

Gardening for Bees - or not!

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HONEY BEE

Scientific Classification: *Apis mellifera* (Family: Apidae)

Social Structure: Social insects with distinct castes: queen (fertile female), workers (non-fertile female), drones (males)

Nest Construction: Wax produced from glands of the body and drawn into hexagonal cells. Almost all hives currently are maintained by beekeepers; feral (wild) colonies originating from swarms may occur in aboveground cavities such as hollow trees or in wall voids of buildings.

Life Cycle: Colonies are perennial. Queens may live for several years, workers and drones for months. Workers and drones are produced continuously from mid-winter through late summer. Queens are produced periodically during this period, particularly in response to overcrowding or decline of the existing queen. New colonies are formed by colonies splitting (swarming), with a single queen leaving with a large percentage of the workers.

Feeding Habits: Nectar and pollen are the primary foods. Other sweet materials may sometimes be taken such as honeydew and sugary drinks.

Sting: Stinger of the workers is barbed and is pulled out in the act of stinging. Queens have a barbless stinger. As the stinger is a modified ovipositor possessed only by females, drones do not sting. Sting is quite painful.

The issue of having honey bees as a garden visitor can be a bit more complex than with some other insects found in gardens. These insects are well recognized for their highly beneficial activities as pollinators and as producers of highly valued products such as honey and bees wax. In this regard one may wish to provide plantings that are utilized by honey bees.

On the other hand they sting. And, although while foraging they are not aggressive and will not sting unless confined (perhaps accidentally), they do often produce anxiety. Large numbers of honey bees foraging as some sites may not be desired.

The following is a list of plants that are highly visited by bees - the "Bee List". It is followed by plants that are not visited by bees. These constitute the extremes among over 200 species of plants that were evaluated between 2006-2008.

Several plants are heavily visited by honey bees with plants in the families Lamiaceae, Asteraceae and Cleomaceae particularly well represented:

Table 1. The "Bee List" (Plants Highly Favored by Honey Bees)

<i>Agastache foeniculum</i>	<i>Allium tangiticum</i>
<i>Aster novae-angliae</i>	<i>Berkheya purpurea</i>
<i>Berlandiera lyrata</i>	<i>Bulbine frutescens</i>
<i>Calamintha nepeta ssp. glandulosa</i>	<i>Caryopteris 'Blue Mist Spirea'</i>
<i>Chamaebatiaria millefolium</i>	<i>Chrysanthemum serotinum 'Herbstern'</i>
<i>Cleome</i>	<i>Cotoneaster</i>

Echinops exalta
Ericameria nauseosa
Eryngium giganteum “Miss Willmott’s Ghost”
Gaillardia aristata
Geranium himalayense
Heliotropium
Kniphofia typhoides
Nepeta cataria
Origanum
Penstemon eatonii
Satureja montana
Sedum spectabile
Silphium laciniatum
Spirea x bumalda
Teucrium orientale
Tilia (linden, basswood)
Veronica longifolia “Lavender Charm”

Eremurus stenophyllus
Eriogonum jamesii
Euphorbia “Diamond Frost”
Geranium ‘Jolly Bee’
Helianthus ‘Lemon Queen’
Inula royleana
Malva alcea
Nepeta x fausonii
Ocimum
Origanum “Hopley’s Purple”
Salvia nemorosa
Scabiosa
Senecio
Solidago
Teucrium chamaedrys
Thymus kotschyanus
Veronica spicata ‘Sunny Border Blue’

Several plants are not visited by honey bees. Some plants are not normally pollinated by bees and do not suitably provide nectar or pollen. Other horticulturally modified plants may become non-attractive, such as cultivars with “doubled” blossoms.

