best in the southwestern part of Arkansas. Plants are drought tolerant and must have well drained soils. They will tolerate (and in fact thrive) in acid soils, but in nature they occur in alkaline soils. Arizona cypress thin out severely at the base if exposed to shade.

**Use in Right of Way:** As mass plantings where a foil for the rich green of pines could be contrasted to the gray-green of these plants. An effective screen though not suited for shearing.

**Planting/Seeding Requirements:** Transplant container grown or balled and burlapped plants during the dormant season.

**Maintenance Requirements:** Once established, the plants are quite tolerant of abuse. Bagworms have not been a problem with this species.

**Cultivars:** Leaf color variations occur in seedling populations. By selecting gray or blue-green colored individuals it is possible to achieve a non-green planting.

## Russian Olive

*Elaeagnus angustifolia* (Elaeagnaceae)

**Description:** A fast growing, round-headed deciduous tree to 25 feet in height with silvery-gray leaves. Leaves are alternate, simple and oblong to 3 inches long with a dull green upper surface and a scaly silvery undersurface. There is little fall color. Flowers are 4 lobed, white, fragrant and insignificant except on close inspection. Yellowish fruit (edible but not too tasty) are to 1/2 inch long and produced in late summer. Trees are short lived, with 25 years the average life span for most Russian olives.

**Site Requirements:** Hardy USDA zones 2 to 7, and in the northern half of Arkansas. Plants should have sandy, sunny sites. Russian olives are well known for their tolerance to extreme growing conditions surviving severe drought, alkaline soil and generally poor maintenance.

**Use in Right of Way:** Useful in locations with poor growing conditions or where cutting has been done to the roadbanks



provided the gray foliage is appropriate. Useful as accents in front of pines.

**Planting/Seeding Requirements:** Transplant container grown, balled and burlapped or bare root plants during the dormant season.

**Maintenance Requirements:** Prune lower limbs up to permit easier maintenance. Once established the plants are tolerant to extreme drought. Verticillium wilt has been a problem in moist soils.

**Comments:** This tree actually does better further west where humidity conditions are low and summer temperatures are high than it does in Arkansas. It has lost favor in the midwest because of the verticillium wilt problem.

### **American Beech**

***Fagus grandifolia* (Fagaceae)**

**Description:** A slow growing, upright to oval deciduous tree reaching 60 feet in height with a smooth gray trunk. Leaves are alternate, simple, ovate with serrate margins and to 4 inches in length. Fall color is a beautiful yellow-brown. Terminal buds are very prominent in winter, often reaching 1 inches in length with a javelin shape. The beech is perhaps the most beautiful tree species in Arkansas.

**Site Requirements:** Hardy USDA zones 3 to 9 and hardy throughout Arkansas. Plants are found in deep, cool valleys of the Ozarks, on the southern slope of the Ouchitas and throughout the gulf coastal plain in Arkansas. The ecotypes of the coastal plains grow in poorly drained and wet sites whereas the ecotypes of the Ozarks require well drained conditions. Any attempt to plant beeches requires careful matching of ecotypes to the proposed planting site. Beeches are particular to soil type and transplant with difficulty. They require acidic conditions with a pH of 5.5 to 6.5. They will tolerate shade but are best in full sun.

**Use in Right of Way:** Every effort should be made to preserve native beech stands but, in most situations, it will be impractical to plant this plant along roadways because of the slow growth and expense involved.

**Planting/Seeding Requirements:** Plants are transplanted in the spring from balled and burlapped plants. Because of the slow growth they are not readily available in the nursery trade, and when available, are expensive.

**Maintenance Requirements:** Their slow growth (8 to 10 feet in 10 years) requires careful maintenance to prevent injury while mowing. Removal of less desirable and faster growing woody species would be needed. Once established and fully grown, beeches require little maintenance because their shallow rooting characteristic prevents competition from other plants.

**Cultivars:** The European beeches (*Fagus sylvatica*) are more common in horticulture than the native species, but they too are not recommended for general use. The American beech outperforms the European beech in zones 7 to 9, which includes most of Arkansas.

**Comments:** American beeches, if planted, are not planted for today's generation but for tomorrow's. They are long lived but it takes them a long time to attain their magnificent stature in the forest.

## **White Ash**

*Fraxinus americana* (Oleaceae)

**Description:** A medium to fast growing large, oval to round deciduous tree reaching heights and spreads of 75 feet or more. Leaves are opposite, pinnately compound with 7 to 9 leaflets with leaves to 12 inches or more in length. Leaflets are usually entire; fall color is usually purple or maroon. The fruit, on female plants, consist of a dense cluster of samaras to 2 inches in length which are of no ornamental value. Selections listed as fruitless are male selections. Trees develop massive trunks with age that are gray to brown and deeply furrowed.

**Site Requirements:** Hardy USDA zones 3 to 9 and statewide in Arkansas. Native throughout the state, this tree does best in fertile, deep well drained sites. However, it is found in native stands that are less than ideal so it does have some adaptability in landscape situations. Should be planted in full sun.

**Use in Right of Way:** Useful throughout the state in any situation where a large shade tree is desired, especially if fall color is important. Should not be used on road cuts or fills where the soil is shallow or has been replaced.

**Planting/Seeding Requirements:** Transplants and establishes quickly as bareroot, balled and burlapped or container grown plants.

**Maintenance Requirements:** Once established white ash have good drought tolerance. Severe drought may cause earlier defoliation in the fall. Plants are most bothered by ash borers, a stem borer that may cause the terminal to die. A preventative spray program would be beneficial the first two years following transplanting. If pruning is required, do so in the fall.

**Cultivars:** A dozen selections have been made of this species, primarily from midwestern nurseries. Of these three are common:

'Autumn Applause' is an oval (fruitless) male reaching 40 feet with maroon fall color.

'Autumn Purple' is by far the most commonly grown and offered white ash cultivar. It is seedless, pyramidal to oval in outline to 50 feet in height with glossy green summer leaves followed by



maroon fall foliage which persists for 2 to 4 weeks when weather permits.

'Skyline' is a seedless oval form to 45 feet in height with orange-red fall color. 'Rosehill' is similar.

**Comments:** Fall color develops earlier than for maples and oaks, usually appearing in late September and early October.

### **Green Ash**

*Fraxinus pennsylvanica* (Oleaceae)

**Description:** A large, fast growing round to oval-headed deciduous tree reaching heights of 65 feet or more. Leaves are pinnately compound with 5 to 9 leaflets with the margins serrate. Fall color is yellow. The fruit are winged samara to 2 inches long that are borne in dense terminal clusters. Fruitless selections are male.

**Site Requirements:** Hardy USDA zones 3 to 9 and hardy throughout Arkansas. Though native statewide where it is found in moist bottomlands, the tree is tolerant of upland sites where conditions are rather poor. Though not suited for roadcut or swamp use, this species could be used in virtually all other roadside habitats.

**Use in Right of Way:** As a mass planting or part of a mixed stand of trees to create a natural appearing stand.

**Planting/Seeding Requirements:** Transplants readily as balled and burlapped or bare root plants during the dormant season. It is also grown in the container nursery trade.

**Maintenance Requirements:** Once established requires little maintenance. Ash borers are a problem, especially on newly transplanted trees, but the borer is seldom fatal to the trees. Usually the trees outgrow the injury once they become established. Fall pruning is recommended.

**Cultivars:** A dozen or more cultivars are on the market but only a few are widely propagated. The most important are:

'Marshall's Seedless' is the oldest and most widely used green ash cultivar. Plants have glossy green leaves and yellow fall color. Plants reach 50 feet with a spread almost equal their height. The male flowers form terminal clusters that sometimes raise questions of "what is wrong?". Does well in Arkansas.

'Patmore' is an upright oval seedless form generally similar to 'Marshall's Seedless' but more winter hardy, having been selected from a tree growing in Alberta. The extra winter hardiness is not necessary for Arkansas and will probably lead to defoliation by mid September. 'Prairie Spire' is a similar selection from eastern North Dakota with good winter hardiness and a compact form of growth.



'Summit' is an upright, pyramidal form that tends to maintain a central leader as it grows. Plants reach 45 feet in height with a spread about one half of their height. Leaf color develops about 2 weeks ahead of 'Marshall's Seedless'.

**Comments:** Other ashes are in the nursery trade but they have no advantage over the species listed above.

**Thornless Honeylocust *Gleditsia triacanthos* var. *inermis* (Legume)**

**Description:** Fast growing, fine textured, open canopied, round headed deciduous tree to 60 feet or more in height. Leaves are pinnately and bipinnately compound to 8 inches long with leaflets small to 1/2 inch in length. The tree produces light shade and deep roots so grass will grow up to the base. An excellent tree for its informal, picturesque form. Fall color is yellow. Wild trees of the straight species will sometimes have thorns arming the trunk that are to 8 inches long and extremely intimidating. Long twisted brownish red legume pods to 12 inches in length are seen on wild species but are rare on the "seedless" cultivated forms.

**Site Requirements:** Hardy USDA zones 3 to 9 and statewide in Arkansas. Plants have good drought tolerance and thrive in a wide array of soil types including acid soils (to pH 5.5) or alkaline soils. Not suited for permanently wet sites but will tolerate winter wetness and occasional flooding. Best in full sun.

**Use in Right of Way:** Best used in mass plantings with mixed species, as individual specimens near interchanges or in rest areas where light shade and good grass cover are both important.

**Planting/Seeding Requirements:** Transplants readily as bare root, balled and burlapped or container grown specimens. Transplant during the dormant season.

**Maintenance Requirements:** Once established honeylocust is extremely drought resistant. Young plants require pruning to develop a high canopy. Pests sometimes bothersome on this species includes the webworm in the summer, borers when young and occasionally spider mites. Although these pests may be serious, they are seldom life threatening to this tough tree.

**Cultivars:** Over 20 cultivars are listed but fewer are common in the nursery trade. The most important are:

'Imperial' is a round headed tree growing to 45 feet in height with good branching structure that produces a few pods as it ages. In Wichita, KS plantings, without irrigation, this cultivar averaged almost 2 feet of growth per year over a 10 year period.

'Green Glory' is a pyramidal selection reaching 65 feet in height

which has been increasing in popularity in larger landscape settings.

'Moraine' was the first seedless honeylocust selected. It reaches 50 feet in height with a broad, graceful crown. This selection does have some webworm resistance but it seems to be giving way to newer introductions in the nursery trade. 'Majestic' is similar.

'Shademaster' has ascending branches and reaches 45 feet in height with a 35 foot spread. Considered the best selection and the most popular cultivar in terms of nursery production.

'Skyline' is a pyramidal form reaching 45 feet in height with a spread of 35 feet. It is a strong grower and is readily available in the nursery trade.

'Sunburst' is among the most common selections. It has a round head with new growth a bright yellow, fading to green as the leaves mature. This color variant must be used sparingly in landscape settings, and then only as an accent.

#### **Kentucky Coffee Tree**

*Gymnocladus dioicus* (Leguminosae)

**Description:** A slow growing, usually low branched, round headed deciduous tree reaching heights of 75 feet under ideal conditions. Leaves are bipinnately compound and to 30 inches in length with leaflets to 2 inches long. Leaves turn yellow in the fall but good color development is the exception rather than the rule. The trunk is gray, rough textured and a distinctive feature of the tree. The tree is sparsely branched and has a distinctive winter appearance. Black, 8 inch long, stout pods are produced in the fall and persist all winter on female plants.

**Site Requirements:** Hardy USDA zones 3 to 8 and hardy statewide. Typically found in bottomland sites and in deep, fertile soils; however, the tree will grow in upland locations with poor, even alkaline soils. Good drainage is essential. In Arkansas the tree is found throughout the Ozarks, in central Arkansas and along Crowley's Ridge. Not recommended for roadside cuts or wet sites, otherwise should be suitable for most roadside conditions.

**Use in Right of Way:** An interesting, long-lived tree that would make a good specimen or addition to mixed plantings. Because of its distinctive form, this would be an excellent addition to plantings around rest stops and other public use areas.

**Planting/Seeding Requirements:** Difficult to transplant unless balled and burlapped or grown in root control bags. Taproot pruning is essential while the seedling is young for successful future transplanting. Root control bags, common in Oklahoma nurseries, aid in transplanting this species.

**Maintenance Requirements:** Once established, considered pest



free.

**Carolina Silverbell**

*Halesia carolina* (Styracaceae)

**Description:** A medium growth rate flowering deciduous tree with ascending branches forming a broad, rounded crown to 35 feet in height. Leaves are alternate, simple and sparingly toothed and to 5 inches in length. Fall color is insignificant. White, 4 parted nodding, bell shaped blooms are produced in late April and May after the leaves appear. Two inch long, 4-winged tan colored fruit line the stem in the fall.

**Site Requirements:** Hardy USDA zones 4 to 8 and statewide in Arkansas. Native to deep valleys of the southern Ozarks and in the Ouachitas, though nowhere common. Plants grow as an understory tree in uniformly moist, fertile, highly organic, acidic soils (pH 5.5 to 6.0 preferred) that have good drainage. The tree requires a like condition for best performance in right of way plantings.

**Use in Right of Way:** Because the flowers appear with the leaves, this species does not present a tremendous display from a distance. Use in the right of way should be restricted to interchanges or rest areas where the flowers can be seen.

**Planting/Seeding Requirements:** Transplant in the dormant season using balled and burlapped plants. Not readily available in the nursery trade but available from a number of North Carolina and Tennessee nurseries. A good companion plant for azaleas.

**Maintenance Requirements:** Plants lack drought tolerance but otherwise are undemanding in their cultural requirements.

**Comments:** Smith uses the name *H. tetraptera* var. *monticola* for this species, but in the nursery trade it is known under the name used above. Var. *monticola* is a larger plant than the typical species with larger flowers.

**Common Witchhazel**

*Hamamelis virginiana* (Hamamelidaceae)

**Description:** This is a medium to slow growing small, multi-trunked flowering trees (or large shrubs) which reaches 20 feet in height and spread. Leaves are to 5 inches long, short petioled and wavy edged and rough textured. Usually yellow (sometimes maroon or red) straplike flowers to 2/3rds of an inch of length crowd the stems of this species during the winter months (December to February) when it blooms. Hunter indicates this species is non fragrant while *H. vernalis* is fragrant; other authorities do not comment or give fragrance to *H. virginiana*. Dark, 1/2 inch long bobbed-off capsules appear following blooming and persist for a year or more.

**Site Requirements:** Hardy USDA zones 3 to 8 and statewide in Arkansas. The species is found throughout the Ozarks and

Ouachitas and along Crowley's Ridge, primarily along streams. Witchhazel should have semi shade or sunny sites in moist locations with acidic soils.

**Use in Right of Way:** Useful where their early blooms can be appreciated up close such as near interchanges or rest areas. In right of way plantings witchhazel would be effective as mass plantings along roadside streams. On sunny days in February the fragrance of this species fills the low valleys.

**Planting/Seeding Requirements:** Transplant container grown or balled and burlapped plants during the dormant season. Does not transplant readily from the wild.

**Maintenance Requirements:** Other than a lack of drought tolerance, these plants have little in the way of problems.

**Related Species:** *H. vernalis*, Ozark Witchhazel, is similar to common witchhazel but is smaller, usually not exceeding 15 feet in height, and it blooms in the spring in February and March. Because of the more diminutive size, this species is better suited for use as a shrub.

*H. x intermedia* is a species based on hybrids of the Asian witchhazel *H. japonica* x *H. mollis*. The naturally occurring hybrids are fast growing and produce trees 20 feet tall with upright and somewhat spreading form. Blooming is in late winter and very early spring, with actual time depending on the cultivar. Flowers are larger (with petals an inch in length) than either parent and the flowering display much more effective. Many cultivars are in the trade of this hybrid group. The most noteworthy or common are:

'Arnold Promise' is a yellow flowered selection with a reddish base; blooms are later than many selections of the hybrids, usually appearing in late February and lasting for about a month. This is one of the showiest and probably the most common of the group in the nursery trade.

'Carmine Red' has red-orange flowers which are borne on a spreading plant to 18 feet in height. 'Ruby Glow' has coppery red flowers on a plant that reaches at least 20 feet in height.

'Diane' is a red flowered form with coppery-red flowers borne on plants around 20 feet in height. One of the more common selections but leaves persist in the winter, sometimes partially obscuring the blossoms.

**Comments:** Witchhazel are the earliest blooming plants in the landscape, usually completing flowering before other early plants such as Serviceberry or Flowering Plums make a show. This group of plants should enjoy wider use in the landscape and right of way plantings. Their blooming period alone warrants wider use.

**Foster Holly**      *Ilex x attenuata* 'Fosteri No. 2' (Aquifoliaceae)

**Description:** A medium to fast growing, narrowly erect broadleaf evergreen tree reaching 25 to 30 feet in height with a spread of 6 to 8 feet. Leaves are alternate, to 3 inches long and sparingly spined towards the tip of the leaf. Red berries 1/4 inch in diameter persist through the winter and are effective from a distance. This cultivar is a female clone; male *I. opaca* or the male clone 'Foster No. 4' could be used to pollinate it.

**Site Requirements:** Hardy USDA zones 6 to 9, statewide in Arkansas. Foster holly is a standard in the landscape trade doing well in most soil provided it is reasonably fertile and not droughty. Although not suited for roadside cuts, this species should survive in almost all planting sites encountered in right of ways.

**Use in Right of Way:** Best used as a screen or for specimen use in interchanges.

**Planting/Seeding Requirements:** Transplant container grown or balled and burlapped (available but less common than container grown specimens) plants into a fertile, acidic, well drained soil that is not prone to be droughty. Partial shade to full sun conditions are required.

**Maintenance Requirements:** Hollies lack drought tolerance therefore are most practical in the areas of the state where summer rains occur such as the delta, coastal plain and central Arkansas area. Although there are pests, they are seldom serious.

**Cultivars:** Several natural and manmade crosses have been selected. The cultivars listed here have a more open, informal appearance than Foster Holly and could be used in right of way plantings with pleasing effect. In general they resemble *I. opaca* and only the well informed would realize they are not of that species. The most common include:

'East Palatka' is a nearly spineless holly with a more open, broader spreading habit than Foster Holly. Berries are smaller but borne in great profusion. Common in the nursery trade but not as winter hardy as Foster Holly.

'Hume #2' grows to 35 feet in height with a more open form than Foster Holly. Leaves are spineless except at the tip of the leaf. Berries are translucent.

'Savannah' is a 30 foot tall pyramidal plant with leaves that resemble those of American holly with spines around the extent of the leaf margin. Berries are produced in abundance.

**Comments:** The plants in this group were interspecific hybrids of *I. opaca* x *I. cassine*.

## **American Holly**

***Ilex opaca* (Aquifoliaceae)**

**Description:** Slow to medium growing conical broadleaf evergreen trees reaching 60 feet or more in height. Landscape plants are usually shorter than wild trees. Leaves, to 4 inches long, are well armed with stiff spines around the margins. Berries are to 1/3 inch in diameter and borne in dense, exposed clusters on female plants. Natural pollination is usually sufficient in urban and the southern half of the state. In years when the fruit load is high, the foliage adjacent to the berries is depleted of nutrients and takes on a chlorotic color. Berries are popular with songbirds and opossums and racoons.

**Site Requirements:** Hardy USDA zones 5 to 8, statewide in Arkansas. Grows in fertile, well drained, acidic and moist sites. It occurs wild in the southern half of the state and along Crowley's Ridge where it is in the understory of the deciduous forest. Full sun or partial sun produces best berry load.

**Use in Right of Way:** Can be used along the borders of deciduous woods or a specimens near interchanges.

**Planting/Seeding Requirements:** Transplant container grown plants during the dormant season.

**Maintenance Requirements:** American holly lacks severe drought tolerance, but once established, will tolerate average drought conditions without injury. Holly leaf minor may be troublesome but control is not warranted.

**Cultivars:** Over 1000 cultivars of this plant are described. Because there is so much variation in form, growth rate, berry display and overall appearance, only the cultivars should be planted and not seedlings. Among the most common are:

'Angelica' is a fast growing form with larger than normal fruit and berries. 'Wyetta' is similar.

'Croonenburg' is a compact, pyramidal selection that is monoecious and has both male and female flowers. It tends to produce a good berry crop every year.

'Goldie' is one of several golden fruited forms that are offered as novelties in the nursery trade.

'Greenleaf' is probably the most common in the nursery trade with plants producing medium size leaves and a compact, pyramidal form. Growth rate is moderate.

'Old Heavy Berry' is a fast growing, round topped form that was selected for its heavy production of berries.

**Nellie R. Stevens Holly** *Ilex 'Nellie R. Stevens'* (Aquifoliaceae)

**Description:** A large, fast growing evergreen mound of a shrub reaching 20 feet or more in height. Leaves are dark green, shiny and to 5 inches in length with a 2 to 5 spines per side. The plant is decidedly non-spiny, at least for a holly. This female clone sets fruit parthenocarpically and produces heavy berry loads each year.

**Site Requirements:** Hardy USDA zones 6 to 9, and hardy statewide in Arkansas. Well adapted to average soil conditions as long as they are not droughty.

**Use in Right of Way:** Suitable for use as an evergreen screen.

**Planting/Seeding Requirements:** Transplants readily from container grown plants.

**Maintenance Requirements:** One of the toughest hollies, requiring little attention once established. If pruning is required, cut back as much as needed in early spring before new growth begins.

**Cultivars:** Other hybrid hollies are in the market but offer little in the way of advantage to this hybrid.

**Comments:** Not for general use but could be used to screen equipment storage areas, service areas and the like.

**Yaupon Holly**

*Ilex vomitoria* (Aquifoliaceae)

**Description:** A slow growing, irregularly shaped, small evergreen tree to 20 feet in height with a gray-green foliage. Leaves are to 2 inches long without spines; berries, on female plants, are translucent red and to 1/5 inch in diameter.

**Site Requirements:** Hardy USDA zones 7 - 9, and in Arkansas in the southern half of the state. This species is found in Arkansas in scattered locations in the Gulf Coastal Plains and in the southern Ouachita mountains. It is tolerant of moist, lowland soils and could be used in relatively moist locations, at least for a holly.

**Use in Right of Way:** Plants could be used in mass plantings or for irregular screening. They are too slow growing for right of way use but, should natural stands occur, every effort should be taken to preserve them.

**Planting/Seeding Requirements:** Transplant container grown or balled and burlapped plants during the dormant season.

**Maintenance Requirements:** Once established, yaupon hollies should survive without much maintenance.

**Cultivars:** 'Pendula' is a weeping form but it probably has no place in right of way plantings.



## Eastern Red Cedar

*Juniperus virginiana* (Cupressaceae)

**Description:** Compact, medium to fast growing, conical evergreen trees reaching 40 feet in height. Plants are fast growing while young but slow down with age. Leaves are scale-like and prickly. Gray berries (wax covered cones) are produced during the summer on female plants. On old trees, the bark is reddish-gray colored and furrowed in long narrow strips.

**Site Requirements:** Hardy USDA zones 2 to 9, and found throughout the state. One of the most drought tolerant trees, often forming pure stands in "cedar glades" - which are shallow, usually alkaline sites where little else will grow. The species is pliable and will grow in acid or alkaline soils, but not poorly drained soils. Plants must have full sun conditions.

**Use in Right of Way:** Useful in mass plantings and as an evergreen screen. Cedars occur all over Arkansas roadways and their retention or removal from a cite should be based on the needs of a particular site. As they reseed into an area, they can be controlled, but not eradicated, by annual mowing.

**Planting/Seeding Requirements:** Transplants readily as balled and burlapped plants if it is root pruned and nursery grown. Transplanting from the wild is often difficult except for the smaller sizes because the root system is not root pruned during production. They are best transplanted in the late winter and spring. Though amenable to container production, only the cultivars are grown in containers.

**Maintenance Requirements:** Once established, junipers require no maintenance. They will occasionally suffer bagworm attack but it is seldom so serious as to cause threatening damage to wild plants. Spraying is probably never warranted in a roadside setting. Bagworms do not usually present as severe a problem along roadsides as they do in urban settings. Fire will kill the plants outright.

**Cultivars:** *J. v.* var. *crebra* is a distinct form which is tall and narrow (usually 4 to 5 times as tall as wide) as compared to the species which is 1 1/2 to 2 1/2 times as tall as wide. This variety appears sporadically around the state with populations in Clarksville, near the Arkansas river in Ft. Smith, and north of Hot Springs. Its unique conical form lends itself admirably to plantings where a tall narrow screen is needed or where a unique plant shape is desired. Most of the cultivars listed below have been selected from this variety.

'Canaertii' is readily available in the nursery trade. It is 25 feet in height and forms a pyramidal form, becoming open with age. Foliage is clustered at the ends of the branches; dense masses of whitish blue berries are produced.

'Emerald Sentinel' is a narrow, upright female with bright green leaves that reaches 25 feet in height. 'Hillspire' is similar.

'Manhattan Blue' is a compact, pyramidal male form reaching 25 feet in height with bluish green foliage.

'Skyrocket' is a compact, conical form with blue-gray foliage reaching 25 feet or more in height. This is perhaps the most common of the upright forms in the midwestern nursery trade.

#### **Golden Raintree**

*Koelreuteria paniculata* (Sapindaceae)

**Description:** A medium to fast growing 35 foot tall, low branched, round-headed deciduous flowering tree which is native to China. Leaves are alternate and pinnately compound (sometimes bipinnate) and to 18 inches long with as many as 15 leaflets. Fall color, when it does develop, is yellow or orange-yellow. Yellow flowers in open panicles are produced in late May and June and are followed by dense clusters of yellow-green triangular fruit to 1 1/2 inches long which fade to tan as fall approaches. The tree is attractive from flowering until winter when the fruit clusters begin to break up.

**Site Requirements:** Hardy USDA zones 5 to 9 and statewide in Arkansas. Raintrees are among the most drought tolerant trees doing well in acid or alkaline conditions. Good drainage and full sun are required. Young trees may show winter injury if severe winter conditions occur a year or two after planting. Winter injury, sometimes seen in northern Arkansas, never kills the trees but they may freeze back to the main trunk.

**Use in Right of Way:** Planted near interchanges or in masses where a flowering tree is desired.

**Planting/Seeding Requirements:** Transplant container grown or balled and burlapped plants in the spring.

**Maintenance Requirements:** Once established, little attention is required. Low branching may require "limbing up" while young. In garden situations the raintree will reseed but it does not appear to have escaped cultivation into the wild.

**Cultivars/Related Species:** *K. bipinnata* is a vase shaped tree to 35 feet in height with a spread of 3/4 its width. Leaves are bipinnately compound and to 24 inches in length. Flowers are yellow in dense, large open panicles and appear in August and September. The fruit go through a pink stage during maturation, creating a display that is equally attractive to the flowers. This species is hardy in zones 7 to 9; it should not be used in northern counties. The late season of blooming might make this tree worth considering for the coastal plains region of the state.

## **Crapemyrtle**

*Lagerstroemia indica* (Lythraceae)

**Description:** Fast growing, small, usually multi-trunked, oval to round shaped deciduous flowering trees reaching 25 feet in height. Leaves are simple, entire and subopposite to alternate and to 2 1/2 inches long. Fall color varies from none to yellow or red, depending on the cultivar. Flowers appear in mid summer and are crepe-like in dense terminal panicles to 8 inches in length and range from white to pink, purple or red. Plants bloom for 2 to 3 months. The trunks, on old specimens is smooth, gray colored, sculptured and beautiful.

**Site Requirements:** Hardy USDA zones 7 to 9; in Arkansas all except the northern counties. Crapemyrtles tolerate acid or alkaline soils as long as they are well drained. It thrives on hot dry weather. They should have full sun.

**Use in Right of Way:** Useful as specimen flowering trees in interchanges and at rest areas where this "tree of the south" can be viewed up close and personal by northern visitors.

**Planting/Seeding Requirements:** Transplant balled and burlapped or container grown plants in the spring only. Winter injury is more severe on young plants and is very likely with fall planted plants. Crapemyrtles are among the latest plants to leaf out; do not attempt to determine the extent of winter injury by inspecting plants during the winter. Wait until June 1 before pruning out winter injured wood to make sure it is really dead.

**Maintenance Requirements:** Once established, crapemyrtles tolerate considerable drought. Pruning, best performed by thinning congested stems and trunks should be done in the spring just before new growth starts. Aphids are often a problem and result in severe sooty mold conditions, especially if the plants are congested. Powdery mildew, resistance to which many cultivars exhibit, is a serious (unsightly) late summer problem. Established plants survive cutting to the ground or freezing to the ground without problems.

**Cultivars / Related Species:** Hundreds of cultivars of crapemyrtles have been named over the years with differences primarily based on flower color. In the 1950's *L. fauriei* was introduced from Japan and used by Dr. Donald Egolf in the crapemyrtle breeding program. *L. fauriei* exhibited several desirable characteristics which were useful additions to the crapemyrtle gene pool including: 1) increased winter hardiness (probably hardy to USDA zone 6, -10°F) 2) increased mildew resistance and 3) a beautiful cinnamon brown exfoliating trunk. From his breeding program more than 20 cultivars have been released, most of which are of hybrid origin. These plants are currently under trial at the U of A Plant Evaluation Center. Their adaptation to northern Arkansas conditions has yet to be proved. The following table gives some of the more commonly available selections and their attributes.

Crape myrtle cultivars commonly available in the nursery trade:

Cultivar	Flower Color	Height	Form	Mildew Resistance
Acoma*	white	4'	spreading	high
Apalachee*	lavender	12'	upright	high
Basham's Party	Pink	30'	upright	medium
Biloxi*	pink	25'	vase shaped	high
Byers Red	red	25'	upright	good
Byers White	white	20'	erect	good
Caddo*	bright pink	8'	rounded	high
Catawba*	purple	20'	upright	good
Centennial**	purple	3'	spreading	good
Cherokee*	red	12'	round	good
Comanche*	dark pink	12'	round	high
Conestoga	lavender	18'	arching	good
Dallas Red	red	20'	upright	good
Hardy Lavender	lavender	20'	upright	good
Hope**	pink	4'	rounded	good
Hopi*	pink	7'	rounded	high
Lipan*	lavender	15'	upright	high
Miami*	dark pink	20'	upright	high
Muskogee*	lavender	25'	spreading	high
Natchez*	white	30'	spreading	high
Near East	pink	18'	spreading	medium
Ocmulgee	red	3'	round	good
Osage*	pink	12'	weeping	high
Pecos*	pink	7'	upright	high
Pink	pink	18'	upright	medium
Potomac	pink	20'	upright	good
Powhatan*	purple	20'	upright	good
Prairie Lace	pink/white	5'	upright	good
Purple	purple	20'	upright	medium
Seminole	pink	15'	round	good
Sioux*	dark pink	15'	upright	high
Tonto*	fuchsia	6'	spreading	high
Tuscarora*	coral pink	15'	upright	high
Tuskegee*	dark pink	15'	spreading	high
Victor**	red	3'	spreading	good
Watermelon Red	red	20'	upright	medium
Wichita*	lavender	20'	upright	high
Wm Toovey	pink red	15'	vase shaped	good
Yuma*	lavender	15'	upright	high
Zuni*	lavender	10'	upright	high

\*These introductions are hybrids of *L. indica* x *L. fauriei*. Many have highly ornamental bark; among the most attractive with this regard are Apalachee, Lipan, Natchez and Wichita.

\*\*These introductions are from the Department of Horticulture and Forestry, University of Arkansas, Fayetteville.

## Sweetgum

*Liquidambar styraciflua* (Hamamelidaceae)

**Description:** Fast growing, erect, deciduous native trees reaching 75 feet or more in height. Leaves are star shaped with a long petiole and to 5 inches across. Fall color is maroon to red or yellow. The flowers are of no ornamental value but the fruit, the accursed "balls" bedevil people when produced in abundance. The ball is indestructible and persists for several years in the turf.

**Site Requirements:** Hardy USDA zones 5 to 9, and statewide in Arkansas. Generally seed sources should be within 100 miles of the planting sites to insure winter hardiness, especially in northern zones. Sweetgums are very forgiving, being an invasive species and one of the first to colonize old fields or roadways. Adapted to wet or dry sites, acidic soils and full sun.

**Use in Right of Way:** Like the Eastern red cedar, deciding where to allow sweetgums to grow may be as key as deciding to use them or not. Because they are so invasive, yearly mowing may be required to control the size of the stand. Mowing will not kill the trees, just make it mad and sucker from the base. This species could be used anywhere a mass planting is needed including interchanges, right of ways or other areas.

**Planting/Seeding Requirements:** Transplant container grown or balled and burlapped trees in the spring. Moist, bottomland sites produce quicker growth than upland sites.

**Maintenance Requirements:** Tolerant of considerable abuse once established. The year after transplanting, balled and burlapped plants may make little growth. Though sometimes hit by webworms, few diseases or insects seriously affect the sweetgum.

**Cultivars:** 'Moraine' is a budded tree that is more uniform than seedling trees and produces an upright-oval form with red fall color. This is perhaps the most hardy of the cultivars, being hardy in central Ohio.

'Palo Alto' is a vegetatively propagated form with a typical form; fall color is orange-red.

'Rotundiloba', Fruitless Sweetgum, is a tree that is going to have an impact on tree planting over the next decade, much as the Bradford pear did over the last. The leaf is round lobed and looks little like a sweetgum except in venation and texture. Mature trees are broadly pyramidal in outline to 60 feet in height. Fall color ranges from yellow to maroon, depending on the year. The tree is fruitless.



**Tuliptree, Tulip Poplar**     *Liriodendron tulipifera* (Magnoliaceae)

**Description:** A fast growing deciduous shade tree with a pyramidal form while young and an open, round-headed outline when mature. Mature trees can reach nearly 100 feet in height. Leaves are glaucous above and unique in outline and to 6 inches long and wide. Fall color is yellow to gold. Orange, ringed with yellow-green flowers are produced on mature trees throughout the crown. The flowers are produced in late spring and are not especially noticeable from a distance on such large trees.

**Site Requirements:** Hardy USDA zones 4 to 9 and statewide in Arkansas. Plants should have a sunny, well drained, slightly acidic, fertile bottomland type soil. They are not suited to roadside cuts or droughty areas.

**Use in Right of Way:** Of use anywhere a large specimen tree is required including interchanges and right of way.

**Planting/Seeding Requirements:** Transplant balled and burlapped or container grown plants in the spring.

**Maintenance Requirements:** Plants are native in Arkansas only along the Crowley's Ridge but are used throughout the state as ornamentals. Plants must be watered until established. Once established in a deep, fertile soil additional watering is not required. On marginal sites drought injury and/or sunscald may be a problem. Aphids are the major pest of the tree with heavy infestations building up during the summer and creating a sooty mold situation. Some leaves will be killed due to the aphids but more problem is caused by the unsightly sooty mold on the foliage.

**Hedge Apple, Osage Orange, Bois d'Arc** *Maclura pomifera* (Moraceae)

**Description:** An upright shade tree of medium growth rate with a picturesque irregular form. In the winter landscape the bois d'arc is perhaps the most beautiful of our native trees in stately form. Young trees may appear somewhat ungainly with multiple, almost arching branches. Leaves are alternate, simple, entire to 5 inches long and borne on stems that may be thorny, especially on juvenile trees. Fall color is minimal, or when produced yellow. Trees are dioecious with females producing a heavy crop of grapefruit size hedge apples each year.

**Site Requirements:** Hardy USDA zones 4 to 9 and throughout Arkansas. Widely planted during the dust bowl era on the Great Plains, it has earned a reputation for toughness. Tolerates drought, wet conditions, acidic or alkaline pH and high heat.

**Use in Right of Way:** A good tree for difficult sites along road cuts or other exposed sites. The tree is long lived and will, once established make a valuable addition to the right of way plantings. It lacks the refinement needed for situations where people could get up close and personal with the tree.

**Planting/Seeding Requirements:** Transplants readily as bare root or balled and burlapped transplants in the fall or spring.

**Maintenance Requirements:** Once established, no maintenance is required other than "limbing up" to permit easier mower access. The tree can survive being cut to the ground. Female trees should not be used unless the mass of hedge apples are far enough from the roadway to discourage people to check out the unusual yellow green fruit.

**Cultivars:** Several nurseries are propagating and growing selected male thornless forms in the Great Plains states, especially Kansas. Cultivars such as 'Wichita', 'Double-0' and 'Park' are available.

**Comments:** The wood of bois d'arc is almost unaffected by wood rotting decay fungi, making the tree valuable for wooden fence posts. The wood was used for making bows by American Indians.

## **Southern Magnolia**

*Magnolia grandiflora* (Magnoliaceae)

**Description:** An erect to oval broadleaf evergreen tree with a medium growth rate which reaches 80 feet or more in height. Leaves are glossy green above, brownish pubescent beneath and to 10 inches in length. White, bowl shaped blooms to 10 inches across are produced on the ends of branches in late spring and early summer. Cones to 5 inches long with protruding red to orange berries are produced following flowering and add a dimension of interest to the tree. Leaf drop occurs throughout the year instead of being concentrated during one season.

**Site Requirements:** Hardy USDA zones 6-9, statewide in Arkansas. Trees should be planted in rich, well drained fertile sites in full sun or partial sun. Once planted the tree will tolerate moist soils but not standing water.

