



*Landscape Design
and Stone Sculpting
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Food plants for Insects, with a focus on bees:

Many species of bees use only a small range of food plants from which they collect pollen. Although they might drink nectar from many different food plants, including alien species, these specialist bees can not survive in the absence of their specific pollen source. Specialization to certain plants or plant groups is also frequently found among caterpillars of butterflies and moths. In order to provide habitat for these insects, it is necessary to meet their needs for food plants, as well as for nesting and overwintering.

The best plants to support insects in gardens are the ones that support the largest number of insect species, while still being suitable for garden culture. The following plant recommendations are based on the results of studies about lepidoptera food plants by Doug Tallamy, and about bee food plants by Jarrod Fowler and Sam Droege. These two groups of insects can be used as a measure for the value of a plant to support insect life as they are both of great importance to their habitat. The list of the most important host plants for caterpillars was compared to the list of plants needed by specialized bees, and those plants selected where the lists overlapped.

Among the woody plants (and disregarding the Oak, which is wind pollinated) the genera Salix and Prunus are the most important caterpillar food plants. Salix is the number one plant in the bees list, with the highest number of dependent specialized bee species (Prunus is important for generalist bees). Vaccinium, the number two woody plant for specialized bees, is also high up in the lepidoptera list.

Even more striking is the overlap for herbaceous plants in the two studies: Solidago, Aster (Symphyotrichum) and Helianthus are the number one, two and three in both lists!

All of these plants are also important for generalist bees and other pollinators, as well as many other insects and birds. These 'superfoods' for wildlife should be used in abundance in all gardens, as we have to make up for what we took from nature. Many other plants that are important to insects, or liked for their beauty, can be added to the design.

Some of these superfood plants are not commonly used in gardens and might require an open mind for unconventional design. These plants are also not easy to find in the nursery trade. If they are not deemed worthy around the house, they will still be suitable for transition plantings at the edge of a woodland, near a wetland, or in the backyard meadow.

The beauty does not come from the plants alone, it also comes from the richness of insect and wild life.

The Superfoods for Insect Gardens:

A. Woody plants:

rank	plant genus		supported species	
			lepidopteran caterpillars	specialist bees
1	Willow	Salix	456	14
2	Blueberry and Cranberry	Vaccinium	288	9

B. Herbaceous plants:

rank	plant genus		supported species	
			lepidopteran caterpillars	specialist bees
1	Goldenrod	Solidago	115	11
2	Aster	Symphyotrichum	112	7
3	Sunflower	Helianthus	73	7

Recommended Willow Species:

The following list is somewhat tentative, as there is no documented experience with these shrubs as garden plants.

Willows are dioecious and it is necessary to plant male and female plants to best serve the bees. Seeds are viable only for a short time - seed quickly! Propagation by hardwood cuttings late winter is usually successful. Prune as desired.

Salix	common name	
bebbiana	Long-beaked Willow	adaptable, used for re-vegetation, heavily browsed by moose
discolor	Pussy Willow	sometimes planted in gardens and by bee-keepers
rigida (sometimes incl. under eriocephala)	Heart-leaved Willow	a widespread species and important wildlife plant; 'American McKay' is a clone selected for use in basket making.
humilis	Prairie Willow	6-12 ft. more drought tolerant than other species, seed is available by Prairie Moon Nursery
occidentalis (syn. humilis occidentalis)	Dwarf Prairie Willow	more compact, and naturally found in dry locations such as barrens, fields and woodlands

pyrifolia	Balsam Willow	red stems - might be hard to find, needs moist sites and lime, but might be worth checking out for gardening potential
sericea	Silky Willow	large shrub with attractive silvery foliage
uva-ursi	Bearberry Willow	trailing, 3" high, for rock gardens

Alien species found in the nursery trade:

Salix alba 'Tristis' / caprea 'Pendula' / integra 'Hakura Nishiki' / melanostachys / purpurea 'Nana'; alien willows found in the wild are S. cinerea and pentandra.

Recommended Vaccinium Species:

Blueberries are important wildlife plants that nourish a wide range of animals. Since several kinds of blueberries are common garden plants they are easy to find in the nursery trade. Also consider the low-growing Vaccinium species as they are excellent groundcover plants or useful in rock gardens. The deciduous species tend to have brilliant fall colors.

