IOWA DEPARTMENT OF NATURAL RESOURCES

RETHINKING ACREAGE AND RURAL TREE PLANTINGS

A Case for Using Native Trees and Shrubs

Native trees and shrubs can be used in many rural applications - including windbreaks, screens, forest buffers, and landscaping

Trees and shrubs selected for use on acreages and in rural plantings need to be functional, durable, and beautiful. While many non-native trees and shrubs have been used for these purposes, this guide exists to help you find native woody plants that meet, if not exceed your rural planting needs and expectations.

CHOOSING NATIVE PLANTS

Trees and shrubs planted in rural Iowa must be hardy in order to withstand the oftentimes extreme environments they are planted in. Native trees and shrubs can be used for all rural planting needs.

Native plants are adapted to the many landscapes and soil associations found in Iowa. There are native trees and shrub species that are naturally adapted to tough planting sites – where some ornamentals may struggle.

Knowing how to select the right plant for the right site is one of the most important steps in implementing new tree and shrub plantings.

IMPORTANT CONSIDERATIONS FOR SELECTING TREES AND SHRUBS

- Soils: One of the most important factors you should know before selecting trees and shrubs is your soil type. Your soil type has many characteristics that factor how well a tree/shrub can grow, including: pH, drainage, percolation, and predisposition to nutrient deficiencies.

- Ultimate Size: The trees and shrubs you select for your property should be selected based on their ultimate size. Factors that influence the size of tree or shrub you need are proximity to: homes, utilities, septic systems, wells, drainage tiles, existing trees, gardens, and roads/right of ways.

- **Shade Tolerance/Sun Exposure:** Trees and shrubs have different tolerances for sunlight. Trees and shrubs suited to full or partial shade should be used on north or east sides of homes, or where already sheltered by existing trees. Conversely, trees/shrubs planted in full sun areas (south and west sides of homes or farmsteads) must be well-adapted to hot and sunny environments.

- Function of Trees/shrubs Used: Are you planting trees and shrubs for wildlife habitat, wildlife food, human food production, windbreaking, energy savings, visual interest/color, or screening? A well-designed planting using native trees and shrubs can accommodate many of these goals all in the same planting.

- Existing Trees: If existing trees have died due to insects or disease, it may be time to consider diversifying your rural planting. Consider what trees are on your property and surrounding properties. If one species is dominant, consider using native trees suited for your site and soils. Diverse plantings can help plantings be resilient, if forest health issues arise.

- Origin of Trees/Shrubs: Exotic, non-native plants are readily available, because they can be easy to grow, and many are showy. Unfortunately, some ornamental plants have proven to be invasive – meaning they spread from where they are planted and outcompete native plants, and degrade ecosystems. If you have questions about the origin of a species you are interested in, please contact your DNR District Forester.

Trees positioned on the East, South and West sides of homes can provide substantial energy savings. Photo – Mark Vitosh

IMPORTANT CONSIDERATIONS FOR RURAL PLANTINGS

WINDBREAKS/SHELTERBELTS/DUST BARRIERS/PRIVACY PLANTINGS: Windbreaks and barrier plantings are carefully designed tree plantings used to protect acreages and farms from high winds, particles, or to provide privacy. These plantings can also be used to: protect livestock from weather stresses, provide wildlife habitat, provide food resources for homeowners, and increase property values. The effectiveness of windbreaks and barriers is reliant upon proper design. In general, these plantings should:

