



SELECTING PLANTS FOR POLLINATORS

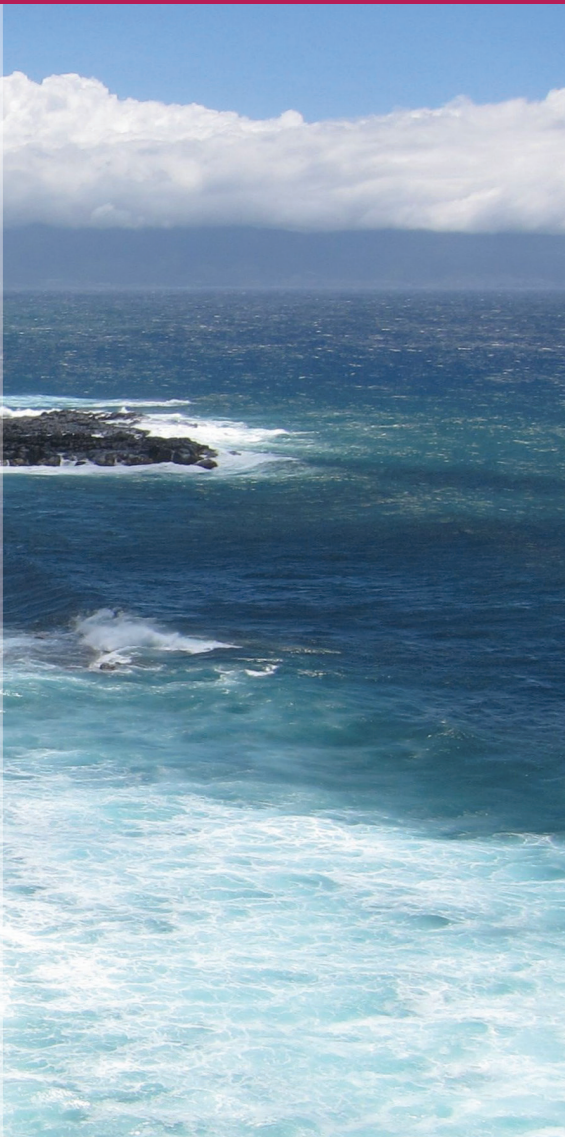


A REGIONAL GUIDE FOR FARMERS, LAND MANAGERS, AND GARDENERS IN THE



HAWAIIAN ISLANDS PROVINCE

INCLUDING THE
TROPICAL MOIST FOREST,
TROPICAL DRY FOREST,
AND
TROPICAL GRASSLAND
& SHRUBLAND



**POLLINATOR
PARTNERSHIP**

and
NAPPC

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This is one of several guides for different regions in the United States. We welcome your feedback to assist us in making future guides useful. Please contact us at feedback@pollinator.org

Cover photos:
Butterfly & Eleilei Bay courtesy Karl Magnacca,
Kauai mountains and taro fields
courtesy Lauren Rusert.

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FARMERS, LAND MANAGERS,
AND GARDENERS**

IN THE
ECOLOGICAL REGION OF THE
HAWAIIAN ISLANDS PROVINCE

INCLUDING THE
TROPICAL MOIST FOREST,
TROPICAL DRY FOREST,
AND
TROPICAL GRASSLAND & SHRUBLAND

A NAPPC AND POLLINATOR PARTNERSHIP PUBLICATION

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WHY SUPPORT POLLINATORS?

IN THEIR 1996 BOOK, *THE FORGOTTEN POLLINATORS*, Buchmann and Nabhan estimated that animal pollinators are needed for the reproduction of 90% of flowering plants and one third of human food crops. Each of us depends on these industrious pollinators in a practical way to provide us with the wide range of foods we eat. In addition, pollinators are part of the intricate web that supports the biological diversity in natural ecosystems that helps sustain our quality of life.

Abundant and healthy populations of pollinators can improve fruit set and quality, and increase fruit size. In farming situations this increases production per acre. In the wild, biodiversity increases and wildlife food sources increase.

Macadamia nuts, avocados, watermelon, guava, and coffee are some of the crops that rely on honey bees and native bees for pollination. Domestic honey bees pollinate approximately \$10 billion worth of crops in the U.S. each year.