Vaccinium	common name	
angustifolium	Lowbush Blueberry	can be used in dry, lean and acidic locations, important food crop, shear every few years,
angustifolium 'Michigan'		more compact and resistant to leaf spot disease
angustifolium 'Putte'		slightly taller and resistant to stem disease
corymbosum	Highbush Blueberry	most common on wetland margins, but adaptable to average soil
fuscatum	Black Highbush Blueberry	similar to Highbush blueberry but more common in bogs and wetlands
macrocarpon	American Cranberry	useful as groundcover in wet locations, adaptable to average soil if not too dry, important food crop
myrtilloides	Velvet-leaved Blueberry	similar to Lowbush, with velvety foliage, common at high elevations throughout NE
oxycoccus	Small Cranberry	a smaller cranberry common in bogs, but usually not cultivated, can be layered and is edible
vitis-idea	Mountain Cranberry	low and evergreen, prefers cool climates at high elevations, suitable for rock gardens

Recommended Goldenrod Species:

Well over 20 species of Goldenrods are found in NE alone, and similar numbers of Asters (incl. *Symphotrichum*, *Eurybia*, *Doellingeria*, etc). Many other genera from this family are important to generalist and specialist bees.

Goldenrods have sticky pollen that do not become airborne and are not responsible for pollen allergies! Instead pollen allergies are often caused by ragweed.

Solidago	common name	
caesia	Blue-stemmed Goldenrod	under 3 ft. tall, sulphur-yellow flowers, a well-behaved woodland species also suitable for garden plantings, tolerates dry shade
flexicaulis	Zigzag Goldenrod	over 4 ft. tall, spreading, tolerates dry shade, good for open woodlands
flexicaulis 'Variegata'	Variegated ...	yellow leaf patches can be an overkill!
nemoralis	Gray Goldenrod	smaller, later blooming than others and therefore one of the latest sources of nectar and pollen,
odora	Sweet Goldenrod	dry open woods, colonists drank a tea made from <i>Solidago odora</i> and <i>Ceanothus americanus</i>
<u>rigida</u>	Stiff Goldenrod	over 5 ft. tall, clump-forming, good foliage-flower contrast, with flat-topped flower clusters, prefers moist soil, a good garden plant
rugosa	Wrinkle-leaved Goldenrod	reaches more than 8 ft. in height, spreading, important for its late bloom into November
rugosa 'Fireworks'	Fireworks ...	under 5 ft. tall, refined arching clumps, slowly spreading, prefers moist soil
sempervirens	Coast-Goldenrod	vigorous plants with fleshy foliage, tolerant of salt and drought, perfect for coastal plantings
<u>speciosa</u>	Showy Goldenrod	an attractive goldenrod that is adaptable to dryer locations, woodland edges, sandy meadows

Solidago sphacelata with the very compact garden variety 'Golden Fleece' is native west and south of Virginia.

Alien species found in the nursery trade:

S. virgaurea (syn. *S. brachystachys*) is from Eurasia, and some garden varieties (Golden Baby, Baby Sun) are hybrids of unknown parentage that are best avoided in native plantings.

Recommended native Sunflowers:

Some of the sunflower species barely reach the north-east in their northern limits.

Helianthus	common name	
decapetalus	Ten-petaled Sunflower	floodplains and forest edges, prefers evenly moist soil
divaricatus	Woodland Sunflower	more tolerant of dry and sandy soil and partial shade;
giganteus	Tall Sunflower	reaches NY
strumosus	Pale-leaved Sunflower	found in forests, meadows and fields, adaptable

While the Field-Sunflower (*Helianthus annuus*) is an American plant and like corn was spread around on the continent by native Americans, it is not native to the north-east. It is probably still a suitable plant for the specialist bees that occur in the North-east as they are largely the same species as further south. The same is true for the Tuberous Sunflower (*H. tuberosus* / Jerusalem Artichoke).

