

## **NJ BIOLOGY TECHNICAL NOTE**

### **Habitat Development for Pollinators**

As many as two-thirds of the world's crop species depend on insects for pollination, and this may account for 15-30 percent of the food we consume. In the United States one third of all agricultural output depends on pollinators. More than 90 crops in North America depend upon bees for pollination. In New Jersey crops such as apples, peaches, strawberries, blueberries, cranberries, pumpkins, cucumbers, squash and more depend upon insect pollination. The seeds of many forage crops used by New Jersey livestock producers such as clover and alfalfa require insect pollinators. Pollinators are also important to the function of many terrestrial ecosystems because they enhance native plant reproduction. Native plants provide food and cover for numerous wildlife species, help stabilize the soil and improve water quality. As a group, pollinators are threatened worldwide by habitat loss and fragmentation, pesticides, disease, and parasites. This has serious economic implications for native ecosystem diversity and stability, for agricultural producers, and for all consumers of agricultural products.

Honey bees, first brought to the United States from Europe in the 1600s, have been used by farmers for many years for pollination of crops. Honey bee populations are experiencing sharp declines recently due to honey bee pests and diseases. Prices for rental of honey bee colonies have doubled in recent years and many crop producers report it has even become hard to secure any honey bees for pollination services. Wild honey bee colonies, once common on New Jersey farms, are almost non-existent due to the recent pests and diseases.

Native pollinators such as bees and butterflies are often underestimated when it comes to pollination. Except for the larger bumble bees, many native bees are small, solitary, non-social insects. While some species look like bees, many are very small and look like flies or flying ants. Native bees can contribute significantly to crop pollination, and if the proper conditions exist on farms they may provide all the pollination needs of some crops. Some researchers suggest that crops pollinated by wild bees in the United States are valued at \$2 to \$3 billion annually. Researchers around the country are learning more about native pollinators such as their role in crop pollination and what producers can do to benefit habitat for native bees on their farms.

To provide habitat for native pollinators, diverse floral sources that provide a succession of flowers are needed. Some floral sources should be available throughout the spring, summer and fall so nectar and pollen are available to insects for the entire growing season. Bees and butterflies have good color vision so choose flowers of several colors – particularly blues, purple, violet, yellow and white. Provide flowers of different shapes to attract pollinators with different body sizes and mouthparts. Use native plants first since these are usually adapted to New Jersey's growing conditions and native pollinators evolved with these plants.

Quality nesting sites must also be available for native pollinators to thrive. Many native bee species are digger bees that nest underground. Nesting sites may be underground in sunny, well drained, partially bare areas adjacent to crop fields. Other species nest in hollow twigs of dead shrubs,

tunnels in dead trees left behind by wood-boring beetles, or excavate nests in above-ground rotting logs and stumps. Cranberry growers report some success in providing artificial nesting structures or “trap nests” made by drilling ten to twenty 5/16” diameter holes, 4”-10” deep, in blocks of wood that are erected near bogs for leaf-cutting bees. Bumble bees are social insects and build nests just under or near the soil surface in small depressions such as old mammal borrows or under fallen plant matter. Leaf cutting bees and bumble bees are very effective pollinators of cranberries and blueberries. Bee nesting areas can be established on sunny, south facing slopes on well-drained soils. A combination of bare soil, brush piles, standing dead trees and flowering forbs, shrubs and trees is ideal. Several of these areas could be located strategically around a farm since many native pollinators do not fly long distances like honeybees.

Another practice important to native pollinators on farms is integrated pest management. Pesticides can inadvertently kill beneficial insects or beneficial plants. Contaminated nectar and pollen can be collected by bees and brought back to nests to feed to larvae, causing reproduction failures. Insecticides, if necessary, should be chosen wisely and applied during times when beneficial insects are least active. Indiscriminant herbicide use should be discouraged, and herbicides should be targeted directly at specific weed problems. Odd areas, hedgerows, filter strips and field borders may appear “weedy” but can provide important pollinator habitat and should be protected from pesticides.