- Have a windward row at least 100 feet from the home/building you are trying to protect. This distance is necessary to prevent snow from accumulating on roofs or around buildings.
- Be positioned in ways to prevent snow from accumulating on driveways or roads
- Be at least 1 tree length (full size of tree) from septic systems, and other underground infrastructure where disturbance could impact roots or where roots could impact the functionality of the infrastructure.
- Be diversified (not all one species if possible), and should have trees and shrubs suited to the soil, site, and planting intensity. Native shrubs, evergreens, and hardwood trees can be combined to create beautiful, multipurpose, and durable windbreaks.
- Be properly spaced to accommodate the species used. Often times, large conifer trees are used for these purposes. When planted too tight, some conifers (especially spruce) do not get enough airflow – which can result in fungal diseases. While it takes longer for windbreaks to establish at wider spacings, the trees will stay healthier and fuller in the long-run. Most pine, spruce, and fir species should be spaced at least 25-30 feet apart. Native eastern red cedar trees can be planted at a closer spacing without disease issues. Spacings of 15-20 feet are common for eastern red cedar.
- Be planted using trees appropriate for the site/soils. Most conifers prefer well drained sites, and do not grow well in damp, clayey soils. For clayey sites or sites that are persistently wet, consider using 6 to 8 rows of native bottomland hardwood species. These trees can be planted tight (8x8 or 10x10 foot spacing) for rapid growth, and later thinned to the desired, wider spacing. Hardwood trees can also be combined with rows of native shrubs. In general, shrubs should be planted 4-6 feet apart within their rows, and rows can be planted 6-10 feet apart, depending upon the size of the shrubs. Consider planting shrubs in blocks or short rows of the same species, and then switch to another shrub of a similar size in a different genus (to prevent disease issues).

Some commonly used non-native conifer species are very prone to a condition called winter burn/winter desiccation. If you plan to use these burn-prone conifers (concolor fir, white cedar, spruce species), consider planting them in rows closest to the house (where they are most protected from wind and sun). Consider planting a native species (like eastern red cedar) on the windward row(s). Eastern red cedar is: adapted to harsh environment; can be planted closer together; and will not be seen if you have more attractive trees closer to your house. Blue spruce, Scotch pine, and Austrian pine are the most common evergreens to have terminal health issues, and should be avoided in plantings. Finally, consider using good quality wood mulch and tree protectors/exclusion fence around newly planted trees. These actions will go a long way towards protecting your windbreak investment.

Multiple rows of hardwood trees can be used to create windbreaks where soils will not accommodate evergreens. Hardwood trees can also be incorporated into traditional windbreaks, to add height (and downwind protection) to the windbreak or shelterbelt.

Photo - Mark Vitosh

IMPORTANT CONSIDERATIONS FOR RURAL PLANTINGS

SHADE TREES/ORNAMENTAL TREES: Shade trees are beneficial for beautifying acreages and farmsteads, providing critical shade during summer months, and for providing visual interest during winter months. The full value of these trees can be captured by keeping the following items in mind:

- Shade trees are beneficial for reduced energy consumption when planted on east and west portions of a residence. Widely spaced hardwood shade trees provide summer energy benefits through cooling, and can provide energy saving benefits (through warming) during winter months. Shade trees should be planted 1/2 tree length (ultimate size of the tree) from the residence, to prevent foundation damage or future roof interference. Shade trees should be planted at least 25 to 30 feet apart from each other, to prevent crowding.

- Shade trees should be planted to avoid overhead and underground utility infrastructure (as mentioned above). Removing large limbs to avoid powerlines, for example, can severely harm full-grown trees. Trenching or excavating through roots can also damage and kill adult trees. Prune trees properly when young, to encourage strong branch structure and wind resistance.

- Avoid creating planters or adding soil to the root flares of shade or ornamental trees. Small amounts of new soil can cause strangling root conditions, and sometimes outright kill the tree. Instead, provide a 2-4" layer of good quality wood mulch around the root flare of the tree (making sure to keep the mulch from actually touching the tree bark).

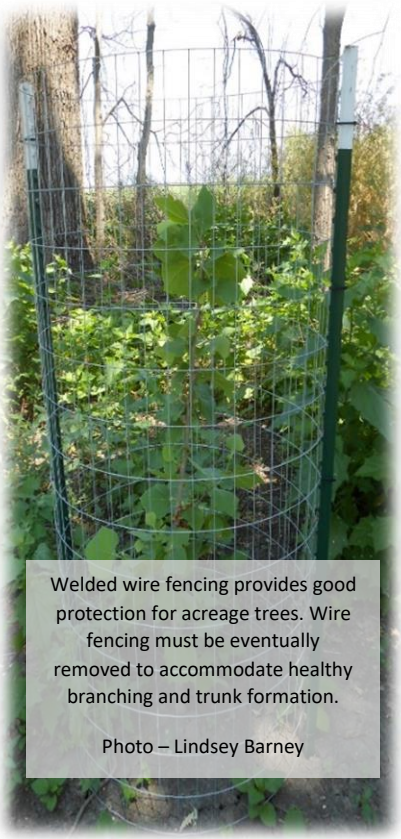
Retain lower branches on thin barked trees (like this black cherry) to help prevent sunscald and wildlife damage in exposed environments.

