Incorporating Pollinator Habitat into Silvopasture

Tom Ward, Forester, USDA NRCS East National Technology Support Center
Nancy Adamson, Pollinator Conservation Specialist, Xerces Society/NRCS ENTC

Silvopasture is the intentional combining of trees (silvo) and forages for grazing or browsing animals (pasture). In its simplest application there may be only two plant species included in a silvopasture, a pine tree species, for example, and a forage grass like tall fescue. Neither of these offers much for pollinators.

Adding Pollinator Habitat to Simple Silvopasture Designs

A typical silvopasture design includes one or more rows of trees alternating with wide "alleyways" for grazing. An alternative design that provides habitat for pollinators might include maple as the tree component (an important spring pollen source) and little bluestem (a grass that lodges and provides good bumble bee nesting habitat) for the forage component. There are many potential combinations of trees and forage plants, including lots of choices that benefit pollinators. Some pollinator-friendly forages include several species of clover and vetch, which need to be reseeded every few years. Less commonly used are some native perennial legumes that, if managed well, will persist once established such as bush clovers and tickseeds.

Adding Pollinator Habitat to More Complex Silvopasture Designs

When the silvopasture design includes two or more tree rows, pollinator plants can be added or allowed to grow within or between the tree rows. These additional small trees, shrubs, forbs and grasses can provide additional pollen, nectar, and nesting sites for pollinators. The diagram below illustrates how to incorporate a variety of native grasses, forbs, and shrubs into various tree row designs for silvopasture.

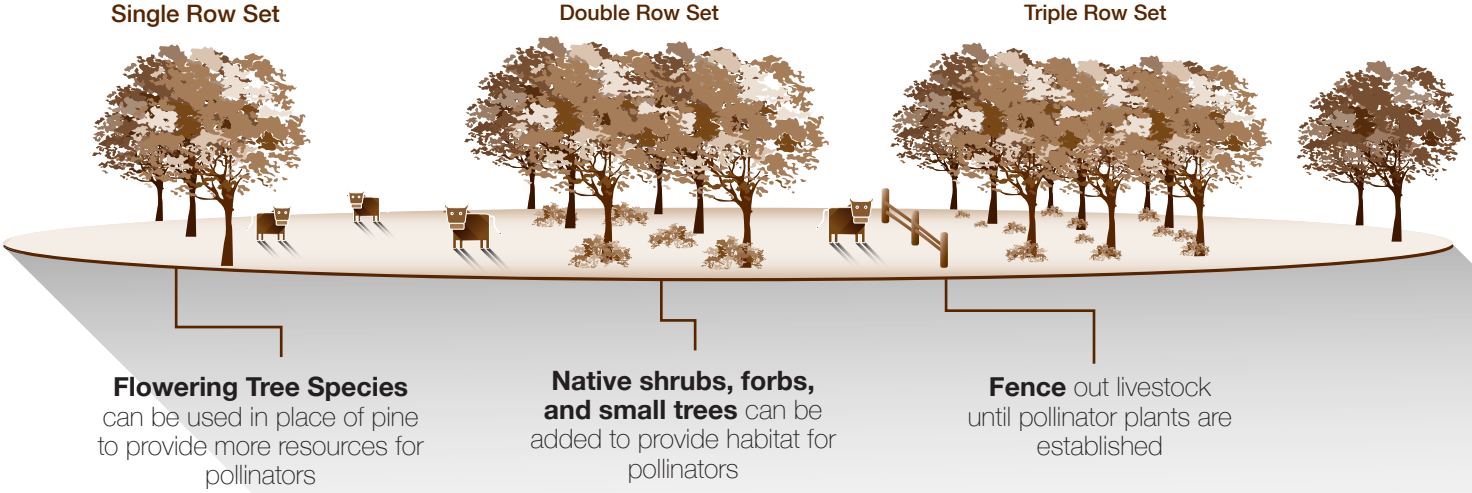
Depending on the soils and site conditions (such as annual precipitation, average temperature, growing season, etc.) a variety of forbs, shrubs and small trees can be added between tree rows without reducing the forage crop in the alleyways. Plants established in the tree rows will need to be at least somewhat shade tolerant, although considerable sunlight will reach the ground because of the open alleyways on either side of the tree rows. Pollinator plants may need protection from grazing or browsing while becoming established.

Other Management Activities that Favor Pollinators

Rotational grazing systems (those that involve limiting the grazing period and return interval of livestock) have been found to stimulate germination of seeds existing in the soil. Within a few years this results in greater natural diversity than season-long grazing systems or overgrazing. Managed rotational grazing that leaves adequate plant structure both protects pollinator species in tree rows and increases species diversity in alleyways. More information on managed rotational grazing can be found at http://www.nrcs.usda.gov/wps/portal/nrcs/detail/ky/newsroom/factsheets/?cid=stelprdb1101721.