**Use in Right of Way:** Best used as specimens near interchanges or periodically along the right of way. To develop fully, the tree needs a lot of room and freedom from nearby competing trees.

**Planting/Seeding Requirements:** Transplant balled and burlapped or container grown trees in late winter or early spring. Seed grown trees vary in the age of flowering, often requiring as long as 20 years for their first blooms. Vegetatively propagated trees are faster to bloom and usually begin flowering within a year or two of planting.

**Maintenance Requirements:** Though not extremely drought tolerant, southern magnolias will withstand normal drought episodes once established. Drought tolerance increases on better site. The tree is virtually insect and disease free. Lower limbs are usually allowed to remain on so the skirt of limbs hides the ground (and the fallen leaves). Winter injury in northern counties may occasionally damage leaves but trees usually survive without serious injury.

**Cultivars:** Over 100 cultivars are named but, for general use in right of way plantings, seedlings will suffice. The poorest seedling southern magnolia is still a wonderful tree. However, seedlings will not bloom as early as vegetatively propagated trees. Among the most common or noteworthy cultivars are:

'Bracken's Brown Beauty' is a compact, dense form about 30 feet in height at maturity with small (6 inch) leaves which are densely covered with brown pubescence on the underside. One of the best selections and commonly available in the nursery trade.

'Little Gem' will become a common landscape addition over the next decade because the small size of this plant will permit every southern garden to contain a southern magnolia. It is the smallest form so far selected, with 20 year old trees reaching 20 feet in height with a spread of 10 feet. Leaves are small (to 4 inches) and flowers are likewise reduced (4 inches in diameter).

'Majestic Beauty' has large, lustrous leaves and is free flowering while young. Reaches 50 feet tall and 20 feet wide at maturity.

**Comments:** No other tree symbolizes the south like the southern magnolia. The addition of this tree at the entrances of the state makes the statement that you have arrived in Dixie!

**Sweetbay Magnolia**

***Magnolia virginiana* (Magnoliaceae)**

**Description:** Erect deciduous or semideciduous trees of medium growth rate which reach 50 feet in height and 25 feet in spread. Leaves are alternate, simple, entire and to 5 inches in length. The underside of the leaf is silvery. In the northern part of the state the tree tends to be completely deciduous, in the southern part more or completely evergreen. In southern counties, if the tree does defoliate, it usually does so late in the fall. Fragrant flowers are creamy white to 3 inches across and appear in late spring. Cones are to 2 inches in length with red seeds.

**Site Requirements:** Hardy USDA zones 5 to 9, statewide in Arkansas. The tree is native in Arkansas in the Coastal Plains areas of the state. Best suited to fertile, moist soils with an acidic pH. Unlike most magnolias, this species will grow in wet to swampy sites but establishing large nursery-grown sweetbays in a swampy site is difficult. To do so, plant only smaller, younger plants. Plants may be used in shady or sunny sites.

**Use in Right of Way:** Ideal in low areas where the fragrance can be appreciated in May and June in the evenings. Best suited for use in low areas where moisture will be plentiful in the summer. Ideal specimens and attractive plants for use near rest areas.

**Planting/Seeding Requirements:** Transplant balled and burlapped or container grown plants in the spring.

**Maintenance Requirements:** Once established, little maintenance is required. The sweetbay makes a better species for massing than does *M. grandiflora*. The tree is not bothered by serious insect or disease problems.

**Cultivars / Related Species:** Though several cultivars have been developed, nearly all nursery grown plants at this time are seedlings. Attempts are being made to develop evergreen cultivars. Several other native magnolias include:

*M. acuminata*, Cucumber Magnolia, is a deciduous tree found in deep valleys of the Ozarks along stream banks and the northern faces of mountains. Trees reach 50 feet in height with leaves to 6 inches in length and greenish-yellow flowers to 3 inches in diameter produced in late spring. Pinkish cones to 3 inches long appear in the fall and resemble, before opening, cucumbers. The tree could be used in right of way plantings or as specimens at

interchanges. 'Elizabeth' is a yellow flowered hybrid selection that blooms in mid spring.

*M. tripetala*, Umbrella Magnolia, is found in the Ozarks and Ouchitas along creeks and in cool, moist sites on the northern faces of mountains. Trees may reach 35 feet in height but are low branches and tend to be sprawling in habit. Leaves are 12 to 24 inches in length and spectacular to find in the wild. Fragrant, creamy white flowers are to 10 inches across and produced in May and June. Could be used along waterways statewide at the edge of the deciduous woods. The large leaves create a tropical feel.

**Saucer Magnolia, Tulip Tree *Magnolia x soulangiana* (Magnoliaceae)**

**Description:** Deciduous flowering trees to 25 feet high with an erect habit while young and a rounded form when mature; trees have a medium rate of growth. Leaves are to 5 inches long and lack fall color. Flowers are spectacular. That is, provided they make it through blooming without being frosted in the spring. Flowers are pink, purple or even white and to 6 inches across and completely cover the plants in late winter and early spring. In Fayetteville blooming is usually around the second to third week of March, 2 weeks earlier in southern Arkansas. During the winter 2 to 3 inch long gray-pubescent buds are displayed at the ends of the branches.

**Site Requirements:** Hardy USDA zones 4 to 9, statewide in Arkansas. Plants should be given sunny, fertile, well drained acidic soil (pH 5 to 6.5) supplied with some moisture during the summer months.

**Use in Right of Way:** Best used in interchanges, as specimens along rights of way or near rest areas.

**Planting/Seeding Requirements:** Transplant balled and burlapped or container grown plants in spring.

**Maintenance Requirements:** Once established, plants require little maintenance. Low branching may require some pruning to facilitate mowing; prune in spring after blooming. No serious pests or diseases occur. The early blooming habit makes this species susceptible to frost injury; only the flowers are killed - the stems or trunks never suffer injury.

**Cultivars / Related Species:** 'Alba Superba' is a white flowered form with an erect habit of growth. 'Alexandrina' is one of the more commonly grown selections in the nursery trade. It has rose-purple flowers on the outside of the petals and white inside. 'Burgundy' is a deep purple flowered form. 'Lennei' has dark purplish petals that are white inside with flowers to 6 inches across. 'Verbanica' is a late flowering selection with strap-shaped rose colored petals.



*M. stellata*, Star Magnolia, is a bush-form magnolia reaching 18 feet in height with an equal spread. Flowers are produced in early spring at the same time as *M. x soulangiana* but they have 12 to 18 small, straplike petals as compared to the 6 to 10 of the saucer magnolia. Plants are small and could be used as small specimens near rest areas. Several cultivars are available.

## Crabapples

*Malus sp.* (Rosaceae)

**Description:** Fast growing deciduous flowering trees to 25 feet in height is a general description which fits the vast majority of the hundreds of crabapple cultivars which have or are being grown today. Trees are usually as broad as tall, low branched and often brushy internally if not pruned. Weeping, fastigiate and vase shaped forms are available. Fall color is variable, usually yellow if produced. Flowers are single (with 5 petals) or doubled and to 2 inches across in dense terminal clusters. Colors range from white to pink or red. Fruit are pomes (miniature apple) which are red or yellow in color and range in size from 1/2 inch in diameter to over 2 inches. The fruit are edible and have been used for making jelly.

**Site Requirements:** Hardy USDA zones 3 to 8, statewide in Arkansas. Crabapples are adaptable to a wide array of conditions but require full sun for best flowering. Good drainage is essential for success. They perform best in a loamy, acidic (pH 5.5 to 6.5) soils but will grow in less than optimum conditions.

**Use in Right of Way:** Crabapples are excellent for massing to create colorful areas near visually important areas such as near rest stops, major interchanges or near the entrances to the state. As medium size trees, when used in mass, they can be treated as large shrubs in the way they are used in design.

**Planting/Seeding Requirements:** Crabapples transplant readily and are available as bare root trees, container grown trees and balled and burlapped. They may be successfully planted in the spring, fall or winter. Some nurseries propagate crabapples on dwarfing or semidwarfing root stock. Seedling rootstocks give the most vigor, give better anchorage and are recommended.

**Maintenance Requirements:** Crabapples are tough plants but they are susceptible to a number of diseases. Because the plants are so tough, they survive disease attack year after year but their ornamental effectiveness is often lost. Resistant cultivars are available and should be used. Spraying to prevent disease is impractical on susceptible cultivars. The accompanying table gives the relative susceptibility to the major diseases (apple scab, fire blight, cedar-apple rust, mildew). The Asiatic species and their cultivars tend to have better disease resistance than North American species or their cultivars.

Pruning is sometimes needed because crabapples tend to be "brushy". Pruning should be done after flowering with the goal of removing internal suckers and opening up the plant. If left unpruned crabapples will continue to bloom quite effectively.

**Cultivars:** As many as 500 cultivars are thought to be available in the nursery trade in the United States. With such an extensive list available, sorting out the better cultivars and/or species is difficult. The following table lists the most common:

CRABAPPLE CULTIVARS AND SPECIES COMMONLY AVAILABLE IN THE NURSERY TRADE

Cultivar	Color	Flower	Size <sup>1</sup>	Form <sup>2</sup>	Size <sup>3</sup>	Tree- Form	-Fruit- Size <sup>1</sup>	Color	Disease Resistance
Adams	pink		1.5	sgl	24	rounded	0.6	red	very resistant
Adirondack	red open white		1.0	sgl	10	erect	0.5	red	resistant
Almey	purple-red		1.8	sgl	25	spreading	1.0	maroon	susceptible
American Beauty	dark red		2.0	dbl	25	rounded	none	produced	gets scab
M. baccata (Siberian Crab)	pink open white		1.5	sgl	35	open	0.4	red	susceptible
Ballerina	white		1.8	sgl	15	vase	0.5	yellow	resistant
Barbara Ann	pink		1.9	dbl	20	rounded	0.5	purple	gets scab
Beauty	pink		2.0	sgl	25	columnar	1.6	red	very resistant
Beverly	red open white		1.4	sgl	20	rounded	0.7	red	resistant
Blanche Ames	pink and white		1.5	sdbl	25	rounded	0.3	yellow	resists scab
Bob White	pink fade white		1.0	sgl	20	rounded	0.7	yellow	susceptible
Bonfire	red open white		1.3	sgl	15	rounded	0.3	orange	resistant
Brandywine	rose pink		1.0	dbl	20	rounded	1.0	yellow	get cedar rust
Callaway	pink open white		1.5	sgl	20	rounded	1.0	maroon	resistant
Coral Cascade	pink		1.3	sgl	15	weeping	0.4	pinkish	very resistant
Coralene	red open white		1.0	sgl	12	weeping	0.5	coppery	resistant
David	pink open white		1.5	sdbl	18	rounded	0.5	red	resistant
Dolgo	pink open white		1.8	sgl	35	open	1.3	purple	moderate
Donald Wyman	pink open white		1.8	sgl	25	spreading	0.4	red	resistant
Dorothea	pink		1.8	sdbl	25	rounded	1.8	yellow	susceptible
Eleyi	red/purple		1.3	sgl	25	rounded	1.0	purple	gets scab
Evelyn	pink		1.2	sgl	20	erect	1.2	yellow	very resistant
Fiesta	red open white		1.0	sgl	15	weeping	0.3	coppery	resistant
M. floribunda (Japanese Flowering Crabapple)	pinkish		1.5	sgl	25	rounded	0.4	red/yellow	resistant
Garnet	red open white		1.2	sgl	8	rounded	0.7	red	resistant
Gypsy Dancer	red open white		1.3	sgl	14	spreading	0.5	coppery	resistant
Hopa	purple/pink		2.0	sgl	30	rounded	1.0	red	gets scab bad
M. hupehensis (Tea Crabapple)	pink fade white		1.5	sgl	25	vase	0.4	red/yellow	moderate

Cultivar	Color	Flower	Size <sup>1</sup>	Form <sup>2</sup>	Size <sup>3</sup>	Tree- Form	-Fruit- Size <sup>1</sup>	Color	Disease Resistance
Indian Magic	red open pink		1.5	sgl	20	rounded	0.7	red	moderate
M. ioensis (Prairie Crabapple)	pink open white		1.7	sgl	25	rounded	1.3	greenish	gets rust
M. i. 'Plena' (Bechtel Crabapple)	pink		2.0	dbl	30	rounded	few	produced	gets rust
Katherine	pink fade white		2.0	dbl	20	open	0.3	yellow	moderate
Mary Potter	pink open white		1.0	sgl	20	spreading	0.5	red	moderate
Moonglow	red open white		1.2	sgl	12	rounded	0.4	green	resistant
Ormiston Roy	pink open white		1.6	sgl	20	erect	0.4	yellow	moderate
Prairiefire	red open pink		1.3	sgl	20	rounded	0.3	red	very resistant
Prince Georges	pink		2.0	dbl	20	rounded	none	produced	resistant
Prof. Sprenger	pink open white		1.0	sgl	25	erect	0.6	orange	very resistant
Radiant	purple red		1.2	sgl	28	rounded	0.5	red	gets scab bad
Red Baron	red open pink		1.0	sgl	20	columnar	0.5	red	moderate
Red Jade	pink open white		1.6	sgl	15	weeping	0.5	red	moderate
Red Silver	rose		1.5	sgl	30	rounded	0.8	purple	gets scab bad
Red Splendor	red open pink		1.8	sgl	25	upright	0.6	red	moderate
Royal Splendor	pink open white		1.8	sgl	12	weeping	0.6	red	resistant
Royalty	purple/red		1.8	sgl	20	upright	0.7	purple	gets scab
M. sargentii (Sargent Crabapple)	pink open white		1.0	sgl	12	mounded	0.3	red	resistant
Silver Moon	pink open white		1.5	sgl	20	oval	0.2	purple	moderate
Snowdrift	pink open white		1.3	sgl	20	rounded	0.4	orange	moderate
Sparkler	rose red		1.2	sgl	25	spreading	0.4	red	gets scab
Spring Snow	pink open white		1.8	sgl	25	oval	few	produced	gets scab
Spring Song	rose fade white		2.0	sgl	10	rounded	0.5	red	resistant
Van Eseltine	pink		2.0	dbl	20	vase	0.7	yellow	gets scab
White Cascade	white		1.7	sgl	15	weeping	0.3	yellow	resistant
Wildfire	red open pink		1.2	sgl	16	mounded	0.4	red	resistant

<sup>1</sup>Average flower or fruit size in inches

<sup>2</sup>Flower form: sgl = single with 5 to 9 petals; dbl = double with 16 to 30 petals; sdbl = semidouble with 9 to 15

<sup>3</sup>Average tree size in feet

### **Fruitless Mulberry**

***Morus alba* 'Stribling' (Moraceae)**

**Description:** A fast growing deciduous shade tree reaching 40 feet in height with an oval crown. Leaves are alternate, usually lobed, and to 6 inches long. Fall color, when it develops is yellow. This is a male selection which is among the most common in the nursery trade. The female tree should never be planted, at least as long as birds still roam the rights of ways of American roads.

**Site Requirements:** Hardy USDA zones 4 to 9, statewide in Arkansas. This is one of the most tolerant species in difficult sites. It will grow in droughty, acid or alkaline soils, wet soils or about any place a plant would be expected to survive.

**Use in Right of Way:** Probably of no practical use unless an impossible site needs a tree planting. Should be used in mass where it can be only seen from a distance so taxpayers won't know you are using tax money to plant mulberries.

**Planting/Seeding Requirements:** Transplant bare root or container grown plants during the dormant season.

**Maintenance Requirements:** Quickly establishes itself and requires little maintenance.

**Cultivars:** Several other male clones are available including 'Bellaire', 'Hampton' and 'Mapleleaf' that are more or less similar to 'Stribling'. The weeping form 'Pendula' is the most commonly available ornamental mulberry but it has no place in right of way plantings. It is an unusual weeping specimen.

### **Black Gum, Sour Gum**

***Nyssa sylvatica* (Nyssaceae)**

**Description:** A moderate growth rate tree reaching 65 feet in height with an upright form and horizontal branches. In the winter landscape this is a distinctive tree form. Leaves are glossy green, alternate, simple and entire to three inches in length. Fall color is early, 2 to 3 weeks ahead of most other species, and bright red. Leaves on individual trees do not change colors all at once but as individuals; thus trees are in color for longer than most species. Flowers are insignificant. Bluish black fruit to 1/2 inch long ripen in the fall but have no ornamental effect.

**Site Requirements:** Hardy USDA zones 3 to 9 and statewide in Arkansas. It occurs naturally in Arkansas throughout the state and is found in wet areas or dry hillsides. It needs an acidic pH (5.0 to 6.5) and reasonably fertile soils. Not suited for roadcuts.

**Use in Right of Way:** Useful for naturalizing, as a boulevard planting or as specimen plants for exchanges. This species is the most dependable tree for fall color in southern Arkansas.



**Planting/Seeding Requirements:** Transplant balled and burlapped or container grown trees in early spring. Small trees transplant and establish better than larger trees. Trees are readily available in the nursery trade.

**Maintenance Requirements:** Once established the trees have little in the way of maintenance requirements. Plants respond nicely to watering and fertilization.

**Related Species:** *Nyssa aquatica*, Water Tupelo is found in the swamps of eastern Arkansas. It is similar to Black Gum except leaves are twice as large and the tree forms a buttress trunk at the base. It is not widely available in the nursery trade.

**American Hophornbeam**

*Ostrya virginiana* (Betulaceae)

**Description:** A slow growing, round headed deciduous tree reaching 35 feet in height. Leaves are alternate, simple to 5 inches long with finely dissected margins. Fall color is minimal. Flowers are not readily apparent but in the fall the fruit are borne in a hop-like yellow-green sac. The bark is gray-brown and shaggy.

**Site Requirements:** Hardy USDA zones 3 to 9 and statewide in Arkansas. Though native throughout the state this species is seldom encountered in the nursery trade. It should have a fertile, well drained slightly acid pH soil. Trees tolerate full sun or partial shade.

**Use in Right of Way:** Should be retained if encountered but of insufficient value to seek out for right of way planting.

**Planting/Seeding Requirements:** Transplant small, balled and burlapped or container grown plants in early spring.

**Maintenance Requirements:** Slow growing and may present trouble in out-growing weeds. Established trees require little maintenance other than "limbing up" to provide sufficient ground clearance.

**Sourwood, Lily of the Valley Tree *Oxydendron arboreum* (Ericaceae)**

**Description:** Slow growing, erect deciduous tree to 35 feet in height. Leaves are to 6 inches long, alternate, simple with entire or small serrations, leathery and glossy green. Fall color is outstanding and usually in shades of purple or red. Fall color is produced earlier than most species. White flowers are small but borne in drooping clusters to 10 inches in length and produced in early summer. Clusters of 1/4 inch long capsules follow the flowers and are a distinctive feature of mature trees.

**Site Requirements:** Hardy USDA zones 5 to 9 and statewide in Arkansas. Though not native in Arkansas, the tree begins to appear within 60 miles of Memphis going east on I-40. It occurs

in well drained, acidic soils that are never deficient of moisture. Like all members of the rhododendron family, this species should have acidic (5.0 - 6.0), highly organic soil with excellent drainage. Plants will not tolerate standing water or prolonged drought.

**Use in Right of Way:** Useful as a specimen at interchanges or rest areas or where a mass effect is desired. Areas along Crowley's Ridge and in well drained parts of the Ozark and Ouachita uplands would be ideally suited for this ornamental plant.

**Planting/Seeding Requirements:** Transplant small balled and burlapped or container grown trees in winter or spring into sites amended with 15% peatmoss. Keep the tree watered until established, usually 2 years after planting. Once established plants display moderate drought tolerance.

**Maintenance Requirements:** Once established, plants display moderate drought tolerance. Because of slow growth, mulch with an organic mulch to maintain a weed free zone around each plant.

**Comments:** A beautiful tree but somewhat difficult to establish in a "fend for yourself" setting.

**Empress Tree, Kiri**

***Paulownia tomentosa* (Bignoniaceae)**

**Description:** A fast growing deciduous flowering tree with an oval form and coarse, catalpa-like leaves. Leaves are to 24 inches long, alternate and entire with a deltoid shape. Growth, especially on young trees is very fast, often with 10 feet or more produced in one growing season. There is no fall color with leaves turning black with the first frost. Purple, foxglove-like flowers are produced from the terminal cluster of brown buds in early spring. Flowers are to 3 inches long with bloom clusters 12 inches or more in length. Pecan-size seed pods remain during winter.

**Site Requirements:** Hardy USDA zones 5 to 9 and statewide in Arkansas. This tree is a pioneer species and will establish itself on road cuts, fills, spoil banks and in abandoned fields. It is tolerant of poor soils and grows quickly, but will not compete with climax tree species. Though occasionally found in the wild, it has not become an invasive weed tree like mimosa.

**Use in Right of Way:** Could be used as a flowering tree for mass planting in difficult sites such as along road cuts and fill sites. Not a refined tree and not for mass planting. An occasional tree would make be interesting because of the unusual purple flowers.

**Planting/Seeding Requirements:** Transplant young, container grown trees in early spring into sunny sites.

**Maintenance Requirements:** The tree requires little special maintenance once established. Winter injury can be a problem when temperatures fall below -5°F; the trees will not be killed but may die back and require pruning to remove the dead wood.

**Comments:** Certainly not a premium tree but one that could be used occasionally for its showy spring blooms. This species is planted widely to cover mine spoils and other difficult sites.

## Loblolly Pine

*Pinus taeda* (Pinaceae)

**Description:** Fast growing coniferous evergreen tree reaching 75 feet or more in height and the major species planted for timber production in the southeastern U.S. Trees are erect with a strong central leader; lower branches dropped as the tree grows when grown in close proximity to other trees. Needles are borne 3 per fascicle and are 6 to 9 inches long. Needle drop occurs in the fall with 3 year old needles falling. Plants can be expected to average 2 to 3 feet of growth a year while young.

**Site Requirements:** Hardy USDA zones 6 to 9 and statewide in Arkansas. While native in the Gulf Coastal Plains area of the state, the tree is adapted statewide. It grows well in a wide variety of soil types, from dry uplands to wet lowlands. Its adaptability to a variety of sites makes it popular with southern foresters. Better, more adapted species are available for roadside cut plantings. Locate in full sun.

**Use in Right of Way:** Useful for evergreen screening between sides of the road, for mass plantings along right of way edges and at exchanges. It is a useful "filler" plant where something other than grass is desired.

**Planting/Seeding Requirements:** Bare root liners (1 year old seedlings) are probably the most appropriate planting material for this species. Container grown plants (primarily in 1 gallon size containers) are available but the container often results in malformation of the taproot of the tree. These trees then are slow to establish and often never reach full size. Sometimes they even fail to survive. Trees may be planted as close as 6 to 8 feet on center, thus creating a solid stand in 4 or 5 years. If this technique is used, an effort should be made to avoid row planting but instead used "random planting and spacing". Plants must be planted during the dormant season, with all plantings completed before mid March in the south, early April in the north.

**Maintenance Requirements:** Easily maintained and grown, provided they are not mowed down. One year old liners should be individually flagged to make them visible to mower operators. The trees usually emerge above the canopy of grass and wild flowers the second growing season following planting.

**Cultivars / Related Species:** Several selections have been made for improved forestry performance. These "improved" loblollies are worth growing if speed of growth is critical.

*Pinus echinata*, Shortleaf Pine, is a native pine throughout Arkansas and is better suited for dry sites and difficult roadside cuts. It is hardy in USDA zones 6 to 9 and reaches heights of 100 feet. There are usually 2 needles per fascicle that average 5 inches in length. From a visual perspective the two species are interchangeable in the landscape. Shortleaf Pine

is best adapted for upland portions of the state and difficult sites; Loblolly Pine is best adapted for the Gulf Coastal plains and Delta region.

*Pinus elliottii*, Slash Pine, is native to the southeastern U.S. and is hardy USDA zones 7 to 9. It is hardy in Arkansas except for the northern portion of the state. There are 2 to 3 needles per fascicle and needles are often 8 inches long. Because of the long needles, this tree has a reputation for severe ice damage. Even though ice damage may occasionally be severe on all species of southern pines, Slash Pine is extremely susceptible. Its use should be minimal for that reason.

**Comments:** The southern pine beetle has occasionally caused problems in east Texas where it has spread through hundreds of acres killing all loblolly trees in its path. It has not been severe in Arkansas so far. Other pine bark beetles will kill an occasional tree in Arkansas, especially if the trees are injured or drought stressed, but they should not be considered limiting factors for right of way planting.

#### **Japanese Black Pine**

*Pinus thunbergiana* (Pinaceae)

**Description:** A commonly available ornamental pine planted for its stately form and dense character. Trees retain their foliage to the ground and often develop contorted, picturesque habits of growth. There are 2 needles per fascicle with needles to 4 inches long and often clumped near the ends of the branches. Candles often extend during the fall but needles do not grow until spring giving the plant a distinctive winter form. Trees seldom exceed 50 feet in height, although are reportedly capable of twice that with time.

**Site Requirements:** Hardy USDA zones 5 to 9, statewide in Arkansas. A Japanese native, this tree has become popular in the nursery trade because of its fast growth and easy reproduction from seed. Trees tolerate a wide array of soil types including dry, rocky sites. They are intolerant of saturated, poorly drained soils. Locate them in sunny sites.

**Use in Right of Way:** Well suited for mass planting and screening. Plants are fast growing and maintain their branches to the ground; ideal for screening or preventing the glare of oncoming lights.

**Planting/Seeding Requirements:** Transplant balled and burlapped or container grown plants during the winter season.

**Maintenance Requirements:** Plants have good drought tolerance once established and require little in the way of maintenance. Low branching will require attention while mowing. The pinewood nematode has been found associated with this species, though it has not become so serious as to limit its use in the landscape.



## **Cultivars / Related Species:**

*Pinus densiflora*, Japanese Red Pine, is an open, picturesque, often leaning specimen tree reaching 50 feet in height. Trees are hardy USDA zones 3 to 7 and only suited to the northern half of the state. Needles are in pairs and reach 5 inches in length. The bark on older trees is orange-red and very colorful. Although considered one of the most ornamental of this group of pines, it is none-the-less relatively uncommon in the nursery trade in Arkansas. If used, it should only be planted north of the Arkansas River in Arkansas.

*Pinus nigra*, Austrian Pine, is a dense, dark green conical tree reaching 50 feet in height at maturity. Hardy USDA zones 4 to 8. There are 2 needles per fascicle with the needles stiff and to 6 inches long. While this species makes an impressive plant while young, it does not age gracefully. Leaf diseases, especially Diploidia tip blight, cause defoliation after the tree reaches 35 to 40 years of age. The basal portion of the tree is often defoliated. If used, this species should only be planted in the northern counties.

*Pinus sylvestris*, Scotch Pine, is a commonly available, fast growing ornamental pine with twisted needles to 3 inches long borne in pairs in the fascicles. Hardy USDA zones 3 to 7. Trees are squatty, often 2/3rds as tall as wide. They have been used as a Christmas tree in northern areas of the state. Pinewood nematode has destroyed this tree in northern parts of Arkansas. Planting for roadside use at this time is not recommended.

*Pinus virginiana*, Virginia or Scrub Pine, is a waste land pine found in the eastern part of the U.S. that has been used as a Christmas tree in Arkansas. It is hardy USDA zones 5 to 9. Trees reach 40 feet in height and retain branches to the ground. Two needles are borne per fascicle with the needles to 3 inches long, stiff and twisted. Virginia pine grows in difficult sites and would be a good choice for roadside planting. Bare root seedlings are available and the preferred way of planting. Though not a "stately" pine, the species makes up for any lack of beauty by its toughness.

**Comments:** Several other pines will occasionally be encountered, but as a rule these are the most common in the nursery trade. These pines are considered more tolerant of abuse than the "southern" species.

### **White Pine**

### ***Pinus strobus* (Pinaceae)**

**Description:** Conical pine to 70 feet or more in height with dense foliage and branches retained to the base. Five, soft, flexible blue-green needles are borne per fascicle with needles to 5 inches long. Of the pines encountered in Arkansas, this is probably the most beautiful but difficult to grow.

**Site Requirements:** Hardy USDA zones 3 to 7; in the northern half of Arkansas. This species should have sunny positions with fertile, moist, well drained soil and an summer moisture.

**Use in Right of Way:** Only suited for use as an occasional specimen near state entrances, and then in only the northern counties. Though it will grow in central Arkansas, the longevity of the tree decreases as one moves south in the state.

**Planting/Seeding Requirements:** Transplant balled and burlapped plants during the winter months.

**Maintenance Requirements:** Attention to watering is required until the plant is established (usually 2 growing seasons). Bagworms are sometimes a serious pest.

**Cultivars / Related Species:** Several cultivars and related 5-needle pines are encountered in the nursery trade; however, their use is not recommended.

**Comments:** The 5 - needle pines are the most demanding pines with the 2 - needle pines the least demanding.

#### **Chinese Pistachio**

*Pistacia chinensis* (Anacardiaceae)

**Description:** Medium growth rate deciduous tree reaching 30 feet in height with a rounded head. Leaves are alternate, evenly pinnately compound to 10 inches long with 10 to 12 leaflets. Fall color is usually orange or orange-red, especially in difficult sites. Plants are dioecious, with males the preferred species because of less landscape clutter.

**Site Requirements:** Hardy USDA zones 6 to 9, statewide in Arkansas. Very tolerant of dry, difficult sites with plants performing well when the pH ranges from 6 to 7.5. Plants should have full sun. Plants will not tolerate poor drainage.

**Use in Right of Way:** Useful as occasional specimens and or for mass plantings statewide, provided the site is not poorly drained. Could be used in southern Arkansas for fall display.

**Planting/Seeding Requirements:** Transplant balled and burlapped or container grown plants during the fall or spring. It is considered easy to transplant.

**Maintenance Requirements:** Although somewhat slow to establish, the Chinese Pistachio, tolerates drought well even when newly transplanted. Newly planted plants may be multiple trunked and may require staking and/or pruning to maintain a central leader. Plants are considered disease and insect free.

**Comments:** Although occasionally touted as an outstanding specimen, this species has yet to hit the big time in the nursery and landscape trade. It is well worth using in difficult sites.

**Sycamore*****Platanus occidentalis* (Platanaceae)**

**Description:** A fast growing deciduous tree reaching 80 feet or more in height and spread with exfoliating white or tan colored bark on younger limbs. Old limbs turn gray with furrowed bark. Leaves are large, prominently 3-lobed and to 10 inches long and wide. There is no fall color. Sycamores produce conspicuous 1 1/2 inch pendulous seed balls which persist through the winter, dispersing in the spring.

**Site Requirements:** Hardy USDA zones 4 to 9 and statewide in Arkansas. Performs well in almost any situation but is typically found in the wild along moist stream banks. Production of unwanted seedlings may be a problem.

**Use in Right of Way:** A coarse textured tree that could be planted in the right of way where a fast growing, large tree is needed. It is always dropping something during the year, so it is not well suited for neatly maintained landscape spaces.

**Planting/Seeding Requirements:** Transplant balled and burlapped or container grown plants anytime during the dormant season.

**Maintenance Requirements:** Once established sycamores are almost indestructible; however, they are plagued with two serious pests that appear yearly. These pests, though, are not life threatening to the tree and simply reduce its aesthetic appeal. The pests are sycamore anthracnose which kills newly emerging leaves almost every spring and sycamore lacebug which turns the leaves russet colored in late summer. Neither pest warrants spraying for control. Sycamores will drop their inner leaves if drought stressed, alarming some people into thinking the tree is dyeing.

**Related Species:** *Platanus x acerifolia*, the London Plaintree, is a more refined sycamore for landscape use. The tree has a moderate growth rate and only reaches 60 feet in height. The bark tends to stay white longer than with *P. occidentalis*. The London Plaintree has a smaller leaf than the native species and has two to three seed balls in a dangling chain instead of one. It is resistant to sycamore anthracnose.

**Cottonwood, Poplar*****Populus deltoides* (Salicaceae)**

**Description:** A fast growing deciduous tree reaching 75 feet or more in height with a massive main trunk and branching high in the tree. Leaves are deltoid shaped, glossy gray green and to 5 inches long. Female trees produce an abundance of "cotton" (wind borne seeds) in the spring which most people find objectionable. Fall color is yellow but only occurs during dry years. The rustling of the leaves in a summer breeze makes this one of the few tree species that can be identified by a characteristic sound.

**Site Requirements:** Hardy USDA zones 2 to 9 and statewide in Arkansas. A creek bank tree that will grow in all but droughty sites. Reproduction requires abundant moisture for seed germination. Reseeding is not a serious problem with this species.

**Use in Right of Way:** Of limited use because better species would be longer lived. If existing, the tree should be saved.

**Planting/Seeding Requirements:** Transplants readily as bare root, container grown or balled and burlapped trees during the dormant season.

**Maintenance Requirements:** Once established the tree requires little in the way of care. Because of its brittle wood, it will drop small limbs during windstorms. However, its sparsely branched canopy makes this species one of the least likely trees to be affected by ice storms. In the summer leafdrop of interior leaves is common when drought hits. Stem canker is a problem with this species and will sometimes take out trees 10 to 20 years old. Cankers cannot be successfully treated.

**Cultivars:** A number of "cottonless" cottonwoods are on the market. These male trees are vegetatively propagated using deciduous hardwood cuttings. 'Siouxland' is the most common of these but others include 'Robusta' and 'Noreaster'.

**Related Species:** Several other poplars are in the landscape market. The Hybrid Poplars are a group of diverse genetic makeup that were developed for use in the pulpwood industry in Scandinavia. They are very fast growing but of limited or unknown value in landscape situations. Most appear to be susceptible to canker diseases.

*P. alba*, White Poplar, Silver Poplar or mistakenly called "Silver Leaf Maple", is a fast growing tree with leaves to 4 inches long, green above and silvery beneath. Young trunks are white, turning gray-black with age. The tree reaches 45 feet in height with an oval outline; however, it often suckers from the ground creating a coppice. Not a really worthwhile species but one that is sometimes encountered in existing plantings and worth saving.

*P. nigra* 'Italica', Lombardy Poplar, is an erect growing tree reaching 40 feet in height with a spread of less than 10 feet. It is very fast growing and very susceptible to canker disease. It should not be planted. 'Theves' is a similar cultivar that is reportedly more resistant to canker, however, cases of canker have been observed on this cultivar. No cultivar of this species should be planted.

**Comments:** Better landscape species can be acquired than the poplars. They are better suited for use in the Great Plains states and the Southwest.

## **Cherrylaurel**

*Prunus caroliniana* (Rosaceae)

**Description:** Moderate to slow growing broadleaf evergreen tree reaching 25 feet in height and spread. Leaves are glossy green and to 3 inches in length. Flowers are white, 5-petaled and borne in panicles 2 to 3 inches in length. Flowers are not very significant in appearance. Black berries are produced in the fall which permits bird-spread of to adjoining locations.

**Site Requirements:** Hardy USDA zones 7 to 10 and statewide in Arkansas with the possible exception of Benton and Baxter counties. It persists well in Fayetteville. A native of the Gulf Coastal plain, it is better suited to bottomland situations but it is adaptable and will tolerate more demanding sites.

**Use in Right of Way:** Can be used as a small evergreen specimen tree but more commonly it is planted in mass for screening. If planted for screening it can be maintained as a sheared hedge at almost any height or it can be maintained as an informal screen by cutting back every 3 to 5 years as needed to maintain size.

**Planting/Seeding Requirements:** Transplant balled and burlapped or container grown plants in the spring.

**Maintenance Requirements:** Once established, little maintenance is required unless it is being maintained as a hedge. In that case pruning may be needed 3 times a year to maintain a formal hedge.

**Cultivars:** 'Bright 'N Tight' is a compact growing form with smaller leaves and a pyramidal habit. It is well suited for hedging purposes.

## **Purpleleaf Plum**

*Prunus cerasifera* (Rosaceae)

**Description:** Medium to fast growing, twiggy deciduous trees reaching 20 to 25 feet in height with purple leaves. Leaves are to 3 inches long and purple during the summer; without fall color. Flowers are pink and typical of the flowering cherries. Edible, red to blackish fruit to 1 1/2 inch across are occasionally produced.

**Site Requirements:** Hardy USDA zones 5 to 9 and statewide in Arkansas. An adaptable species that will grow in most well drained sites. It will not tolerate wet soils.

**Use in Right of Way:** Useful at interchanges and rest areas where more refined landscape plants are desired. Because of peachtree borer attack, this species should never be planted in rows because invariably some of the trees will be killed within a few years of planting.

**Planting/Seeding Requirements:** Transplant balled and burlapped or container grown trees in the dormant season.



**Maintenance Requirements:** Not a long lived tree. In fact, the peachtree borer often kills 50% of a planting in the first 5 years of establishment. Necessary control procedures reduce the effectiveness of this species in the landscape. Spring webworm is also a problem with this species.

**Cultivars:** 'Atropurpurea', Newport' and 'Thundercloud' are the most common in the trade.

**Related Species:** *P. x cistena*, Purpleleaf Sand Cherry, is an interesting 8 foot tall cherry that spreads by means of underground stems and can form a thicket similar to our native sand plums. This could be used as a mass planting at intervals along the right of way to introduce a color contrast to the overall landscape.