Table 2. Plants not Visited by Honey Bees

<i>Acanthus hungaricus</i>	<i>Achillea filipendula</i> “Coronation Gold”
<i>Achillea millefolium</i> “Moonshine”	<i>Achillea ptarmica</i>
<i>Achillea taygetea</i>	<i>Alcea rugosa</i>
<i>Alyssum</i>	<i>Allium moly</i>
<i>Amaranthus caudatus</i>	<i>Ameria meritima</i> ‘Victor Reiter’
<i>Anemone coronaria</i>	<i>Anemone sylvestris</i>
<i>Angelonia</i>	<i>Anthemis tinctoria</i>
<i>Aquilegia caerulea</i>	<i>Aquilegia flavescens</i>
<i>Arabis</i>	<i>Argyranthemum</i>
<i>Artemesia</i> ‘Bwis Castle’	<i>Aster sericeus</i>
<i>Aster dumosus</i>	<i>Aster x Finalist</i>
<i>Begonia tuberhybrida</i>	<i>Brachycone</i>
<i>Callistephus chinensis</i>	<i>Camassia quamash</i>
<i>Campanula carpatica</i>	<i>Catharanthus roseus</i>
<i>Celosia</i> (most)	<i>Centranthus ruber</i>
<i>Cerastrium tomentosum</i> ‘Silver Cape’	<i>Chrysanthemum</i> (most)
<i>Clematis</i>	<i>Cornus kousa</i>
<i>Crossandra</i>	<i>Cosmos</i> (doubles)
<i>Dahlia</i> (doubled)	<i>Delosperma dyeri</i>
<i>Delosperma floribundum</i>	<i>Delosperma rugigenum</i>
<i>Delphinium</i>	<i>Dianthus</i> (most)
<i>Diascia integerrima</i>	<i>Eustoma</i>
<i>Galium verum</i>	<i>Ganzia krebsiana</i>

<i>Geranium (ivy)</i>	<i>Geranium richardsonii</i>
<i>Geranium sanguineum</i>	<i>Gomphrena globosa</i>
<i>Goodenia</i>	<i>Heuchera x bressingham</i>
<i>Helichrysum basalticum</i>	<i>Helleborus orientalis</i>
<i>Hosta</i>	<i>Hyacinthoides hispanica</i>
<i>Hypericum frondosum</i>	<i>Hypericum perforatum</i>
<i>Ismelia carinata</i>	<i>Lathyrus latifolius</i>
<i>Laurentia</i>	<i>Leucanthemum</i>
<i>Manicaria chamomilia</i>	<i>Mercardonia sp.</i>
<i>Miribilis multiflora</i>	<i>Nemesia fruticans</i>
<i>Nicotiana</i>	<i>Nierembergia</i>
<i>Nymphaea 'William McClane'</i>	<i>Oenothera missouriensis</i>
<i>Osteospermum barberiae compactivum</i>	<i>Penstemon pinifolius</i>
<i>Penstemon rostriflores</i>	<i>Penstemon 'Phoenix Violet, Red'</i>
<i>Petunia</i>	<i>Philadelphus cornonarius 'Silver Showers'</i>
<i>Phlox paniculata</i>	<i>Phlox subulata</i>
<i>Pinellia spp.</i>	<i>Platycodon</i>
<i>Polygonum</i>	<i>Portulaca (most)</i>
<i>Pycnanthemum</i>	<i>Rheum arstrale</i>
<i>Rudbeckia triloba</i>	<i>Rudbeckia "Denver Daisy"</i>
<i>Ruta graveolens</i>	<i>Sanvitalia</i>
<i>Scrophularia macranth</i>	<i>Stachys officinalis</i>
<i>Syringa villosa x reflexa</i>	<i>Teucrium lucidum</i>
<i>Verbena (all)</i>	<i>Veronica austriaca ssp. teucrium</i>
<i>Veronica pectinata</i>	<i>Veronicastrum virginicum</i>
<i>Vinca (all)</i>	<i>Viola (all)</i>

BUMBLE BEES

Scientific Classification: *Bombus* species (Family: Apidae/Subfamily: Bombinae)

Social Structure: Social insects with castes including queens (fertile female), workers (non-fertile female), drones (males). There is wide range in size of workers, sometimes described as being minor or major workers.

Nest Construction: Wax produced from abdominal glands drawn into jug-like containers. Nests are most often constructed below ground in abandoned rodent nests. Other sites of nesting might be stuffed furniture or walls with appropriate insulating debris of some sort.