Unfortunately, the numbers of both native pollinators and domesticated bee populations are declining. They are threatened by habitat loss, disease, and the excessive and inappropriate use of pesticides. The loss of commercial bees to Colony Collapse Disorder (CCD) has highlighted how severe the issues of proper hive management are to reduce stresses caused by disease, pesticide use, insufficient nutrition, and transportation practices. Currently, the pollination services that the commercial beekeeping industry provides are receiving much needed research and conservation resources. The efforts to understand the threats to commercial bees should help us understand other pollinators and their roles in the environment as well.

It is imperative that we take immediate steps to help pollinator populations thrive. The beauty of the situation is that by supporting pollinators' need for habitat, we support our own needs for food and support diversity in the natural world.

Thank you for taking time to consult this guide. By adding plants to your landscape that provide food and shelter for pollinators throughout their active seasons and by adopting pollinator friendly landscape practices, you can make a difference to both the pollinators and the people that rely on them.

Laurie Davies Adams
Executive Director
Pollinator Partnership

“
**FLOWERING PLANTS
ACROSS WILD, FARMED
AND EVEN URBAN
LANDSCAPES ACTUALLY
FEED THE TERRESTRIAL
WORLD, AND
POLLINATORS ARE THE
GREAT CONNECTORS
WHO ENABLE THIS GIANT
FOOD SYSTEM TO WORK
FOR ALL WHO EAT...
”
INCLUDING US.**

– ROGER LANG,
CHAIRMAN,
POLLINATOR PARTNERSHIP



THIS REGIONAL GUIDE IS just one in a series of plant selection tools designed to provide information on how individuals can influence pollinator populations through choices they make when they farm a plot of ground, manage large tracts of public land, or plant a garden. Each of us can have a positive impact by providing the essential habitat requirements for pollinators including food, water, shelter, and enough space to allow pollinators to raise their young.

Pollinators travel through the landscape without regard to property ownership or state boundaries. We've chosen to use R.G. Bailey's classification system to identify the geographic focus of this guide and to underscore the connections between climate and vegetation types that affect the diversity of pollinators in the environment.

Bailey's Ecoregions of the United States, developed by the United States Forest Service, is a system created as a management tool

and is used to predict responses to land management practices throughout large areas. This guide addresses pollinator-friendly land management practices in what is known as the Hawaiian Islands Province.

The Hawaiian Island Province comprises an area of 6,500 square miles with its topography varying greatly from the western sea-level plains to easterly mountainous terrain reaching heights of more than 13,000 feet.

The temperature in this province varies greatly by altitude, but maintains an average of 70-75° F year round. The climate also varies greatly by location—the windward sides of the islands experience heavy precipitation year round, while the leeward slopes are semiarid.

Hawaii is characterized by its tropical climate and volcanic history—all 9 islands are volcanoes at various stages of activity and decay. Due to its isolation and unique soil profile, the Hawaiian

Islands Province has a small but distinctive population of fauna. There are many native bird species, along with a few species of introduced mammals. The flora includes many endemic species, and major habitat types include shrublands, forests, bogs, and moss and lichen covered mountainsides and outcrops that vary according to elevation and wind exposure.

Long before there were homes, development, and invasive species in this area, the original, native vegetation provided continuous cover and adjacent feeding opportunities for wildlife, including pollinators. In choosing plants, aim to create habitat for pollinators that allow adequate food, shelter, and water sources. Most pollinators have very small home ranges. You can make a difference by understanding the vegetation patterns of the farm, forest, or neighbor's yard adjacent to you and by making planting choices that support the pollinators' need for food and shelter as they move through the landscape.