**Comments:** Purple leaved plants are overused in the landscape.

### **Japanese Flowering Cherry**

*Prunus serrulata* (Rosaceae)

**Description:** Medium growing deciduous flowering trees reaching 20 feet in height with a similar spread. Variable in outline depending on cultivar characteristic but most are vase shaped or broad spreading in habit. Flowers are pink or white, multipetaled and among the most beautiful of the spring flowering trees. Fall color is minimal.

**Site Requirements:** Hardy USDA zones 6 to 9, statewide in Arkansas. Trees require excellent drainage but have poor drought tolerance. A good, fertile soil with a pH of 6 to 6.5 is best.

**Use in Right of Way:** As specimen plantings near rest areas. Not recommended for use where maintenance cannot be readily provided.

**Planting/Seeding Requirements:** Transplant balled and burlapped or container grown trees in the dormant period.

**Maintenance Requirements:** Trees are susceptible to borer attack and will not survive establishment without some attention. Once established, severe droughts will make them again susceptible to borer attack.

**Cultivars:** Several are found in the nursery trade with the most common 'Kwanzan', an extremely floriferous, pink double flowered form with a vase shape; 'Mt. Fuji' is a white flowered form; 'Shirofugen' is a vigorous, double, white flowered form that fades to pink with age.

**Related Species:** *P. subhirtella* 'Pendula', Weeping Japanese Cherry, is one of the most graceful landscape trees that provide both flowers and the weeping form. Trees reach 35 feet if allowed to grow on their own roots; if grafted at 6 feet onto a rootstock they look like umbrellas and only attain 15 feet in height. Flowers are doubled, pale pink in color.

*P. x yedoensis*, Yoshino Cherry, are round headed to weeping trees with pink or white flowers in early spring. This species is planted in Washington DC around the Tidal Basin and is the basis for the Cherry Blossom Festival. Several cultivars are listed but none are commonly available. It has done well in Fayetteville under trying conditions.

**Comments:** Because of their beauty, flowering cherries should be considered for planting; however, because of their difficulty in establishment they should be located where they can be cared for.

**Bradford Flowering Pear**     *Pyrus calleryana* 'Bradford' (Rosaceae)

**Description:** Fast growing, oval shaped, short trunked, multiple branched deciduous flowering tree reaching 35 feet in height with a spread of 25 feet. Leaves are glossy green, turning maroon in the fall, and to 4 inches in length. Flowers are white and cover the tree in the spring. Fruit are only produced when pollen is provided by another clone or a seedling; pears are self incompatible. When produced the fruit are marble sized, russet brown in color.

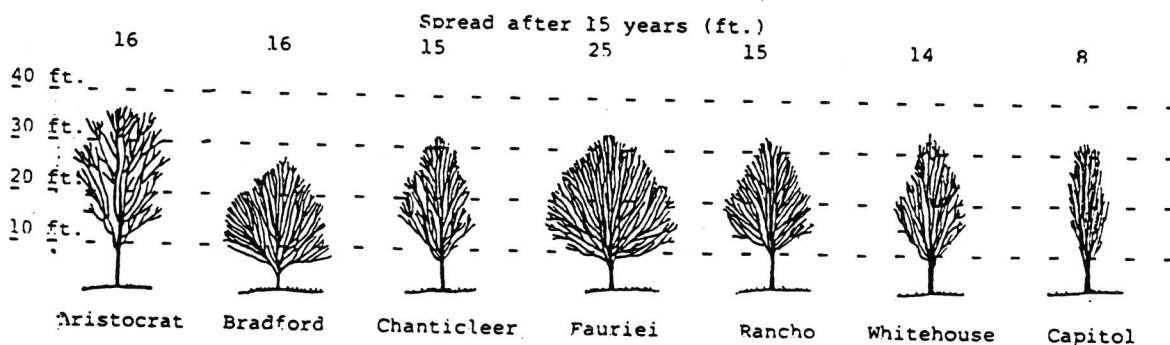
**Site Requirements:** Hardy USDA zones 5 to 9, statewide in Arkansas. As indicated by the widespread planting of this tree, it has few specific site requirements. It tolerates wet soils well or droughty situations. In alkaline soils it tends to develop chlorosis (iron?).

**Use in Right of Way:** This species has a very formal appearance, so its use should be limited to areas where a degree of formality is intended in the design. Such situations could be at interchanges, rest areas or in urban settings.

**Planting/Seeding Requirements:** Transplant bare root, balled and burlapped or container grown trees in the dormant season. Because trees are so fast growing, little advantage is gained by planting larger size trees. One growing season will turn a broom handle into a fine young tree.

**Maintenance Requirements:** Once established, little attention is needed. No serious diseases or insects have been observed to date. Pruning trees while young (every year for the first 3 years) to remove the lowest limbs and thin the number of internal limbs in the crown will raise the head on the tree and make mowing easier plus reduce the likelihood of limb breakage problems later in the tree's life.

**Cultivars:** Over a dozen cultivars have been released. The accompanying illustration gives the forms of the most common types. Tree form is the most outstanding difference between cultivars.



**Comments:** A popular tree that is rapidly being overplanted.

### **Sawtooth Oak**

*Quercus acutissima* (Fagaceae)

**Description:** A moderate growth rate, low branched, deciduous tree reaching 45 feet in height with a spread equal or occasionally greater than its height. Leaves are glossy green to 8 inches long with bristles along the margin and decidedly un-oaklike appearance. Fall color is yellow.

**Site Requirements:** Hardy USDA zones 5 to 9 and statewide in Arkansas. Trees are tolerant of difficult sites but do best in better soils. Very heat tolerant.

**Use in Right of Way:** Useful as individual specimens at interchanges or rest areas or as an addition to the right of way planting. Because of its wide spreading, low branched habit of growth, it should not be planted within 35 feet of the roadway.

**Planting/Seeding Requirements:** Transplants readily as bare root, balled and burlapped or container grown trees.

**Maintenance Requirements:** Once established little additional attention is required.

### **Cultivars:**

**Comments:** Planted by the Arkansas Forestry Commission as a deer browse tree, primarily for its large crops of acorns.

### **White Oak**

*Quercus alba* (Fagaceae)

**Description:** Large, moderate to slow growing deciduous tree reaching 80 feet or more in height with a rounded crown. With extreme age, such as the Council Oak at Dardanelle, becoming wider than tall. Leaves are deeply lobed to 8 inches long; fall color is unpredictable but when it does occur usually in shades of orange or red.

**Site Requirements:** Hardy USDA zones 3 to 9 and statewide in Arkansas. Though found on a wide variety of sites, it does best in fertile, deep well drained soil with an acidic pH of 5.5 to 6.5.

**Use in Right of Way:** Not likely to be found in the nursery trade but seedlings are available through the Arkansas Forestry Commission. Any white oak trees should be left in native stands. Useful in any situation where a spectacular specimen tree is needed.

**Planting/Seeding Requirements:** Only young seedlings transplant well. Trees up to 3 years old may be moved balled and burlapped, but after that their deep roots make replanting difficult.

**Maintenance Requirements:** Once established, little attention is required.

**Related Species:** *Q. bicolor*, Swamp White Oak, is a similar species in the white oak group which reaches 60 or more feet in height with a rounded crown. Fall color is usually yellow but sometimes red or orange. It is found in bottomland situations along streambanks; never as an upland species like white oak. It is considered more easily transplanted than the white oak and is sparingly in the nursery trade.

*Q. lyrata*, Overcup Oak, is a smaller tree in the white oak group which reaches 35 feet or more in height. It is a bottomland species in the wild but will tolerate sites that are prone to be droughty. Fall color is yellow brown.

*Q. macrocarpa*, Bur Oak or Mossycup Oak, is a broad spreading tree reaching 70 feet in height. Typically a bottomland species, this tree will survive dry, clayey upland sites. It is difficult to transplant so must be moved as a small tree.

**Comments:** The White Oak is the most beautiful of all oaks. Unfortunately its difficulty in transplanting and relatively slow growth rate will continue to limit its use in landscape situations. Nurseries in the south that produce trees were surveyed and it was found that 18% listed *Q. alba* while 5% listed *Q. bicolor* or *Q. macrocarpa*.

#### Pin Oak

#### *Quercus palustris* (Fagaceae)

**Description:** Fast growing, pyramidal tree to 60 feet in height with a width one half it's height. Trees have a strong central leader. Lower branches droop as they get longer and sweep the ground unless removed. Mature trees take on a more oval outline and lose their pyramidal character. Leaves are deeply lobed, bristle tipped and to 8 inches long. Fall color is red to maroon.

**Site Requirements:** Hardy USDA zones 4 to 8 and statewide in Arkansas. This is an adaptable species doing well in most landscape sites provided they are not poorly drained and provided the pH is between 5.5 and 6.8. High pH soils cause severe iron chlorosis.

**Use in Right of Way:** As one of the most popular large shade trees, the pin oak is at home in any position where a large tree is needed. Because arching lower limbs, it should not be planted within 30 feet of the roadway.

**Planting/Seeding Requirements:** Transplants readily as bare root, balled and burlapped or container grown trees during the dormant season. One of the easiest oaks to transplant, helping to explain its widespread popularity. The red oak group is easier to transplant than the white oaks.

**Maintenance Requirements:** Easily established. Lower limbs will have to be pruned on a biyearly basis to provide mowing clearance.



**Related Species:** *Q. coccinea*, Scarlet Oak, is similar to the pin oak except it is more broad spreading and not as pyramidal while young. Trees reach a similar size but lower limbs do not droop as in pin oak. Fall color is red. It is more commonly available from midwestern nurseries than southern growers.

*Q. falcata*, Southern Red Oak or Spanish Oak, is a 90 foot tall, fast growing tree found in throughout Arkansas and most of the southeastern states. Trees are not commonly found in the nursery trade in the south but are available from forestry seedling suppliers. It is a much larger and courser tree than the pin oak and scarlet oak and not as well suited for landscape use.

*Q. falcata* var. *pagodifolia*, Cherrybark Oak, is an even larger and faster growing variety of Southern Red Oak, often reaching heights of 120 feet in good sites. The tree is favored for oak forest replanting sites because of its fast growth and straight, limb free trunks. This species could be used in right of way plantings where a fast growing tree is needed.

*Q. rubra*, Red Oak, is a 75 foot tall specimen with a rounded crown and up-swept branches. The tree is comparable to the pin oak in landscape usage and cultural requirements, but is seldom used.

*Q. shumardii*, Shumard Oak, is a pyramidal tree resembling pin oak except the leaves are larger, the general character is coarser and the acorns are larger. This species is more tolerant of poor growing conditions and will grow in areas with alkaline soils without developing iron chlorosis. It is becoming more common in the nursery trade. *Q. shumardii* var. *acerifolia*, Mapleleaf Oak, has gained a certain amount of notoriety in Arkansas because of its maple like oak leaves. The variety, not yet fully accepted as a true botanical variety, is a smaller version of the shumard oak that is found only on the top of Mt. Magazine.

*Q. velutina*, Black Oak, is a coarse leaved tree reaching 70 feet in height with a large, round open crown. Though not common in the nursery trade, it is commonly along roadsides throughout the state.

**Comments:** Of the oaks in this red oak group, 61% of southern production nurseries list Pin Oak in their catalogs; 40% list red oak and 37% list shumard oak. The other red oaks were offered by less than 20% of the firms.

#### **Willow Oak**

#### ***Quercus phellos* (Fagaceae)**

**Description:** A large, fast growing deciduous oak reaching 90 feet in height with massive, unbranched lower trunks. Trees are rounded in outline. Leaves are linear to 5 inches long and resemble a willow or peach leaf. Fall color is yellow or brown.

**Site Requirements:** Hardy USDA zones 5 to 9, statewide in Arkansas. A bottomland species that is adaptable to most sites provided they are not excessively droughty or the pH is above 6.8.

**Use in Right of Way:** Useful in any location where a large, stately tree is needed such as interchanges, picnic areas or along rights of way.

**Planting/Seeding Requirements:** Transplants readily as balled and burlapped or container grown trees.

**Maintenance Requirements:** The smaller leaves and high crown of this species make this one of the lowest maintenance oaks. Once established, an easily cared for tree.

**Related Species:** *Q. imbricata*, Shingle Oak, is a medium size, round headed tree reaching 60 feet in height. The growth rate is moderate to slow. The leaves are broader than the willow oak. Not commonly found in southern nurseries, but available from midwestern suppliers. Called shingle oak because wood of this species was used for shingle making. Hardy USDA zones 5 to 9.

*Q. laurifolia*, Laurel Oak, has a dense, round crown with leathery leaves which persist until mid winter. The tree resembles the water oak but lacks the terminal lobes. Well suited for the coastal plains and wet sites. Hardy USDA zones 6 to 9.

*Q. nigra*, Water Oak, is an attractive, moderate to slow growing oak with a rounded crown and mature height of 50 feet. Trees are semievergreen and retain their leaves until midwinter. Leaves are three lobed at the apex and more leathery than the willow oak. Hardy USDA zones 6 to 9.

*Q. virginiana*, Live Oak, of the deep south is hardy in the southern one third of Arkansas but it seldom attains its mature stature in the state. The tree is evergreen with entire to sparingly lobed leaves. This species is not recommended for general roadside use in Arkansas because of its limited hardiness.

**Comments:** Of the oaks in this group, 58% of southern nurseries carry the willow oak, 29% carry the water oak and live oak.

#### **English Oak**

***Quercus robur* 'Fastigiata' (Fagaceae)**

**Description:** Medium to fast growing oak in the white oak group with a narrow, columnar form. Trees reach 40 feet in height with a spread of less than 10 feet. Fall color is yellowish brown.

**Site Requirements:** Hardy USDA zones 5 to 8, statewide in Arkansas. Of the white oak group, this European species is one of the most tolerant of poor growing conditions as long as good drainage is provided.

**Use in Right of Way:** Useful where the tall, fastigiate form could be used as a landscape statement. Not suited for general right of way planting.

**Planting/Seeding Requirements:** Transplant balled and burlapped or container grown trees in the dormant season.

**Maintenance Requirements:** Little maintenance required once established.

**Comments:** A tree that is becoming more common in the nursery trade.

#### **Black Locust**

*Robinia pseudoacacia* (Leguminosae)

**Description:** Erect growing deciduous trees reaching 40 feet in height. Leaves are compound to 8 inches long. Stems are armed with stout spines while young. The tree is rhizomatous and often forms thickets. White, very fragrant, pendulous pea-like flowers are produced in mid spring. Black 3 inch long locust pods are produced in the fall and persist over winter.

**Site Requirements:** Hardy USDA zones 3 to 9, hardy statewide in Arkansas. This is an adaptable species that will grow in a wide array of soil types. It has good drought tolerance.

**Use in Right of Way:** Useful in mass plantings along the right of way.

**Planting/Seeding Requirements:** Transplants readily as bare root or balled and burlapped plants.

**Maintenance Requirements:** Easily maintained and will sucker if cut off at the ground. Not a long lived species, trees seldom exceed 25 years of age. The most serious problem of this species is a leaf miner that turns the leaves brown every summer, for much of the summer. The tree is tough enough to survive the problem but it does seriously detract from the appearance of the tree. Spraying for leaf miner insects is difficult because timing of application must be exact and ongoing.

**Cultivars:** Several are listed, but not commonly found.

**Comments:** This species is more commonly used in nurseries of the Great Plains. Kansas nurseries often grow the plant.

#### **Weeping Willow**

*Salix babylonica* (Salicaceae)

**Description:** Fast growing, weeping deciduous tree reaching 45 feet in height with a spread approaching its height. Long, arching branches sometimes sweep the ground. Fall color is yellow, and late to occur. This species leafs out before most deciduous trees and loses its leaves after most other species.

**Site Requirements:** Hardy USDA zones 5 to 9, statewide in Arkansas. Tolerant of wide array of soil types, from wet bogs to dry, upland sites. It will not grow on rock piles, but most other sites are acceptable.

**Use in Right of Way:** Could be used in any situation where the graceful form of a willow useful, especially near water. Could be used near rest areas or at interchanges.

**Planting/Seeding Requirements:** Transplants readily in the dormant season from containers, balled and burlapped plants or even as unrooted cuttings stuck in moist soil.

**Maintenance Requirements:** Trees are relatively easy to maintain. Canker diseases can be a problem in some years.

**Related species:** *S. alba* 'Tristis', Golden Weeping Willow, is a fast growing tree reaching 70 feet in height with young branchlets especially long and slender and bright yellow in color.

*S. x blanda*, Wisconsin Weeping Willow, is often listed in nursery lists but is apparently a synonym for the Babylon Weeping Willow.

*S. matsudana* 'Tortuosa', Corkscrew Willow, is the most common of the several novelty varieties available from growers. Trees are oval in outline with ascending branches with branchlets weeping and twisted and curled. The tree is, from a distance, just another willow. The curly character of the bark is observable just from closer inspection.

*S. matsudana* x *S. alba* 'Austree' is a tree that has been making a lot of news in the horticultural world in the past few years because the promoters have been spending a lot of money promoting it. As far as can be determined, it is just another hybrid willow. It is indeed fast growing, but all willows are fast growing. The tree is being promoted for all sorts of environmental purposes from wind breaks to prevention of erosion. As far as is now known, it is nothing special.

**Comments:** None of the willows are long lived in any landscape setting, seldom persisting over 25 years.

#### **Western Soapberry**

*Sapindus drummondii* (Sapindaceae)

**Description:** A small, round headed deciduous tree with a slow to moderate growth rate that reaches 30 feet in height. Leaves are compound to 12 inches long with 12 to 16 leaflets. In midsummer clusters of yellowish-green flowers appear in terminal panicles to 8 inches long. In the fall clusters of marble size yellowish fruit are produced that persist through much of the winter.

**Site Requirements:** Hardy USDA zones 5 to 9, statewide in Arkansas. This native tree is seldom encountered in the wild or

in the landscape but it is well suited to dry, exposed, especially sandy sites. The tree has tremendous drought tolerance and will grow in areas with less than 15 inches of rain a year. The species does well in good soil provided given adequate drainage.

**Use in Right of Way:** An ideal specimen for mass planting in the right of way or interchanges. Well suited for the southwestern part of Arkansas.

**Planting/Seeding Requirements:** Transplants readily as container grown or balled and burlapped plants during the dormant season.

**Maintenance Requirements:** Little attention to maintenance is required. In good sites reseeding could be a problem, but that is a problem I have never observed.

**Comments:** A little used tree but one that is produced by Texas, Oklahoma and Kansas nurseries.

### **Sassafras**

### ***Sassafras albidum* (Lauraceae)**

**Description:** A small, slow growing, irregularly shaped 35 foot tall deciduous tree with variable leaves that are either unlobed, have one lobe or two lobes. Fall color is brilliant orange. A tree that can attain considerable size, but one that today has been almost relegated to shrub status because the roots were harvested in the past for sassafras extraction. The tree forms suckers and often creates clonal colonies from a single plant.

**Site Requirements:** Hardy USDA zones 4 to 9 and statewide in Arkansas. A tolerant species that requires good drainage and partial sun to full shade. Growth is faster in good soils but the species will survive in poor, shallow sites.

**Use in Right of Way:** Useful for mass planting, interchanges or anywhere that fall color would be appropriate. This is a species that should be used more in all landscape plantings.

**Planting/Seeding Requirements:** Transplant balled and burlapped or container grown trees in the spring. Considered somewhat difficult to transplant unless root pruned by the production nursery to break the deep tap root.

**Maintenance Requirements:** Easily maintained once established.

**Comments:** An excellent tree for fall color planting.



## **Bald Cypress**

*Taxodium distichum* (Taxodiaceae)

**Description:** A tall, erect deciduous conifer reaching 70 feet in height with a decidedly pyramidal form while young, become more broadspreading with age. In late summer the foliage takes on a reddish color.

**Site Requirements:** Hardy USDA zones 4 to 9, statewide in Arkansas. Although this species is found in swamps, it is quite drought tolerant. Standing water is required only for seed germination. The tree is used in low rainfall areas of western Texas and Oklahoma because of its drought tolerance. It will grow in lowland, swampy sites or more arid, upland sites. It tolerates a wide range in pH from 5.5 to 7.5. Nursery grown plants cannot be taken out and plunked down in the middle of a lake and be expected to survive.

**Use in Right of Way:** This species, like most narrowly pyramidal plants, is best used in mass plantings. It is a natural around swampy areas and lakes and is very much at home in the central and southern part of Arkansas. It is useful in interchanges, rest areas, and for right of way plantings.

**Planting/Seeding Requirements:** Transplant young bareroot seedlings, container grown plants or balled and burlapped plants during the dormant season.

**Maintenance Requirements:** Little or no maintenance is required once established.

**Related Species:** *T. ascendens*, Pond Cypress, is similar to the bald cypress except it is considerably more narrow and the limbs emerge from the main trunk at right angles. It presents an interesting contrast to the pyramidal form of the more common bald cypress.

**Comments:** A logical addition in wet areas.

## **Blackhaw**

*Viburnum prunifolium* (Caprifoliaceae)

**Description:** A slow growing, round headed, usually multitrunked tree reaching 20 feet in height with a similar spread. The lustrous green leaves are opposite, entire and to 3 inches long. White clusters of flowers appear in late spring. Blue, turning black, edible fruit are produced in pendant clusters. Although edible, the fruit have a color and texture reminiscent of used crank case oil.

**Site Requirements:** Hardy USDA zones 3 to 9 and hardy statewide in Arkansas. This species is adapted to droughty sites where it occurs as an understory shrub or at the edge of the woods where it makes a small tree. The soil should be well drained.

**Use in Right of Way:** A useful addition to the right of way where a natural appearance is desired. Worth saving if it occurs naturally.

**Planting/Seeding Requirements:** Transplants easily as balled and burlapped or container grown plants. Young seedlings move well bare root.

**Maintenance Requirements:** No serious problems.

**Comments:** Not commonly available in the nursery trade but a worthy subject.

**Chastetree**

***Vitex negundo* (Verbenaceae)**

**Description:** A fast growing, broad spreading deciduous tree reaching 25 feet in height with compound, palmately arranged leaves. Flowers are blue and appear in mid summer in terminal, finger-like spikes to 8 inches long.

**Site Requirements:** Hardy USDA zones 6 to 9, statewide in Arkansas. Because the plant will occasionally freeze back in northern counties, it attains a larger size in the south. Chastetrees are adaptable of a wide array of soil types so long as they are well drained. The plant requires full sun conditions.

**Use in Right of Way:** Useful at interchanges or rest areas where summer color is desired. Because this species blooms before crapemyrtle, it could be used as an early introduction to summer color.

**Planting/Seeding Requirements:** Transplant container grown plants in the spring.

**Maintenance Requirements:** Easily maintained. Has a high degree of drought tolerance.

**Cultivars / Related Species:** 'Alba' is a white flowered form.

*V. agnus-castus* is a similar species which lacks the cold hardiness of *V. negundo*.

**Comments:** Not often seen in the landscape but a tough plant that could be used more because of its tolerance of heat and drought.

## Shrubs for Right-of-Way Plantings

Shrubs are the primary element for vegetative screening at eye level for the roadway and rest areas in the highway corridor. Much visual blight along the roadway such as unattractive objects, structures and distractions that appear in the vertical zone from the ground to the top of the windshield viewing area can be eliminated by shrub barriers. Shrubs screen by physically hiding undesirable views, by providing a backdrop for ground level focal points such as wildflowers, and by the shrubs serving as a focal point themselves thereby diverting attention from unattractive views beyond.

A shrub by general definition is usually a multiple stemmed plant which develops foliage from the ground to the top of its canopy. Most shrubs, whether deciduous or evergreen, usually can take pruning well to control height and to modify form. The most successful use of shrubs in a low maintenance environment is to select those plants that can be effective because of their natural growth characteristics without pruning. Shrubs can be used in designing the vegetation sequence along the roadway to provide different effects at every season of the year. Seasonal effects result from winter form, spring or summer flowering, summer foliage color and textures and often autumn foliage color changes and ripe fruit color. Shrub selection along the open roadway may heavily utilize flowering material to allow the motorist to vary his view and reduce monotony while shrubs with less conspicuous flowers or other attributes may be selected in high traffic situations where motorists' attention should not be diverted from the roadway.

The use of shrubs in the rest area should contribute to the separation of these sites from the highway by visual enclosure at area perimeters. Shrub borders of evergreen material can reduce noise and exhaust levels in rest areas. An obvious use of shrubs in rest areas is for the vegetation enhancement of the buildings, picnic areas and grounds. Rest area plantings can be used to showcase the native vegetation of the various regions of Arkansas and add to a subtle educational component to visitor/tourists enjoyment and travel relaxation.

Shrubs should be used in groups to create bold sweeps of plant material rather than in precise linear rows. Most large shrub groups should include several species that relate visually or are found growing in close association naturally. Shrubs selected for planting should have natural relationships to the trees, grasses and wildflowers used in the overall design.

### Shrubs for Planting in Mountainous Regions

<i>Abelia grandiflora</i>	Glossy Abeli
<i>Euonymus alatus</i>	Winged Euonymus
<i>Forsythia x intermedia</i>	Forsythia
<i>Ilex verticillata</i>	Winterberry
<i>Jasminum nudiflorum</i>	Winter Jasmine
<i>Kolkwitzia amabilis</i>	Beautybush
<i>Lonicera tartarica</i>	Tartarian Honeysuckle
<i>Philadelphus x lemoinei</i>	Mockorange
<i>Rhus typhina</i>	Staghorn Sumac
<i>Spiraea vanhoutte</i>	VanHoutte Spirea
<i>Viburnum plicatum tomentosum</i>	Doublefile Viburnum
<i>Viburnum x juddii</i>	Judd Viburnum

### Shrubs for Planting the Delta and Coastal Plains Regions

<i>Elaeagnus pungens</i>	Thorny Elaeagnus
<i>Ilex glabra</i>	Inkberry Holly
<i>Jasminum nudiflorum</i>	Winter Jasmine
<i>Juniperus conferta</i>	Shore Juniper
<i>Ligustrum ovalifolium 'Aureum'</i>	Variegated Privet
<i>Myrica cerifera</i>	Southern Waxmyrtle
<i>Rhus typhina</i>	Staghorn Sumac
<i>Viburnum plicatum tomentosum</i>	Doublefile Viburnum
<i>Viburnum rhytidophyllum</i>	Leatherleaf Viburnum
<i>Yucca filamentosa</i>	Adam's Needle Yucca

## **Glossy Abelia**

*Abelia x grandiflora* (Caprifoliaceae)

**Description:** A spreading, dense, rounded multistemmed evergreen shrub with arching branches that grow to a height of 6 feet. The leaves are 1/2 - 1 1/2" long with a lustrous dark green color in summer and a bronze-green winter color.

**Site Requirements:** Hardy from USDA zones 6-9. Prefers well-drained, moist, acid soil and is adapted to full sun to 1/2 shade and medium fertility.

**Use in Right of Way:** Good as a mass planting where year round screening may be desired. The Edward Goucher hybrid is valuable for interchanges where flowering display is desired and sight lines must be protected.

**Planting/Seeding Requirements:** Easily grown and transplanted from balled and burlapped or from containers. Occasional thinning needed to remove dead wood. New Growth can be pinched or sheared in spring for compactness.

**Maintenance Requirements:** Trouble-free, easy to maintain. Hard pruning in late winter is recommended to rejuvenate old plants. No serious insects or diseases.

**Cultivars/Related Species:** 'Francis Mason'. Less vigorous than species. Leaves yellow to yellow with yellow-green middle. *Abelia x hybrida* 'Edward Goucher' is similar to *A. grandiflora*, but with showier flowers, more compact growth, and slightly less hardy than *A. grandiflora*.

## **Red Chokeberry**

*Aronia arbutifolia* (Rosaceae)

**Description:** Upright, multistemmed open shrub, with a round top reaching a height of 6 - 10 feet. Majority of foliage is present on upper 1/2 to 1/3 of plant. Leaves are 1 1/2 to 3 1/2" long, with a lustrous dark green upper surface. Fruit is a bright red berry of 1/4" diameter that persists in winter. The plant tends to sucker and will spread into a clump.

**Site Requirements:** Hardy in zones 4-9, prefers soil with adequate drainage but adapts to wet and dry sites of wide soil types. Grows in full sun or part shade.

**Use in Right of Way:** Valuable for areas adjacent to R.O.W. perimeter where naturalistic summer screening is desired. The flower and fruit display can provide visual interest that complements the native woody vegetation.

**Planting/Seeding Requirements:** Transplants well due to fibrous root system from balled and burlapped or containers.

**Maintenance Requirements:** No serious problems but occasional leaf spots and twig & fruit blight.



**Cultivars/Related Species:** 'Brilliantissima' - Brilliant red chokeberry with lustrous dark green leaves that turn brilliant scarlet in fall. It has more abundant flowers and glossier, larger and more abundant red fruit.

**Wintergreen Barberry**

***Berberis julianae* (Berberidaceae)**

**Description:** A non-deciduous shrub that forms a 6-10' mound of dense branches and shiny green foliage. Leaves are narrow, 2-3" long with spines on margins. Stems have stiff thorns that make this plant valuable as a barrier. It fruits in late fall producing round to oblong blue berries.

**Site Requirements:** Hardy in zones 6-8. Wide tolerance to soil types, growing in sun or part shade, with medium drainage & fertility.

**Use in Right of Way:** A valuable plant for mass planting or low barrier hedge in interchanges and at rest stops. The presence of spines acts as a natural deterrent to pedestrian and pet traffic.

**Planting/Seeding Requirements:** Transplants readily from containers, and new transplants should be watered in thoroughly. Mulching is beneficial for good early plant growth.

**Maintenance Requirements:** Requires little maintenance once established. Does not require pruning and is not generally affected by insect or disease pests.

**Mentor Barberry**

***Berberis x mentorensis* (Berberidaceae)**

**Description:** Upright plant growing to 6 feet with many stiff, slender stems, becoming bushy with age. Regular, rounded form to a spread of 5 feet having clusters of 3 spines distributed along the stems high. The dark green leathery leaves turn yellow-orange-red in fall. This plant is a semi-evergreen with moderate to rapid growth rate and an excellent barrier plant.

**Site Requirements:** Hardy in zones 6-8. Very adaptable to soils and exposure. It prefers well-drained soil and full to part shade.

**Use in Right of Way:** For use as a screen planting along R.O.W. fence where screening is desired year round. This plant is very dense and visually impenetrable even when out of leaf. Valuable for Rest Areas for screening and to prevent pedestrian access.

**Planting/Seeding Requirements:** Easily transplanted from containers or balled and burlapped situations.

**Maintenance Requirements:** No serious pests. No pruning needed. This plant requires little or no care after establishment and withstands heat and drought very well.

## Japanese Barberry

*Berberis thunbergii* (Berberidaceae)

**Description:** Multi-branched, very dense rounded shrub with a height of 5 feet and spread of 5 - 7 feet at maturity. Leaves are 1/2 - 1 1/4" long and sometimes spine-tipped. Stems usually bear single spine 1/2" long. One of the first shrubs to leaf out in spring with orange fall color and bright red berries that remain on the plant throughout the winter that remain on the plant throughout the winter.

**Site Requirements:** Hardy in zones 6-8. Tolerant of many soil types and prefers sun to part shade exposure.

**Use in Right of Way:** The Japanese barberry and all of its cultivars are valuable in rest areas, interchanges and along roadway for interesting foliage color diversity in low maintenance situations. They can provide screening and avoid people and animal disturbance because of their spines.

**Planting/Seeding Requirements:** Easily transplanted from a container. Adaptable to many soil conditions, tolerant of dry soils and compaction.

**Maintenance Requirements:** Little incidence of disease or insect problems under ordinary landscape conditions. Some pruning is beneficial to encourage dense growth.

### Cultivars/Related Species:

'Atropurpurea' - (Redleaf Barberry) Generally grows to same size with dark red leaves throughout the summer.

'Aurea' - (Golden Barberry) Vivid yellow leaves in summer. Slow-growing to 3' tall, needs full sun.

'Crimson Pygmy' - (Crimson Pygmy Barberry) Low, dense shrub 1 1/2' tall and 2-2 1/2' wide. Dark red foliage, needs full sun exposure.

'Kobold' - (Kobold Barberry) - Lustrous dark green foliage, 2-2 1/2' tall, forms perfect mound without pruning.

'Rose Glow' - (Rose Glow Barberry) - New foliage is a rose-pink color, at maturity, foliage is reddish purple. Grows to a height of 6 feet.

'Sparkle' - (Sparkle Barberry) - Grows 3-4' high with arching horizontal branches and glossy, dark green foliage that turns fluorescent reddish orange in fall. Bright red fruits persist during winter.

*Berberis x gladwynensis* 'William Penn' - William Penn Barberry - Dense mounded habit that reaches 4' at maturity. Lustrous dark green foliage turns bronze in winter and plant is considered a semi-evergreen in northern areas of Arkansas and evergreen in southern part of State. Bright yellow flowers in April-May. May not be hardy below -10°F.

**American Beautyberry**

***Callicarpa americana* (Verbenaceae)**

**Description:** Open and sprawling large shrub with loose branches growing to 8 feet tall and 6 feet wide. Leaves are opposite with narrow tip and toothed margin. It flowers from June to August.

**Site Requirements:** Hardy in zones 7 - 9, grows well in shade, yet best fruiting occurs when planted in sunny location.

**Use in Right of Way:** Beneficial for native plant groves in low maintenance areas bordering maintained grasses of interchanges, Rest Areas or roadway lanes. Provides outstanding visual interest in autumn.

**Planting/Seeding Requirements:** Easily transplanted

**Maintenance Requirements:** Grows best with ample root moisture. Benefits from being cut back to within 4 - 6' when excessively tall and leggy. No pest problems.

**Cultivars/Related Species:** var. *lactea* (White Beautyberry)  
White berries, attractive foliage and similar growth habit.

**Comments:** A beautiful native useful in mass plantings, especially where the plant would cascade from rock faces.

**Carolina Allspice**

***Calycanthus floridus* (Calycanthaceae)**

**Description:** Dense, bushy rounded, broad shrub with regular outline; reaching a height of 9' and width of up to 12 feet. It has opposite leaves 2-5" long that are dark green and aromatic when crushed. It produces flowers in mid April that are reddish brown in color and have a strawberry fragrance.

**Site Requirements:** Hardy in zones 6-9, adaptable to many soil types and tolerant of wide pH range. Prefers deep, moist loam soil, shade or sun exposure, but does not grow as tall in sun.

**Use in Right of Way:** Valuable for native plant groves in interchanges, Rest Areas and along roadway where mixed species stands are established or enriched. Flower fragrance is an asset for Rest Areas in Spring.

**Planting/Seeding Requirements:** Easily transplanted. Needs occasional thinning & removal of dead wood.

**Maintenance Requirements:** Very carefree plant with no documented pest problems.

## **Flowering Quince**

*Chaenomeles speciosa* (Rosaceae)

**Description:** Large rounded shrub reaching 6 - 10 feet with equal spread of dense branches bearing spines. The leaves are alternate dark - glossy green and arranged in tuft like whorls. Flower color varies from red, orange to pink and white. This plant flowers profusely in early Spring and provides high visual interest.

**Site Requirements:** Hardy from zones 6-9 and adaptable to a wide range of soil conditions, yet performs well in dry situations. Best flowering occurs when grown in the sun. Prefers low pH and chlorosis may occur on high pH soils.

**Use in Right of Way:** An especially noticeable shrub in the Spring that is valuable at interchanges and Rest Areas for mass planting displays of varied flower colors. Useful also as linear shrub plantings along roadway to provide Spring interest and summer/fall screening.

**Planting/Seeding Requirements:** Transplants easily from balled and burlapped condition or from a container. Older branches, sucker growth or entire plant may be pruned periodically to within 6" of ground to improve flower display.

**Maintenance Requirements:** Pest problems include fire blight, scale, and aphids on young stems and leaves. Pest problems appear minimal when good growing conditions exist.

### **Cultivars/Related Species:**

'Jet Trail' - a dwarf white flowering quince that develops a height and spread of about 1 1/2 feet.

'Texas Scarlet' - Dwarf red flowering quince, bright red flowers; spreading compact plant with profuse flowers.

'Cameo' - Japonica. Fluffy, semi-double apricot-pink flowers; few thorns

## **Variegated Redstem Dogwood**

*Cornus alba* (Cornaceae)  
'Argenteo-marginata'

**Description:** Small tree to large multi-stem shrub reaching 8 - 10 feet in height and 5 - 10 feet in width. It is usually distinctly erect in youth, arching somewhat with age and developing an open loose appearance. The leaves 2 - 4 1/2" long and leaves have irregular creamy-white margins with a grayish-green center. In winter the stems are a vivid red color.

**Site Requirements:** Hardy in zones 2-7, prefers moist, well-drained sites with sun to partial shade.

**Use in Right of Way:** An unusual clump plant with striking red stems in winter that is useful as a mass planting along R.O.W. where visual interest is desired or at interchanges and Rest Areas where some regular maintenance care can be provided.

**Planting/Seeding Requirements:** Fibrous root system provides relatively easy transplanting and adaptability to varied soil conditions.