Life Cycle: Colonies are annual. Fertilized queens are the only overwintering stage. Nest construction begins in spring. Since all rearing is done by the queen at this time the first bumble bees are almost all minor workers, quite small in size. After they emerge, the workers assist with colony functions and colonies increase rapidly. By late summer several hundred workers may be present and some fertile queens and drones are produced. These new queens mate and disperse, wintering in protected locations away from the nest. Drones and workers die at the end of the season and the colony dies out.

Feeding Habits: Nectar and pollen.

Sting: Queens and workers can sting, but the stinger is not barbed. Sting is quite painful.

Honey bees and bumble bees may both visit many of the same flowers. However, bumble bees can access the nectar/pollen from some plants that honey bees do not. Usually these are somewhat deeper flowers or that have their pollen resources more hidden. For example, bumble bees will visit many night shade family plants (Solanaceae) that are avoided by honey bees since bumble bees “buzz pollinate” and can shake the pollen from blossom. Some of the plants often visited by bumble bees include the following:

Plants Noted to be Most Heavily Visited by Bumble Bees

Agastache rupestris

Cuphea

Echinops

Nepeta

Perovskia atriplicifolia

Solidago

Veronicastrum virginicum

Anemone nemororosa

Echinacea purpurea

Hypericum frondosum

Penstemon x. mexicali

Sesili gummiferum

Symphylum officinale

SOLITARY BEES

LEAFCUTTER BEES

Scientific Classification: Family Megachilidae. Most common are *Megachile* species.

Another group are the mason bees (*Osmia* spp.)

Social Structure: Solitary insects with the female doing all nest construction and maintenance. Fertile females and males are produced.

Nest Construction: Nesting is done alone by the female which emerges in late spring; overwintering occurs as a larva within the nest cells. Nests usually are excavated out of soft, rotten wood or the pith of plants. However, they will nest in existing holes of the proper size, including holes in clay banks or stone walls. Some leafcutter bees are semidomesticated and are managed by providing them predrilled "bee boards".

After the nesting tunnels are constructed, the female cuts fragments of leaves or flower petals and uses them to line the tunnels. Individual nest cells are constructed in this manner, somewhat resembling cigar butts. The cells are filled with pollen and some nectar and sealed. A series of cells is produced in each tunnel.

The mason bees (*Osmia* spp.) similarly nest in holes excavated out of wood or pith. However, their cells are lined with mud and they do not cut leaf fragments.

The wool sower bee (*Anthidium manicatum*) nests in existing holes/cavities. The nest area is lined with plant hairs.

Life Cycle: Leafcutter bees have an annual life cycle, with one generation produced per year. Winter is spent as a full-grown larva in the cell. They pupate in spring and emerge in early summer.

Feeding Habits: Nectar and pollen.

Sting: Female leafcutter bees can sting, but are very non-aggressive and rarely do. The stinger is not barbed and is slightly painful.

THE "GROUND NESTING" BEES

Scientific Classification:

Acute-tongued burrowing bees: Family Andrenidae

Digger bees: Family Apidae (Subfamily Anthoporinae)

Sweat bees: Family Halictidae

Note: The following biology for these families is generalized

Social Structure: Solitary insects, but many individuals often nest in close proximity where soil conditions are favorable. Fertile females and males are produced.

Nest Construction: Nesting is done alone by the female; overwintering stage is a larva within the nest cell. Nests are constructed by digging in soil. Excavated tunnels branch and are lined with waxy or shellac-like material and some species re-use tunnels in subsequent generations. The females provision the nest cells with pollen and nectar.

Life Cycle: Digger bees have an annual life cycle, with one generation produced per year. Winter is spent as a full grown larva in the cell. They pupate in spring and emerge in early summer.

Feeding Habits: Nectar and pollen. Some species have highly specialized habits, e.g., certain digger bees solely visit cucurbits.

Sting: Female bees can sting, but are very non-aggressive and rarely do. The stinger is not barbed and is slightly painful. Occasional problems with sweat bees do occur, primarily related to their habit of visiting moisture, including sweat. This may cause them to sting when humans attempt to deter; the sting is momentarily mildly painful.