Further Plants of high value for insect gardens (additional to those above):

Woody plants important to specialist bees:

Swida (formerly Cornus)	Dogwood	
Ceanothus americanus	New Jersey Tea	
Ilex	Winterberry, Inkberry	
Rhododendron	Rhododendron and Azalea	

Herbaceous plants important to specialist bees:

Agalinis	Gerardia	Oenothera	Evening Primrose
Calystegia	False Bindweed	Packera	Groundsel
Campanula	Bellflower	Penstemon	Beardtongue
Cirsium	Thistle	Phacelia	Scorpion-weed
Claytonia	Spring-beauty	Polemonium	Jacob's-ladder
Erythronium	Trout-lily	Pontederia	Pickerel Weed
Geranium	Cranesbill	Potentilla	Cinquefoil
Helenium	Sneezeweed	Rudbeckia	Black-eyed Susan

Heuchera	Coral Bells	Uvularia	Bellwort
Hibiscus	Rose-mallow	Verbena	Vervain
Houstonia	Bluet	Viola	Violet
Lysimachia	Loosestrive	Zizia	Golden Alexanders
Monarda	Bee Balm		

Native and alien Violets:

Viola	
<i>Native Viola species in New England:</i>	flowercolor:
blanda, primulifolia	white
pubescens, rotundifolia	yellow
affinis, cucullata, nephrophylla, sagittata, selkirkii, sororia (widespread), palmata, pedata	blue
<i>Alien Viola species found in the nursery trade:</i>	
V. odorata, canina, palustris, and riviniana (which is sold by nurseries under the name V. labradorica!!!) as well as V. cornuta (Pansies)	

Native NE Lysimachia species:

These are food plants for Oil-collecting Bees (Macropis)

Lysimachia	
<i>Native Lysimachia species in New England:</i>	
ciliata	moist forests, floodplains, thickets
hybrida	as above
terrestris	swamps, marshes, wet meadows, lake shores
thyriflora	swamps, fens, shores
quadrifolia	woodlands, dry fields, roadsides
<i>Alien Lysimachia species found in the nursery trade:</i>	
vulgaris	flowers yellow and 1/2" wide, no red centers
nummularia	creeping

Pollinator plant lists for the North-East:

http://www.xerces.org/wp-content/uploads/2014/09/NortheastPlantList_web.pdf

https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_027028.pdf

Sources of information:

https://gobotany.newenglandwild.org/genus/Salix/	best regional plant information
http://www.bringingnaturehome.net/what-to-plant.html	links to Doug Tallamy's research
http://jarrodflower.com/specialist_bees.html	study about specialist bees
http://www.nativebeesofnewengland.com/	list of NE bee families and genera
https://www.sharpeatmanguides.com/	excellent bee images and information
http://greatpollinatorproject.org/	good introduction into bees
https://xerces.org/	resources to support pollinators
https://www.flickr.com/photos/usgsbiml/	focus-stacked bee images by S. Droege
https://crownbees.com/	information about hosting bees
http://www.illinoiswildflowers.info/	plants and their faunal associations
https://www.chicagobotanic.org/downloads/planteval_notes/no15_goldenrods.pdf	
https://bugguide.net/node/view/15740	insect and spider ID assistance
http://www.discoverlife.org/	identification guides and more
http://www.catalogueoflife.org/	listing of the worlds species

Effects of deer:

<https://academic.oup.com/aobpla/article/doi/10.1093/aobpla/plx047/4107548/A-regional-assessment-of-whitetailed-deer-effects>
<http://www.deerandforests.org/resources/northeast>

Books:

Ted Elliman and the New England Wildflower Society: Wildflowers of New England / Timber Press 2016
Donald J. Leopold: Native Plants of the Northeast / Timber Press 2005
Allen M. Armitage: Armitage's Native Plants for North American Gardens / Timber Press 2006
John Laird Farrar: Trees of the Northern Unites States and Canada / Iowa State University Press, 1995
Douglas W. Tallamy: Bringing Nature Home / Timber Press 2012
The Xerces Society: Attracting Native Pollinators / Storey Publishing 2011
Joseph S. Wilson & Olivia Messinger Carril: The Bees in Your Backyard / Princeton University Press 2016
Heather Holm: Pollinators of Native Plants / Pollination Press 2014
Heather Holm: Bees / Pollination Press 2017
Eric R. Eaton & Ken Kaufman: Field Guide to Insects of North America / Hillstar Editions L.C. 2007
Cyrill Harnischmacher: The Complete Guide to Macro and Close-Up Photography / Rocky Nook 2016

Further exciting reading:

Dave Goulson: Bee Quest searching for the rarest bees of the world

PS: you can order these books from your local bookstore, and will find some of them at the shop of Xerces.org, or the Garden and book store of the New England Wildflower Society in