**Maintenance Requirements:** Requires pruning of 1/3 of old wood every year in winter or cutting entire clump to 6 - 12' at periodic intervals. Disease problems include cankers, blights of flowers, leaves & twigs, and powdery mildew. The main insect problem is borers and to a lesser extent leaf miner and scales.

**Grey Twig Dogwood**

***Cornus racemosa* (Cornaceae)**

**Description:** Multistemmed, suckering shrub that forms a plant colony in all directions from the original plant. The stems develop an attractive gray color after they are about 3 years old. Plant clumps grow to a height of 10 - 15 feet with equal spread. Leaves are 2-4" long, flowers are white and appear in late May to early June. Clusters of reddish-pink flower buds are evident over winter.

**Site Requirements:** Hardy in zones 4-8, very adaptable to a wide range of site conditions and will withstand wet to dry soils, full shade or full sun.

**Use in Right of Way:** An attractive clump plant for use in native plant groves for situations requiring little maintenance care. Gray stems are of visual interest in fall and winter in Rest Area sites.

**Planting/Seeding Requirements:** Fibrous root system allows easy transplanting from balled and burlapped or container situations.

**Maintenance Requirements:** Need virtually no care and has no serious diseases or insects.

**Red Osier Dogwood**

***Cornus sericea* (Cornaceae)**

**Description:** A fast growing broad, spreading, rounded, canopy multistemmed shrub with horizontal branches at its base that spreads by underground stems. This plant has interesting red colored stems that reach a height of 7 - 9 feet and spread to 10 feet. It has typical dogwood leaves yet rather dull white flowers of 1 1/2 - 2 1/2" in diameter that appear in late May to early June.

**Site Requirements:** Zones 2-8, but not performing well in 8. Extremely adaptable to a wide range of soil & climatic conditions. Often seen in wet, swampy sites in the wild.

**Use in Right of Way:** The red stem and yellow stem cultivar dogwoods are unusual plants that provide visual interest in fall and winter when planted in mass-groupings. They are compatible with other dogwoods and valuable for interchange plantings and Rest Area sites.



**Planting/Seeding Requirements:** Fibrous roots provide easy transplanting by bare root from nursery fields or balled and burlapped and containers.

**Maintenance Requirements:** Twig blight can be a serious disease problem as can insects such as scale & bagworms. Problems appear minimal when grown in a natural site condition.

**Cultivars/Related Species:** 'Flaviramea' - Yellowtwig Dogwood that has yellow stems. This cultivar appears more prone to twig blight problems.

#### **Scotch Broom**

*Cytisus scoparius* (Leguminos)

**Description:** An upright, fan-shaped, open shrub with green twigs and alternate leaves. This feathery shrub attains a height of 5 feet or more and similar width. The flowers are a glowing yellow, 1" long and 4/5" across that bloom in May-June with a fantastic splash of color.

**Site Requirements:** Hardy in zones 6-8. Prefers sandy, infertile soils which are somewhat on the dry side, full sun, and tolerates a wide ph range. This shrub is a restorer species that seeds itself in waste, disturbed areas.

**Use in Right of Way:** Practical and attractive for hot, dry sunny locations with low fertility. This plant is useful for newly established roadways where maintenance care is minimal to non-existent.

**Planting/Seeding Requirements:** It is easy to grow and tends to seed itself in; old plants may die out but are replaced by new ones. Could be difficult to transplant unless container-grown.

**Maintenance Requirements:** Very low maintenance requirements with no insect or disease problems.

#### **Thorny Elaeagnus**

*Elaeagnus pungens* (Elaeagnaceae)

**Description:** Dense, spreading, sprawling thorny shrub that grows to 8 feet in height with similar spread. Leaves are glossy dark green leaf above and silvery beneath. The flower is silvery white, very fragrant, and appears in Oct-Nov. Stem are covered with scales and have numerous thorns of 2 - 3 " in length. This shrub is extremely rapid growing and develops a dense mass of intertwining branches which make it almost physically impenetrable.

**Site Requirements:** Zones 7-9 and adaptable to varied soils with considerable drought tolerance. This plant will grow best in full sun yet is shade tolerant and resistant to salt sprays and air pollutants.

**Use in Right of Way:** This plant provides good year round screening because of its rapid growth and extreme density. It is valuable for linear screen plantings. This species used in Mississippi for crash barrier plantings on Interstate highways because of its density and durability. It is valuable at interchanges in mass plantings and also at Rest Areas for its interesting silvery underleaf and fragrant flowers in early spring.

**Planting/Seeding Requirements:** Easily grown and very easy to transplant. Requires frequent pruning if size and shape is to be controlled.

**Maintenance Requirements:** No serious problems and one of the most trouble free plants in the landscape.

**Cultivars/Related Species:** 'Aurea-variegata' - Variegated Thorny *Elaeagnus* with large leaves with deep a yellow blotch in the center. This cultivar often has intermediate yellow color between yellow and green areas. Variegation is unstable and may revert to yellow and green shoots.

**Autumn-olive**

***Elaeagnus umbellata* (Elaeagnaceae)**

**Description:** Large, spreading, spiny branched multistemmed shrub with silvery leaves that grows to a height of 12 feet and spread to 15 feet. The young foliage is silvery on upper and lower surfaces while mature leaves develop green top surfaces. It flowers in spring with fragrant yellow bloom and produces scarlet berries in fall.

**Site Requirements:** Zones 6-8 and very tolerant of varied soil types, sun or shade. This plant is very drought resistant when established.

**Use in Right of Way:** This plant is valuable as a large screen planting along roadway or at Interchanges in very low maintenance situations. Because of its fragrant flowers it is useful at Rest Areas for screening and physical separation as well as visitor interest.

**Planting/Seeding Requirements:** Adapts and naturalizes well, Tolerant of pruning and of dry soils, heat and atmospheric pollutants. Transplants easily. Withstands city conditions.

**Maintenance Requirements:** Very trouble free plant with no documented pest problems.

## **Winged Euonymus**

## ***Euonymus alatus* (Celastraceae)**

**Description:** Spreading, flat-topped shrub, that becomes broader than high. While usually seen at heights of 5 - 8 feet in the maintained landscape it will grow to 15 feet with a spread in excess of this. It has distinctive corky wings on its green branches and develops a vivid pink/scarlet fall color before shedding its leaves. This plant has extremely high visibility, in autumn, hence its common name of "burning bush".

**Site Requirements:** Zones 6-8 with best growth in well drained soils over a wide pH range. This plant can grow in full sun to partial shade, yet full sun exposure is needed for best fall foliage color development.

**Use in Right of Way:** This plant is useful for linear plantings that provide summer screening and visual interest in fall. Because of its vivid fall foliage display, it is valuable for interchanges and Rest Areas as in mass planting beds.

**Planting/Seeding Requirements:** Easily transplanted balled and burlapped or from containers. Widely adaptable to planting sites yet not tolerant of water logged soils.

**Maintenance Requirements:** Withstands heavy pruning if desired for height control, yet grows without pruning. Has no serious pests.

**Cultivars/Related Species:** 'Compactus' - Dwarf Winged Euonymus - Dwarf form to 6' tall; corky wings not as pronounced.

## **Strawberry Bush**

## ***Euonymus americanus* (Celastraceae)**

**Description:** A loose, suckering, green stemmed shrub with a spreading and irregular to rounded crown. It flowers May-June, and produces rather inconspicuous yellow flowers. The fruit is orange-red, and appears in early fall in capsules with warty covering that cracks to expose seeds. This plant grows to a height of 8' with a spread of 7 - 8'.

**Site Requirements:** Zones 6 - 9, prefers shade, good drainage, with medium moisture & fertility.

**Use in Right of Way:** A plant that can be used for low summer screening when in full leaf. A native plant for naturalistic groves or plantings.

**Planting/Seeding Requirements:** Naturalizes easily and transplants readily. This plant can be pruned to control size and shape.

**Maintenance Requirements:** Susceptible to euonymus scale & crown gall yet these seem to occur seldom in naturalistic plantings.

## **Pearlbush**

*Exochorda racemosa* (Rosaceae)

**Description:** A loose, spreading deciduous shrub reaching 15 feet in height with a spread of 20 feet; becoming open and often straggly with age. One of earliest leafing shrubs. Alternate, elliptic leaves 3" long. Twigs roughened by lenticels and fissures. Buds Pearl-like delicate appearance in bloom.

**Site Requirements:** Zones 6-8. Sun or part shade. Prefers well-drained acid, loamy soil, pH adaptable.

**Use in Right of Way:** A large flowering shrub useful in mass plantings with other shrubs such as forsythia, spirea or quince.

**Planting/Seeding Requirements:** Transplant balled and burlapped or as a container plant in early spring.

**Maintenance Requirements:** No serious pests. Tolerates extensive pruning in the spring.

**Cultivars:** 'The Bride' is a dwarf form reaching 6 feet in height which does not grow as vigorously or do as well as the species.

## **Forsythia**

*Forsythia x intermedia* (Oleaceae)

**Description:** Upright deciduous shrub with arching branches. Leaves 3-5" long, oblong lanceolate with serrated edges. Flowers in early March, bell-like, Yellow, in cluster.

**Site Requirements:** Zones 6-9. Does well in almost any soil. Full sun to maximize flower, pH adaptable.

**Use in Right Of Way:** Useful for mass planting or screening; for adding color at interchanges.

**Planting/Seeding Requirements:** Fibrous root, transplants readily bare root or balled & burlapped; prefers a good loose soil. Withstands city conditions.

**Maintenance Requirements:** Prune after flowering; thin & renew occasionally. No major pest problems.

### **Cultivars/Related Species:**

'Beatrix Farrand' - Farrand Forsythia - vivid yellow flowers, 2" diameter; upright growth.

'Karl Sax' - Karl Sax Forsythia - Large deep yellow flowers; upright in habit.

'Spring Glory' - Spring Glory Forsythia - 6' tall; pale sulphur yellow flowers covering branches.

'Arnold Dwarf' - Widespreading and low growing; useful as a ground cover; flowers pale greenish yellow.

**Weeping Forsythia**

***Forsythia suspensa* (Oleaceae)**

**Description:** Upright, arching, fountain-like with long, slender, trailing pendulous branches. Golden yellow flowers in April, not as profuse as *F. x intermedia*. Leaves opposite, simple sometimes 3-parted; coarsely toothed.

**Site Requirements:** Hardy zones 5 - 8, and statewide in Arkansas. Tolerates a wide array of soil conditions in full sun or partial shade. Blooms best in full sun.

**Use in Right of Way:** Could be used to cascade over rock faces in mountainous regions.

**Planting/Seeding Requirements:** Similar to *F. x intermedia*

**Maintenance Requirements:** Similar to *F. x intermedia*

**Greenstem Forsythia**

***Forsythia viridissima* (Oleaceae)**

**Description:** Stiff, upright flat-topped shrub. Flowers are bright yellow with a slightly greenish tinge 1" long. Greenish chambered pith. Leaves long & narrow with teeth on outer margin.

**Site Requirements:** similar to *F. x intermedia*

**Use in Right of Way:** Useful for mass planting or screening.

**Planting/Seeding Requirements:** similar to *F. x intermedia*

**Maintenance Requirements:** similar to *F. x intermedia*

**Large Fothergilla**

***Fothergilla major* (Hamamelidaceae)**

**Description:** Rounded, multistemmed shrub; very dense due to leaves closely borne along stems. Dark green leaves above, pubescent beneath, leathery & coarsely crenate or toothed, 2-4" long. Good orange to red Fall color.

**Site Requirements:** Zones 4-8. Need acid soil, plants stressed on limy soil.

**Use in Right of Way:** An expensive plant but useful near rest areas where it can be viewed close use.

**Planting Requirements:** Some shade & soil moisture in hot climates may be necessary. Balled and burlapped or container grown.

**Maintenance Requirements:** Trouble-free.



**Rose of Sharon, Althea**

*Hibiscus syriacus* (Malvaceae)

**Description:** Shrub or small tree, usually upright and erect but occasionally spreading. Upright branches, lustrous, medium green foliage, 2-4" long, coarsely toothed. Flowers - July-Sept., 2-4" wide with 5 petals; white, pink, red, lavender or blue.

**Site Requirements:** Zones 5-9. Soil-good drainage, avoid extremely wet or dry soil, pH adaptable, full sun or partial shade.

**Use in Right of Way:** Useful for mass planting, especially where the summer flowers can be appreciated close up.

**Planting/Seeding Requirements:** Transplants well. Move as small plant (less than 5'). Does well with composting.

**Maintenance Requirements:** Prune heavy in spring, pests include leaf spot, blights, canker, rusts, aphids, mining scale, japanese beetles, foliar nematodes & white-fly.

**Cultivars/Related Species:**

'Ardens' - Althaea - Light purple semi-double flowers.

'Diana' - Diana Rose of Sharon - dense branching & compact; graceful form. Glossy-green foliage, abundant large white flowers, 6" diameter, remaining open at night.

'Helen' - Large white flower with red eye; usually seedless.

'Boule de Fev' - Double Althaea

'Jeanne d' Arc' - White Althaea

'Pulchermis' - Pink Althaea

**Oakleaf Hydrangea**

*Hydrangea quercifolia* (Saxifragaceae)

**Description:** Spreading & irregular in shape. Mounded colonies form from suckers. Leaves 3-8" long resembling oak; dark green above, whitish to brownish tomentose below. Flowers 1 1/2" diameter in 4-12" long erect panicles. Bloom in late May through July, color white, purplish at maturity.

**Site Requirements:** Zones 5-9. Somewhat tender plant when young. Moist, fertile soil. Sun or partial shade, well drained soil.

**Use in Right of Way:** Useful for scattered inclusion in rest areas or where a mass planting with bold impact is desired.

**Planting/Seeding Requirements:** High fertility with organic matter. Prune after flowering.

**Maintenance Requirements:** Fairly trouble-free plant. Some leaf blight and powdery mildew.

**Cultivars/Related Species:** 'Snow Queen' - Snow Queen Hydrangea - Large dense upright flowers. 'Snowflake' - Snowflake Hydrangea - Large double flowers; 12-15" long panicles.

**Inkberry Holly, Gallberry**

*Ilex glabra* (Aquifoliaceae)

**Description:** Upright, semiglobular, much-branched evergreen shrub. Somewhat open with age often losing lower leaves. Suckering forms colonies. Leaves dark green, lustrous, 3/4" - 2" long with few obtuse teeth near apex. Fruit, black on female plants. Male plants have best winter color.

**Site Requirements:** Zones 4-9. Moist acid soils. In swamps in large clumps. Shade tolerant. Best in full sun.

**Use in Right of Way:** Excellent native plant for mass planting or for a low screen where headlight glare is a problem.

**Planting/Seeding Requirements:** Transplants readily balled & burlapped or from a container. Avoid extremely high pH soils. Withstands heavy pruning.

**Maintenance Requirements:** Fairly free of problems.

**Cultivars/Related Species:**

'Compacta' - Compact Inkberry - Dwarf female clone. 3 - 3 1/2' in height. Spread 3 1/2 - 4', 'Ivory Queen' - 'White Inkberry' - 6-8' tall, white fruit, 'Shamrock' - Dwarf Inkberry - Lustrous dark green leaves. Compact form.

**Winterberry**

*Ilex verticillata* (Aquifoliaceae)

**Description:** Oval or round with dense twiggy branching. Deciduous, tends to sucker and form large multistemmed clumps. Foliage deep green in summer. Elliptic leaf 1 1/2-3" long. Male and female flowers on separate plants. Fruit brilliant red persistent, stems black.

**Site Requirements:** Zones 4-9. Adaptable to wet conditions. (Native to swampy areas.) Does well in light and heavy soils. Prefers acid (pH 4.5 - 6.5), high organic matter; full or partial shade.

**Use in Right of Way:** Same as for inkberry.

**Planting/Seeding Requirements:** Transplant balled & burlapped or container plant. Pruning - tolerant.

**Maintenance Requirements:** No serious problems but can get tar spots, leaf spots, and powdery mildew.

**Cultivars/Related Species:**

'Sparkleberry' - Sparkleberry Holly - multistemmed; 10-12' high; abundant bright red berries. 'Winter Red' - Deciduous Holly - 8' high; dark green foliage; fall, golden yellow. Large profusion of intense, red, persistent fruit.

**Showy Jasmine**

*Jasminum floridum* (Oleaceae)

**Description:** Half-evergreen to evergreen, 3-5' high shrub with a mass of slender, arching green stems. Leaves are alternate; 3 leaflets 1/2-1 1/2" long. Yellow 1/2-3/4" long, 5-lobed flowers open over a long period from April-June. Fine foliage.

**Site Requirements:** Zones 7-9. Sun or part shade. Tolerant of most soils.

**Use in Right of Way:** Useful for cuts and outcroppings where its cascading habit can be displayed. This species is more evergreen than *J. nudiflorum*, but it is less winter hardy. It should only be used in the southern half of Arkansas.

**Planting/Seeding Requirements:** Transplants readily. No pruning needed.

**Maintenance Requirements:** No pests.

**Winter Jasmine**

*Jasminum nudiflorum* (Oleaceae)

**Description:** Low spreading bush with 4-angled trailing branches arising from central crown. Opposite trifoliate leaves 1" long. flowers Jan-March, bright yellow, 1" diameter.

**Site Requirements:** Zones 6-9. sun or shade, widely adaptable, prefers well drained soil.

**Use in Right of Way:** Same as above.

**Planting/Seeding Requirements:** Transplants readily. Should be rejuvenated every 3-5 years but cutting plant to 6" height. Difficult to remove once established.

**Maintenance Requirements:** No serious pests. Little care required.

**Blue Vase Juniper**      *Juniperus chinensis* 'Blaauw' (Cupressaceae)

**Description:** Dense-growing, upright form 4-6' high. Foliage is a rich blue-green. Evergreen.

**Site Requirements:** Zones 3-9. Tolerant of difficult sites.

**Planting/Seeding Requirements:** Transplant balled and burlapped or from container. Prefers moist, well-drained conditions; full sun; pH adaptable; tolerant of calcareous soils.

**Maintenance Requirements:** Relatively trouble-free Juniper. Phomopsis blight kills young shoots, (prevalent in early spring and wet weather), and bagworms.

**Cultivars/Related Species:** 'Hetzi' - Hetzi Juniper - Large, rapid-growing, upright-spreading form, branches in all directions, 15' by 15' but usually less. Leaves scale-like, some awl-shaped. Bears large numbers of small cones transplants readily. 'Nick's Compact' - Compact Chinese Juniper - Relatively flat-topped, wide-spreading form with green, slight blue overcast foliage, more needle-like than scale-like. 'Pfitzeriana' - Pfitzer Juniper - Wide spreading, variable form 5' high and 10' wide. 'Pfitzeriana Aurea' - Golden Pfitzer Juniper - Branchlets and leaves tinged golden yellow in summer, becoming yellowish green in winter. Flatter and not as large as 'Pfitzeriana'.

**Shore Juniper**

*Juniperus conferta* (Cupressaceae)

**Description:** Dense spreading evergreen shrub. awl-shaped, prickly foliage is bluish green in summer, bronze-green in winter. Widely planted in southern states. Fruit is berrylike; 1/2" diameter; black.

**Site Requirements:** Zones 6-8. Prefers sandy loam but grows on low fertility soils. Does not tolerate excess soil moisture. Likes full sun.

**Planting/Seeding Requirements:** Adapts well to sandy soils. Withstands severe exposure.

**Maintenance Requirements:** Red spiders may be a problem.

**Cultivars/Related Species:** 'Blue Pacific' - Blue Pacific Shore Juniper - More compact and makes a better groundcover than the species. Has low trailing habit and doesn't grow more than 1' high. Withstands heat well. May be hardier than the species.

**Andorra Juniper**

*Juniperus horizontalis* 'Plumosa'

**Description:** Wide-spreading. Dense. Compact form. Light green, feathery foliage turns reddish-purple in fall. Leaves are awl-shaped and scale-like. Branches arise at a 45° angle to ground.

**Site Requirements:** Zones 6-9. Does well in full sun; soil-good drainage; low fertility. Prefers slightly alkaline conditions.

**Planting/Seeding Requirements:** Transplants readily. No pruning necessary. Withstands city conditions.

**Maintenance Requirements:** Main pest problems are bagworms and mites. Also gets blight.

**Cultivars/Related Species:** 'Youngstown' - Dwarf Andorra Juniper - More compact than species.

**Japanese Garden Juniper**      *Juniperus procumbens* (Cupressaceae)

**Description:** A dwarf, procumbent plant with long, wide-spreading, stiff branches. Will trail over walls. Foliage is bluish-green or gray-green.

**Site Requirements:** Zones 4-9. Needs full sun. Is tolerant of many soils, thrives under adverse conditions, needs open situations, thrives on calcareous soils.

**Planting/Seeding Requirements:** Easily transplants.

**Maintenance Requirements:** Phomopsis can be a problem. Also spider mites can be serious in hot, dry locations in summer.

**Cultivars/Related Species:** 'Nana' - Dwarf Japanese Garden Juniper - Forms a compact mat, spreading widely, as much as 10-12'. 'Variegata' - Variegated Japanese Garden Juniper - Has bluish-green foliage streaked with creamy-white coloring.



## **Beautybush**

*Kolkwitzia amabilis* (Caprifoliaceae)

**Description:** Upright, arching vase-shaped shrub, fountain-like in overall effect. Principal attribute of this plant is the flower which is pink, flaring bell-shaped, and 1/2" long. Blooms in May-early June.

**Site Requirements:** Zones 6-8. Full sun. Tolerant of many soils. Needs medium moisture and good drainage.

**Planting/Seeding Requirements:** Easily transplanted balled and burlapped; pH adaptable. Older stems should be pruned back. Pinching during first years thickens growth.

**Maintenance Requirements:** No serious pests.

**Cultivars/Related Species:** 'Pink Cloud' - Pink Cloud Beautybush - Has large and abundant pink flowers.

## **Variegated Privet** *Ligustrum ovalifolium* 'Aureum'/(Oleaceae)

**Description:** Large, vigorous shrub forming a dense thicket of erect stems. In zone 8 plant can be evergreen or semi-evergreen. Blooms in June-July. Flowers are dull white occurring in 2"-4" long clusters. Leaf is golden yellow with a green spot in the center.

**Site Requirements:** Zones 5-9. Grows in almost any soil, in hot locations, in full sun or partial shade.

**Planting/Seeding Requirements:** Easy to grow. A tough, durable plant.

**Maintenance Requirements:** No serious pests.

## **Spicebush**

*Lindera benzoin* (Lauraceae)

**Description:** Usually rounded shrub in outline, somewhat loose and open in the wild; dense, full and broad-rounded in full sun. Leaves oblong, light green above, pale beneath, in summer, yellow in fall.

**Site Requirements:** Zones 4-9. Does best in moist, well-drained soils; full sun or 1/2 shade. Does adequately in dry soils.

**Use in Right of Way:**

**Planting/Seeding Requirements:** Difficult to transplant because of coarsely fibrous root system and somewhat slow to reestablish.

**Maintenance Requirements:** No serious pests.

**Fragrant Honeysuckle      *Lonicera fragrantissima* (Caprifoliaceae)**

**Description:** Globe-shaped shrub with arching branches. Deciduous but holds foliage very late in fall and into winter in southern states. Leafs out early in spring. Has creamy-white, very fragrant flowers. Blooms from Jan.-early March.

**Site Requirements:** zones 6-8. Adapts well to many soils and pH levels. Prefers good loamy, moist, well-drained soil. Grows in full sun or part shade.

**Use in Right of Way:**

**Planting/Seeding Requirements:** Transplants readily. Pruning is best done after flowering and when overgrown, cut back to ground, as they develop new shoots readily.

**Maintenance Requirements:** Plant can be infested with a large variety of insects but none serious.

**Tartarian Honeysuckle      *Lonicera tatarica* (Caprifoliaceae)**

**Description:** Habit is upright, strongly multi-stemmed and dense. Foliage is bluish-green in summer. Flowers are profuse and are pink to white, 3/4"-1" long. Blooms in May. Leafs out very early in spring.

**Site Requirements:** Zones 3-8. A tough tolerant shrub.

**Use in Right of Way:**

**Planting/Seeding Requirements:** Adaptable to a wide range of soils, moisture conditions and light intensity.

**Maintenance Requirements:** The Russian aphid is a problem with some cultures.

**Southern Waxmyrtle      *Myrica cerifera* (Myricaceae)**

**Description:** Wispy broadleaf evergreen, broadly spreading small tree or large shrub. Leaves are narrow, typically 1 1/2"-3" long, glossy olive green with a serrated apex. Bark is gray to white.

**Site Requirements:** Zones 7-9. Plant is sensitive to cold (0°F and less). It tolerates infertile soils but responds tremendously to good watering and nutritional practices.

**Planting/Seeding Requirements:** Difficult to transplant from the wild. Container or field nursery material will greatly increase survival and performance.

**Maintenance Requirements:** Leaf anthracnose causes spotting and browning of leaves. Not serious yet.

**Heavenly Bamboo**

***Nandina domestica* (Berberidaceae)**

**Description:** Upright shrub with many canes. Becomes leggy at base unless pruned. Foliage is twice or three times compound, with leaflets 1-4" long. Flowers in April; fruit in fall is bright red and persists into winter, very showy.

**Site Requirements:** Zones 7-9. Durable, tolerant and drought resistant plant. Grows in sun or part shade. Very responsive to good cultural practices.

**Use in Right of Way:**

**Planting/Seeding Requirements:** Easily transmitted from container. It's best to thin out old stems every year to produce a denser plant.

**Maintenance Requirements:** Amazingly trouble-free plant.

**Mockorange**      ***Philadelphus x lemoinei* 'Mont Blanc' (Saxifragaceae)**

**Description:** Rounded shrub with stiff, straight ascending branches that arch with age. Has single flowers, 1 1/4" diameter. One of the hardier cultivars. Fragrant flowers, but short blooming period of 7-10 days.

**Site Requirements:** Zones 4-8. Full sun or light shade. Makes best growth with organic matter and moist, well drained soil.

**Use in Right of Way:**

**Planting/Seeding Requirements:** Transplants readily; not particular as to soil.

**Maintenance Requirements:** No serious pests.

**Cultivars/Related Species:** 'Dwarf Snowflake' - Dwarf Mockorange  
'Glacier' - Glacier Mockorange

**Cherrylaurel**

***Prunus caroliniana* 'Bright'Tight' (Rosaceae)**

**Description:** Compact tightly branched pyramidal form with smaller leaves than the species. Leaves rarely have serrations. Glossy dark green leaves.

**Site Requirements:** Zones 7-10. Superior to the species for most situations. Not cold hardy in mountain areas.

**Use in Right of Way:**

**Planting/Seeding Requirements:** Difficult to transplant in large sizes. Tolerant to pruning.

**Maintenance Requirements:** No pest problems.

**Cherrylaurel**

*Prunus laurocerasus* 'Otto Luyken' (Rosaceae)

**Description:** Fine form and compact habit. Leaves are dark green, 4" long, about 1" wide. Very free-flowering. Leaves not usually toothed toward apex. Flowers in spring with clusters 4" long.

**Site Requirements:** Zones 6-9. Tolerates sun or shade and many soil types. Likes high organic content.

**Use in Right of Way:**

**Planting/Seeding Requirements:** Transplant balled and burlapped or form a container. Withstands pruning.

**Maintenance Requirements:** Shothole fungus can infect plant and produce circular holes in leaf.

**Cultivars/Related Species:** 'Schipkaensis' - Schipkaensis Cherrylaurel - Grows 4-5' tall with 5-8' spread. Irregular and widespreading. Dark green foliage. Adapts to city conditions. Hardy and vigorous but also susceptible to shothole fungus and insects.

**Scarlet Firethorn**

*Pyracantha coccinea* 'Lalandei' (Rosaceae)

**Description:** Upright and spreading with many trunks. Thorns on branches. Leaves 1 1/2" long. Orange fruit 1/4" diameter. Is evergreen and berries are persistent.

**Site Requirements:** Zone 5. Plant is hardy and widely grown. Full sun for best fruiting. Does well where soil is dry in summer.

**Use in Right of Way:**

**Planting/Seeding Requirements:** Move as a container plant in spring into well-drained soil. Difficult to transplant and once established should be left in that area.

**Maintenance Requirements:** Susceptible to scab.

**Cultivars/Related Species:** 'Wyatti' - Scarlet Firethorn - Has orange-red fruits which are prolific hardy to zone 5. Grows 9-12' high. tolerant of poor soil. Highly susceptible to scab and fireblight. 'Gnome' - Gnome Firethorn - Grows 6' tall and 8' wide compact. Densely branched growth and somewhat spreading. 1/4-3/8" diameter fruits. Hardy and successful in zone 5. Highly susceptible to scab of leaves and fruit. 'Mohave' - Mohave Firethorn - grows 6-10' tall huge masses of bright orange-red berries on medium-sized, dense, upright bush, resistant to scab and fireblight. 'Navaho' - Navaho Firethorn - Low growing, 6' high and 7.5' wide. Is densely branched and mounded. Has rich orange-red fruits. Resistant to scab and highly tolerant to

fireblight. 'Teton' - Teton Firethorn - A strong grower reaching 16' high and 9' wide. Has yellow-orange fruits. Most cold-hardy Pyracantha.

**Fragrant Sumac**

*Rhus aromatica* (Anacardiaceae)

**DESCRIPTION:** Low, irregular spreading shrub with lower branches turning up at tips. Plant tends to sucker from roots and produce a dense tangled mass of stems and leaves. Foliage has 3 leaflets, a medium green color, glossy on upper surface. Flowers in March-April; 1" long yellow male catkins, short panicles at ends of branches are female. Male catkins are persistent summer fall and winter.

**SITE REQUIREMENTS:** Zones 3-9. Is a fast grower. Withstands 1/2-3/4 shade, or full sun. Prefers acid soil.

**PLANTING REQUIREMENTS:** Has a fibrous root system and is easily transplanted and adaptable.

**MAINTENANCE REQUIREMENTS:** No serious diseases or insects.

**Winged Sumac**

*Rhus copallina* (Anacardiaceae)

**DESCRIPTION:** A compact and dense plant in youth becoming more open and irregular in maturity. Has crooked, ascending branches, spreading which makes it broader at top. Foliage is lustrous green in summer turning scarlet in fall. Compound leaf. Flowers are 4-8" long, 3-4" wide panicles. Fruit is a crimson drupe ripening in September.

**SITE REQUIREMENTS:** Zones 4-9. Can grow in dry, rocky areas.

**PLANTING REQUIREMENTS:** Easily transplanted.

**MAINTENANCE REQUIREMENTS:** No serious pests.

**Staghorn Sumac**

*Rhus typhina* (Anacardiaceae)

**DESCRIPTION:** Large, loose, open spreading shrub. Often the spread is equal to or greater than height. Fast development from root suckers. Stem has a velvety reddish brown pubescence persisting on 2-3 year old branches. Leaves are bright green in summer, yellow, orange and scarlet in fall. Distinctive fruit is closely packed in a pyramidal hairy drupe, closely packed in a pyramidal panicle; bright crimson in early fall turning darker red in winter.

**SITE REQUIREMENTS:** Zones 3-8. Is adapted to many soils types except poorly drained areas. Tolerates dry sterile soil.

**PLANTING REQUIREMENTS:** Easily transplanted. Suckers profusely and tends to form widespreading colonies.



**MAINTENANCE REQUIREMENTS:** Can rejuvenated by cutting to ground in late winter.

**CULTIVARS:** 'Lanciniata' - Lacy Staghorn Sumac - Leaflets are finely divided creating a fine-textured, ferny appearance.

**Anthony Waterer**      *Spiraea x bumalda* 'Anthony Waterer' (Rosaceae)

**DESCRIPTION:** A broad, flat-topped, low shrub with twiggy and erect branches. Often mounded in habit. Leaves are 1-3" long, ovate with toothed margins. Has 4-6" diameter, pink inflorescences, appearing in May.

**SITE REQUIREMENTS:** Zones 3-8. Tolerant of many soils types except very wet areas. prefers full sun and open areas.

**PLANTING REQUIREMENTS:** Easy to transplant.

**MAINTENANCE REQUIREMENTS:** No serious pests although can be afflicted with same problems as other member of Rose Family - fireblight, bacterial hairy root, leaf spot, powdery mildews, root rot, spirea aphid, scales and others.

**CULTIVARS:** 'Gold Flame' - Golden Spirea - Appears to be on fire when leaves emerge in spring. Orange-red leaves change to yellow then to green. Colors are repeated in fall. 'Goldmound' - Goldmound Spirea - Low-mounded form with golden leaves throughout growing season. Size is 2 1/2'-3 1/2' by 3-4'.

**Snowmound Spirea**      *Spiraea nipponica* 'Snowmound' (Rosaceae)

**DESCRIPTION:** Has dense outline with small dark blue-green leaves and white flowers appearing in late May. Oval leaves are 1/2-1 1/2" long, toothed at tip with smooth sizes.

**SITE REQUIREMENTS:** Zones 3-8. Grows in both sun and part shade. Needs medium drainage, medium fertility.

**PLANTING REQUIREMENTS:** May need to remove old wood near ground.

**MAINTENANCE REQUIREMENTS:** Aphids can be a pest problem. Withstands city conditions.

**Bridalwreath Spirea**      *Spiraea prunifolia* (Rosaceae)

**DESCRIPTION:** Is an open, coarse, straggly shrub, often leggy. Leaves are simple, oblong 1-2" long and denticulate. Stems are zig-zag, slender and shiny brown. Flowers are white, double, 1/3" diameter, occurring 3 to 6 together covering leafless stems in mid to late April.

**SITE REQUIREMENTS:** Zones 4-8. Grows in sun or shade.

**PLANTING REQUIREMENTS:** Thin old canes and spindly growth after flowering.

**MAINTENANCE REQUIREMENTS:** Aphids can be a pest problem.

**Double Reeves Spirea** *Spiraea cantoniensis* 'Lanciata' (Rosaceae)

**DESCRIPTION:** Has upright branches flowering gracefully toward ground. Leaves are bluish-green and hold late in the fall without coloring. Has abundant, showy white 1/2" diameter flowers appearing in April.

**SITE REQUIREMENTS:** Zones 6-9. Is tolerant of many soils. Grows in sun or part shade. Has excellent heat tolerance.

**PLANTING REQUIREMENTS:** Easily transplanted. Almost evergreen in warmer areas.

**MAINTENANCE REQUIREMENTS:** Can be affected by aphids.

**Thunberg Spirea**

*Spiraea thunbergii* (Rosaceae)

**DESCRIPTION:** Is a bushy slender-branched shrub with narrow lance-shaped leaves 1-1 1/2" long, with serrations. Stem is slightly angled and zig-zag. flowers are white 1/3" across blooming in Feb.-April usually is the first Spirea to bloom.

**SITE REQUIREMENTS:** Zones 6-8. Grows in sun or part shade.

**PLANTING REQUIREMENTS:** Needs pruning to keep plant from becoming straggly.

**MAINTENANCE REQUIREMENTS:** Can get aphids.

**Vanhoutte Spirea**

*Spiraea x vanhouttei* (Rosaceae)

**DESCRIPTION:** Habit if fountain-like or vase-shaped, round-topped with arching branches. Foliage is dull bluish-green in summer. White flowers are 1/3" across. Flowers are profuse.

**SITE REQUIREMENTS:** Zones 3-8. Grows in sun and shade, with medium moisture, drainage and fertility. Dependable plant.

**PLANTING REQUIREMENTS:** Transplants easily. Thin old, weak canes arch to the ground.

**MAINTENANCE REQUIREMENTS:** Pest problems with aphids.

**Indian Currant**

*Symphoricarpos orbiculatus* (Caprifoliaceae)

**DESCRIPTION:** Develops into a spreading arching shrub. Foliage is dull green in summer and hangs on late in fall. Flowers are yellowish-white blooming in June or July. Fruit is a purplish-red, 1/6-1/4" diameter, berry-like drupe. Suckers profusely.

**SITE REQUIREMENTS:** Zones 2-7. Shade tolerant, vigorous plant.

**PLANTING REQUIREMENTS:** Transplants easily, very tolerant of any soil. If pruned in early spring current season's growth can produce flowers.

**MAINTENANCE REQUIREMENTS:** Transplants easily, very tolerant of any soil. If pruned in early spring current season's growth can produce flowers.

**CULTIVARS:** Pest problems include anthracnose, berry rot, leaf spots, powdery mildews, rusts, stem gall, aphids, scale and glacial whitefly.

**Blueberry, Farkleberry**

*Vaccinium spp.* (Ericaceae)

**DESCRIPTION:** Many species and cultivars exist ranging in size from 6" to 6'. Hardiness zones vary also with species and cultivar. There are about 130 species of vaccinium. Cultivated blueberries are subjected to a number of insects and diseases but for landscape purposes no control program is necessary.

**SITE REQUIREMENTS:** An acidic (ph 5.0 to 5.8), well drained site in full sun or partial shade is required. Plants will not tolerate severe or prolonged summer drought.