Photo – Lindsey Barney

- Avoid planting thin barked trees in areas exposed to full sun. Many ornamentals (like hybrid maples and fruit trees) get sunscald when planted on these fully exposed sites. Alternatively, keep lower limbs in place on the tree, and use a protective, ventilated, white bark guard. Several native species (bur oak and chinkapin oak) for example, can excel on hot, windy, exposed hill tops.

- Young trees are prone to wildlife damage, especially in rural settings. For individual shade trees, create large cages made out of 5-foot-tall welded wire fence. The diameter of the cage should be at least 5 feet in diameter. Each cage should be staked with two t-posts or similar staking rod. For larger tree plantings, consider using plastic tree shelters or exclude the entire tree planting area with three-dimensional electric fence.

- Trees and shrubs of all species and sizes can be negatively impacted by misused turf-herbicides. Before treating your yard to kill weeds (or use the clippings from a treated yard), make sure to thoroughly read and understand the herbicide label. The herbicide used must be labeled for use near trees, shrubs, and/or ornamentals.



Welded wire fencing provides good protection for acreage trees. Wire fencing must be eventually removed to accommodate healthy branching and trunk formation.

Photo – Lindsey Barney

Windbreaks and other buffers can be created using native fast-growing bottomland hardwood trees and native shrubs.

Photo - Mark Vitosh

Native trees and shrubs can be used to protect homesteads, farms, livestock operations, and also provide wildlife cover.

Photo – Lindsey Barney

Shelterbelts, windbreaks, screens, and buffers using native trees and shrubs provide food, cover, and travel corridors for wildlife – which are all essential habitat elements for wildlife's survival.

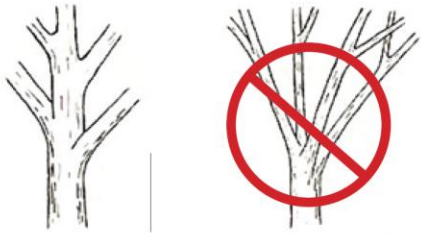
Photo – Lindsey Barney

Selecting and Planting Your Tree

Tree selection shouldn't be based on species alone. Selecting a quality tree from the nursery will help insure generations benefit from the tree. Look for the following for a quality tree selection:

1. Trunk diameter and taper is sufficient to keep the tree vertical without the support of a nursery stake.

2. Large-growing shade trees should have a central leader -- a single, relatively straight vertical main stem, free of co-dominant stems



3. Main branches are well-spaced.

4. No circling or kinked roots in the rootball. Purchasing a tree in an "air-pruned" pot is the best way to avoid this. If purchasing a tree in a hard-plastic pot, slip the tree out of the pot and inspect the rootball to insure there are no woody roots circling the stem or outside of the rootball. The uppermost roots should be within one inch of the soil surface.

CONDITION OF THE ROOTS

• Locate where the trunk flares out and becomes the roots. This spot, called the root flare, should be located at ground level, not below. The flare turns into the large supporting roots. They may be visible on the surface or covered by a couple inches of soil. These large supporting roots will help identify the correct depth to dig the hole. Planting trees too deep causes premature death from circling or girdling roots, and increases the likelihood of the tree falling over in high winds.
• Inspect the root mass for circling and girdling roots by placing the tree on its side and removing the entire container. If the tree is pot-bound and has roots circling the root mass, cut off the entire outside ¼-inch of the root mass, including the bottom, with a sharp shovel or pruning saw.

SIZE AND SHAPE OF THE HOLE

• Dig a hole with a diameter two to three times the width of the tree's container. Typically the hole should be 10 to 12 inches deep, but look for the root flare on the tree. This should be at or slightly above ground level after planting.
• Loosen up surface roots and straighten out any large roots.
• Keep the root flare of the tree even with the ground level.
• Be sure the tree is straight before backfilling the planting hole.