NRCS can assist landowners with habitat enhancement for pollinators by encouraging them to establish an array of plants that flower throughout the growing season to provide a source of nectar for adult pollinators and a diversity of herbaceous material for immature pollinator life stages. In addition, bee shelter areas can be designated on farms to provide nesting sites. The Upland Wildlife Habitat Management or Early Successional Habitat Development/Management standards and specifications could be used in conservation plans for pollinator habitat. In general, diverse upland wildlife habitat on farms, in areas such as hedgerows, odd areas and field borders, with diverse native plants and if protected from pesticides, will be good pollinator habitat.

The pollinator habitat development practices discussed above will help enhance farms for native pollinators and likely help with crop pollination. One or more of the items discussed above could easily be worked into most farm conservation plans. These practices will also provide habitat for many other wildlife species including many beneficial insects. In 2007, the New Jersey Wildlife Habitat Incentive Program (WHIP) includes cost sharing assistance for “Pollinator Meadows” as a component of Early Successional Habitat Development/Management (Practice Code 647). The plants on the attached list provide some good guidance on pollinator plants for New Jersey and will be updated as further results are obtained from ongoing local research projects. For specific planting recommendations or developing seed mixes, contact the NRCS Biologist in your region. The references listed provide more detailed information on specific pollinator topics and should be reviewed prior to adding pollinator practices into conservation plans. Selected references could also be provided to landowners interested in pollinator habitat enhancement.

## References:

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USDA - NRCS Wildlife Leaflet Number 34: *Native Pollinators*. 2005. USDA NRCS Wildlife Habitat Management Institute.  
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## Beneficial Plant Species for NJ Pollinators on Farms

Common Name	Scientific Name	Early-Mid-Late Summer Flowering Period	Wetland Indicator Status*	Benefits
<b>Native Herbaceous Perennials</b>				
Goldenrods	<i>Solidago</i> spp.	Mid and Late	various	Many native bee spp. and honeybees use, one of the best bee plants
Asters	<i>Aster</i> spp.	Late	various	Many native bee spp. and honeybees use, one of the best bee plants
Bee Balm, Wild Bergamot	<i>Monarda fistulosa</i>	Mid	UPL	Excellent bee plant. Substitute <i>M. punctata</i> (horsemint) in S. Jersey
Showy Tick Trefoil	<i>Desmodium canadense</i>	Mid	FAC	Long summer flowering period
Wild Columbine	<i>Aquilegia canadensis</i>	Early	FAC	Good early bee plant
Wild Indigo	<i>Baptisia tinctoria</i>	Mid	U	Yellow flowers
Common Boneset	<i>Eupatorium perfoliatum</i>	Mid to Late	FACW	Excellent butterfly and bee plants
Joe-Pye Weed	<i>Eupatorium purpureum</i>	Mid to Late	FAC	Excellent butterfly and bee plants
Giant Sunflower	<i>Helianthus giganteus</i>	Mid to Late	FACW	Large, up to 8' tall, very showy
Ox Eye Sunflower	<i>Heliopsis helianthoides</i>	Mid to Late	U	Long bloom period, up to 4' tall, yellow flowers
Round-headed Bush Clover	<i>Lespedeza capitata</i>	Late	FACU	Native clover
Milkweeds	<i>Asclepias</i> spp.	Mid	various	Excellent butterfly and bee plants
Blazing Star	<i>Liatris spicata</i>	Mid	FAC	Pink, purple spikes
Wild Lupine	<i>Lupinus perennis</i>	Early	U	Large blue flowers
Beardtounge	<i>Penstemon digitalis</i>	Early	FAC	White to purple tinged flowers
Black-eyed Susan	<i>Rudbeckia hirta</i>	Mid to Late	FACU	Common volunteer
Blue Vervain	<i>Verbena hastata</i>	Late	FACW	Moist areas
Jewelweed	<i>Impatiens capensis</i> or <i>pallida</i>	Mid	FACW	Common in moist woodlands, no commercial seed source
Great Blue lobelia	<i>Lobelia siphilitica</i>	Late	FACW	Showy blue flowers
Purple Coneflower	<i>Echinacea purpurea</i>	Mid	U	Showy pink flowers
Evening Primrose	<i>Oenothera biennis</i>	Mid to Late	FACU	Common volunteer, showy yellow flowers
Fleabanes	<i>Erigeron</i> spp.	Mid to Late	various	Common weed on farms, no seed sources
<b>Non-native Herbaceous Perennials</b>				
White Clover	<i>Trifolium repens</i>	Mid	FACU	Excellent honeybee nectar source, native bee use
Red Clover	<i>Trifolium pratense</i>	Mid	FACU	Excellent honeybee nectar source, native bee use
Crimson Clover (annual)	<i>Trifolium incarnatum</i>	Early to Mid	U	Excellent honeybee nectar source, native bee use
Bird's Foot Trefoil	<i>Lotus corniculatis</i>	Mid	FACU	Excellent honeybee nectar source, native bee use
Sweet Clover (biennial)	<i>Melilotus officinalis</i>	Mid	U	Excellent honeybee nectar source, native bee use. Can be invasive
Mustards	<i>Brassica</i> spp.	Early	various	Very early yellow flowers
Dandelion	<i>Taraxacum officinale</i>	Early	FACU	Very common weed, good pollen source. Can be invasive
Daisies	<i>Chrysanthemum</i> spp.	Mid to Late	various	Showy white flower