**PLANTING REQUIREMENTS:** Generally blueberries can be transplanted balled and burlapped or form a container easily. Moist, acid, organic well-drained soils are required. Can grow in full sun or part shade. The native farkleberry is very slow growing.

**Burkwood Viburnum**

*Viburnum x burkwoodii* (Caprifoliaceae)

**DESCRIPTION:** Plant is upright, multi-stemmed, often a tangled mass somewhat straggly. Leaves are dark green; light gray-brown beneath. Tends to be semi-evergreen in zone 8. Buds are pink, flowers white with a spicy aroma. Flowers are in a hemispherical cyme are 2-3" across, each flower 1/2" wide. Leaves are oblong, pointed and rough to the touch.

**SITE REQUIREMENTS:** Zones 6-8. requires a slightly moist, well-drained soil. Is pH adaptable, preferring a slightly acid situation.

**PLANTING REQUIREMENTS:** Should be moved balled and burlapped or as a container specimen. Small plants can be handled bare root. Is heat and cold tolerant.

**MAINTENANCE REQUIREMENTS:** Relatively free of major problems but can get leaf spot, crown gall, powdery mildew, rusts, spray burn, aphids, asiatic garden beetle, planthopper, plant bug, thrips and others.

**CULTIVARS:** 'Mohawk' - Mohawk Viburnum - Has dark red flower buds opening to white petals; clove fragrance compact growth habit. Resistant to bacterial leaf spot and powdery mildew. Orange-red leaves in fall.

**David Viburnum**

*Viburnum davidii* (Caprifoliaceae)

**DESCRIPTION:** Rounded, compact mound of medium density. Foliage is opposite, leathery, to 5 1/2" long, slightly toothed at edges and deeply veined. Flowers in early summer, 2-3" wide white clusters.

**SITE REQUIREMENTS:** Zones 7-8. Can grow in sun or part shade and is tolerant of different soils.

**PLANTING REQUIREMENTS:** Transplant balled or burlapped or as a small bare root plant.

**MAINTENANCE REQUIREMENTS:** No serious pest problems.

**Judd Viburnum**

*Viburnum x juddii* (Caprifoliaceae)

**DESCRIPTION:** Plant has a full, rounded, spreading habit. Leaves are 2" wide, toothed and deeply veined. Flowers in early spring with loose clusters 3 1/2" wide and very fragrant. A berry-like fruit forms in fall which attracts birds.

**SITE REQUIREMENTS:** Zones 6-8. Grows in sun or part shade on sites with good drainage and medium to high fertility and moisture.

**PLANTING REQUIREMENTS:** Transplant balled and burlapped. Prune to remove winter killed parts.

**MAINTENANCE REQUIREMENTS:** More resistant to bacterial leaf spot than other Viburnums.

**Doublefile Viburnum** *Viburnum plicatum tomentosum* (Caprifoliaceae)

**DESCRIPTION:** Plant habit is horizontal, with tiered branches creating a stratified effect. It appears rounded at maturity. Leaves are opposite, 3-4" long with impressed veins creating a ridge and furrow effect. Flowers appear in April, after leaves, and are snow white. Outer flowers are sterile; inner flowers fertile. A plant in full flower is a magnificent sight.

**SITE REQUIREMENTS:** Zones 6-8. Demands moist, well-drained soil.

**PLANTING REQUIREMENTS:** Transplants well. Will not tolerate drought.

**MAINTENANCE REQUIREMENTS:** Prune when needed to renew growth. No major pest problems.

**CULTIVARS:** 'Mariesii' - Graceful horizontal branching and large flowers.

'Shasta' - Shasta Viburnum - Shrub is 6' high with abundant 4-6" wide white inflorescences.

**Allegheny Viburnum** *Viburnum x rhytidophylloides* (Caprifoliaceae)

**DESCRIPTION:** Plant was vigorous, dense, globose growth habit. Foliage is dark green and tends to be deciduous to semi-persistent. Leaves are coarse & leathery. Flowers are abundant, yellowish-white, blooming in April.

**SITE REQUIREMENTS:** Zones 4-8. Can grow in sun or partial shade. Does best in protected location.

**PLANTING REQUIREMENTS:** Transplants well and is adaptable.

**MAINTENANCE REQUIREMENTS:** No serious pests. Is resistant to bacterial leaf spot.

**Leatherleaf Viburnum** *Viburnum rhytidophyllum* (Caprifoliaceae)

**DESCRIPTION:** This shrub is upright and strongly multistemmed, often somewhat open with age. Leaves are dark lustrous leathery green above & brownish tomentose beneath, it is an evergreen in the south. It flowers in May with cymes 4-8" diameter, and yellowish-white in color.

**SITE REQUIREMENTS:** Zones 6-8. Plant can be killed to ground in severe winters, but usually develops new shoots the following spring. Tolerant of different soils and sun or part shade.

**PLANTING REQUIREMENTS:** Transplants well. A well-drained soil aids hardiness. No serious pest problems.



**Tea Viburnum**

*Viburnum setigerum* (Caprifoliaceae)

**DESCRIPTION:** This plant is upright, multistemmed and often leggy at its base. Leaf color is soft blue-green in summer. Fall color is inconsistent, sometimes reddish purple. White flowers appear in May and are 1-2" in diameter. Fruit is an egg-shaped drupe, 1/3" long becoming bright red in fall.

**SITE REQUIREMENTS:** Zones 5-7. Similar to other viburnums.

**PLANTING REQUIREMENTS:** Transplants well.

**MAINTENANCE REQUIREMENTS:** No serious pests.

**Arkansas Yucca**

*Yucca arkansana* (Agavaceae)

**DESCRIPTION:** Plant has swordlike, whorling leaves in a mound. Flowers are creamy-white, 1" long on a 6 to 7 ft. tall cylindrical inflorescence. Blooms appear from May-October.

**SITE REQUIREMENTS:** Native to Arkansas. Highly adaptable plant which thrives on dry soils on a wide variety of locations.

**PLANTING REQUIREMENTS:** Transplants readily.

**MAINTENANCE REQUIREMENTS:** Once established will survive without difficulty. Will survive being mowed over, but not more than once every 2 to 3 years.

**Adam's Needle Yucca**

*Yucca filamentosa* (Agavaceae)

**DESCRIPTION:** Leaves are 1-2 1/2' long and 1 1/2-4" wide, narrow at the apex. Curly thread-like filaments 2-3" long break away from the margins. These are especially numerous toward the base. A flower stalk 3-6' high forms in the summer with 2-3" diameter yellowish-white pendulous flowers.

**SITE REQUIREMENTS:** Zones 5-9. it is very hardy and drought resistant plant.

**PLANTING REQUIREMENTS:** Transplants easily. Remove old flower stalks and brown foliage.

**MAINTENANCE REQUIREMENTS:** Can get leaf spot or blight during rainy growing season.

**CULTIVARS:**

'Bright Edge' - Bright Edge Yucca - Leaves have a green center and yellow margin.

'Golden Sword' - Variegated Yucca - Leaves have a yellow center & green margin.

'Starburst' - Starburst Yucca - Has narrow, long green leaves striped with creamy-yellow, tinged with pink in cooler weather.

**Spanish Dagger**

***Yucca gloriosa* (Agavaceae)**

**DESCRIPTION:** Plant is short trunked or has no trunk. Leaves are 2-2 1/2' long & 2" wide with stiff points and smooth margins. Flowers in September on a 6-8' spike.

**SITE REQUIREMENTS:** Zones 7-9. Needs sun and good drainage. Does well with low fertility & low moisture soil.

**PLANTING REQUIREMENTS:** Transplants easily. Prune to remove dead leaves and flower stalks.

**MAINTENANCE REQUIREMENTS:** No major pests.

**RELATED SPECIES:** *Yucca recurvifolia* - Curveleaf Yucca. Similar to *Y. gloriosa* except upper leaves are recurved rather than straight.

## GRASSES FOR PLANTING ARKANSAS HIGHWAYS

Grasses function in erosion control by absorbing the soil-eroding energy of the raindrop bombs. Grasses will bind the soil against the rushing waters and winds - and errant autos and trucks. Other plants may be more colorful in their weeks of glorious bloom or bigger and shapelier and get more passing attention. But the lowly beautiful grasses will unify the right-of-way landscape.

Thirty one (31) grasses and their uses and maintenance are described in this chapter.

Five grasses are particularly well adapted for the immediate safety berm (and on down to the drainage swale). Common bermudagrass can be seeded throughout Arkansas, but Guymon is recommended in the colder northern portions of the state. Buffalograss may be seeded or sprigged alone anywhere in Arkansas. Redtop merits consideration for overseeding into bermudagrass (or tall fescue) in the northern portion of Arkansas. Tall fescue is well adapted in the north and west central portions of Arkansas and will withstand much more shade than bermuda and buffalograss. Bahiagrass is well adapted in the southern third of Arkansas. Weed-free stands of bermuda, buffalograss, redtop, and bahiagrass might not need to be mowed at all, but the seedheads of tall fescue (3' tall) will need to be cut in May or June. Buffalograss and bahiagrass grow so densely that only pure stands should be used. If AHTD desires to make the immediate berm more colorful, bermudagrass, redtop, and tall fescue can be overseeded with legumes, especially consider large hop clover, common white clover, red clover and Crimson clover. Where these grasses are extended on down to the drainage swale consideration for overseeding could be given to purple prairie clover, partridge pea, and Marion lespedeza in addition to the above clovers.

Several medium sized prairie grasses are well adapted for use from the immediate safety berm to the drainage swale and even better adapted for the backslope. Indiangrass, Old World bluestem, big bluestem, and eastern gamagrass are best adapted to deep fertile moist soils throughout Arkansas. Switchgrass, purpletop, little bluestem, sideoats grama, and Florida paspalum are adapted to a wider range of soils.

Little bluestem and sideoats grama are especially well adapted to calcareous soils. Switchgrass and sideoats grama are especially well adapted to the northwest. Big bluestem and little bluestem are not well adapted in the southeast, and Florida paspalum is limited to the southern third of Arkansas. Dallisgrass is likely to invade roadsides throughout Arkansas. Purpletop is likely to volunteer in roadsides in the northwestern third of the state. Of course, a wide variety of medium to large sized legumes and wildflowers can be planted with these grasses to provide a "tall grass prairie" vista for motorists.

A few large ornamental grasses are described. They are used best as "grass shrubs" at rest parks and interchanges or as very large scale show or screen plantings. Vegetative planting increases costs. Pampasgrass, giant plumegrass, maidengrass and fountain grass are limited to southern and southeastern Arkansas. Ravenagrass is probably the best adapted overall to roadside conditions and will grow throughout Arkansas.

Several grasses are described which are included for limited area, special situations. Broadleaf uniola, longleaf uniola, Virginia wildrye, beaked panicum (and tall fescue) are well adapted for various shade situations. Reed canarygrass, knotroot bristlegrass, knotgrass, and beaked panicum are well adapted for very wet soils. Weeping lovegrass, splitbeard bluestem, and arrowfeather threeawn are adapted in very droughty, poor soils. Blue grama is a small grass which could be used with mixtures of small wildflowers. Japanese bloodgrass should probably be left to ornamental gardeners.

For mountainous regions the ten (10) "best" grasses are tall fescue, Guyman bermuda, redtop, buffalograss, Indiangrass, switchgrass, splitbeard bluestem, Reed canarygrass, weeping lovegrass, and ravenagrass.

For the delta region the ten (10) "best" grasses are common bermudagrass, little bluestem, Indiangrass, eastern grama, big bluestem, splitbeard bluestem, arrowfeather threeawn, Virginia wildrye, knotgrass, and ravenagrass.

For coastal plains region the ten (10) "best" grasses

are bahiagrass, Florida paspalum, common bermudagrass, Indiangrass, switchgrass, Virginia wildrye, longleaf uniola, beaked panicum, maidengrass, and ravenagrass.

Each of the "ten (10) best" lists include grass(es) for each general use situation from safety berm to backslope, ranges of soil types from deep fertile to shallow infertile and droughty to very wet, as well as partial shade and one (or two) for high "ornamental screening". Any extremes of soil pH at any site should be considered in selecting grasses; the lists don't consider pH adaptation much. Thus a few grasses not included in any regional listing would be good choices for particular situations. Furthermore, two widely adapted general utility grasses, Old World bluestem and sideoats grama, did not quite make any regional "ten (10) best" list. Twenty two (22) grasses are included in the three "ten (10) best" lists.



## Redtop

*Agrostis alba* (Gramineae)

**Description:** Redtop is a long-lived, cool season perennial grass with both upright and creeping stems. The leaf blades are from 4-24" long and 1/4" wide, smooth on the under surface and tapered to a sharp point. Its root system is made up of shallow, vigorous rootstalks 2-6" long that form a loose, coarse turf. It becomes dormant during summer heat and drought. It grows to a height of 1-3 feet. Redtop's small, open, pyramidal, compound branched panicles are reddish in color.

**Site Requirements:** Redtop has naturalized in the U.S. over a range similar to Kentucky bluegrass in the east. Redtop will grow state wide but is better adapted in the northern half of the Arkansas. Redtop grows on very acid soils, infertile clayey soils, and on poorly drained land. No other grass is adapted to such a wide range of climatic and soil conditions. It is one of the best tame wetland grasses. It will remain under water for short periods without damage, yet it adapts to dry conditions on acid or alkaline soils.

**Use in Right of Way:** Redtop merits use in combination with Guymon bermuda on roadside berms in northern Arkansas to provide year-round green color. Redtop is similar in leaf texture and growth habit to bermudagrass. Redtop's particularly wide adaptability to soils of varying texture, pH, fertility and moisture levels makes it worthy of inclusion in most seed mixtures for most sites in northern Arkansas. Its modest size and density make it an excellent companion for many small legumes and wildflowers. Its reddish seedheads are of some ornamental interest.

**Planting/Seeding Requirements:** Seeding is done during September and early October at 2-5 lbs/acre (\$1.70/lb). The seed is very small, similar to bermuda. Ideally, the seed should be covered by about 1/8-1/4" of soil, rolled, and mulched.

**Maintenance Requirements:** Redtop may be mowed at a 4" or higher height anytime during the year and quite frequently if desired. Redtop is tolerant of Trimec and MSMA, but not Oust, herbicides. Redtop would respond well to late summer to fall fertilizer applications, but this is not necessary.

## Big Bluestem

*Andropogon gerardi* (Gramineae)

**Description:** Big bluestem is a native, warm-season, rhizomatous perennial tall grass with short scaly underground stems and roots that saturate the top two feet of soil and extend much deeper. Growth begins in early April and produces very abundant foliage in late spring from axillary buds at basal nodes and from the rhizomes. The leaf blades are medium green, 6-18" long and 0.25-0.5" wide; flat to slightly V-shaped, abruptly tapering at the tip and very hairy toward the base. Culms are purplish at the base and covered with fine hair. Growing points stay close to the ground until late August to early October when seed stalks 4 to 7 feet tall appear. At that time, growing points are 2 to 4 inches above ground. The inflorescence has 2 to 3 distinct racemes, 1-2" long, on top of tall stems, resembling toes of a turkey's foot. Big bluestem tends to grow in large clumps.

**Site Requirements:** Big bluestem is adapted to hardiness zones 4-9 and may be found over much of United States. But it is best adapted the higher rainfall portions of the Great Plains - the so-called "tall grass prairie". Big bluestem will grow throughout Arkansas, but it is less adapted to the extreme eastern and southeastern regions of the state. Big bluestem is best adapted to deep, fertile soils but grows abundantly during wet periods on shallow, gravelly ridges and near limestone ledges. It thrives on the blackland soils, particularly the calcareous soils, from Texas to Georgia.

**Use in Rights of Way:** Big bluestem merits use in the more fertile, moist, but not wet, soils along roadsides. Its large size, abundant foliage, bronze foliage color in the fall and persistence into the winter results in outstanding ornamental value. Livestock and elk prefer it to most associated grasses during early stages of growth. It will dominate over most other plants where well adapted. Nevertheless, seeding it with the larger, stronger legumes and moderate sized prairie grasses will result in a very attractive roadside "prairie".

**Planting/seeding Requirements:** Seeding is done from December to April at 2-4 lbs/acre (about \$5/lb). The seed is moderate sized, a little larger than tall fescue. Ideally, the seed should be covered by about 1/8-1/2" of soil, rolled and mulched.

**Maintenance requirements:** Big bluestem can be mowed at a 6" or higher height anytime, but it is preferable to mow it in the late fall or winter.

**Little bluestem*****Andropogon scoparius* (Gramineae)**

**Description:** Little bluestem is a native, warm-season, perennial bunch grass with a dense root system that may reach 5' or more in depth. It spreads by seed, tillers and short underground rootstocks. It can be identified by its flat bluish-purplish-colored basal shoots and folded leaves which are about 6-10" long and 1/8-1/4" wide. Growth starts in late spring and continues throughout summer if moisture is adequate. Little bluestem withstands prolonged dry periods. The inflorescence has racemes borne singly, in pairs, or in groups on a zigzag rachis; 2 spikelets 1 sterile, 1 fertile. The seedstocks appear in late August through October and reach a height of 2-5 feet. Seed ripens in October and November, but native stands produce good (harvestable) seed crops only about once every 5-10 years. Mature plants turn light reddish brown after frost.

**Site Requirements:** Little bluestem is one of the most widely distributed perennial grasses in America. It grows well on deep, shallow, sandy, fine-textured and rocky soils. But it grows best on calcareous soils derived from limestone. It is adapted throughout Arkansas, except the extreme southeast.

**Use in Right of Way:** Little bluestem's moderate size, wide soil adaptation, and reddish fall color make it well suited for inclusion in seed mixtures with many legumes and wildflowers for many roadside situations. Little bluestem, an important forage grass, is grazed readily by livestock, deer and elk.

**Planting/seeding Requirements:** Little bluestem is seeded from December to April at 2-3 lbs/acre (about \$6.50/lb). The seed is moderate sized, somewhat larger than tall fescue. Ideally, the seed should be covered by about 1/4-1/2" of soil, rolled and mulched.

**Maintenance Requirements:** Little bluestem may be mowed anytime during the year for hay or beautification, but leave 4" or higher stubble.

**Comments:** None

**Splitbeard bluestem***Andropogon tenarius* (Gramineae)

**Description:** Splitbeard bluestem is a native, warm season, perennial bunchgrass. It spreads by seed and tillering. Growth starts in April. The lower leaves are 1/8-1/4" wide and 10-16" long and the upper leaves are shorter. They are usually hairy and curl back toward the base of the clump at maturity. Basal leaves remain green until late fall; some leaves in center of large bunches stay green all winter. Bunches 2-4" in diameter are formed. Each erect seedstalk is tipped by paired racemes about 2" long with small tuft of hair at base; spiklets long and hairy - thus the name "splitbeard". Seedheads form in late August and September. Seedstalks persist after seed ripen and into the winter. It will survive burning.

**Site Requirements:** Splitbeard bluestem's climatic range includes the eastern part of Texas, Oklahoma and Kansas to the Atlantic Coast and north to Delaware. It grows on a variety of soils in the southeastern United States, but it grows best on the reddish prairie and red sandstone (well-drained coarse to medium textured) soils of poor fertility and low pH on ridges and knolls. It may appear in almost pure stands during one period of natural plant succession on disturbed areas of such soils. Thus it is adapted to some roadside sites in the northwestern third of Arkansas.

**Use in Right of Way:** Splitbeard bluestem's utility is limited to seed mixtures for steep banks and very poor soils as described above, similar to lovegrasses. Several other grasses are better suited to most sites. Its forage is unpalatable and stemmy. Its "splitbeard" has some ornamental interest.

**Planting/seeding Requirements:** Seeding is done from December to April at 2-4 lbs/acre. The seed is medium sized, a little larger than tall fescue. Ideally, the seed should be covered by 1/4-1/2" of soil, rolled and mulched.

**Maintenance Requirements:** It would probably be better to not mow this grass at all. But, if it is mowed, late fall would be best. It will survive occasional mowing anytime at a height of 4" or higher.

**Comments:** None

**Arrowfeather threeawn*****Aristida purpurascens* (Gramineae)**

**Description:** Arrowfeather threeawn is a native, warm-season, tufted, perennial bunchgrass. The bunches enlarge by tillering. Spring growth starts about two weeks before most warm-season grasses. The flat, narrow leaf blades of 4-8" length tend to curl at the base of the plant and form a grayish colored mound. The seedheads are a narrow, sometimes lax and nodding, panicle of 4-12" length. Spiklets are crowded close on the seedhead, one flowered, and have 3 awns (at about 120 degree angles) about 3/4" long. A good seed crop is produced in June. Mature seedstalks of 1.5-2.5' height have a purplish cast. Barb-like hairs at the base of the seed help pull seed into the soil for self planting. Seedstalks do not deteriorate readily unless burned or broken off. The plants go dormant in the summer and greenup again after fall rains.

**Site Requirements:** Arrowfeather threeawn is found growing wild in all states east of the Great Plains, including all of Arkansas. It grows best on sandy soils and will grow on hard, dry rocky soils. It tolerates moderate shade.

**Use in the Right of Way:** Arrowfeather threeawn's short, spring growing season allows it to form a sparse ground cover on very droughty, infertile soils and under partial shade. It could be included in seed mixtures for such sites. It produces only small amounts of low-quality forage. The curly leaves and the lax, nodding, narrow, purplish panicle have some ornamental interest.

**Planting/seeding Requirements:** Seeding is done from December to April at 2-4 lbs/acre. The seed is moderate sized, somewhat larger than tall fescue. Ideally, the seed should be covered by about 1/4-1/2" of soil, rolled and mulched.

**Maintenance Requirements:** If mowed at all, it is best to mow in summer after seeds mature.

**Comments:**

## Old World bluestem

*Bothriochloa caucasica* (Gramineae)

**Description:** Old World bluestem is a warm-season perennial bunchgrass, deep-rooted, drought tolerant, and with enough cold tolerance to be grown as far north as Missouri and Kansas. It breaks dormancy a few weeks later in the spring and goes dormant in fall at about the same time as bermudagrass. The leaf blades are long narrow, and grow mainly from the base of the plant rather than from the elevated part of the stem. It flowers indeterminately on 2-4' tall seedstalks and matures seed from July through October. The seed are "feathery", very light and are born in unbranched racemes. It produces maximum growth from June to Mid-October with highest yield in September.

**Site Requirements:** Old world bluestem is best adapted in the central and southern Great Plains. It grows well in Oklahoma, Kansas, Missouri, Texas and all of Arkansas. The grass does well on soils ranging from well-drained sandy loams to red or black clay loams and sandy clay loams. It is better adapted to loamy or clay loam soils than deep droughty sandy soils. The grass prefers a soil pH of 6.0 to 7.5 but will grow on a more acid soils.

**Use in Right of Way:** While Old World bluestem has no special ornamental value per se, it is very well suited for inclusion in mixtures with other grasses, legumes and wildflowers to produce a roadside "prairie". It is well adapted to good quality soils along roadsides. Its outstanding late summer forage and seed production provides feed for deer and birds.

**Planting/seeding Requirements:** Seeding is done from April to June at 1.5-3 lbs/acre (\$5.50-14.00/lb). Seed is medium sized, about the same as tall fescue. Ideally, the seed should be covered by about 1/4-1/2" of soil, rolled and mulched.

**Maintenance Requirements:** Mowing can be done anytime during the year at a 4-6" height. It is slightly better to mow in late fall.

**Cultivars:** None

**Comments:** None



**Sideoats grama*****Bouteloua curtipendula* (Gramineae)**

**Description:** Sideoats grama is a native, warm-season, rhizomatous perennial mid grass with short scaly underground stems. Growth begins in early spring. Leaves are 4-8" long, flat, and hairy along edges. The seedhead are 35 to 50 spikes along one side of slender zigzag rachis; the 5-8 spikelets resembling oats suggests the name "sideoats". Seedstalks appear from early July to September. Seed produced in fall are more viable than those produced in summer. Seed set is rare in midsummer. It is a winter-hardy and drought-resistant grass. This grass has two growth forms: (1) Low growing (8 to 14 inches) rhizomatous produces few seedheads and reproduces from rhizomes; (2) tall upright (16 to 30 inches) bunch grass produces many seedheads and reproduces from seeds. The upright form is desired for roadsides. The "sideoats" seedhead gives ornamental interest.

**Site Requirements:** Sideoats grama is found throughout the Great Plains and east to Virginia, including all of Arkansas. It is better adapted to the northwestern and western portions of Arkansas. It grows on well-drained uplands, shallow ridges, and rocky areas but may be found on soils ranging from deep to very shallow. This grass is better adapted to calcareous and moderately alkaline soils than to neutral or acid soils.

**Use in Right of Way:** Sideoats grama could be included in included in seed mixtures for roadside "prairie", especially where soil pH is neutral or higher. It produces high quality forage and wild turkey, quail and other birds eat the seed.

**Planting/seeding Requirements:** Seeding is done from December to April at 15-25 lbs./acre (\$4.75-5.75/lb). Consider liming soils prior to planting. The seed is large, somewhat smaller than wheat. Ideally, the seed should be covered by about 1/2-3/4" of soil, rolled and mulched.

**Maintenance Requirements:** Mowing can be done anytime during the year.

## **Blue grama**

*Bouteloua gracilis* (Gramineae)

**Description:** Blue grama is a native, warm-season, short, perennial bunchgrass with very slowly spreading short rhizomes. Spring growth starts in late May. The leaf blades are only about 2-4" long, narrow, flat and smooth. The plants form a clumpy "turf". The greenish inflorescence has two rows of 50-60 spiklets growing from one side of the slightly curved rachis; this gives a somewhat comb-like shape to the seedhead. This seedhead is about 1-2" long and borne on 8-24" erect culms. Flowering and fruiting occurs from June to September and the reddish to purplish seedheads persist. Blue grama goes dormant in summer drought and greens up again after fall rains.

**Site Requirements:** Blue grama is adapted throughout the Great Plains to southern Canada to central Mexico. It is limited to west-central Arkansas. It grows best in loams and sandy loam soils and does not grow on sandy, gravelly, and clayey soils.

**Use in Right of Way:** Blue grama's use in Arkansas is quite limited. It is too small to compete well with larger grasses and has no special sites of adaptation. It might be used as the only grass in a mixture with small wildflowers for special plantings of selected sites as part of contrasting landscape designs.

**Planting/seeding Requirements:** Seeding is done from December to April at 2-3 lbs/acre (\$4.60/lb). Seed is about the same size as tall fescue. It is slow to establish from seed. Ideally, seed should be covered by about 1/4-1/2" of soil, rolled and mulched.

## **Buffalograss**

*Buchloe dactyloides* (Gramineae)

**Description:** Buffalograss is native, warm-season, stoloniferous perennial that spreads by vigorous stolons which root well at the nodes and form a dense sod. Growth starts in late spring and continues through frost. Leaves are gray green color, less than 1/8" wide, 3-6" tall and curly. Female flowers are in sessile heads or burs, partly hidden among the leaves. Male flowers are in 2 or 3 short spikes on slender, erect stems that rise a few inches above the foliage.

**Site Requirements:** Buffalograss is well adapted throughout the short-grass region of the Central and Southern Great Plains. It grows throughout Arkansas, but may not compete well with established bermudagrass or tall fescue in our wetter climate. It is best adapted to soils having a high clay content. It dominates on sites intermittently wet and very dry, but does not succeed on sandy soils, soils having pH less than 5.0 or shaded sites. It withstands submergence, prolonged summer droughts and recovers very quickly after rains.

**Use in Right of Way:** Buffalograss, if established in pure stands, would perform very well for soil stabilization and erosion control immediately adjacent to roads. It is also used for livestock pasture, grass waterways, lawns and low traffic recreational areas. It has little use in seed mixtures because taller grasses would shade it out.

**Planting/seeding Requirements:** Vegetative cultivars should be sodded or sprigged in the spring. Sprigs should be sprigged thickly into good seedbeds for rapid cover growth. After watering in sprigs, application of simazine herbicide and a complete fertilizer would aid establishment of a pure, weed-free stand. The seeded cultivars should be seeded in May at 4-7 lbs/acre (\$8.50/lb). Ideally, the seed should be covered by about 1/16-1/4th " of soil, rolled and mulched.

**Maintenance Requirements:** Buffalograss grows so low that weed-free stands would not need mowing. It can be mowed anytime. Buffalograss is tolerant to phenoxy, simazine, pendimethalin, and glyphosate (when dormant) herbicides, but it is not tolerant to MSMA and its tolerance to sulfometuron methyl (Oust) is unknown.

**Cultivars:** Two new vegetative (sodded or sprigged) cultivars, 'Prairie' and '609', were selected for greater density, better color, etc. and are female plants so no seedheads show above foliage. The older 'Texoka' cultivar is seeded.

**Comments:** A dense, nearly weed-free, patch of buffalograss was found beside U.S Hwy. 62 west of Eureka Springs. Chenshaw/Douget Turfgrass, 609 Castle Ridge Road, Austin, TX 78746 (512/328-0884) are selling about 1000 truckloads of sod annually for roadside use. Current research and turfgrass industry experience will soon determine the limits of wider uses of buffalograss.

## **Pampasgrass**

*Cortaderia selloana* (Gramineae)

**Description:** Pampasgrass is an exotic, warm season, upright-open, very tall growing, gynodioecious, weakly perennial grass with very large plumes from early June to frost. Leaf growth begins in early spring and grows to a few feet tall before flowering culms develop in June. The medium to glaucous green, leaf blades are 0.4-0.6" wide and 1-8' long, mostly crowded at base of culm and mostly arching. Pistillate inflorescences are broadly pyramidal (24-30" long and 8-12" wide), usually longer, broader, and more showy in color than staminate flower plants. Culms are stout, erect, densely tufted, forming large, very competitive, clumps, topped at a 6-12' height by large showy plumes which persist into winter. Few, if any, grasses are more magnificently ornamental.

**Site Requirements:** Pampasgrass is hardy in zones 8-10, thus it is limited to the southern one quarter of Arkansas. It is best adapted to sandy soils with adequate moisture, especially in spring. It does not grow well in clayey soils, especially if roots are actually in water.

**Use in Right of Way:** Pampasgrass is generally used in large, well maintained gardens and parks as a background specimen planting. It could be used (1) as specimen plants in large detailed landscapes at selected special sites, or (2) in mass large monostands away from the roadway.

**Planting/seeding Requirements:** For specimen plant usage it would be appropriate to select desired cultivar(s), multiply them in nursery rows, and transplant crown divisions in March to April. For mass plantings, obtain seed of cultivars or common types and plant in well prepared seedbeds at 2-5 lbs/acre in March to April. Seed is large, about as long as rice. Ideally, the seed should be covered by about 1/2-3/4th" of soil.

**Maintenance Requirements:** Mowing should be done at about 10" height in early winter. The mowing "mulch" would protect plants from winter freezing. The short-lived perennial nature of pampasgrass is probably caused by a "root-bound" condition and/or the large accumulation of biomass. Regardless of cause, cutting through pampasgrass areas every two or three years in late winter to early spring with a large disk or field cultivator would probably facilitate longer-term maintenance of stands.

**Cultivars:** A dozen or so cultivars are available in the nursery trade. These vary in size and color of plumes from common whitish-silverish through several shades of yellows, reds and purples. 'Monstrosa' is the largest; 'Rubra' is pink pampas grass. Seeds are not completely true to cultivar type.

**Description:** Bermudagrass is a naturalized, warm-season creeping perennial that spreads by rhizomes, stolons, and seed. Leaves grow from buds on stolons and rhizomes in warm (65 F) spring weather and grow best during the heat of summer. The leaves are grayish green, fine textured, flat, elongated, narrowing to a blunt tip and grow to a height of 6-12". Inflorescences are 4-5 digitate, radiating, dark purple spikes (1-2" long) borne in a single whorl about 6" above the leaves from May to October. The plants harden off in October and go dormant after heavy frost. The deep, fibrous root system makes it very drought-tolerant. It recovers well from summer dormancy. It is not tolerant of shade.

**Site Requirements:** Common and Guyman bermuda are adapted throughout Arkansas. But in dry years and/or under poor soil conditions common bermuda seedlings may not become well enough developed to survive their first winter in the northern third of Arkansas (use Guymon). Bermuda grows on a wide variety of soil types and pH and fertility levels, but is best adapted to fertile, loamy and well drained soils with a pH of 6 to 7 and responds well to good N and K fertilization. Moderate K levels protects against winter kill.

**Use in the Right of Way:** Bermudagrass alone (or in combination with tall fescue or redtop in northern Arkansas) may be the best grass for berm stabilization and erosion control near roadways. Its low height provides safety advantages. It could be overseeded in September with white, crimson or hop clovers to provide colorful spring blooms.

**Planting/seeding Requirements:** Seeding is done from mid April to mid June, May is best, at 5-7 lbs/acre (\$2.75-7.00/lb). The seed is very small. Ideally, the seed should be covered by about 1/8-1/4" of soil, rolled and mulched. Sprigging is done from April to June at about 25-50 bushels/acre. Sodding of waterways is desirable. Liming and fertilizing with a complete fertilizer prior to planting is desirable on some soils.

**Maintenance Requirements:** Bermuda can be mowed anytime at a height of 4" or higher during its growing season or after frost. Weed-free bermuda may not need to be mowed. Bermudas are tolerant of phenoxy, MSMA, simazine, and sulfometuron herbicides.

**Cultivars:** Arizona common bermuda seed is low cost and good for most situations. Guymon is more cold tolerant and similar in other ways and better for seeding in northern Arkansas. Tifway is much denser, finer textured, darker green and lower growing and widely available as sod. Tifway is recommended for sodding and sprigging situations.

**Comments:** None

## Virginia wildrye

*Elymus virginicus* (Gramineae)

**Description:** Virginia wildrye is a native, cool-season, perennial, bunchgrass which reproduces by tillering and seed. The leaf blades are dark green, flat, 4-12" long and 0.4-0.7" wide and tend to grow widely spaced along the culm rather than from the base. The inflorescence is an erect to nodding, terminal spike, 2-8" long and 0.8-1.0" diameter. The spiklets are sessile, 2-3 at each rachis node, 3-5 flowered and glumes are long awned. Flowering occurs in May-mid June. Overall plant height is 2-3'. It may go dormant in the summer. Virginia wildrye is grown as an ornamental for its dark green (brownish in open sun) foliage and beautiful, curled, often drooping, flowering spikes which may form a mound-like clump.

**Site Requirements:** Virginia wildrye is adapted in hardiness zones 3-9 over most of the United States and throughout Arkansas. It grows best in fertile, medium textured, quite moist soils, even along drainageways that overflow occasionally, in open woodlands under 20-30% shade.

**Use in the Right of Way:** Virginia wildrye would be a desirable inclusion in seed mixtures for areas having good moist soil and partial shade. It is readily grazed by all livestock and deer in the fall and spring. Game birds eat the seed.

**Planting/seeding Requirements:** Virginia wildrye is seeded from mid September to mid October at 10-12 lbs/acre (\$25/lb). The seed is large, about the size of rice. Ideally, the seed should be covered by about 1/2-3/4" of soil, rolled and mulched.

**Maintenance Requirements:** It can be mowed anytime at about 6" height, but late summer when it is nearly dormant may be the best time.

**Comments:** None



## **Weeping lovegrass**

*Eragrostis curvula* (Gramineae)

**Description:** Weeping lovegrass is a naturalized, warm-season perennial bunchgrass with a shallow fibrous root system. It forms dense sod bunches 12-15" in diameter. Basal leaves are medium to dark green, fine textured, 10 to 20 inches long and 1/4 inch wide and taper to a needle like point and grow rapidly in spring. Seedheads are loose panicles, vary in color from dull straw to leaden gray, and measure 8-12" long. The overall plant height is 2-4 feet. Flowering occurs from June through August. The geniculating culms and long, pendulous, filiform leaves, which cascade ("weeping") to the ground, produce a large, attractive, symmetrical mound.

**Site Requirements:** Weeping lovegrass is adapted to the southern Great Plains and the western two-thirds of Arkansas. Weeping lovegrass does well on most any type of well-drained soil but prefers sandy loams, but has an outstanding ability to grow on low-fertility, droughty soils.

**Use in the Right of Way:** Weeping lovegrass is used in Oklahoma and Arkansas for erosion control on low-fertility soils, including steep highway road cut banks. Its ability to survive on low fertility soils, coupled with its extreme drought tolerance, makes weeping lovegrass an excellent choice for seeding with selected forage legumes on the steeper road cut banks.

**Planting/seeding Requirements:** Seeding is done during April and May at 4-5 lbs/acre (\$2.60/lb). The seed is similar in size to tall fescue. Ideally, the seed should be covered by 1/4-1/2" of soil, rolled and mulched.

**Maintenance Requirements:** It is best, if mowed at all, to mow lovegrass during the winter at a height of about 4-6". Spring growth will be more attractive if mowed. If the soil is so infertile that only a poor stand of weeping lovegrass persists, an application of 150 lb per acre of 13-13-13 fertilizer made in late April to mid May would improve grass growth and erosion control greatly.

**Closely Related Species:** Purple lovegrass (*E. spectabilis*) has more upright leaves, short rhizomes, showier reddish-purple panicles, and greater cold tolerance - consider its use on slightly better soils. Sand lovegrass (*E. trichodes*) has downward curling leaves and is better adapted to deep sandy or sandy loam soils in southwestern Arkansas. Except as noted, weeping lovegrass has more general utility for steep banks.