BACKFILLING THE HOLE

• Do not substitute planting hole soil with mulch, compost or fertilizers.
• Backfill the planting hole, taking care to break up soil chunks.
• Lightly step around the tree base to firm up soil.

MULCHING

• Place three to four inches of organic mulch around the tree in a saucer shape, 18 to 36 inches wide. Organic mulch, such as composted wood chips, greatly enhances tree growth.
• Keep organic mulch three inches away from the base of the tree to prevent moisture buildup on the bark.

INITIAL WATERING

• Water the tree slowly and thoroughly to eliminate air pockets in soil. Initial watering should be approximately 10 to 15 gallons of water or until the water stands for a few seconds. Water is critical for tree survival during the first few years.
• Water two gallons for every inch diameter of the tree trunk one to three times per week for the first two years. During draught, water more frequently.

Don't be afraid of trying bare root seedlings as well. Most of the plantings shown in this document havegrown up from bare root tree and shrub seedings. With proper planting and care, bare root seedlings area cost-effective way to create large plantings in your rural landscape.

The following table will help you select native trees and shrubs based on planting site characteristics and also planting purpose.

Large Hardwood (deciduous) Trees

Species	Comments	Growth rate	Rural Planting Attributes									
			Flowering	Fall Color	Shade Tree	Wildlife Use	Wind, visual, & dust screening	Stream-side buffers	Excessively Drained (Dry)	Poorly Drained (Wet)	Alkaline Soils	Compacted Sites
Eastern Cottonwood	Do not plant close to homes	Fast		Y		X	X	X		X	X	
American Sycamore	ANT.	Fast		RB	X	X	X	X		X		
Silver Maple	Do not plant close to homes	Fast		Y	X	X	X	X		X		X
Sugar Maple Black Maple		Slow-Moderate		O	X	X	X					
Black Willow	Do not plant close to homes	Fast	YG	Y		X	X	X		X	X	X
River Birch	JB	Fast		Y		X	X	X		X		
American elm	CUL	Fast		Y/B	X	X	X	X	X	X	X	X
Honey Locust		Fast	YG	Y	X	X	X	X	X	X	X	X
Kentucky Coffee Tree	Toxic to livestock	Moderate-Fast		Y	X	X						
Hackberry		Moderate-Fast		Y	X	X	X	X				
American Linden (Basswood)	JB	Moderate-Fast	W	Y	X	X	X	X				X
Shagbark Hickory	Large Seed	Slow		YO	X	X	X		X		X	
Bitternut Hickory	Large Seed	Slow-Moderate		YO	X	X	X	X		X	X	
Shellbark Hickory	Large Seed	Slow-Moderate		YO	X	X	X	X		X		
Northern Pecan	Large Seed	Moderate		Y	X	X	X	X				
Black Walnut	Large Seed	Moderate		Y	X	X	X	X				
Bur Oak	Large Seed	Slow		B	X	X	X	X	X	X	X	
Chinkapin Oak		Slow		RB	X	X	X		X		X	X
White Oak		Slow		RP	X	X	X		X			
Swamp White Oak	Large Seed	Moderate		RB	X	X	X	X		X		X
Red Oak	Large Seed	Moderate		R	X	X	X					
Black Oak		Moderate		RB O	X	X	X		X			
Pin Oak	IC	Moderate		RB	X	X	X	X		X		X
Shingle Oak		Moderate-Fast		RB	X	X	X	X	X			X

Colors: Y = Yellow, R=Red, B=Brown, P=Purple, O=Orange, Y=Yellow, G=Green, W=White, EG = Evergreen
Comments: CUL = look for true Am. Elm cultivars, JB = Japanese beetle issues, ANT = Anthracnose disease, IC=Iron Chlorosis on alkaline soils