Native tree species are more likely than non-native species to provide habitat for a diversity of insects, including agriculturally beneficial predators and parasitoids. Tree choices that are good for pollinators in the southeast include tulip poplar, sourwood, black locust, basswood, black cherry, persimmon, sourwood, maple, basswood, and black gum. Although pine species are popular choices in silvopasture systems due to fast growth and high timber value, flowering tree species provide more resources for pollinators. Additionally, some flowering trees such as tulip poplar, may have nearly the same growth rate and timber value as pine species. Other tree species that provide a mix of pollinator and timber value include black locust, basswood, black cherry, persimmon, maple and basswood.

Silvopasture Diagram



A portion of a silvopasture alleyway has been disked to prepare the site for natural generation of native plants expected to be in the soil seed bank. Photo by Tom Ward.

Potential pollinator-friendly tall shrubs to include within and between tree rows are: serviceberry, redbud, willow, dogwood, witch-hazel, hawthorn, crab apple, plum, sand cherry, elderberry, mountain-ash, paw-paw, blueberry, sumac, and nannyberry. Potential low shrubs include: paintbrush, bedstraw, salal, huckleberry, blackberry, and raspberry. Potential forbs are too numerous to list.

Alleyways are typically reserved for forage but pollinator habitat can be increased by reserving a portion of the alleyways for pollinator plants. The design for these areas will be similar to a field border designed for pollinators. In systems that tolerate burning, prescribed fire can help rejuvenate understory plants and increase diversity.

Some may prefer a more natural appearance with silvopasture trees in groups. As with the row systems, pollinator habitat can be created with additional plantings or by managing grazing. Livestock may need to be fenced out until pollinator plants are established.

Silvopasture is a good example of an agroforestry practice that can be easily modified to incorporate key elements of pollinator habitat. A multi-functional design will integrate elements of grazing, forestry and pollinator biology. We can learn from some of our most spectacular pollinator habitats- our native prairies- how grazing can help enhance floral diversity, and support not only large grazing mammals, but the bees and other pollinators that help feed us.

Thinning for pollinators and healthier forest communities

Tom Ward, Forester
USDA NRCS East National Technology Support Center

Nancy Adamson, Pollinator Conservation Specialist
Xerces Society/NRCS ENTC

Forests provide an additional opportunity to manage for pollinators. This article explores opportunities to think about pollinators in the context of forest management. Managing existing woodlands or forest stands by thinning and leaving dead wood can be very beneficial for pollinators. While the primary aim of thinning is to grow bigger and higher quality trees, opening the canopy also allows more light to reach understory plants, stimulates flowering, and can greatly enhance forage resources for pollinators. Thinning can also be targeted to improve the growth of canopy trees or understory species that are especially good sources of pollen and nectar. In the southeastern United States, for example, maple, sourwood, basswood, black gum, black locust (where it's not invasive), tulip tree, and magnolia are important pollinator species. Understory pollinator plants that might benefit from the thinning of overstory trees include: serviceberry, redbud, blueberry, huckleberry, holly, azalea (important for spring migrating hummingbirds), black cohosh, and many others. In riparian areas, thinning can be especially important for encouraging regrowth of shrubs and herbaceous plants that improve soil stabilization. Leaving dead wood to provide nesting habitat for bees and other insects (that in turn become food for birds and other forest wildlife), also creates excellent substrate for natural forest regeneration. Rotting logs host some species of native bees and are also hot spots for new seedling growth, with seeds taking root in mosses and fungal hyphae that set the stage for succeeding forest communities. If managed for both timber and wildlife, standing snags provide homes for other cavity nesting species.

Sourwood, Oxydendrum arboreum, is a good example of an important nectar and pollen source for pollinators that might benefit from forest management,

Bumble bee foraging on sourwood. Photo by Debbie Roos.

such as thinning and prescribed burning. Sourwood is most commonly found on dry sites and relatively poor soils, although it occurs on a wide variety of sites. Sourwood is very shade tolerant and often found in the understory or midstory of mature forests. Maximum flower and seed production, however, will be obtained if the sourwood crown is in full sun. Cutting or killing one or more trees that overtop a sourwood tree will likely result in a slow increase in the number of blossoms and seed produced. Sourwood seedlings will germinate and grow on undecomposed leaf litter on the forest floor but prescribed burning to reduce leaf litter will increase the abundance of sourwood seedlings. Thinning to increase the amount of light reaching the forest floor will accelerate the development of any sourwood seedlings that are present. It's possible to increase both the number of blossoms per tree and the number of sourwood trees per acre by carefully thinning and prescribed burning forestland with existing mature sourwood trees.