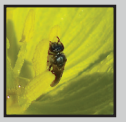
UH Honeybee Project

Pollinators in Hawaii

Most flowering plants rely on animal pollinators. Worldwide, there are over 200,000 species of animals involved in pollen transfer including birds, mammals, and insects, such as bees and flies. Animal assisted cross-pollination is often required to fertilize flowers and for fruit formation.

Natural ecosystems in Hawaii rely on the pollination services of native birds and insects, in particular the honeycreepers, and the yellow-faced bees. These pollinators tend to prefer the native flora, and some species display strong morphological and behavioral adaptations to native plant species; consequently, their contribution to crop pollination is minimal.



In Hawaii, introduced pollinators, especially the honeybee (*Apis mellifera*), play a crucial role in the sustainability and diversification of the local agriculture. The following information is a brief introduction to the most common species that occur in urban and agricultural landscapes.

Bee Pollinators

Honeybees

Honeybees are the most abundant social insect in Hawaii, and their contribution to crop pollination is undeniable. Honeybee populations have been decimated by the invasion of two bee pests: the varroa mite and the small hive beetle.

Honeybees on crops: winter melon (left) and sweet potato (right)

Carpenter bees

The term "carpenter bee" encompasses a group of bees that use their mandibles to excavate nests in wood. There are two types of carpenter bees in Hawaii which can be easily distinguished by their body size.

Large Carpenter bees

This large bodied bee is an excellent pollinator of large open flowers including melon and lilikoi. Females are solid black and males are completely golden. They tend to nest in groups, and can be destructive to man-made wooden structures. Carpenter bees are often deterred by painted surfaces, and their nests are often found in the unpainted underside of eaves.

Male carpenter bee (left) and female covered in pollen from zucchini (right)

Small Carpenter bees

The emerald carpenter bee is one of three species of small carpenter bees found in Hawaii. This little bee is a thorough pollen collector and is known to help pollinate cucurbits, legumes, and native plants, such as Naupaka, Ilima, and Ōhai. Small carpenter bees create nesting sites by chewing holes in woody stems or twigs. This nesting behavior may indirectly help native bees which utilize these cavities, but they also compete with native bees at flowers.

Emerald carpenter bee on hibiscus (left) and on Ilima (right)

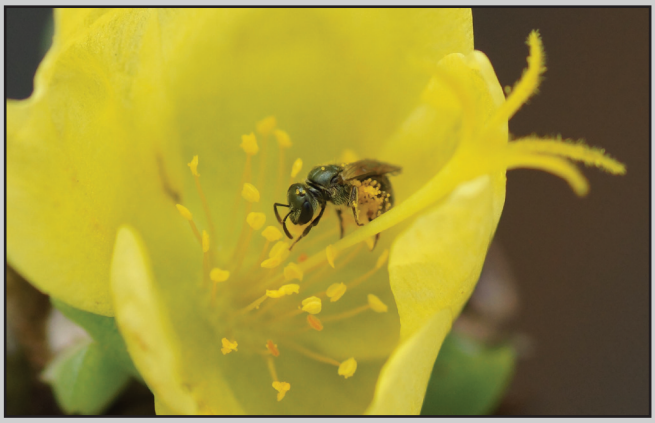
Leafcutter bees

Leafcutters are medium sized solitary bees that pollinate many crops. The underside of the abdomen on female bees of this group is covered in thick hairs, which serve them to carry pollen to their nests. They generally use crevices between rocks or pre-existing burrows in wood to build their nests. The nests are lined with plant bits that they cut from leaves use in nest building.

A Leafcutter bee cutting leave segments to build a nest (right), feeding on sunnhemp (top left) leafcutter with pollen on the abdominal hairs (bottom left)

Sweat bees

The three sweat bees in Hawaii are small in size. Sweat bees nest on the ground or in holes in branches. They are among the most common bees in urban areas in Hawaii. They will visit ornamental introduced plants as well as native plants in urban settings.



Sweat bee collecting pollen on ʻIhi Molokini - a native Hawaiian plant

Fly Pollinators

Flies are often overlooked when it comes to pollination services but are among the most common insect flower visitors. Flies play a role in the pollination of natural ecosystems, and are also known to pollinate many crop species, including many important local crops such as cacao, mango, tea, and onions.

One of the most abundant flower visitors in Hawaii's gardens are the syrphids, commonly called "hover flies" due to their characteristic flight pattern. Hover flies are variable in size and coloration – some are metallic green, and many have stripes, looking more like miniature wasps or bees. One important consideration with respect to hover flies is that their larvae, unlike other fly larvae, do not develop in water but rather live on plants, and eat insect pests such as aphids. Thus, having hover flies in your garden increases the pollinator abundance, diversity, and helps reduce pest problems.

Butterfly & Moth Pollinators

Butterflies and moths pollinate many garden plants. Butterflies are "flitty" - moving flower parts with their wings and switching quickly between flowers. This kind of behavior favors pollen transport. Moths, most of which are nocturnal, have elongated tongues that allow them to pollinate night blooming flowers or long lasting flowers with deep corollas.

Beetle Pollinators

Some beetles also contribute to pollination, in spite of being voracious pollen eaters. Scarab beetles, for example, have been observed visiting mango and soursop trees, as well as native plants such the Hawaiian poppy.

Wasp Pollinators and Pest Control

Wasps are often perceived as dangerous and undesirable, consequently, their role as pollinator and natural pest control system in agricultural systems tends to be overlooked. Wasps visit plants for 3 main reasons: the adult wasps feed on plant nectar, some take pollen to feed their larvae, and most search in the vegetation for insect prey to feed their larvae back at their nest. Thus, wasps can be very beneficial to the garden ecosystem. Unfortunately, some species of introduced wasps, such as yellowjackets, contribute little to pollination, and actively prey on local insects such as native yellow-faced bees.

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