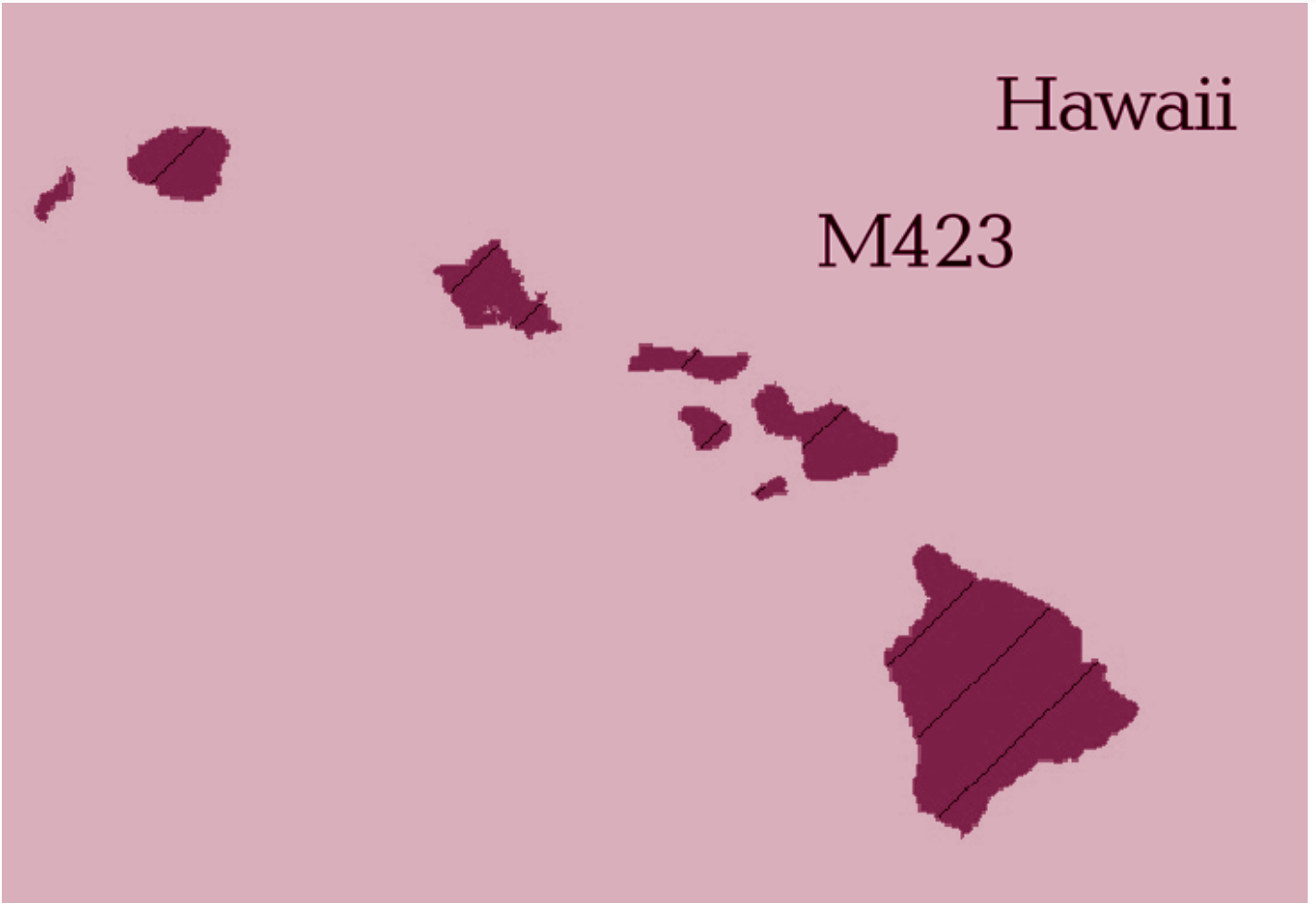


Photo courtesy Colleen Kwong

- ✿ This region is designated **M423** in the Baileys' Ecosystem Provinces. To see a map of the provinces go to: www.fs.fed.us/rm/ecoregions/products/map-ecoregions-united-states/.
- ✿ Not sure about which bioregion you live or work in? Go to www.pollinator.org and click on **Ecoregion Locator** for help.
- ✿ The Hawaiian Islands region covers 6,500 square miles.
- ✿ Primarily a hilly and mountainous region, all the islands are volcanoes in various stages of activity and decay.
- ✿ Elevations ranging from sea level to higher than 13,000 feet.
- ✿ Average annual temperature ranges from 70° to 75°F.
- ✿ Year-round precipitation can reach averages of 200 inches.
- ✿ USDA Hardiness Zones 9a-13a (2012 version).

CHARACTERISTICS

- ✿ The ohia tree, its accompanying ferns, and the koa tree predominate ecosystems unique to Hawaii's wet forests.
- ✿ Shrublands exist primarily on leeward mountainsides where rainfall is minimal.
- ✿ Bogs are common at higher elevations with heavy rainfall.
- ✿ Mosses and lichens survive even above the tree line, where frost is a frequent occurrence.
- ✿ The volcanic islands' surfaces vary from deep Ultisols on the older islands to igneous rock on the youngest islands.