## **Giant plumegrass**

*Erianthus giganteus* (Gramineae)

**Description:** Giant plumegrass is an exotic, warm season, tall, upright, stout perennial, having strong ornamental value. Leaf foliage is light to medium green. Basal leaves are 12-30" tall and 0.3-0.6" wide with shorter upper culm leaves. Inflorescence is a terminal, purplish, wooly, compressed, broadly oblong panicle, 8-16" long and 5-8" wide and erect to slightly nodding. The 4-9' culms are strong and not likely to lodge. Leaf growth begins in April and continues through summer. Flowering occurs from late August until frost, with the plumelike panicles persisting into the winter.

**Site Requirements:** Giant plumegrass is hardy in zones 7-10 and adapted in the southern and southeastern two-thirds of Arkansas. It prefers moist, well-drained soil in full sun for maximum growth. It is adapted to a wide range of soil types.

**Use in the Right of Way:** Giant plumegrass is generally used as a background border or specimen planting in gardens and parks. The large size of giant plumegrass makes it well suited for planting alone in large scale mass plantings at selected locations along the roadsides.

**Planting/seeding Requirements:** Although it can be seeded and will reseed itself, plant division is the preferred method of propagation. Rootstocks can be planted as new growth begins in April. Seeding can be done in April or May at 2-5 lbs/acre. Seed are somewhat larger than tall fescue seed. Ideally, seed should be covered by about 1/4-1/2" of soil, rolled, and mulched.

**Maintenance Requirements:** Mow at a 10" height during the winter. If stands decline after a few years, strong cultivation with a large disk or field cultivator in early spring should rejuvenate the beds.

**Cultivars:** None

## **Ravenagrass, Plumegrass**

*Erianthus ravenne* (Gramineae)

**Description:** Ravenagrass or plumegrass is an exotic, warm season, upright-narrow, tall growing, stout perennial with showy fluffy panicles, having excellent ornamental value. Leaf foliage is medium green, 12-30" tall and 0.2-0.5" wide. Leaves are flat above the middle and narrowed, thick and folded toward base. The inflorescence is an erect, terminal, branched, dense, silky panicle of silvery tawny to light purplish color, 1-2' long and 5-7" wide. The 6-12' tall, strong culm persists into winter without lodging. Leaf growth begins in mid spring. Flowering occurs from August to frost. The fluffy, shiny beige panicles remain intact into winter.

**Site Requirements:** Ravenagrass is hardy in zones 5-10 and adapted throughout Arkansas. It prefers fertile, well-drained moist or wet soil. It is adapted to a wide range of soil types. It grows best in full sun, but may be grow in light shade.

**Use in Right of Way:** Ravena plumegrass is probably the largest ornamental flowering grass. Its architectural form and dramatic change from medium green foliage to frost induced fall colors of light brown to tan or beige, tinged with orange and purple, which persist into winter, make it very desirable for planting alone into large mass monstands along selected roadside areas. It is widely used for background, screen, and specimen plantings in large gardens and parks. Among the large ornamental grasses, Ravena plumegrass is probably the best to include in roadside landscapes in Arkansas.

**Planting/seeding Requirements:** Ravenagrass rootstalks or seed may be planted in spring when soil temperature reach 55-60 F. Plumegrass can be seeded in the spring although vegetative propagation is preferred, especially if the variety *purpurascens* is selected. Seed is somewhat larger than tall fescue seed. Ideally, the seed should be covered by about 1/4-1/2" soil, rolled, and mulched.

**Maintenance Requirements:** Ravenagrass will grow back up through old growth well, but appearance is improved by winter mowing at a 10" height.

**Cultivars:** A botanical cultivar, *E. ravennae* var. *purpurascens* differs in having better shades of brown, orange, and purple fall colors and silverish-purple panicles. It might be the best choice.

## **Tall fescue**

*Festuca arundinacea* (Gramineae)

**Description:** Tall fescue is a cool-season, long-lived perennial bunchgrass with short rhizomes which in older stands may develop a uniform thick sod. Leaves are flat, stiff, prominently keeled below and veined above, dark green and shiny on bottom, pointed at the tip, 10-15" tall and 0.2-0.5" wide. The inflorescence is erect, or nodding, lanceolate to ovate, somewhat contracted, branched panicle, 4-12" long; spiklets four to five flowered. Flowering occurs in May to early June. Culms are round, erect, stout, tufted, 3-4' tall. Tall fescue grows well in the fall and spring when night temperature are cool (65 F or less) and continues into the winter until soil temperatures drop below about 40 F. It will withstand considerable freezing temperatures and may not go totally dormant unless soil temperatures go below 40 F. Leaf growth resumes in late winter. Tall fescue stops growth and may become dormant in the summer when soil temperatures exceed about 75 F and soil moisture is limiting.

**Site Requirements:** Tall fescue is adapted throughout the U.S. east of the Great Plains, but it grows best in the transition zone between northern cool humid and southern warm humid climates. This zone includes the north and northwestern third of Arkansas. It is best adapted in clay, loam or silty soils, but tolerates wide ranges of soil types and pH levels as well as moderate shade. It responds well to fertilization, but survives in low fertility soils. It grows well in partial shade.

**Use in the Right of Way:** Tall fescue is very well suited for use for berm stabilization and erosion control in the cooler, mountainous portions of northwestern Arkansas. It is excellent alone (or in combination with Guymon bermudagrass or redtop) for providing stabilization and erosion control on roadside berms. It could be planted with or overseeded with white, crimson or hop clovers for spring color. It may compete strongly (or possibly be allelopathic) against wild flowers in backslope plantings. Tall fescue is among the most drought tolerant of cool season grasses.

**Planting/seeding Requirements:** Tall fescue is seeded from September to mid October at about 20 lbs/acre (\$0.65/lb). Seed are medium sized. Ideally, the seed should be covered by about 1/4-1/2" of soil, rolled, and mulched.

**Maintenance Requirements:** It may be mowed anytime during the year at a 5-10" height. Mowing in late spring will remove seedstalks and improve safety and neatness on berms.

**Cultivars:** More than 100 cultivars exist for lawn and forage purposes, but overall Kentucky 31 is fine for roadsides.

**Comments:** None

**Japanese bloodgrass**

*Imperata cylindrica* 'Rubra' (Gramineae)

**Description:** Japanese bloodgrass is an exotic, warm season, short, perennial whose ornamental value is limited to its unusual shiny, greenish, medium red-purplish foliage. Its leaves are stiffly upright of 6-12" height and medium texture. Its flowering culms reach a total height of 12-18". It grows best in partial shade on soils of medium texture, fertility and moisture. Its best ornamental use is as pure stand, massed accent planting for the color contrast. It does not seem appropriate for highway roadside usage.

**Comments:** No seed source found. Springbrook Gardens, Inc., P.O. Box 388, Mentor, OH 44061-0388 (216/255-3059) sell potted divisions at \$2.10-2.00 each.

**Maidengrass**

*Miscanthus sinensis* var. *gracillimus* (Gramineae)

**Description:** Maidengrass is an exotic, warm season, densely tufted, upright-open perennial, having distinctive dark green, fine textured foliage and large upcurved, graceful panicles of outstanding ornamental value. Leaves are dark green with white midribs, fine textured, glabrous, flat, arching, 2-3' tall and only less than 0.1" wide, which is distinctively ornamental. Leaf growth begins in mid spring. The inflorescence is an erect, bright, shiny, reddish, branched panicle, 4-8" long and 3-6" wide, forming a whorl, and becoming curled, twisted and fluffy at maturity. The flowering culms are erect, 5-7' tall, glabrous, stiff, and stout and do not lodge in fall. Flowering occurs from September to frost.

**Site Requirements:** Maidengrass is adapted to hardiness zones 6-9 and thus all but extreme northwest Arkansas. It is adapted to a wide range of soil types, but requires ample fertility and moisture for maximum growth. It prefers full sun, but will tolerate light shade.

**Use in the Right of Way:** Maidengrass is adapted to selected special interest plantings, as a pure stand, in good, moist soil sites along roadsides. It is excellent in stately appearance, architectural quality, and colorful foliage and fluffy panicles during the growing season and into late fall. Foreground plantings should be short grasses alone.

**Planting/seeding Requirements:** It is best to propagate vegetatively which would require nursery production and furrow planting procedures in the spring. Seeding can be done in April-May at 2-4 lbs/acre in well prepared, weed-free seedbeds, but many inferior plant types will result. Seed is somewhat larger than tall fescue and should be covered with 1/4-1/2" of soil, rolled, and mulched.

**Maintenance Requirements:** Mow at 6-10" height in winter.

**Closely Related Subspecies:** Maidengrass may be the most desirable ornamentally of the several botanical varieties and cultivars of Japanese silvergrass or Eulalia, *M. sinensis*. The sub-types vary in leaf color and width, height and flower color. Silvergrass, *M. sinensis* var. *variegatus*, differs in having foliage variegated with longitudinal whitish or yellowish stripes. Zebragrass, *M. sinensis* var. *zebrinus*, is a unique, curiosity among ornamental grasses in having golden horizontal stripes across the medium to light yellowish leaves. These last two could be used in the same manner as maidengrass.

**Comments:** None



**Beaked panicum*****Panicum anceps* (Gramineae)**

**Description:** Beaked panicum is native, warm-season, weak, rhizomatous perennial. Leaves are folded at base; v-shaped at tip; about 1/2" wide; upper side hairy near base; stiffly erect giving the plant a distinct upright appearance. Seedheads are open panicles, 6-14" long, each spikelet 1/4-1/2" long; second glume curved at end like bird's beak. The overall height is 2-4 feet. Growth starts in February. Most of the vegetative growth is completed by May or June. Plants remain green until fall. Seedheads appear during September. Beaked panicum is a prolific seed producer. Tolerates shade. Pure stands are common. Large clumps are formed as it spreads laterally from short rhizomes.

**Site Requirements:** Beaked panicum is found mostly in forested region of the South and Southeast, including all of Arkansas. It grows on moist to wet soils along margins of fresh marshes, swamps, and bottom lands that overflow occasionally. It grows best under 30 to 35 percent shade.

**Use in the Right of Way:** Beaked panicum could be included in seed mixtures for wet, partial shaded areas along roadsides. Beaked panicum is grazed by cattle, horses and deer. Seed are eaten by most upland birds and some waterfowl.

**Planting/seeding Requirements:** Seeding is done during December to April at 2-5 lbs/acre. Seed is somewhat larger than tall fescue seed. Ideally, it should be covered with 1/4-1/2" of soil, rolled, and mulched. But probably the wetness of the sites will limit seeding method to hydromulching.

**Maintenance Requirements:** Sites are probably too wet to mow. Mid summer mowing would cut off seedheads in stems.

**Comments:** None

## Switchgrass

*Panicum virgatum* (Gramineae)

**Description:** Switchgrass is a native, warm-season, deep rooted, perennial tall bunchgrass that spreads slowly by rhizomes and seed. Leaves are medium green, flat, 1-2' tall and 0.2-0.6" wide and become bronze after frost. Switchgrass makes major growth from March through September. The inflorescence is a sparse, open, branched panicle about 6-12" long and 3-6" in diameter. The 3-7' tall culms are produced from July to September with panicles formed from late August through September. Growing points are 4 to 5 inches above ground during the latter part of growing season. Rhizomes grow actively during January to April. Switchgrass withstands temperatures of -25 to -30 F. without apparent damage.

**Site Requirements:** Switchgrass is adapted from the Rocky Mountains, south into Arizona, and east to the Atlantic coast in hardiness zones 5-9. It is adapted in all of Arkansas, especially the west and northwest. While it is best adapted to fertile, moist soil, it will produce better growth and cover on droughty, infertile, eroded soils than most introduced grasses. It grows equally well on the highly calcareous soils of central Texas and the wet, acid soils of south Florida as well as in brackish marshes. It is drought tolerant.

**Use in the Right of Way:** Switchgrass has good ornamental value. Its seedheads appear cloud-like over the foliage. The reddish seeds and the leaves which turn bronze after frost adds to its beauty. The stems remain erect through the winter. It provides graze for deer and seeds for birds. Switchgrass could be seeded alone as a mass planting or mixed with larger legumes and wild flowers in selected areas along roadsides for outstanding beauty.

**Planting/seeding Requirements:** Seeding is done in April to May at about 2-3 lbs/acre (\$2.25-5.00/lb). The seed is fairly large, much plumper and about the same length as tall fescue seed. Ideally, the seed should be covered by about 1/4-1/2" of soil, rolled and mulched.

**Maintenance Requirements:** Best to mow at 6-10" height in late fall. It is okay to mow in late spring.

**Cultivars:** 'Rehbraun' and 'Rostrahlbusch' have reddish foliage in the fall. 'Strictum' has bluish-green, narrower foliage, flowers earlier and is smaller than common switchgrass. 'Rubrum' is much smaller (only about 3' tall) and less vigorous with reddish leaf color, especially toward the tips, red fall color.

**Dallisgrass*****Paspalum dilatatum* (Gramineae)**

**Description:** Dallisgrass is a fast growing long-lived warm-season, deep-rooted perennial bunchgrass with very short rhizomes. The smooth, flat leaves 1/2" wide and 4-10" long are produced in leafy abundance at the base of the plant. Seed is produced abundantly from June to September on 2-3' tall nearly leaf-less seedstalks. Seed are oval and hairy and arrayed in two compact rows on the 5-9 racemes of the digitate panicle. It begins growth in the spring earlier than most warm-season grasses and continues growth later in the fall. It is not injured by moderate frosts. It is highly heat and drought resistant.

**Site Requirements:** Dallisgrass is adapted throughout the cotton belt wherever annual rainfall is 30" or more. It is found from New Jersey south to Tennessee and Florida and west to Texas and throughout Arkansas. This grass is adapted to a wide variety of soils but grows best on moist fertile clay and loam bottomland. On heavy clay soils, dallisgrass will endure extremes of both drought and moisture. It is not well suited to extremely sandy soils.

**Use in the Right of Way:** Dallisgrass could be included in seed mixtures for areas away from the immediate right-of-way. Its coarse leaf texture, decumbent growth habit, abundant seedhead production and difficulty of herbicidal control make it a serious weed, necessitating extra mowing, wherever pure stands of bermudagrass, buffalograss, tall fescue or redtop are desired. It provides good grazing and seed for wildlife. It mixes well with forage legumes of moderate height. Dallisgrass is sometimes used for erosion control.

**Planting/seeding Requirements:** Seeding is done from March to April at 5-10 lbs/acre (\$3.75/lb). The seed is plumper and shorter than tall fescue seed. Ideally, the seed should be covered by 1/4-3/8th" of soil, rolled and mulched.

**Maintenance Requirements:** Dallisgrass can be mowed anytime at a 4" or higher height. It withstands mowing very well as a lawn weed.

## **Knotgrass**

*Paspalum distichum* (Gramineae)

**Description:** Knotgrass is native, warm-season, rhizomatous, stoloniferous perennial which will grow well in very wet areas. Leaf blades are flat to V-shaped, ascending from swollen stolon nodes and from culms, and tapering to a sharp point. Inflorescence is erect, terminal with two racemes often curved inward, usually a few long white hairs at fork. Its overall height is 1-2 feet. New growth starts in early March in warm parts of range. Foliage stays green until frost. Produces seed several times during late spring and summer. Reproduces from rhizomes, stolons, and seed.

**Site Requirements:** Knotgrass is native throughout the eleven southeastern states and along the west coast from California to Washington and east to Idaho. It is found in all of Arkansas. It grows primarily on fresh-water marshes and occasionally on brackish marshes. Tolerates moderate salinity and some standing water.

**Use in Right of Way:** Knotgrass could be included in seed mixtures for very wet areas. Seed are choice food for wild ducks on fresh-water marshes. Knotgrass is readily grazed by cattle and horses from spring until fall. It may increase on wet sites if tall, dominant grasses are grazed out.

**Planting/seeding Requirements:** Seeding is done from March to May at 15-20 lbs/acre. The seed are plumper and about the same length as tall fescue seed. Ideally, the seed should be covered by about 1/4-1/2" soil, rolled and mulched. But probably the sites will be too wet so hydromulching may work best.

**Maintenance Requirements:** If mowed at all, late summer may be the best time at 4" or more height.

**Florida paspalum**      *Paspalum floridanum* 'Wilmington' (Gramineae)

**Description:** Florida paspalum is a native, warm-season, robust, rhizomatous perennial. It spreads by rhizomes and seed and is very aggressive and deep rooted. The succulent leaves are flat, 14-20" long and 0.2-0.5" and taper to a point. The inflorescence is erect, consisting of 2-3 racemes, 3-4 " long with spikelets about 3/16th" long. Rhizomes begin to grow in late December and January. New leaf growth starts in late winter and early spring. Seedheads appear during late July and mature about a month later.

**Site Requirements:** Florida paspalum is found throughout eleven southern states, including all of Arkansas, and in Kansas and Missouri. It is adapted to the nearly level acid to neutral, somewhat poorly drained flatwoods soils in the Coastal Plain and Florida. Also, adapted to well drained deep soils on uplands that have a sandy surface over a fine-textured subsoil which are more likely in the southern two-thirds of Arkansas. It is drought tolerant.

**Use in Right of Way:** 'Wilmington' Florida paspalum could be included in seed mixtures in selected soil areas in southern Arkansas. It provides graze for deer and good erosion control. It may be somewhat less aggressive than bahiagrass thus better suited for areas away from the immediate roadside.

**Planting/seeding Requirements:** Seeding is done from March to May at about 15-20 lbs/acre. Seed is plumper and about the same length as tall fescue seed. Ideally, the seed should be covered by about 1/4-1/2" of soil, rolled and mulched.

**Maintenance Requirements:** It may be mowed anytime during the year at a 4-5" height.

**Cultivars:** 'Wilmington' is not available in the seed market, but some seed is available from USDA/SCS in Mississippi.

**Bahiagrass**

*Paspalum notatum* 'Pensacola' (Gramineae)

**Description:** 'Pensacola' bahiagrass is a warm-season, robust, deep-rooted, very aggressive, dense sod-forming, rhizomatous perennial. Rhizomes begin to grow in late winter to early spring. New leaf growth starts in early spring. Leaves are dark green, 3-9" long, 0.1-0.3" wide, stiffly spreading, crowded and strongly folded at the base, and pubescent at the margins. The inflorescence is a racemose panicle bearing 2 or sometimes 3 racemes. Racemes are curved and ascending with spikelets occurring in two rows. Culms range from 6 to 24" in height and occur in dense tufts. Flowering and fruiting occur from May to September.

**Site Requirements:** Bahiagrass is widely grown from east Texas to the Carolinas, and as far northward as the southeastern quarter of Arkansas and the southwestern corner of Tennessee. It is best adapted on sandy soils with a pH of 5.5 to 6.5 but is adapted to a wide range of heavier coastal plains soils. It will grow on drier soils with relatively low fertility and on sandier soils than most other pasture grasses in its region of adaptation.

**Use in Right of Way:** Extensive use has been made of bahiagrass for preventing erosion, stabilizing road shoulders and pasture for beef cattle. It withstands close grazing and has the unique ability to produce moderate yields on soils of very low fertility. Once a good sod is established, it is very competitive and will crowd out most other plants. It is better adapted than bermudagrass on sandy soils. It should be planted alone where used.

**Planting/seeding Requirements:** Seeding is done during March to mid May at about 15-20 lbs/acre (\$0.70/lb). Seed are oval shaped, yellowish green in color, glossy and about 0.12" in length; about the same length as tall fescue. Ideally, seed should be covered by about 1/4-1/2" of soil, rolled, and mulched.

**Maintenance Requirements:** It may be mowed anytime at a 4-6" height. After sod formation, it may be uniform and weed-free enough and low enough growing that no mowing is required.

**Cultivars:** 'Pensacola' bahiagrass is recommended because it has long narrow leaves and large stems and is more winter-hardy than common, Argentine, or Paraguay types.

**Comments:** None



**Fountain grass*****Pennisetum alopecuroides* (Gramineae)**

**Description:** Fountain grass is an exotic, upright-open, mound-forming, densely tufted, warm-season perennial with extensive, fibrous roots. The foliage is medium to dark green, turning yellowish with leaf blades of 6-8" length and 0.3-0.4" width. The inflorescence is a bristly, hairy, spikelike panicle, erect with ascending branches, arching at the top, 4-10" long and 2-3" wide, bronzy, becoming bright reddish. Leaf growth begins in mid-spring with flowering and fruiting from July to September with seedhead color persisting into the fall. The 3' diameter mounds and 2-4' overall height of colorful seedheads give fountain grass outstanding ornamental value.

**Site Requirements:** Fountain grass is adapted in hardiness zones 6-9, but may be only weakly perennial in zones 6-7. It grows well on fertile, moist to wet, but well-drained, pH 6-7 soils in full sun or light shade.

**Use in Right of Way:** Fountain grass is best used in large mass monstand plantings in better soil areas for summer and fall ornamental effect.

**Seeding/planting Requirements:** Seeding is done in April-May at about 5 lbs/acre. Ideally, seed should be covered by 3/8-3/4" of soil, rolled, and mulched. Propagation by plant division insures the form, size and color of cultivars or desired plant types.

**Maintenance Requirements:** Mowing may be done in late spring or better in late fall at a 6-10" height. Use of a preemergence herbicide in early spring would reduce invasion of beds by other plants. A heavy disking every few years would prevent the center the crown from dying out.

**Cultivars:** 'Hameln' is dwarf fountain grass, popular in garden landscapes. It is only 18-24" tall with 12-14" diameter mounds and has pink flowers. 'Weserbergland' is intermediate sized at 2-3' tall and makes excellent specimens in groups in full sun. *P. alopecuroides* var. *viridescens* is about 2-3' tall, has dark almost black plumes and is a desirable specimen plant. Probably the common type fountain grass is best overall for roadside usage.

**Comments:** None

## **Reed canarygrass**

*Phalaris arundinacea* (Gramineae)

**Description:** Reed canarygrass is a coarse, sod-forming cool season perennial with short rhizomes and deep-roots, capable of growing on very wet sites. The leaf blades are medium green, flat, coarse textured of 4-12" length and 0.3-0.7" width, harsh to touch, and acuminate. The leaves grow mainly from stout stems in spring and fall. The inflorescence is dense, branched, spikelike panicle, greenish to sometimes purplish, 3-6" long and up to 1.0" wide. The culms reach heights of 3-5 feet. Flowering and fruiting occurs from June to August. In thin or volunteer stands it often grows in clumps up to 3' or more in diameter. It spreads by short scaly rhizomes which form a heavy sod in well-managed solid seedings.

**Site Requirements:** Reed Canarygrass is indigenous to the temperate portions of all five continents and is well adapted to the northern half of the United States. It is definitely limited to extreme northern portions of Arkansas. Reed Canarygrass is extremely tolerant of flooding and poorly drained soils. It is drought tolerant and tolerates a soil pH range of 5 to 8.

**Use in Right of Way:** Reed canarygrass is limited to very wet soils in drainageways and at the edge of ponds. It might be included in seed mixtures for such sites, but its aggressive sod forming nature should be considered.

**Planting/seeding Requirements:** Seeding is done from September to mid October at 5-8 lbs/acre (\$5.50/lb). Seedling vigor is poor so establishment is slow. Seed is about the size of tall fescue seed. Ideally, seed should be covered by about 1/4-1/2" of soil, rolled, and mulched.

**Maintenance Requirements:** Late summer mowing at 6-10" height when soils are dry is the most practical time, if mowing at all.

**Cultivars:** Several smaller cultivars, including a variegated form, are available for ornamental use. The common type is best for roadsides.

**Knotroot bristlegrass*****Setaria geniculata* (Gramineae)**

**Description:** Knotroot bristlegrass is a native, warm-season, upright-narrow, weak perennial with short knotty rhizomes. The leaves are light to whitish green, flat, 6 to 10" long, 1/4" wide, with prominent midrib and upper surface covered with soft hair. Leaves grow from short, knotty, branching rhizomes from late March or early April until fall. Base of plant is slender and wiry. The inflorescence is a terminal, cylindrical spikelike panicles, 1-4" long and 0.5" diameter including the bristles. Each spikelet surrounded by 5 or more yellow or purple bristles. Produces two and sometimes three seed crops during one growing season, with the first one during May or June. Bristles are left on the panicle after seed disseminate. It reseeds itself well. The overall height of the plants is 1-3 feet.

**Site Requirements:** Massachusetts to Florida, west to California, north to Illinois and Kansas, including all of Arkansas. It grows best on moist or wet sites. In Florida, grows on wet sandy soils, sloughs, and acid flatwoods soils. In Texas and Louisiana, grows well on salty prairie sites; also grows on salt marshes if water level is relatively low.

**Use in Right of Way:** Knotroot bristlegrass might be included in seed mixtures for marshy areas. Knotroot bristlegrass provides only poor grazing for livestock, usually during spring and summer, and becomes unpalatable in fall. Its copious seed production provides feed for birds.

**Planting/seeding Requirements:** Seeding is done in April and May at 2-4 lbs/acre. Seed is similar to tall fescue in size. Ideally, seed should be covered by about 1/8-1/2" of soil, rolled, and mulched. Wet site soils may dictate hydromulching.

**Maintenance Requirements:** It can be mowed anytime at a 4-6" height. Probably the wet sites can be mowed, if mowed at all, only in the late summer. It can withstand controlled burning if done after September.

**Comments:** None

**Indiangrass***Sorghastrum nutans* (Gramineae)

**Description:** Indiangrass is native, upright-open, warm-season, deep-rooted, perennial tall bunchgrass which spreads slowly with short, scaly rhizomes. The leaves are medium green, 10-20" long and 0.2-0.3" wide, flat, narrow at base, sometimes hairy, and spread at 45 degree angles from stem. It is easily identified by the prominent claw-like ligule where the leaf blade attaches to the sheath. Growth starts in midspring from short, scaly rhizomes. The inflorescence is a branched, bronze-yellow panicle, 6-12" long and 3-4" wide. Seedstalks, 3-6' tall, form in late August and September. Indiangrass is a good seed producer and reseeds itself well. Indiangrass' bronze-yellowish panicle and dark orange-purplish foliage after frost create outstanding beauty.

**Site Requirements:** Indiangrass is found from the east coast to the Rocky Mountains and Arizona and from southern Canada to Mexico, including all of Arkansas. It is best adapted to deep well drained soils from heavy clays to deep sands. It is heat and drought-tolerant.

**Use in Right of Way:** Indiangrass is well adapted for use away from the immediate roadway on the better soil areas, either as a massed planting alone or in seed mixtures with other grasses, legumes and wildflowers. It produces good forage for deer and seed for birds. Its large size and competitiveness may eventually crowd out the smaller legumes and wildflowers. It is an attractive grass.

**Planting/seeding Requirements:** Seeding is done from April to mid May at 6-10 lbs/acre (\$5.45/lb). Seed is plumper and about the same length as tall fescue seed. Ideally, seed should be covered by about 1/4-1/2" of soil, rolled, and mulched.

**Maintenance Requirements:** It may be mowed at a 6-8" height anytime during the year, but waiting until late fall will maximize beauty.

**Cultivars:** None

**Comments:** None

## **Purpletop**

*Tridens flavus* (Gramineae)

**Description:** Purpletop is a native, warm-season, perennial bunch grass. The leaves are glossy green, smooth, flat, 10-28" long, lax and 0.3-0.5" wide. It is identified by a tuft of stiff, short hair on either side of the sheath at the collar. Leaf growth starts in early spring and continues into July. The inflorescence is an open panicle 8-14" long, spreading, pyramid shaped, usually purple, sometimes nearly black, branchlets droop and are covered with an oily or grease-like substance after seed maturity. Seedheads are produced on 3-5' tall culms during July to September; seeds mature during October. Purpletop spreads by short tillers which enlarge the old established bunches and reproduces by seed. Generally, the individual bunches of this grass are 6-8" in diameter at ground level. Purpletop, sometimes called greasegrass, is particularly attractive in the fall.

**Site Requirements:** Purpletop is found growing wild in all states east of the 30" rainfall belt, including all of Arkansas. Purpletop grows on light textured, sandy, moist, fertile soils and is particularly associated with wooded areas. It is adapted to both bottom lands and uplands.

**Use in Right of Way:** Purpletop might be included in seed mixtures for moist, lighter to medium textured soils, partially shaded locations. Its purple seedheads are attractive in the fall. Purpletop is grazed by all livestock during its early stages of growth. The seed are eaten by birds. It may be grazed or mowed to maintain a vigorous condition.

**Planting/seeding Requirements:** Seeding is done during April to June at about 15-20 lbs/acre. Seed are similar in size to tall fescue seed. Ideally, seed should be covered by about 1/4-1/2" of soil, rolled, and mulched.

**Maintenance Requirements:** It may be mowed anytime during the year at a 4-6" height, late spring or mid fall are the best times to mow.

**Cultivars:** None

**Eastern gamagrass***Tripsacum dactyloides* (Gramineae)

**Description:** Eastern gamagrass is a native, upright-open, warm-season, robust, semievergreen, deep rooted, perennial with thick, short, jointed, knotty rhizomes that grows in large clumps of 1 to 4 feet in diameter. The leaf blades are medium to dark green, smooth, 12-24" long and 0.4-1.0" wide, flat with a pronounced midrib. Leaves make major growth in early spring and stay green until late fall or frost if moisture is available. The inflorescence has 2 to 3 terminal racemes, 6-9" long, which are unusual in having the pistillate spikelets on the lower fourth of spike and the staminate (male) spikelets above on the same spike. Flowering and fruiting occurs on 5-9' culms from July to September. Few seed are viable. Robust growth makes eastern gamagrass very conspicuous.

**Site Requirements:** Eastern gamagrass is found growing wild from Massachusetts to Michigan, Iowa, and Nebraska and throughout the southern states, including all of Arkansas. It grows best on moist, well-drained, fertile, deep loam to clay soils. It requires lots of moisture, but does not tolerate standing water for long periods of time.

**Use in Right of Way:** Eastern gamagrass is well suited for planting alone in deep, moist soils or in mixtures with big bluestem and switchgrass and the larger legumes and wildflowers. It produces large quantities of very palatable forage for deer. It is a choice hay plant. Meadows of eastern gamagrass are very attractive.

**Planting/seeding Requirements:** Seeding is done during April and May at about 10 lbs/acre. Seeds are medium sized; about 1/8th" in diameter. Ideally, seed should be covered by about 1/4-1/2" of soil, rolled, and mulched.

**Maintenance Requirements:** Set mower to leave a 6-8" stubble because growing points are high. Mowing may be done anytime, late spring or early fall are best. Summer hay harvest is an option.



**Broadleaf uniola*****Uniola latifolia* (Gramineae)**

**Description:** Broadleaf uniola is a native, cool-season, robust, rhizomatous perennial, shade tolerant grass. The leaf blades are flat, wider in middle than at either end, and 4-6" long and tend to grow mainly from the stems. Growth starts in early spring. As summer approaches, it becomes semi-dormant; then greens up in fall when temperature is cool. The inflorescence is an erect, open panicle strongly drooping with branches which bear a few large, 8-10 flowered, flat spikelets. Thus it has ornamental interest. It produces seed in the fall and can seed itself. It spreads by rhizomes and grows into colonies. Its overall height is about 3-3.5 feet. It is shade tolerant.

**Site Requirements:** Broadleaf uniola is found growing wild throughout the forested areas of eleven southern states, including all of Arkansas, except possibly the west-central portion. It is adapted to moist, fertile bottom-land soils. It grows best under at least 40 percent shade.

**Use in Right of Way:** Broadleaf uniola could be included in seed mixtures for shady areas in bottom lands of northern and eastern Arkansas.

**Planting/seeding Requirements:** Seeding is done during September to October at about 15-20 lbs/acre. Seed is about the size of tall fescue seed. Ideally, seed should be covered by about 1/8-3/8th" of soil, rolled, and mulched.

**Maintenance Requirements:** It can be mowed anytime at a 4-6" height, but waiting until late fall would be best.

**Cultivars:** None

## **Longleaf uniola**

*Uniola sessiliflora* (Gramineae)

**Description:** Longleaf uniola is a native, cool season, rhizomatous perennial. The leaf blades are 12-24" long, bluish green, wide, and flat at top. Leaves remains green during most of winter and summer following major growth. The inflorescence is spikelike panicle which branches close to main stem with spikelets flat and broadly v-shaped at maturity. The overall plant height is 2-3". It produces most seed in June and July and some in fall. It grows best in shade; seldom grows in direct sunlight. It reproduces from short, knotty, pointed rhizomes and from seed.

**Site Requirements:** Longleaf uniola is found growing wild from East Texas and Oklahoma to the Atlantic coast and north to Virginia, including all of Arkansas. It is adapted to moist, shaded bottom-land and upland soils. Best adapted to areas that are shaded more than 50 percent at midday. It grows best on fertile soils but also grows on soils of low fertility. It is the principal grass in mixed pine-hardwood forests of the South.

**Use in Right of Way:** Long leaf uniola merits inclusion in seed mixtures for the outer edge of rights-of-ways where forests provide heavy shade. It would heal such bare areas especially if some fertilizer and lime were added during planting operations. It provides winter and spring grazing for deer.

**Planting/seeding Requirements:** Seeding should be done during September to mid October at 15-20 lbs/acre. Seed are plumper and somewhat shorter than tall fescue seed. Ideally, seed should be covered by about 1/8-3/8th" of soil, rolled, and mulched.

**Maintenance Requirements:** It may be mowed anytime during the year, but fall mowing is best. This grass is moderately tolerant of controlled burning.

**Comments:** None

## Wildflowers for Right-of-Way Plantings

Wildflowers in the highway environment serve several functions. Perhaps the most important function is to increase the visual diversity and lessen the boredom of long range driving through endless areas of sameness with little more to entertain the driver than counting dead armadillos. Highways offer corridors for migrating insects and birds and a habitat for native fauna. Wildflowers provide a necessary food source for these animals. Some examples are the milkweeds (*Asclepias*), which are eaten by Monarch Butterfly caterpillars, and late blooming composites, which furnish nectar for southerly migrating adults. Although not considered a wildflower, the fruit of pokeweed is eaten by hummingbirds and other birds during fall migration. The seed of wild chickory in the summer and evening primrose in the fall are eaten by seed eating birds such as gold finches and indigo bunting. At the same time, wildflowers help to stabilize the roadside environment by reducing erosion. The roadside environment offers an area for mitigation and protection of some wildflowers whose population has been reduced through development. The Ozark spiderwort is an example of the latter. Its population was greatly reduced with the development of Beaver Reservoir, and it is further reduced with road construction in the Ozarks. It grows well in a wooded environment or on large embankments and can develop showy areas. Lastly, showy stands of wildflowers along highways will attract tourist.

Wildflowers have a role different from trees, shrubs and grass in how they increase visual diversity along roadsides. Wildflowers are a part of a mosaic that changes both in space (along the highway) and in time (seasonally). Certain wildflowers can form large zones of color (*Coreopsis tinctoria*), while others form spots (*Chrysanthemum leucanthemum*) or dots (*Vernonia baldwini*). Visual diversity is developed and maintained by mixing color and shape. Care should be taken in establishing and maintaining the zones of color because a endless sea of orange can become boring. The color mosaic will also change in time, because no one wildflower will bloom continuously from early spring to late fall. This sequential flowering will increase the biodiversity of the roadside environment and increase the seasonal visual diversity.

Wherever possible, wildflowers should be established in fresh cuts along with grasses and shrubs before weedy species have had an opportunity to establish a seed pool. Although it is possible to seed wildflowers into established sod, doing so is difficult and stand establishment is often poor. These plantings are a type of secondary succession, and the typical annual grass-weed communities may also occupy such plantings giving a less than pleasing view. Never-the-less the seeded wildflowers will eventually dominate the site if the appropriate species have been selected. The soil may need adjusting with fertilizer or lime to establish wildflower plantings. Liming and fertilizing with phosphorus will have longer term effects than will other

fertilizers since nitrogen and potassium, will tend to leave the site after a few months.

The frequency and timing of mowing is the most important management practice in maintaining wildflower plantings and aiding in their establishment in existing sod. Mowing in mid to late summer will scatter the seeds of earlier blooming plants and effectively prune late blooming composites increasing the number of blooms per plant. Mowing will retard the blooming time of species such as Black-eyed-Susans. If mowing is done early before seed maturity, populations can be eliminated. Certain weakly perennial wildflower populations, such as ox-eyed daisy and tickseed coreopsis, have an unusual habit of being ephemeral in time and wandering in space. They may occupy an area for several seasons and then disappear while another population develops in another area. The time of mowing can be critical in keeping such plants in the roadside.