	Species	Comments	Growth Rate	Flowering	Fall Color	Shade	Wildlife	Screening	Buffers	ED/Dry	PD-Wet	Alkaline	Compact
Conifers	E. White Pine		Moderate		EG		X	X		X			
	E. Red Cedar		Moderate		EG		X	X	X	X		X	X
Small to Medium Sized Deciduous Trees	Ohio Buckeye	Large Seed	Moderate		RB	X	X	X	X		X		
	Black Cherry	Edible fruit	Moderate-Fast	W	RY	X	X	X	X	X	X		X
	Red Mulberry	Edible fruit	Moderate-Fast		Y	X	X		X				
	Ironwood/ E. Hop Hornbeam		Slow-Moderate		RB		X	X		X		X	
	Musclewood, Blue Beech		Slow-Moderate		RO		X	X	X				
	Dwarf Chinkapin Oak		Slow		YO		X	X		X		X	
	Downy Serviceberry	Edible fruit	Slow -Moderate	W	RO		X		X				
	Downy Hawthorn		Slow	W	RO Y		X	X	X	X	X	X	X
	Eastern Redbud		Moderate	P	Y		X			X		X	X
Native Shrubs (in descending order of size)	Wild Plum	Edible fruit	Fast	W	RY		X	X	X	X	X	X	X
	Nannyberry Viburnum	Edible fruit	Moderate	W	RP		X	X	X	X	X	X	
	Black Haw Viburnum		Slow-Moderate	W	R		X	X	X			X	
	Eastern Wahoo		Slow	P	R		X		X			X	
	Gray Dogwood		Slow-Moderate	W	P		X	X	X	X	X	X	X
	Rough-leaved Dogwood		Fast	W	RP		X	X	X	X	X	X	X
	Silky Dogwood		Moderate	W	RP		X	X	X		X	X	
	Red Osier Dogwood		Fast	W	RP		X	X	X		X	X	
	Buttonbush		Moderate	W	Y		X		X		X	X	
	Smooth Sumac		Fast		RY O		X	X	X	X		X	X
	Fragrant Sumac	Short Stature	Moderate		OR		X	X	X	X		X	
	False Indigo Bush		Fast	P	Y		X		X		X	X	
	Choke Cherry	Edible fruit	Moderate-Fast	W	YO		X	X	X	X		X	
	American Hazelnut	Edible fruit	Moderate-Fast		RY O		X	X	X			X	
	American Bladdernut	Needs Shade	Moderate	W	Y		X						
	Common Elderberry	Edible Fruit	Moderate -Fast	W	Y		X	X	X		X	X	
	Shrubby St. John's Wort	Short stature	Moderate	Y	Y		X		X	X		X	X

LINKS TO ADDITIONAL INFORMATION

IOWA DNR FORESTRY:

Landowner Assistance: https://www.iowadnr.gov/Conservation/Forestry/Forestry-Landowner-Assistance

Iowa State Forest Nursery: https://www.iowadnr.gov/Conservation/Forestry/State-Forest-Nursery

Pollinators: https://www.iowadnr.gov/portals/idnr/uploads/forestry/General/ForestPollinatorspub.pdf

Tree Selection: https://www.iowadnr.gov/Portals/idnr/uploads/forestry/urban/RethinkingMaple.pdf

Pruning: https://www.iowadnr.gov/portals/idnr/uploads/forestry/pruning.pdf

Proper Tree Planting Video: https://youtu.be/m_Oh3PtEsuk

WORKING TREES FOR WILDLIFE SERIES AND OTHER USDA PUBLICATIONS:

Wildlife: https://www.fs.usda.gov/nac/assets/documents/workingtrees/brochures/wtw.pdf

Agriculture: https://www.fs.usda.gov/nac/assets/documents/workingtrees/brochures/wta.pdf

Livestock: https://www.fs.usda.gov/nac/assets/documents/workingtrees/brochures/wtl.pdf

Windbreak Design: https://www.fs.usda.gov/nac/practices/windbreaks.php

Tree Care: USFS Tree Owner's Manual:
https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5368392.pdf

ISU COMMUNITY TREE PLANTING AND CARE GUIDE: https://store.extension.iastate.edu/product/Community-Tree-Planting-and-Care-Guide

Native trees and shrubs are beautiful in all seasons. Riparian Forest Buffer - Western Iowa.

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IN PARTNERSHIP WITH UNITED STATES DEPARTMENT OF AGRICULTURE FOREST SERVICE