The Curious Case of the Wool Carder Bee

The wool carder bee, *Anthium manicatum*, is a member of the leafcutter bee family (Megachilidae). Members of this family are solitary bees, each female producing her own nest. The leafcutter bees either use existing cavities or excavate cavities out of soft materials (pith of plants, rotted wood, etc.).

The most common leafcutter bees then line the cavity with fragments of leaves they cut from plants and form into cells. However, the wool carder bee instead lines these cavities with plant hairs.

Therefore, one is likely to find the wool carder bee where one plants “woolly” leaved plants. Lamb’s ear (*Stachys*) is a particularly good plant to encourage the local activity of this insect.

Shelter/Nesting Needs of some Garden Insects

Insects that create nests have special shelter needs that also must be met if they are to be encouraged in a garden. This need is widespread among many of the bees and wasps. Among these are the following, along with the type of shelter that can assist their establishment.

Mason bees (*Osmia*). These are solitary bees in the leafcutter bee family, some of which have been heavily promoted as good, early season alternatives to honey bees for pollination of fruit crops. These bees create separate nesting cells through use of mud partitions. Nests that they use are existing cavities. These can be provided by use of predrilled wood blocks, with a diameter of about 1/4-3/8 inch. Alternately, bundled soda straws are useful for nesting.

Leafcutter bees (*Megachile*). These are the most commonly recognized of the leafcutter bee family as they produce characteristic semicircular leaf cuts when harvesting leaf fragments for nest construction. These will nest in predrilled wood, similar to the mason bees. They will also excavate their own cavities out of rotten, soft wood. Large diameter branches or stems of pithy plants may be used by some species.

Leafcutter bees (*Anthidium*). These leafcutter bees line existing cavities with plant hairs rather than leaf fragments.

Ground nesting bees (Andrenid bees, digger bees, sweat bees). Several groups of solitary bees nest in soil, rather than using aboveground cavities. Slope, soil texture, and surface debris are all critical in the selection of a nest site by these bees. It is difficult to develop a site that may be used by these bees; instead conservation of bee nesting sites that have been accepted and used by the bees is recommended.

Paper wasps (*Polistes*). These common social wasps can sting. However, they also have a tremendous appetite for many of the more important garden pest insects, notably caterpillars. The paper wasps for open-celled paper nests that hang and open downward. Nests are constructed in areas of shelter, typically some overhang (e.g., eaves) or in small cavities. Rough metal or wood surfaces are particularly acceptable by these insects.

Pith nesting hunting wasps. There are many common species of solitary hunting wasps in the family Sphecidae. These are docile (to humans) and specialize in certain insects. Each constructs their own nest, with some nesting in soil like the ground nesting bees. However, among the more common in yards/gardens are small wasps of the genus *Pemphredon*. These specialize in hunting aphids, which they paralyze and cache within the pith of plants. Old cane or other pithy plants provide excellent habitat for nesting. These will also nest in cut rose canes; their subsequent nesting is confined to the pith area and causes very little, if any, harm to the plant.

Mud daubers. The black-and-yellow mud dauber (*Sceliphron caementarium*) can be a fairly common insect that produces a unique mud nest in the form of tubes. These wasps hunt spiders, which they paralyze and cache in the mud nest. The presence of a muddy spot is need for nesting by these insects. Nests are commonly established on the sides of buildings under some overhang shelter.

Reference: *Nuisance Bees and Wasps*

Available online at: <http://www.ext.colostate.edu/PUBS/INSECT/05525.html>

A Note on Bee Mimics

There are several insects that will mimic bees and wasps. This mimicry may involve yellow and black or orange/black markings, which are generally used as warning colors. This mimicry may extend further, with some insects buzzing like bees or having a hairy appearance.

Most often insects that mimic bees are some kind of fly. The family Syrphidae, known as “flower flies” or syrphid flies, are particularly common in yards and gardens. However, certain beetles, moths and other insects may mimic a bee or wasp.

Known of these mimics can sting and all are harmless. The ability to sting is limited to female insects of the order Hymenoptera – the bees, wasps, and ants.