## Selected Wildflowers for Arkansas Roadways

### Spring

*Aquilegia canadensis*  
*Callirhoe papaver*  
*Castilleja coccinea*  
*Chrysanthemum leucanthemum*  
*Coreopsis lanceolata*  
*Coreopsis tinctoria*  
*Delphinium carolinianum*  
*Penstemon arkansanus*  
*Phlox divaricata*  
*Oenothera speciosa*

Columbine  
 Poppy Mallow  
 Indian Paintbrush  
 Ox-eyed Daisy  
 Tickseed Coreopsis  
 Coreopsis  
 Carolina Larkspur  
 Arkansas Penstemon  
 Phlox  
 Showy Evening Primrose

### Summer

*Aesclepias tuberosa*  
*Cichorium intybus*  
*Echinacea pallida*  
*Echinacea paradoxa*  
*Echinacea purpurea*  
*Lobelia cardinalis*  
*Oenothera fruticosa*  
*Oenothera missouriensis*  
*Physostegia virginiana*  
*Rudbeckia hirta*  
*Eupatorium fistulosum*

Butterfly Weed  
 Chickory  
 Pale Purple Coneflower  
 Yellow Coneflower  
 Purple Coneflower  
 Cardinal Flower  
 Sundrops  
 Missouri Primrose  
 Obedient Plant  
 Black-eyed Susan  
 Joe-pye Weed

### Fall

*Aster novae-angliae*  
*Aster serotinus*  
*Bidens aristosa*  
*Helianthus angustifolius*  
*Helianthus grossiserratus*  
*Helianthus maximiliana*  
*Helianthus mollis*  
*Silphium laciniatum*  
*Silphium perfoliatum*  
*Vernonia baldwini*

New England Aster  
 Silky Aster  
 Tickseed Sunflower  
 Narrow-leaved Sunflower  
 Sawtooth Sunflower  
 Maximilian Sunflower  
 Ashy Sunflower  
 Compass Plant  
 Cup Plant  
 Ironweed

**Gold yarrow**

***Achillea filipendulina* (Compositae)**

**Description:** Perennial, 2 - 3 ft. tall with fern like leaves. Plants grow in clumps. Flowers are gold and occurs in clusters at the top of stalks on the plants. Blooms May-August.

**Site requirements:** Prefers sunny locations and tolerates a wide variety of soils.

**Use in Rights of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Several hybridized cultivars. Can spread rapidly.

**Yarrow**

***Achillea millefolium* (Compositae)**

**Description:** Perennial 2 - 3 ft. tall, with fern like leaves. Plants grow in clumps and have a pungent odor. Ray flowers are white with a rare pink and the disc flowers are yellow. Blooms May-August.

**Site requirements:** Prefers sunny locations.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Can spread rapidly and will colonize unused areas.



**Blue star**

***Amsonia ciliata* (Apocynaceae)**

**Description:** Dense cluster of light blue flowers form on slende stalks. Blooms April to June.

**Site requirements:** Open areas.

**Use in Rights of Way:** Naturally occurs on road side clearings.

**Planting/Seeding:** Direct seeding in prepared seedbed.

**Maintenance requirement:** Infrequent mowing after frost and before spring greenup.

**Comments:**

**Columbine**

***Aquilegia canadensis* (Ranunculaceae)**

**Description:** A medium sized plant of 2 to 3 ft tall. Flowers borne above plant on long slender stems. Flower faces downward, petals are fused to form conical spurs above flower. Flowers are yellow below with reddish spurs. Flowers in April to June.

**Site requirements:** Will grow on a wide variety of soils and sites.

**Use in Right of Way:** Will do well on rocky slopes.

**Planting/Seeding:** Direct seeding in prepared seedbed.

**Maintenance requirement:** Infrequent mowing after frost and before spring greenup.

**Comments:** This plant may not be very showy on right-of-ways. It has attractive foliage in addition to the very unusual flower shape. There are several commercial varieties that have deep blue flowers.

**Butterflyweed**

*Asclepias tuberosa* (Asclepiadaceae)

**Description:** A small herbaceous perennial wildflower with multiple stems arising from the crown of the plant. Leaves dark green averaging 1" wide and 2.5 to 4" long. Yellow to orange-red flowers borne on the tips of the stems with some lateral branching. Blooming period of established plantings last untill September or October.

**Site requirements:** Hardy in all areas of Arkansas with less frequency in the Delta regions. Prefers drier sites of lower fertility, and full sunlight.

**Use in Right of Way:** Used in mass plantings either as an individual species or in a species mix. Can be used on steep slopes and areas where sight lines are not critical.

**Planting/Seeding Requirements:** Direct seeding can be used. Germination and survival rate is low. Plants can be transplanted easily and is probably the cheapest method as the seed is very expensive.

**Maintenance requirements:** Some aphids are attracted to the plants for the nectar and sap. An occasional fall mowing after seed ripening will help maintain a neat appearance to the planting.

**Cultivars:** Some cultivar development is under way but these are not recommended for wildflower planting at this time.

**Comments:** Even with the seeding and establishment problems, the beauty of the plant justifies the expense to include this plant in wildflower plantings. These flowers are very attractive to many species of butterflies.

**White-Flowered Milkweed *Asclepias variegata* (Asclepiadaceae)**

**Description:** A small herbaceous perennial wildflower 2 - 3 ft. tall, with single stems arising from the crown of the plant. Leaves dark green with yellow veins. White flowers borne on the tips of the stems with some lateral branching. Blooming period of established plantings is May - July.

**Site requirements:** Hardy in all areas of Arkansas except possibly the Northwest Corner. Prefers drier sites of lower fertility, and full sunlight. Can be used in wet depressions and in some shaded areas.

**Use in Right of Way:** Used in mass plantings either as an individual species or in a species mix. Can be used on steep slopes and areas where sight lines are not critical.

**Planting/Seeding Requirements:** Direct seeding can be used. Germination and survival rate is low. Plants can be transplanted easily and is probably the cheapest method as the seed is very expensive.

**Maintenance requirements:** Some aphids are attracted to the plants for the nectar and sap. A fall mowing after seed ripening will help maintain a neat appearance to the planting.

**Cultivars:** No known cultivars.

**Comments:** Attractive to butterflies and several other nectar using insects.

**Green-Flowered Milkweed**

*Asclepias viridis* (Asclepiadaceae)

**Description:** A small herbaceous perennial wildflower 2 - 3 ft. tall, with multiple stems arising from the crown of the plant. Leaves thick dark green on stems that may droop or recline. Green flowers borne in clusters at the tips of the stems. Blooming period of established plantings is April to September.

**Site requirements:** Hardy in all areas of Arkansas with less frequency in the Delta regions. Prefers drier sites of lower fertility, and full sunlight. Can grow on limestone areas.

**Use in Right of Way:** Used in mass plantings either as an individual species or in a species mix. Can be used on steep slopes and areas where sight lines are not critical.

**Planting/Seeding Requirements:** Direct seeding can be used. Germination and survival rate is low. Plants can be transplanted easily and is probably the cheapest method as the seed is very expensive.

**Maintenance requirements:** Some aphids are attracted to the plants for the nectar and sap. A fall mowing after seed ripening will help maintain a neat appearance to the planting.

**Cultivars:** No known cultivar.

**Comments:** These flowers are attractive to many species butterflies and other nectar using insects.

**Silky aster**

***Aster serotinus* (Compositae)**

**Description:** Spreading branches with silvery gray silky looking leaves. Violet to bluish-purple flowers borne on tips of branches with petals that curve downward. Blooms August-October.

**Site requirements:** Prairies or rocky slopes. Can be found on limestone soils. Prefers dry sunny locations.

**Use in Right of Way:** Better used in mass plantings but can be used in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Commonly found, foliage is most attractive and when in flower creates a very beautiful display.

**New England aster**

***Aster novae-angliae* (Compositae)**

**Description:** Upright perennial 2-4 ft. tall, with oblong toothed leaves. Flowers borne on tips of branches in mid to late summer. Flowers are 1-2 in wide and are of various colors, blue, rose or purple. Blooms August-October.

**Site requirements:** Tolerates many soils if the site is well drained. Prefers full sun.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Several cultivars available. Attractive to butterflies.

**Rattle weed**

*Astragalus canadensis* (Leguminosae)

**Description:** A tall plant to 5 ft. tall. Cream colored flowers in large inflorescence. Flowers in April to July.

**Site requirements:** Rock, well drained soil.

**Use in Right of Way:** On rocky, dry areas.

**Planting/Seeding:** Direct seeding in prepared seedbed.

**Maintenance requirement:** Infrequent mowing after frost and before spring greenup.

**Comments:**

**Ground plum**

*Astragalus crassicaarpus* (Leguminosae)

**Description:** A low growing, sprawling plant, with compound leaves and cluster of cream colored, pea-like flowers. Blooms early, from March to May.

**Site requirements:** Grows in open areas, will do well on dry sites.

**Use in Right of Way:** Naturally occurs on roadside.

**Planting/Seeding:** Direct seeding in prepared seedbed.

**Maintenance requirement:** Infrequent mowing after frost and before spring greenup.

**Comments:** Even though this plant grows close to the ground, it blooms very early before taller plants and can be visible from the highway.



**Tickseed sunflower**

***Bidens aristosa* (Compositae)**

**Description:** A tall sunflower to 7 ft. Flowers are 2 to 3 in. wide and are bright yellow in color. Usually found in large, dense stands. Blooms August-November.

**Site requirements:** Tolerates many soils and grows in damp or dry sites. Prefers disturbed sites in sunny locations.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** One of the latest blooming wildflowers. Can spread rapidly.

**Related species:** Narrow-leaved sunflower (*H. angustifolius*). These are two of the latest blooming wildflowers. They are both vigorous seeders and may form large, beautiful displays of flowers.

**Poppy mallow**

*Callirhoe papaver* (Malvaceae)

**Description:** A perennial with palmate leaves spreading like a vine. Flowers are 2-3 in. wide and are poppy-like and very bright red. Blooms May-August.

**Site requirements:** Open sunny areas tolerates many soils.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Unknown from seed but can be transplanted.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Worth the time and effort to establish. Occur naturally on roadsides.

**Related Species:** Fringed poppy mallow (*C. digitata*) and Purple poppy mallow (*C. involucrata*).

**Wild hyacinth**

*Camassia scilloides* (Liliaceae)

**Description:** Blue to white flowers on a medium spike. Flowers about 1 in. in diameter. Blooms April to May.

**Site requirements:** Tolerates a wide range in soils. Will do well on dry sites.

**Use in Right of Way:** Plant with later blooming species. Will naturally spread and form large colonies. Does not do well with dense cool-season grasses.

**Planting/Seeding:** Plant bulbs in prepared seedbed. Planting may be difficult to obtain.

**Maintenance requirement:** Infrequent mowing after frost and before spring greenup.

**Comments:** Edible root. Native Americans fought over collecting grounds. Naturally grows with Death camas (*Zigadenus nuttallii*). It is difficult to tell the plants apart when not in bloom.

**Tall Bellflower**

*Campanula americana* (Campanulaceae)

**Description:** Tall single stalk with many branches. Large, 1 in., deep blue flowers shaped like 5 pointed stars. Leaves 3" - 6" long. Blooms June to September.

**Site requirements:** Prefers moist sites along streams and borders of woods.

**Use in Right of Way:** Used in mass plantings either as an individual species or in a species mix.

**Planting/Seeding Requirements:** Direct seeding is easy and plants readily spread.

**Maintenance requirements:** An occasional mowing after seed ripening will help maintain a neat appearance to the planting.

**Cultivars:** No known cultivar.

**Comments:** Unusual flowering habit.

**Indian paintbrush**

*Castilleja coccinea* (Scrophulariaceae)

**Description:** Perennial with 3 lobed leaves. Flowers small but bracts very large and orange to yellow. Dominant color comes from bracts which may be from red to light orange. Blooms April-June.

**Site requirements:** Prefers prairies with open sunny well drained soils.

**Use in Right of Way:** Use in mass plantings or in mixes with native grasses.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Very adaptable. Reported to be semi-parasitic on grasses.

**Cornflower**

*Centaurea cyanus* (Compositae)

**Description:** Perennial with slender branching stems, glaucous light green coloring, 3 - 4 ft tall. Flowers 1-2 in wide at the tips of the branches. Flower color is highly varied, white, blue, purple, maroon or red. Blooms May-August.

**Site requirements:** Tolerates many soils. Prefers sunny dry areas.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Spreads naturally.

**Painted daisy**

*Chrysanthemum carinatum* (Compositae)

**Description:** Perennial daisy, 1 - 2 ft. tall, with dark green leaves. Flowers 1-2 in wide with yellow to red colored petals (usually several colors in each flower). Blooms June-October.

**Site requirements:** Prefers sunny locations and tolerates many soils.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** A consistent performer.

**Ox-eye daisy**

*Chrysanthemum leucanthemum* (Compositae)

**Description:** Low growing perennial with rosette of leaves. Flowers 2 in. wide, borne on the tips of the stalks about 1 to 2 ft. height.

**Site requirements:** Sunny well drained sites and tolerates many soils.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** One of the best white flowers for mixes. Will reseed and spread naturally. Browsed by deer

**Chicory**

*Cichorium intybus* (Compositae)

**Description:** Perennial 3- 4 ft. tall with basal leaves similar to dandelion. Bright blue flowers borne on stalks which have many branches. Flowers open starting at the base of the plant continuing upward. Blooms May-October.

**Site requirements:** Sunny well drained sites and tolerates many soils. Grows well in heavily disturbed areas.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Roots can be used as substitute for coffee. Roots are forced to obtain Belgium endive. Seeds eaten by gold finch and indigo bunting.

**Lanceleaf coreopsis**

*Coreopsis lanceolata* (Compositae)

**Description:** Perennial, 2 to 3 ft. tall with dark green deeply lobed leaves found in basal rosettes. Bright yellow or orange flowers borne on slender stalks and are 2.5 in wide. Blooms April-June.

**Site requirements:** Prefers sunny well drained sites and tolerates many soil types.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Browsed by deer. Spreads naturally.

**Related species:** Tickseed (*C. tinctoria*). Tickseed and lanceleaf coreopsis will naturally develop into large colonies with a magnificent display of color in the late spring and early summer.

**Carolina larkspur**

*Delphinium carolinianum* (Ranunculaceae)

**Description:** Perennial with finely divided leaves. Blue, pink, or white flowers in long spikes. Flowers 1-2 in. long with a long spur. Blooms May-July.

**Site requirements:** Prefers open sunny well drained soils. Will grow in a wide variety of soils. Will occur naturally on roadsides.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Several cultivars developed.

**Related species:** Trelease's larkspur (*D. treleasei*) blue flower, found on limestone or dolomitic soils occurs naturally on road cuts. Moore's delphinium (*D. newtonianum*) is found in the four counties of Newton, Searcy, Pike and Pope counties. It naturally occurs on wooded roadside in that area. The flowers are a neon blue. It should be encouraged and protected in the roadside environment.



**Deptford pink**

***Dianthus armeria* (Caryophyllaceae)**

**Description:** Annual naturalized escape from European stocks. Leaves dark green not showy or readily apparent on the plant. Bright pink to red flowers borne on the top of the plant in small clusters. Flowers usually 1/2 in wide with white dots. Blooms May-August.

**Site requirements:** Occurs in Northern Arkansas on wastelands, pastures, and roadsides. Prefers sunny open sites.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Bright showy flowers.

**Pale purple coneflower**

***Echinacea pallida* (Compositae)**

**Description:** Perennial, 3 ft. tall, with long narrow leaves. Flowers are 3-4 in wide with scattered white or pale purple ray flowers. Disc flowers are green and dome shaped. Blooms May-June.

**Site requirements:** Prairies, cutover sites, and disturbed soils. Prefers sunny dry sites.

**Use in Right of Way:** Use in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Occurs naturally on roadsides.

**Yellow coneflower**

*Echinacea paradoxa* (Compositae)

**Description:** Perennial, 3 ft. tall, with long slender hairy leaves and stems. Flowers borne on tips of stems with the typical brown dome shaped disc flowers. Yellow ray flowers hang down giving droopy appearance. Blooms May-June.

**Site requirements:** Limestone slopes and glades. Prefers sunny dry sites.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Preferred deer food during growing season.

**Purple coneflower**

*Echinacea purpurea* (Compositae)

**Description:** Perennial, 3 ft. tall, with long toothed leaves. Flowers are 3-4 in wide with dark purple ray flowers and orange-brown disc flowers in a dome shape.

**Site requirements:** Prefers open sunny dry sites.

**Use in Right of Way:** Use in mass plantings or mixes.

**Planting/Seeding:** Direct seeding in prepared seedbeds.

**Maintenance requirements:** Annual mowing after mowing.

**Comments:** Very showy plant.

**Joe-pye weed**

*Eupatorium fistulosum* (Compositae)

**Description:** Very tall perennial to 8 ft. in height, with purpl hollow stems. Leaves in whorls of 5-7 about 1 ft apart on stem. Pale pinkish or purple flowers borne in terminal clusters of 12-18 in. long. Blooms July-September.

**Site requirements:** Prefers damp sites with plenty of sunlight.

**Use in Right of Way:** Moist areas where sight lines are not a concern. Better used in mixes.

**Planting/Seeding:** Direct seeding in prepared seedbeds.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** One of the better summer bloomers.

**Snow-on-the-prairie**

*Euphorbia bicolor* (Euphorbiaceae)

**Description:** Perennial 2 - 3 ft. tall with pale green leaves edged in white. Flowers are white and inconspicuous. White edged leaves are showy through out most of summer.

**Site requirements:** Open sandy soils.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Plant is grown for the foliage.

**Indian blanket**

*Gaillardia pulchella* (Compositae)

**Description:** Low growing annual, 1 - 2 ft. tall with grayish green leaves. Multicolored lowers 1 - 2 in. wide with purple disc flowers and red, white and yellow ray flowers. Blooms April-November.

**Site requirements:** Prefers open sunny locations and sandy soils but tolerates many soils.

**Use in Right of Way:** Attractive as mass plantings and can use in mixes.

**Planting/Seeding:** Direct seeding in prepared seedbed.

**Maintenance requirement:** Infrequent mowing after frost and before spring greenup.

**Comments:** State flower of Oklahoma

**Maximilian sunflower**

***Helianthus maximiliana* (Compositae)**

**Description:** A tall perennial, to 10 ft., with long narrow leaves grayish with many fine hairs. Flowers 3-4 in. are borne along stem. Inflorescence can be 2 - 3 ft. long. Blooms August-November.

**Site requirements:** Prefers dry rich sites but tolerates some wetness.

**Use in Right of Way:** Use in mass plantings or in mixes where sight line is not a concern.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Some cultivars developed. Very showy when in full bloom.

**Related Species:** There are many native fall blooming sunflowers that naturally occur on right-of-ways. Most are tall and form massive displays of flowers in the fall. All have great value on the right-of-way. Some examples are: Sawtooth sunflower (*H. grossiserratus*), Ashy sunflower (*H. mollis*), Stiff-haired sunflower (*H. hirsutus*) and Woodland Sunflower (*H. divaricatus*).

**Rose mallow**

***Hibiscus laevis* (Malvaceae)**

**Description:** Tall perennial to 7 ft., with pointed leaves shaped like a shield. Flowers are 4-6 in. wide, rose to salmon in color, with a deep rose to purple throat. Blooms July-September.

**Site requirements:** Prefers damp wet areas but will grow in dry areas. Tolerates many soils.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:**

**Comments:** One of the largest wild flowers.

**Related species:** Swamp mallow (*H. moscheutos* var *lasiocarpus*) White flowers with deep red throat.

**Spider Lily**

*Hymenocallis caroliniana* (Amaryllidaceae)

**Description:** The flowers of this plant are showy, white and distinctive. It has a bell-shaped center with 6 slender strap-like lobes. Blooms from May through August. Dark green strap leaves appear early in spring before flowers.

**Site requirements:** Wet areas. Found on the Grand Prairie and Delta.

**Use in Right of Way:** Wet, marshy areas on Delta.

**Planting/Seeding:** Plant grows from a bulb. May be difficult to find a source.

**Maintenance requirement:** None.

**Related species:** *H. liriosome*.

**Comments:** This is a very showy plant and should be protected in the right-of-way environment.



**Yellow star grass**

*Hypoxis hirsuta* (Amaryllidaceae)

**Description:** A low growing plant, about 1 ft. tall, with grass like foliage and bright yellow flowers.

**Site requirements:** Grows in a wide variety of conditions.

**Use in Right of Way:** Not likely to be very visible from highway. Never-the-less it should do well when grown with grasses.

**Planting/Seeding:** Direct seeding in prepared seedbed.

**Maintenance requirement:** Infrequent mowing after frost and before spring greenup.

**Comments:** It may be difficult to obtain seeds of this plant. It is likely to grow naturally along roadsides.

**Crested iris**

*Iris cristata* (Iridaceae)

**Description:** Short iris with large blue to white flower in relation to plant. Forms clumps. Reproduces vegetatively.

**Site requirements:** Requires some direct sunlight. Does well in small clearings. Grows in a variety of soils, does well in sand or rocky soils.

**Use in Right of Way:** Plant in colonies or clumps. Low growing, will not be visible far from roadsides.

**Planting/Seeding:** Direct plantings. May be difficult to obtain plants.

**Maintenance requirement:** May require grass removal. May have high maintenance requirements unless grown in woodland environment.

**Comments:** These are very showy plants even if low growing. They may do best in a woodland environment.

**Copper iris**

*Iris fulva* (Iridaceae)

**Description:** Tall plants with red flowers. Leaves about 3 feet long.

**Site requirements:** Wet areas.

**Use in Right of Way:** Naturally found in wet or swampy areas. Can form very showy colonies. May be a useful plant on interchanges that have wet areas.

**Planting/Seeding:** Plants. May be difficult to find planting stock.

**Maintenance requirement:** None.

**Comments:** This plant and related species can form very showy stands. Given that plants may be difficult to find, it may be more valuable to identify stands on right-of-ways and protecting them rather than trying to establish plantings.

**Related Species:** Short stemmed iris (*I. brevicaulis*) and southern blue flag (*I. virginica*).

**Tree mallow**

*Lavatera trimestris* (Onagraceae)

**Description:** Perennial to 7 ft., with lobed leaves. Flowers 6 in. wide white with deep rose throat. Blooms July-September.

**Site requirements:** Prefers open sunny areas and tolerates many soils.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Occasional mowing.

**Comments:** Can become woody and perennial in areas with mild winters.

**Rough blazing star**

*Liatris aspera* (Compositae)

**Description:** Perennial, 3 ft. tall, with long narrow glabrous leaves dark green. Lavender or purple flowers on short stalks on a tall stem. Blooms start at the base of the stem and progresses to the tip. Blooms July-October.

**Site requirements:** Sunny sites in all soils.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** A true old-time prairie plant.

**Related species:** Blazing star (*L. elegans*) and Button snakeroot (*L. pycnostachya*). Together, this group of plants bloom from May until late summer. They naturally form large, showy colonies, and they naturally occur on roadsides.

**Scarlet flax**

*Linum rubrum* (Linaceae)

**Description:** Perennial, 1 - 3 ft. tall, with small leaves. Scarlet flowers borne on stem, opening from the bottom to the top. Blooms July-October.

**Site requirements:** Sunny to partly shaded areas. Tolerates many soils.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** One of the best true scarlet flowers.

**Related species:** Yellow flax (*L. medium*) with pale yellow flowers. Yellow flax is 2 feet or less in height.

**Orange puccoon**

*Lithospermum canescens* (Boraginaceae)

**Description:** Short plants, about 1 ft. tall with bright yellow to orange flowers. Flowers from April to June.

**Site requirements:** Does well on rocky, alkaline sites, sandy soil, or glade areas.

**Use in Rights of Way:** On dry sites, embankments, and sandy sites.

**Planting/Seeding:** Direct seeding in prepared seedbed but seed is difficult to acquire.

**Maintenance requirement:** Infrequent mowing after frost and before spring greenup.

**Comments:** Difficult to establish but a beautiful plant.

**Cardinal flower**

*Lobelia cardinalis* (Campanulaceae)

**Description:** Tall perennial to 6 ft., with many branches. Large scarlet flowers with 2 upper lobes and 3 lower lobes. Leaves 2 - 6" long. Blooms July to October.

**Site requirements:** Prefers moist sites along streams and borders of woods. Can tolerate some direct sunlight if site is well watered as in a stream bed or drainage ditch.

**Use in Right of Way:** Used in mass plantings either as an individual species or in a species mix.

**Planting/Seeding Requirements:** Direct seeding is easy and plants readily spread. Seed very small but can be readily collected.

**Maintenance requirements:** An occasional mowing after seed ripening will help maintain a neat appearance to the planting.

**Cultivars:** Some blue and white cultivars exist.

**Comments:** One of the most spectacular flowers that can be grown in the shade.

**Related species:** Big blue lobelia (*L. siphilitica*) tall plant with blue flowers.

**Virginia Bluebells**

*Mertensia virginica* (Campanulaceae)

**Description:** Perennial 1- 2 ft. tall, with large and soft leaves, bluish-green, oval to round up to 5" long. Flowers in loose clusters at the top of the stems about 1" long. Buds are pink turning light blue upon opening. Blooms March to Early June.

**Site requirements:** Hardy Northern Ozark Mountain Areas. Prefers moist sites with wooded cover or river bottoms.

**Use in Right of Way:** Used in mass plantings either as an individual species or in a species mix.

**Planting/Seeding Requirements:** Direct seeding can be used. Germination and survival rate is low. Plants can be transplanted easily and is probably the cheapest method as the seed is very expensive.

**Maintenance requirements:** A late summer mowing after seed ripening will help maintain a neat appearance to the planting.

**Cultivars:** No known cultivar.

**Comments:** Short lived plant.

**Beebalm**

*Monarda fistulosa* (Labiatae)

**Description:** A medium sized plant 2 to 4 ft tall with pink to purple flowers borne in heads on end of stalks. Blooms June-September.

**Site requirements:** Prefers open sunny areas and tolerates many soils. Disturbed areas. Tolerates drought.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Browsed by deer. Reseeds and spreads naturally. Forms clumps. Flowers are a nectar source for butterflies and moths.

**Related species:** Horse mint (*M. russeliana*) with white flowers.

**Dotted monarda**

*Monarda punctata* (Labiatae)

**Description:** A perennial mint 2 to 4 ft. tall with yellow flowers borne in whorls on terminal of the stalks and surrounded with lavender bracts. Blooms June-September.

**Site requirements:** Prefers open sunny areas and tolerates many soils. Disturbed areas. Tolerates drought.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Browsed by deer. Reseeds and spreads naturally.

**Related species:** Lemon mint (*M. citriodora*) with pink or white flowers.

**Baby blue-eyes**

*Nemophila phacelioides* (Hydrophyllaceae)

**Description:** A sprawling plant with light blue flowers. Will form sparse colonies. Blooms in late spring and summer, May to July.

**Site requirements:** Will grow in partial shade or open sun, and in a wide variety of soils.

**Use in Right of Way:** Naturally occurs on roadsides. To be visible, it should be near highway edge.

**Planting/Seeding:** Direct seeding in prepared seedbed.

**Maintenance requirement:** Infrequent mowing after frost and before spring greenup.

**Comments:**



**Sundrops**

***Oenothera fruticosa* (Onagraceae)**

**Description:** Plants 1 to 2 ft tall with bright yellow flowers. May grow in stands. Flowers from June to September.

**Site requirements:** Will grow in dry, open areas. Will grow in a wide variety of well drained soils.

**Use in Right of Way:** Naturally occurring on right-of-ways.

**Planting/Seeding:** Direct seeding in prepared seedbed.

**Maintenance requirement:** Infrequent mowing after frost and before spring greenup.

**Comments:** The genus *Oenothera* is commonly found growing on roadsides. They are one most common and showy group of roadside plants.

**Related species:** Evening primrose (*O. biennis*) a tall plant, to 6 ft. with yellow flowers at end of stems. Blooms from June to September. Cut-leaved evening primrose (*O. laciniata*) a prostrate plant with upright pale yellow flowers. Flowers from June until late fall.

**Missouri evening primrose      *Oenothera missouriensis* (Onagraceae)**

**Description:** Perennial 1 - 2 ft. tall, with short narrow dark green leaves. Large, bright yellow flowers 3-4 in. wide. Closed at midday. Blooms May-August.

**Site requirements:** Open sunny areas and tolerates many soils.

**Use in Right of Way:** Use in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Very showy flowers

**Showy evening primrose**

*Oenothera speciosa* (Onagraceae)

**Description:** Perennial with small narrow leaves. Flowers profusely with pink to white flowers 1-2 in. wide. Blooms April-July.

**Site requirements:** Prefers open sunny location tolerates many soils.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Excellent for use close to highway sight line.

**Orange poppy**

*Papaver dubium* (Papaveraceae)

**Description:** A perennial 1 - 2 ft. tall, with finely divided leaves. Orange to reddish flowers 1 in. wide an the tip of a small flower stalk. Blooms May-July.

**Site requirements:** Prefers open sunny well drained soils.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Will fill in bare areas.

**Arkansas beard-tongue**

*Penstemon arkansanus* (Scrophulariaceae)

**Description:** Perennial, to 3 ft., with several stems per plant and dark green leaves. White flowers with lavender streaks are borne in terminal spikes. Blooms April-July.

**Site requirements:** Prefers open well drained soils.

**Use in Right of Way:** Use in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Occurs commonly on roadsides.

**Wild Foxglove**

*Penstemon cobea* (Scrophulariaceae)

**Description:** Perennial with downy leaves that clasp the stem. Flowers large, 2 in. long and 1 in. in diameter. Flower color can vary from pale pink to lavender or white. Blooms April-June.

**Site requirements:** Naturally found on calcareous soils, but it is reported to grow on a wide range of soils.

**Use in Right of Way:** Use in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Limited range but worth the effort.

**Prairie beard-tongue**

*Penstemon digitalis* (Scrophulariaceae)

**Description:** Perennial to 4 ft in height. Flower stalks are opposite on stem with several blooms per stalk. White flowers 1 in. long with almost equal lobes on a funnel shaped corolla. Blooms May-July.

**Site requirements:** Open sunny areas with well drained soils.

**Use in Right of Way:** Use in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** The Penstemons are a large genus that are found throughout North America. They naturally colonize roadsides, form large colonies and develop a spectacular displays.

**Related species:** *P. tubiflorus* has white flowers, that are more symmetrical and borne more closely to stem.

**Hairy phacelia**

*Phacelia hirsuta* (Hydrophyllaceae)

**Description:** Low growing perennial 1 -2 ft. tall, with hairy leaves pinnately divided. Light blue flowers 3/4 in wide with hairy filaments found in clusters at the tips of the stalks. Blooms April-May.

**Site requirements:** Prefers damp sites and tolerates many soils.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Drummond phlox**

*Phlox drummondii* (Polemoniaceae)

**Description:** Perennial 2-3 ft. tall, with short narrow leaves and red flowers borne at top of plant 1 in. wide with fused petals. Blooms June-September.

**Site requirements:** Prefers open sunny sites with well drained soils. Will grow in a wide variety of soils. Will occur naturally on roadsides.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Native of Texas but spread throughout the Southeastern U.S.

**Related Species:** Sand phlox (*P. bifida*) with blue or lavender flowers, Smooth phlox (*P. glaberrima*) with pink flowers and Downy phlox (*P. pilosa*) with pink flowers.

**Wild Sweet William**

*Phlox divaricata* (Polemoniaceae)

**Description:** A short plant 1 - 2 ft. tall with blue flowers. Grows in clumps.

**Site requirements:** Wooded slopes, moist areas.

**Use in Right of Way:** Naturally occurs on roadsides, especially in wooded areas. Will do well in shade.

**Planting/Seeding:** Direct seeding in prepared seedbed.

**Maintenance requirement:** Infrequent mowing after frost and before spring greenup.

**Comments:**

**Obedient plant**

*Physostegia virginiana* (Labiatae)

**Description:** Perennial with lanceolate leaves. Showy reddish purple to white flowers 1 in. long. Blooms from the base of the stem to the tip. Blooms April-August.

**Site requirements:** Moist open areas. Tolerates many soils.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Blooms in early spring with Penstemons.

**Jacob's ladder**

*Polemonium reptans* (Polemoniaceae)

**Description:** A short plant, about 1 ft. tall with blue, bell shaped flowers. Pinnately compound leaves. Blooms in early spring, April and May.

**Site requirements:** Wooded slopes, moist areas.

**Use in Right of Way:** Naturally occurs on roadsides, especially in wooded areas. Will do well in shade.

**Planting/Seeding:** Direct seeding in prepared seedbed.

**Maintenance requirement:** May not compete well with grasses in open areas. Grass may need periodic removal.

**Comments:**



**Mexican hat**

*Ratibida columnaris* (Compositae)

**Description:** A perennial with finely divided leaves on lower half of the plant. Flowers are typical cone shaped 2 in long. Red ray flowers recurved downward with bright yellow tips. Flowers borne on long thin stalks. Blooms June-October.

**Site requirements:** Prefers sunny open areas and will tolerate many soils.

**Use in Right of Way:** Use in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** A single planting becomes trashy.

**Gray-headed coneflower**

*Ratibida pinnata* (Compositae)

**Description:** A perennial with lobed hairy leaves. Flowers 4-5 in. wide, with large gray disc flowers and yellow ray flowers. Entire plant covered with short fine hairs. Blooms June-September.

**Site requirements:** Prefers dry sunny open areas and tolerates many soils.

**Use in Right of Way:** Use in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** A single mass planting becomes trashy.

**Large coneflower**

*Rudbeckia grandiflora* (Compositae)

**Description:** A perennial with dark green hairy leaves. Flowers 2-4 in wide with bright yellow ray flowers and dark brown-black disc flowers. Blooms July-August.

**Site requirements:** Prefers sun and well drained soils.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** One of the most heat and drought tolerant plants.

**Black-eyed susan**

*Rudbeckia hirta* (Compositae)

**Description:** Plants are 2 ft. tall with bright yellow ray flowers and dark brown disk flowers. Very showy plant. Blooms from July to September.

**Site requirements:** Will grow in a wide variety of sites.

**Use in Right of Way:** Will form large, dense colonies. Naturally seeding. May flower after mowing.

**Planting/Seeding:** Direct seeding in prepared seedbed.

**Maintenance requirement:** Infrequent mowing after frost and before spring greenup.

**Comments:** This plant forms very showy vistas during mid summer. It naturally occurs on roadsides. The state flower of Maryland.

**Blue sage**

*Salvia azurea* (Labiatae)

**Description:** A tall perennial to 5 ft. tall, with short linear leaves. Blue flowers borne on tip of stem and in axils of leaves. Blooms June-October.

**Site requirements:** Prefers open to partially shaded areas. Tolerates many soils.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** One of the best pure blue flowers.

**Cup plant**

*Silphium perfoliatum* (Compositae)

**Description:** A tall perennial with large (1 ft) leaves. Yellow flowers are 2-3 in wide and are very numerous on older plants. Blooms July-August.

**Site requirements:** Prefers damp sites near rivers, streams, or roadsides.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Leaves forms "cup" around stem often holding water after rains.

**Compass plant**

*Silphium laciniatum* (Compositae)

**Description:** A tall perennial with very long lower leaves (1 ft.). Yellow flowers are 2-3 in wide with sharply recurved petals. Blooms July-September.

**Site requirements:** Prefers open sunny sites tolerates some wet soils.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Stems have gummy sap.

**Goldenrod**

*Solidago spp.* (Compositae)

**Description:** Perennial with numerous slender pointed leaves. Flowers are tiny but are in a large cluster at the top of the system. Blooms July-September.

**Site requirements:** Prefers open sunny areas and tolerates many soils.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Often blamed for allergies due to ragweed. There are a large number of golden rods that occur naturally in Arkansas. Many are naturally found in the roadside environment. Some species appear to be a late food source for bees and wasps prior to hibernation.

**Celandine poppy**

*Stylophorum diphyllum* (Papaveraceae)

**Description:** Short perennial, 1 ft. tall, with divided leaves. Flowers are 2-4 in. wide and bright yellow. Blooms March-May.

**Site requirements:** Prefers rich shaded and damp sites.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Plants have yellow juice.

**Blue-eyed grass**

*Sisyrinchium* spp. (Iridaceae)

**Description:** Forms "grass like" clumps. Flowers on end of stems about 1 ft. tall.

**Site requirements:** None.

**Use in Right of Way:** Low growing plant that would need to be near edge of pavement to be visible.

**Planting/Seeding:** Direct seeding in prepared seedbed.

**Maintenance requirement:** Infrequent mowing after frost and before spring greenup.

**Comments:** Occurs naturally on right-of-ways. May be difficult to find seed source.

**Spiderwort**

*Tradescantia ernestiana* (Commelinaceae)

**Description:** Perennial 2 ft. tall, with long narrow leaves. Leaves glabrous and dark green. Flowers borne at the top of the stalk with 3 petals 1-2 in wide with bright yellow anthers. Flower color varies from white to blue, purple or rose. Blooms April-June.

**Site requirements:** Found along edges of woodlands, railroads, and old fields. Prefers rich shaded locations but can withstand full sun.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Use rhizomes or separations from mature plants.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Hardy and adaptable to many sites and locations. Propagation material may be hard to find.

**Spiderwort**

*Tradescantia ohiensis* (Commelinaceae)

**Description:** Perennial 3 ft. tall, with upright stems with several branches. Leaves long and narrow glabrous and dark green. Bright blue 3 petalled flowers borne on tips of the stalks. Blooms May-July.