Trees/Shrubs				
New Jersey Tea	<i>Ceanothus americanus</i>	Mid	U	Low upland woodland shrub
Sweet Pepperbush	<i>Clethra alnifolia</i>	Mid	FAC	Moist woodland shrub, sweet smelling flowers
Wild Plum	<i>Prunus americana</i>	Early	FACU	Shrub. Substitute <i>P. maritima</i> (Beach Plum) in coastal areas
Black locust	<i>Robinia pseudoacacia</i>	Early	FACU	Tree. Excellent bee nectar source. Some authors list as non-native
Steeplebush, Meadowsweet	<i>Spirea tomentosa</i>	Mid to Late	FACW	Small shrub in moist soils
Willow	<i>Salix</i> spp.	Early	various	Trees and shrubs. Early pollen source, impt. to many native bees.
Hawthorns, Thorn Apple	<i>Crataegus</i> spp.	Early to Mid	various	Many species, thorny shrubs
Red Maple	<i>Acer rubrum</i>	Early	FAC	Tree provides abundant early pollen sources
Sumac	<i>Rhus</i> spp.	Mid	various	Common shrub of odd areas on farms
Juneberry, Shadbush	<i>Amalanchier</i> spp.	Early	various	Small tree with early white flowers attract many insects
Dogwoods	<i>Cornus</i> spp.	Early-Mid	various	Showy white spring flowers attract many insects
Apple, Crabapple (non-native)	<i>Malus</i> spp.	Early-Mid	various	Showy white spring flowers attract many insects
Raspberries, Blackberries	<i>Rubus</i> spp.	Early-Mid	various	Showy white spring flowers attract many insects
Black Cherry	<i>Prunus serotina</i>	Early-Mid	FACU	Common tree on NJ farms. Good fall fruit for wildlife
Button Bush	<i>Cephalanthus occidentalis</i>	Mid	OBL	Shrub of very wet sites only

\*From US Fish Wildlife Service National List of Plant Species That Occur in Wetlands – Northeast Region. Plants with a “U” normally would not occur in wetlands and are totally upland species and are not on the list (“U” is not an official US FWS designation). Plants with the “various” designation include several species that are good pollinator plants, with several different wetland indicator status designations. Check the wetland indicator status from the US FWS list for the specific plant chosen.

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