**Site requirements:** Prefers sunny rich soil but will tolerate some shade.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Use rhizomes or separations from mature plants.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** Widely adapted to many sites and locations. Propagation material may be hard to obtain. Naturally occurring on roadsides and very common.



**Ozark spiderwort**

***Tradescantia ozarkana* (Commelinaceae)**

**Description:** Low growing perennial, 2 ft tall, with drooping or "lazy" stems. Stalks and leaves are hairy to nearly glaucous. Leaves dark green. Flowers borne on tips of branches and are 1-2 in wide with 3 petals with bright yellow anthers. Flowers are white or pastel colors of pink, rose or lavender. Blooms May-June.

**Site requirements:** Rocky woodlands, slopes, or ledges. Prefers fertile limestone soils with some shade.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Use rhizomes or separations from mature plants.

**Maintenance requirements:** None

**Comments:** Does well in rich, well drained shady soils. May form large, and very showy colonies on steep, rocky slopes.

**Verbena**

***Verbena canadensis* (Verbenaceae)**

**Description:** Lavender flowers form a dense inflorescence at ends of stems. Plant 1 to 2 ft tall. Grows in clumps. Blooms from March to September.

**Site requirements:** Adapted to a wide range of soil types. Does best in open areas.

**Use in Right of Way:** Naturally occurring on roadsides. Is showy when growing on banks.

**Planting/Seeding:** Direct seeding in prepared seedbed.

**Maintenance requirement:** Infrequent mowing after frost and before spring greenup.

**Related species:** Dakota vervain (*V. bipinnatifida*) does well in calcareous areas. Hoary vervain (*V. stricta*) a tall plant with blue or purple flowers. Inflorescence is a spike.

**Ironweed**

*Vernonia baldwini* (Compositae)

**Description:** Tall perennial to 5 ft., with long narrow leaves. Purple or lavender flowers in terminal clusters developed from many branches from leaf axils. Blooms June-September.

**Site requirements:** Prefers open drier sites and tolerates many soils.

**Use in Right of Way:** Use in mass plantings or in mixes.

**Planting/Seeding:** Direct seeding into prepared seedbed.

**Maintenance requirements:** Infrequent mowing after frost and before spring greenup.

**Comments:** One of the best fall flowering plants. Commonly found on roadsides.

**Related species:** Arkansas ironweed (*V. arkansana*). Blooms late fall, natural range - Ozark Mountains.

## LEGUMES FOR PLANTING ARKANSAS HIGHWAYS

Legumes add color, interest and NITROGEN to the roadside landscape. Nitrogen is always in short supply in the natural landscape. As legume roots die away nitrogen will become available for grasses, wildflowers, shrubs and trees. When the seeds of legumes are properly inoculated before planting, colonies of nitrogen fixing bacteria form nodules on the roots. Ask the suppliers of legume species seed to include the correct strain of Rhizobia for inoculation.

Sixteen (16) species of legumes and their uses and maintenance are described in this chapter.

For the safety berm where bermuda, redtop and/or tall fescue are planted, large hop clover and related species may invade naturally, common white clover or Crimson clover are good choices for seeding and so is red clover, although it might be somewhat too tall in some locations. Base choice on the color desired or plant one species for several miles and change to another for several miles. Also, consider herbicide and mowing program.

From the berm to the drainage swale, the above clovers and/or purple prairie clover, partridge pea, hairy vetch, and Marion lespedeza are good choices.

On the backslope or wherever the mid sized to larger prairie grasses are planted leadplant, Illinois bundleflower, Sericea lespedeza, Roundhead lespedeza, blue false indigo, white wild indigo, yellow sweetclover, and red clover will perform well.

Also, consider whether a legume is an annual (partridge pea, Marion lespedeza, large hop clover, Crimson clover, and hairy vetch), a biennial (yellow sweetclover) or a perennial (all the others listed). Annuals are seeded or reseed themselves in the fall. Annuals provide green color in winter and showy spring blooms and improve the soil tilth and nitrogen level. Annuals are especially valuable during the early years on a newly planted roadsides. Within a few seasons, however, the grass stands should become so dense, especially in areas not mowed much, that little open space exists for the annuals (and sweetclover) to reseed successfully. The perennial legumes should remain in the sward as long as the relative heights of the grasses and legumes are balanced so the legumes are not shaded out.

In general, the better the soil the better any of these legumes will grow, but certain legumes will survive better in special situations. White wild indigo will survive in wet soils better. Sericea lespedeza and long-bracted wild indigo will survive better in infertile, low pH, clayey soils. Partridge pea will grow better in sandy, droughty soils. Blue false indigo, yellow sweetclover, and red clover require near neutral soil pH and good phosphorus levels. Crownvetch is best grown alone in huge displays on northerly facing slopes.

Compiling "ten (10) best" lists for mountainous, delta and coastal plains regions from the sixteen (16) legumes described would be redundant. But leadplant, Illinois bundleflower, Roundhead lespedeza, purple prairie clover, blue false indigo, yellow sweetclover, and crownvetch are limited to the mountainous regions. All the other legumes described are adapted throughout Arkansas for the situations outlined above. Proably one annual and one to three perennial legumes should be included in most all seed mixtures, especially for backslopes.

## **Leadplant**

*Amorpha canescens* (Leguminosae)

**Description:** Leadplant is a deep-rooted warm-season perennial shrubby legume which produces from seed. Its grey foliage and purple flowers have good ornamental value. The leaves are subsessile with 15-50 crowded elliptic-oblong or -lanceolate nearly sessile leaflets each about 0.2-0.4" wide. The grey, lead-like appearance of the leaves of the native legume accounts for its common name. Leadplant has small dark purple flowers with a single petal. These single petals are so numerous up and down the stem they appear as a cluster (paniculate-clustered racemes, 3-10" long). Flowering occurs from May to August. The fruit is a small dotted, fuzzy pod containing a single, bean-shaped brown seed. Leadplant reaches a height of 2 1/2 to 4 feet. If allowed to grow undisturbed, some of the stems may reach 1/2 inch in diameter. Under annual mowing, it may produce three or more basal stems.

**Site Requirements:** Leadplant is found throughout a greater part of the upland prairies from Michigan and Indiana to Arkansas west to Montana and New Mexico, including western Arkansas. Leadplant is usually associated with bluestem grasses and is one of the most important native legumes. It grows on a wide variety of well drained soils. Where not disturbed, this is one of the most conspicuous and important native legumes of the upland prairies.

**Use in Right of Way:** Leadplant's primary use is for planting roadsides and protected areas. Leadplant's large size makes it especially well suited for inclusion in seed mixtures with medium sized to large prairie grasses. It could be used as a herbaceous "shrub" in seed mixtures with smaller grasses and wildflowers.

**Planting/seeding Requirements:** Seeding is done from March to May at about 10 lbs/acre (\$72/lb). The seed is about the same size as clover seed. Ideally, seed should be covered with about 1/4-1/2" of soil, rolled, and mulched.

**Maintenance Requirements:** It is preferable to avoid annual mowing. If or where mowed, it is definitely best to wait until fall and mow at a 10" or higher height.

**Comments:** None

## **Blue False Indigo**

*Baptisia australis* (Leguminosae)

**Description:** Blue False Indigo is a native, deep-rooted, warm-season perennial legume which reproduces from underground stems and seed. It has a bushy appearance with large strong smooth upper ascending to lower spreading branches. The trifoliate leaves are borne on a short petiole and leaflets are narrow and 1.5-3.5" long. Flowers are rich, deep blue, scattered up and down the upright stalks and are borne on racemes. The inflated seed pods extend erectly above the outline of the branchy effect of the plant. Growth begins in early spring from underground stems and flowering occurs in early May to June. The overall height reaches about 1.5-2.5 feet. As the plant matures, the leaves and seed pods turn black and the plant stalk breaks off at its base, and becomes detached from the root-system. This plant has an enormous root system. This very showy-flowered plant does well in cultivation and can be grown easily from seed.

**Site Requirements:** Blue False Indigo is found on the limestone glades and prairies of the United States. It is present in southern and central Missouri north to St. Louis. It is also found in Kansas and Oklahoma. In Arkansas tends to be limited to extreme northern Ozark region counties, but is also found in Crawford and Sebastian counties. It seems to grow best in soils high in limestone and with good internal drainage.

**Use in Right of way:** Blue false indigo's primary use is for roadside beautification, but it can be used for livestock hay. Its size and beauty makes it well suited for inclusion in seed mixtures with medium sized grasses, wildflowers and legumes where soils are well drained and have a pH above 6.

**Planting/seeding Requirements:** Seeding is done from March to April at 15-20 lbs/acre (\$144/lb). Seed are about the size of clover seed. Ideally, the seed should be covered by about 1/8-1/2" of soil, rolled and mulched.

**Maintenance Requirements:** Mowing may be done in late summer (and once in late May for hay) or later at a 6" or higher height without harming blue false indigo stands.

**Comments:** Slightly toxic to all classes of livestock if eaten in large amounts, in the early spring. This is not likely to cause a problem in roadside mixtures.



## **White Wild Indigo**

*Baptisia leucantha* (Leguminosae)

**Description:** White wild indigo is a native, deep rooted, warm-season perennial legume which reproduces from underground stems and seed. Leaves are divided into 3 leaflets (trifoliate) with each leaflet about 1-2.5" long. Stems are smooth and covered with a grayish-white (glaucous) covering. White pea-like flowers grow on upright or curved racemes. Blooming begins at the bottom of the inflorescence. It is a much outwardly branched plant which reaches a height of 1-3' or sometimes more. Growth begins in spring from underground stems with flowering occurring in May and throughout the summer in Arkansas. It is easily established from seed.

**Site Requirements:** White wild indigo ranges from Mississippi to Texas north to Ontario, Ohio, Michigan, Wisconsin, Minnesota, and Nebraska, including all of Arkansas. It occurs on prairies, glades, rocky open slopes, alluvial soils along streams, bottom prairies, wet meadows, valleys and along railroads. It prefers wet soil and is at its best along Ozark streams.

**Use in Right of Way:** White wild indigo is used primary for roadside color and soil holding.

**Planting/seeding Requirements:** Seeding is done from March to April at 15-20 lbs/acre (\$120/lb). Seed are somewhat larger than clover seed. Ideally, seed should be covered by about 1/8-3/8th" of soil, rolled, and mulched.

**Maintenance Requirements:** Allow plant to flower, form seedheads, and mature in order to replenish food reserves in the rhizomes. It can be mowed in the fall.

**Comments:** Capable of causing poisoning among horses and cattle, but this is not likely to be a problem on roadsides.

## **Long-Bracted Wild Indigo**

*Baptisia leucophaea* (Leguminosae)

**Description:** Long-bracted wild indigo is a native, deep-rooted, warm-season perennial legume which reproduces from underground stems and seed. The low bushy plants fade to a lead-gray color with the leaves persisting for long periods. Foliage is dark green, each leaf divided into 3 smooth-edged leaflets of 2" length. The showy, cream-colored flowers are borne on long, drooping or horizontal branches called racemes. The individual flowers are similar to those of peas and beans. Vegetative growth begins in the spring from buds on the rhizomes. Most flowering occurs from April through June. The plants are about 1' tall.

**Site Requirements:** Long-bracted wild indigo is found growing wild from Arkansas to Texas, north to Michigan, Wisconsin, Minnesota and Nebraska. It occurs on rocky dry open woods, prairies and open ground, usually in acid soils. It is often found on thin, bare soils along roadways, slopes, etc.

**Use in Right of Way:** Long-bracted wild indigo could be included in seed mixtures for very poor soils of roadside cuts.

**Planting/seeding Requirements:** Seeding is done from March to April at 15-20 lbs/acre. Seed is somewhat larger than clover seed. Ideally, seed should be covered by about 1/8-3/8th" of soil, rolled, and mulched.

**Maintenance Requirements:** Allow the plants to mature and replenish rhizome food reserves. Mow at a 4-6" height in the fall.

**Comments:** None

**Partridge Pea*****Cassia fasciculata* (Leguminosae)**

**Description:** Partridge pea is a warm-season annual legume that reproduces by seed. It is rather leafy and branches freely. Leaves are pinnate with 6 to 18 pair of narrow, short, linear leaflets which fold together when touched. The yellow flowers are 1 1/2 inches across, often with a touch of red-purple spots at the base. The flowers emerge along the stems from the leaf axil from June to October. The pea-pod shaped seed pods grow to 2 1/2 inches long. When ripe, the pods split open with explosive force throwing the seed several feet from the plant. The plants are about 2' tall. This legume is a summer annual and seldom present on well managed ranges. It grows from seedling in the spring and beautiful showy, yellow flowers are produced from June to October.

**Site Requirements:** Partridge pea is common on sandy loam soils of the central and eastern United States from Massachusetts to Florida west to South Dakota and New Mexico, including all of Arkansas. Partridge pea will grow on sandy loams, on prairies, glades, along roads and railroads. In some areas it is a common plant in open woods and timbered ranges.

**Use in Right of Way:** Partridge pea can establish itself in fairly open sandy soil areas along roadsides and thus could be included in seed mixtures for such areas. It is used as a soil builder on cropland and for food for quail, turkey and other game birds. In Georgia and Florida it is considered an important honey plant. It is a nutritious, summer annual legume and readily eaten by livestock.

**Planting/seeding Requirements:** Seeding is done from March to May at 10 lbs/acre (\$7.25/lb). Seed are "bb" sized. Ideally, seed should be covered by 1/4-5/8th" of soil, rolled and mulched.

**Maintenance Requirements:** Mid spring mowing may favor its re-establishment from seed by reducing competition to seedlings. Wait at least until fall to mow to allow time for seed maturation.

**Comments:** None

## **Crownvetch**

*Coronilla varia* (Leguminosae)

**Description:** Crownvetch is a naturalized, cool-season, hardy, strong, rhizomatous, herbaceous, perennial legume with "vetch-like" leaves with florets arranged in an umbel resembling a crown. The leaves are alternate and stipulate and pinnately compound bearing 9-25 oblong leaflets about 0.5" long per leaf on mature plants. Flowering stalks bear pinkish-lavender to whitish clusters of flowers from June to August. Seed are borne in long, narrow finger-like pods that are transversely divided into 3-12 single-seeded segments that break into sections when mature and dry in the fall. Yellow ochre to mahogany in color the seed are rod-shaped and about  $3/32$ " long and  $1/32$ " in diameter. The seeds have a hard seed-coat and must be scarified and inoculated before planting. Seedling are slow to establish. New growth from crown buds and adventitious buds on the rhizomes begins in early spring. It spreads from rhizomes and will form a dense, uniform monostand. Crownvetch has a deep penetrating tap root and numerous lateral roots. Its overall height is 1-3 feet.

**Site Requirements:** Crownvetch has a wide range of climatic adaptations. It grows well in Missouri and north into Iowa and eastward. Summer heat limits crownvetch to north and northwestern Arkansas. It is better adapted to north facing slopes in Arkansas. Crownvetch is best adapted to fertile, well-drained soils of pH 6 or above. It is tolerant of both low pH and low fertility once established.

**Use in Right of Way:** Crownvetch is best used alone in large, showy mass plantings on roadside embankments. It is very attractive, especially during its June to August blooming period. It will perform best on north-facing banks here. It is aggressive, provides excellent erosion protection, and will crowd out most other plants after it is established. Its foliage is considered unpalatable.

**Planting/seeding Requirements:** Seeding is best done from August 15 through September at 5-10 lbs/acre (\$9/lb). It is slow to establish, therefore, planting with a straw mulch or a companion crop of winter wheat is desirable. Scarification and presoaking seed will aid germination and establishment also. On poor infertile, acid soils it is worthwhile to lime to pH 6 and apply 100 lbs./acre of 10-20-10 fertilizer to the seedbed prior to planting. Seed as described above are similar to clover in size. Ideally, seed should be covered by about  $1/4$ - $1/2$ " of soil, rolled and mulched.

**Maintenance Requirements:** Mowing may be done in the fall, but it is not necessary.

**Comments:** None

## **Illinois Bundleflower**

*Desmanthus illinoensis* (Leguminosae)

**Description:** Illinois bundleflower is a native, deep-rooted, warm-season perennial legume which reproduces from seed. Leaves are pinnately compound with 6-15 pairs of leaflets and 20-30 pairs of subleaflets. The tiny greenish-white flowers occur in ball-shaped clusters of about 0.7" diameter at the top of the plants from June-August; maturing to distinctive whorled bundles or clusters composed of 20 to 30 seed pods. It grows to 2-4' in height. Growth begins in mid spring. It is often mistaken for prairie acacia and is difficult to distinguish between the two until fruiting time. Then Illinois bundleflower can be easily identified by the small bundles of seed pods. It competes well with all but the largest grasses.

**Site Requirements:** This native legume is found throughout the plains and prairies of the United States, and is rated the most important native legume by some outstanding range authorities. It is found throughout Arkansas, but more so in northern counties. It is adapted to a wide range of soils and climatic conditions. It is generally found more abundantly in the moist depressions and slopes of the terrain. It is winter-hardy and drought resistant.

**Use in Right of Way:** Illinois bundleflower or Prairie-mimosa has good ornamental value because of its doubly compound leaves and white flowers and seedpod clusters. It is a nutritious plant and is readily eaten by all classes of livestock. It merits inclusion in seed mixtures for many roadside situations, especially for more fertile and moist soils.

**Planting/seeding Requirements:** Seed should be planted from March to May at 10 lbs/acre (\$6.75/lb). Seed is about the same size as clover seed. Ideally, seed should be covered by 1/4-1/2" of soil, rolled and mulched.

**Maintenance Requirements:** It is better to delay mowing until late September. It decreases under heavy grazing or clipping and is an important range condition indicator.

## **Roundhead Lespedeza**

*Lespedeza capitata* (Leguminosae)

**Description:** Roundhead Lespedeza is a native, warm-season deep-rooted perennial legume that reproduces by seed and spreads from a heavy crown. The leaves are elliptical "football" shaped, tapering at each end, and grow up in groups of three on very short branches. The soft hairy flower heads are set close to the stem on the upper part and appear as knots or round heads of seed. The flowers are creamy-white with purple spots at the base. The stiffish stems are relatively stout with a few upright branches. The plants are 2-4' tall. Roundhead lespedeza has a root system 5 to 8 feet deep with many branching laterals that saturate the top soil. Growth from these laterals and from the crown begin in the spring and will grow vigorously with the better tall grasses where efforts to establish (introduce) other legumes have failed.

**Site Requirements:** Roundhead lespedeza grows well on prairies and open woods throughout the central and eastern United States, including the northern half of Arkansas. It is particularly noticeable on loam soils of wooded bluestem ranges. It is one of several native perennial legumes that naturally grow on well-managed blue stem ranges.

**Use in Right of Way:** Roundhead lespedeza has good ornamental value and competes well with mid sized grasses. Thus it merits inclusion in seed mixtures where bluestems, etc., are appropriate. The seed of roundhead lespedeza provides food for game birds and other wildlife. The forage is high in protein and is relished by all classes of livestock. This species seems to require about the same management as bluestem.

**Planting/seeding Requirements:** Seeding is done in April and May at about 8 lbs/acre (\$36/lb). Seed are somewhat smaller than clover seed. Ideally, the seed should be covered by 1/4-1/2" of soil, rolled, and mulched.

**Comments:** None



***Sericea lespedeza******Lespedeza cuneata* (Leguminosae)**

**Description:** *Sericea lespedeza* is a long-lived, warm-season perennial legume, erect to semierect, leafy herbaceous plant with relatively coarse stems. *Sericea* develops an extensively branched deep root system, even in very poor soil. *Sericea* produces trifoliate leaves which are well distributed closely along the stem. Leaflets are long, narrow, and square at the end. Flowers are borne on short pedicels in leaf axils along the stems and vary from cream to purple. The plants are 2-3' tall. Top growth of *sericea* is killed back to the ground each fall and renews its growth from crown buds the next spring. Seasonal production is from April to September. Most of the growth is made during the summer when other pasture growth is often depressed.

**Site Requirements:** *Sericea lespedeza* is well adapted from eastern Texas, Oklahoma and Kansas, including all of Arkansas, eastward to the Atlantic coast. *Sericea lespedeza* will grow on a variety of soil types but grows best on clay loam to sandy loam, with a pH of 5.8 to 6.5. It is quite tolerant to low fertility but gives a profitable response to lime and fertilizer on badly depleted acid soils only. It is especially valuable on badly depleted soils, such as roadside embankments, on which it is difficult to establish other legumes.

**Use in Right of Way:** *Sericea lespedeza* is often planted on the poor soils of roadside banks. It should be included in seed mixture for these very poor sites. It provides good erosion control, soil improvement, and forage for deer. The seed provide food for wild life, especially quail. Its coarse texture adds ornamental interest.

**Planting/seeding Requirements:** Seeding is done from March to April at 20-30 lbs/acre (\$1.15/lb). Seed is somewhat smaller than clover seed. Ideally, seed should be covered by 1/4-1/2" of soil, rolled, and mulched.

**Maintenance Requirements:** *Sericea* should not be grazed or mowed during late summer or early fall thus allowing roots to build up carbohydrate reserves for growth the next spring. Mow after frost and not lower than 5 to 6 inches height.

## **Marion lespedeza**

*Lespedeza striata* (Leguminosae)

**Description:** Marion lespedeza is a new cultivar of striate lespedeza. It is an annual, diffusely branched, decumbent, warm-season forage legume. The leaves are trifoliate with small oblong leaflets about 0.5" long. Flowers are light pink to purple from July to September. Seed are set in leaf axils along the entire length of stems. The plants grow to 6-24" height. After seed emergence in the spring annual lespedezas seldom make enough growth for good pasture before late spring and early summer. From then until late summer the growth is rapid and vigorous when soil moisture is adequate. By fall the usefulness of the crop is largely past except for the seed that is produced.

**Site Requirements:** Marion lespedeza is well adapted in a belt from eastern Texas, Oklahoma and Kansas eastward, including all of Arkansas, to the Atlantic Coast. It is adapted to a wide range of soil types and fertility levels. Marion annual lespedeza will grow relatively well on eroded acid soils low in phosphorus but they grow best on productive, well drained land.

**Use in Right of Way:** Marion lespedeza could be included in seed mixtures with shorter grasses and wildflowers for roadsides. The blooms of Marion are attractive. A massed stand of Marion and bermudagrass or tall fescue would be very attractive through the summer.

**Planting/seeding Requirements:** Seeding is done from March to April at 20-25 lbs/acre (\$1.00-1.50/lb). Although it will grow on acid infertile road cut banks, liming to pH 6.0 and 20 lb/acre of super phosphate fertilizer would be desirable for initial plantings. Seed are somewhat smaller than clover seed. Ideally, seed should be covered by 1/4-1/2" of soil, rolled, and mulched.

**Maintenance Requirements:** It can be mowed anytime during the spring, late summer mowing would decrease seed production, fall mowing would allow seed maturation and natural reseeding.

**Cultivars:** Marion lespedeza is the best adapted cultivar of *L. striata*, sometimes called 'Japanese clover'. Korean lespedeza is a closely related species, *L. stipulacea*. Korean lespedeza is less tolerant of acid soils and more tolerant of alkaline soils than Marion.

**Comments:** Very dense pure stands of Marion might be damaged by powdery mildew and Southern blight, but these diseases are not likely to be serious in a mixed stand as suggested above.

## **Yellow Sweetclover**

*Melilotus officinalis* (Leguminosae)

**Description:** Yellow sweet clover is a biennial, erect with course, 4-8' tall, stems, deep tap rooted, drought-tolerant and winter hardy, but intolerant of soil acidity. Leaves of sweetclover are trifoliate and leaflets tend to be toothed around the entire margin. The stipule of the common sweetclover is small, narrow and entire. Sweetclover flowers are yellow (or white in 'White sweetclover') and much smaller than those of alfalfa and red clover. They are borne in long, loose racemes from late May to september. Seed pods usually contain one seed but sometimes have two. The first season's plant growth of sweetclover consists of one central stem and bud formation on the crown. During the fall months, the roots become fleshy as storage of food reserves proceed. In the spring of the second year, crown buds start growth quickly with vigorous, rapidly growing flowering stems that are much coarser than alfalfa. It can reseed itself.

**Site Requirements:** Sweetclover's primary adaptation is through the corn belt and Great Plains, but it makes growth in areas of adequate rainfall in Texas and on the limestone soils of Alabama and Mississippi. Its adaptation in Arkansas is limited to a few near neutral pH soils of northwestern Arkansas. It does not tolerate acid soils and grows best on soils with a pH of 6.5-7. Sweetclover will grow on most soils with good internal drainage.

**Use in Right of Way:** Sweetclover's large size, open growth habit, and yellow flowers makes it quite ornamental where adapted. It would stand out well ornamentally above small and mid sized grasses. Sweetclover is used as a soil improving and green manure crop. It is one of the most valuable of all plants for honey production. The near neutral soil pH requirement limits sweetclover's use for roadside plantings to a few cherty, outcrop soils of northwestern Arkansas.

**Planting/seeding Requirements:** Seeding is done during September to mid October at 10-15 lbs/acre (\$1.15/lb). If pH of the soil is below 6, lime should be applied well in advance of seeding. Sweetclover seed is the same size as other clover's seed. Ideally, seed should be covered by 1/4-1/2" of soil, rolled, and mulched.

**Maintenance Requirements:** Mowing should be done at a 4-6" height before mid-August or after mid-October, thus allowing ample food reserves accumulation for overwintering.

**Comments:** None

## **Purple Prairie Clover**

*Petalostemon purpureum* (Leguminosae)

**Description:** Purple prairie clover is a native, deep-rooted, warm-season perennial legume, reproducing from underground stems and seed. The leaves are short-branch-like resembling tea leaves and the 3-5 leaflets are narrowly linear of 0.3-0.8" length. The terminal seedhead can be identified by its cone-like shape with purple flowers developing sequentially up the cone. Prairie clover starts growth from crown buds in spring about the same time as native grasses. Its growth habit is characterized by slender, upright growth, with 1-10 or sometimes more 1-2' tall stems growing from a single base. It flowers from May to August.

**Site Requirements:** Purple prairie clover is found growing wild on plains and prairies of the United States, but is more abundant in the tall grass upland prairies. In Arkansas it is found mostly in the Ozarks region and a few southwestern counties. It prefers limestone soils, but will grow on many upland soils having good drainage and medium or better fertility.

**Use in Right of Way:** Purple prairie clover may be used in mixtures with small to mid sized grasses or wildflowers for roadside planting. It provides high protein forage for all livestock but will not withstand heavy grazing. Its fine texture and purple flowers have good ornamental value.

**Planting/seeding Requirements:** Seeding is done in April and May at about 7 lbs/acre (about \$22/lb). Seed is about the same size as other clovers. Ideally, seed should be covered by 1/4-1/2" of soil, rolled, and mulched.

**Maintenance Requirements:** Although prairie clover will withstand mowing anytime at 5-7" height, it is preferable to delay mowing until fall.

**Cultivars:** None

**Comments:** None

## Large Hop Clover

*Trifolium campestre* (Leguminosae)

**Description:** Large hop clover is a naturalized, cool-season, multi-branched annual legume. The trifoliate leaves are striated on the upper margins and about 1/2" long. A distinguishing characteristic of large hop clover from similar species is that the middle leaflet is stalked. Small (about 3/8th" diameter) yellow flowered seedheads are produced profusely from leaf axils during April and May. The plants reach a 10-15" height. Flower heads turn brown as seed matures in June. The plants die in the heat of early summer. After seed germination in the fall, the plants provide late winter and early spring growth affording nutritious grazing at the time when it is most needed. The plant re-seeds itself well in any opening in the plant canopy. The profuse yellow flowers are very attractive.

**Site Requirements:** Large hop clover is found growing throughout the southern half of the United States, the Atlantic coast states and westward in Kentucky, Missouri, Oklahoma, including all of Arkansas, and the Pacific coast states. Large hop clover is adapted to infertile and eroded soils of the southern U.S. It is more prevalent at higher elevations. It will grow on all types of acid and lime soils. Abandoned land in adapted sections usually come back to hop clover if grazed or clipped.

**Use in Right of Way:** Large hop clover merits inclusion in seed mixtures for poor soil areas. It could be planted in selected areas as the only legume with low open growing grasses, such as, bermudagrass, redtop, and tall fescue, to provide a mass effect of yellow in mid spring. It provides fall and winter green color and nutritious grazing in late winter and early spring. Its yellow blooms are attractive in mid spring. It reseeds itself very well.

**Planting/seeding Requirements:** Seeding is done in September to mid October at 1.5-2 lbs/acre. Ideally, seed should be covered by 1/4-1/2" of soil, rolled, and mulched.

**Maintenance Requirements:** Late summer mowing (and hay harvest) would reduce competition against seedling establishment. Plenty of seed will be produced regardless of mowing practices. These related hop clover species are weeds in many lawns.

**Related Species:** Big hop clover, *T. procumbens*, small hop clover, *T. dubium*, field hop clover, *T. agrarium*, and black medic, *Medicago lupulina*, are smaller than large hop clover, but similar in being cool-season annuals with small yellow flowers in the spring and good self re-seeding. These often grow together in mixtures and would perform the same ornamental function on roadsides.

**Comments:** None

## **Crimson Clover**

*Trifolium incarnatum* (Leguminosae)

**Description:** Crimson clover is an upright, hairy, winter annual legume with a central taproot, supported by many fibrous roots. The trifoliate leaflets are broadly obovate at the tip, narrow at the base and densely covered with hairs. Each stem is terminated by a cylindrical, long-pointed (1-2") flowerhead composed of 75-125 florets which are a bright crimson color opening in succession from bottom to the top of the seedhead. The plants grow to 1-3' tall. Flowers are mostly self-fertile but not self-pollinating. Crimson clover is seeded or reseeds itself in late summer or early fall. Plants may become dormant in the winter and regrow from late February onward. A beautiful display of flowers occurs during May. Seeds mature in approximately 24 to 30 days after pollination and the plant dies in early summer heat.

**Site Requirements:** Crimson clover grows well in most of the states south of a line from northern Virginia to northern Kansas and east of the Great Plains, including all of Arkansas. Crimson clover does not tolerate calcareous or poorly drained soils. It grows well on almost all well drained soils from sands to heavy clay varying in acidity and alkalinity.

**Use in Right of Way:** Crimson clover is used extensively for roadside stabilization and beautification because the blooms are very showy in May. It is well suited to interseeding into bermudagrass but not tall fescue on roadway berms. Serious crown and stem rot diseases may develop in rank thick growth through the winter months if crimson clover is planted alone. This problem is minimal if crimson clover is interseeded into bermuda or mowed in the late fall.

**Planting/seeding Requirements:** Seeding is done from late August to mid October at 20-30 lbs/acre (\$0.65/lb). Ideally, seed should be covered by 1/4-1/2" of soil, rolled, and mulched. Clover must be planted sufficiently early for plants to develop before the advent of cold weather. On many soils it is desirable to apply P and K fertilizers before the initial seeding.

**Maintenance Requirements:** Mowing after crimson clover dies in early summer will improve appearance of bermuda during the summer. If the bermuda is mowed (and harvested for hay) in late summer competition to new seedlings is reduced. Areas planted to crimson clover must be coordinated with herbicide programs to avoid unwanted control of clover.

**Comments:**



**Red clover*****Trifolium pratense* (Leguminosae)**

**Description:** Red clover is a short lived perennial herbaceous legume plant made up of numerous thick hairy stems rising from a crown. It is erect-growing and has a deep tap root with numerous side branches. The leaves are large, velvety, softly hairy beneath and marked with a "V". Flowers are clustered into large (1-1.5" diameter) pinkish-violet heads in May and June. The flower heads are borne on individual seed stems and contain as many as 125 florets which attach directly to the center of the seedhead. Red clover reaches a 2-3' height. New spring growth comes from crown buds. It has a long growing season from April to October.

**Site Requirements:** Red clover is extensively grown from the Atlantic Coast west to eastern North and South Dakota, Nebraska and all of Arkansas, south to Tennessee and North Carolina. Red clover prefers loams, silt loams and even fine-textured soils to light sandy or gravelly soils. It will grow on moderately acid soils but maximum yields are obtained only when Ca is adequate and the pH is 6.0 or higher and soil P and K levels are moderate to high.

**Use in Right of Way:** Red clover is an attractive legume which will grow well for a few years on medium textured, moderately fertile soils. It provides high quality forage, seed for birds, and improves soil. It merits inclusion in seed mixtures for many areas of roadside plantings.

**Planting/seeding Requirements:** Seeding is done from October to early November at about 15 lbs/acre (\$1.50/lb). Ideally, seed should be covered by 1/4-1/2" of soil, rolled, and mulched.

**Maintenance Requirements:** Mowing can be done anytime during the year. It is better to mow in late summer or after frost at least every second or third year. Thus allowing seed to mature and making re-seeding more likely. Mowing reduces the likelihood of crown and root rot and northern anthracnose diseases also.

**Cultivars:** Two forms of red clover are medium red and American mammoth. The choice depends on the plant size needed to compete with associated grasses.

**Comments:** None

## Common White Clover

*Trifolium repens* (Leguminosae)

**Description:** White clover is a naturalized, fairly long-lived perennial in the upper South. The very leafy plants spread by stolons and form shallow roots at nodes. The non-hairy, trifoliate leaflets vary considerably in size and shape and are usually marked with a white "V". The leaves develop from the crown and at the nodes of stems. Flowerheads (1/2-3/4" in diameter) are composed of 20 to 40 or more individual white to pinkish-white florets. Most flowering occurs from May to July. The plants grow to 6-10" tall. The stolons develop radially from the primary stem and produce numerous leaves. Individual leaves grow and senesce within only about 40 days. The main growing season is from April to October.

**Site Requirements:** White clover is found naturalized in the humid eastern half of the United States, including all of Arkansas, in the Pacific Northwest, and along river valleys and in irrigated lawns and pastures of the inter-mountain region. White clover is best adapted to well-drained silt loam and clay soils of pH 6-7. It is widespread as a weed in lawns. It will survive considerable dry weather.

**Use in Right of Way:** White clover could be included in seed mixtures with the shorter grasses and wildflowers for better soil areas along roadsides. It is used for pasture, hay, soil improvement, erosion control, seed production and wildlife.

**Planting/seeding Requirements:** Seeding is done from September to October at 2-3 lbs acre (about \$2.50/lb). Seed is somewhat smaller than red clover seed. Ideally, seed should be covered by 1/4-1/2" of soil, rolled, and mulched. Soil should be limed if pH is below 6 and fertilized with P and K fertilizer as per soil test recommendations prior to initial seeding.

**Maintenance Requirements:** White clover can be mowed anytime at 4" or higher without reduction of stand. Indeed, frequent mowing by roadside standards may reduce competition and favor white clover. White clover thrives under the weekly mowing of lawns.

**Cultivars:** Three general forms exist: large (Ladino), intermediate (Louisiana White), and small (English or New York wild white). Common white clover (White Dutch) is of the intermediate or small form or a mixture of the two. Ladino clover grows 2-4 times as large as common white clover but does not produce as many seedheads. Common white clover is preferred for most for most roadside uses.

**Comments:** Several diseases and insects attack white clover, but none seem to be very serious.

## Hairy Vetch

*Vicia villosa* (Leguminosae)

**Description:** Hairy vetch is winter annual legume with attractive purple flowers in the spring. Leaves bear 10-20 leaflets pinnately and terminate in a tendril. Large purple flowers borne in elongated clusters in early spring. Spherical seeds enclosed in elongated, somewhat compressed pods. Plants are 2-4' tall. Fall seeded hairy vetch grows slowly after seed germination and goes through the winter as a small plant. It begins growth in the early spring with seasonal forage production in March - May. Seed production usually occurs in June - July. Vetches reseed themselves.

**Site Requirements:** Hairy vetch is adapted through the southern half of the United States, the Atlantic Coast states and westward in Kentucky, Missouri, Oklahoma, Kansas, eastern Texas and the Pacific coast states. It is adapted throughout Arkansas. Vetches need well drained soil. Vetches are tolerant of soil acidity but have a relatively high phosphorus requirement.

**Use in Right of Way:** Hairy vetch could be included in seed mixtures for many roadside planting situations and soils. It will provide winter green color, add to erosion protection, grazing for deer in late winter and early spring, and attractive purple flowers in the spring. If the seed are allowed to mature by delaying mowing until late summer, it will reseed itself in the fall wherever "space" in the ground cover allows.

**Planting/seeding Requirements:** Seeding is done in September to October at 20-25 lbs/acre (\$0.70/lb). Seed is somewhat larger than red clover. Ideally, seed should be covered by 1/4-1/2" of soil, rolled, and mulched.

**Maintenance Requirements:** It is best to delay mowing to late summer to allow seed maturation and reseeding.

**Cultivars:** 'Madison' would be a good choice for all of Arkansas. A subspecies *V. villosa* subsp. *varia*, renamed winter vetch from woolypod vetch, cultivar 'Auburn' has less cold and more heat tolerance. Common vetch, *V. sativa*, cultivar 'Warrior' is less cold tolerant. These last two would perform well in southern Arkansas.

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HIGHWAY.FIN ON 5-6-4