The Hawaiian Islands Province includes:

The Tropical Moist Forest, Tropical Dry Forest, and Tropical Grassland and Shrubland

“ CREATING POLLINATOR HABITAT IS ONE PRACTICE WE MUST EMPLOY TO MITIGATE THE IMPACT OF NEW VIRAL AND PARASITIC PRESSURES ON HAWAII’S ENVIRONMENTALLY ISOLATED FERAL AND DOMESTICATED HONEY BEE POPULATIONS. ”

-- DAVE SCHELL, GM,
ISLAND PRINCESS MACADAMIA NUT COMPANY, KEA’AU, HAWAII,
OPERATIONS

MEET THE POLLINATORS



I'iwi bird

Photo courtesy Karl Magnacca



WHO ARE THE POLLINATORS?

BEES

Bees are well documented pollinators in the agricultural and natural systems of the Hawaiian Islands Province. A wide range of crops including Macadamia nuts, watermelon, guava, and coffee all benefit from bee pollination.

Most of us are familiar with the colonies of honey bees that have been the workhorses of agricultural pollination for years in the United States. They were imported to Hawaii from Europe about 150 years ago.

There are nearly 4000 species of native ground and twig nesting bees in the U.S. Some form colonies while others live and work a solitary life. Native bees currently pollinate many crops and can be encouraged to do more to support agricultural endeavors if their needs for nesting habitat are met and if suitable sources of nectar, pollen, and water are provided. Bees have tongues of varying lengths that help determine which flowers they can obtain nectar and pollen from.

The **sweat bee** (family *Halictidae*) nests underground. Various species are solitary while others form loose colonies.

Solitary bees include carpenter bees (*Xylocopa* spp.), which nest in wood; digger, or polyester bees (*Colletes* spp.), which nest underground; leafcutter bees

(*Megachile* spp.), which prefer dead trees or branches for their nest sites; and mason bees (*Osmia* spp.), which utilize cavities that they find in stems and dead wood.


BUTTERFLIES

Gardeners have been attracting butterflies to their gardens for some time. These insects tend to be eye-catching, as are the flowers that attract them. Position flowering plants where they have full sun and are protected from the wind. Also, you will need to provide open areas (e.g. bare earth, large stones) where butterflies may bask, and moist soil from which they may get needed minerals. By providing a safe place to eat and nest, gardeners can also support the pollination role that butterflies play in the landscape. It might mean accepting slight damage to the plants, known as host plants, that provide food for the larval stage of the butterfly.

A diverse group of butterflies are present in garden areas and woodland edges that provide bright flowers, water sources, and specific host plants. Numerous trees, shrubs, and herbaceous plants support butterfly populations.

Butterflies are in the Order *Lepidoptera*. Some of the species in the Hawaiian Islands Province are the Citrus Swallowtail, Painted Lady, Hawaiian Blue, and the King Kamehameha butterfly. They usually look for flowers that provide a good landing platform.

Wet mud areas provide butterflies



with both the moisture and minerals they need to stay healthy. Butterflies eat rotten fruit and even dung, so don't clean up all the messes in your garden!

MOTHS

Moths are most easily distinguished from butterflies by their antennae. Butterfly antennae are simple with a swelling at the end. Moth antennae differ from simple to featherlike, but never have a swelling at the tip. In addition, butterflies typically are active during the day; moths at night. Butterfly bodies are not very hairy, while moth bodies are quite hairy and more stout.

Moths, generally less colorful than butterflies, also play a role in pollination. They are attracted to flowers that are strongly sweet smelling, open in late afternoon or night, and are typically white or pale colored.

BEETLES

Over 30,000 species of beetles are found in the United States and many of them can be found on flower heads. Gardeners have yet to intentionally draw beetles to their gardens, possibly because beetle watching isn't as inspiring as butterfly or bird watching. Yet beetles do play a role in pollination. Some have a bad reputation because they can leave a mess behind, damaging plant parts that they eat. Beetles are not as efficient as some pollinators. They wander between different species, often dropping pollen as they go. Beetle pollinated plants tend to be

large, strong scented flowers with their sexual organs exposed. They are known to pollinate Magnolia, sweetshrub (*Calycanthus*), paw paws, and yellow pond lilies.

FLIES

It may be hard to imagine why one would want to attract flies to the garden. However, like beetles, the number of fly species and the fact that flies are generalist pollinators (visit many species of plants), should encourage us all to leave those flies alone and let them do their job as pollinators.

Recent research indicates that flies primarily pollinate small flowers that bloom under shade and in seasonally moist habitats. The National Research Council's *Status of Pollinators in North America* study states that flies are economically important as pollinators for a range of annual and bulbous ornamental flowers.

Plants pollinated by the fly include the American pawpaw (*Asimina triloba*), dead horse arum (*Helicodiceros muscivorus*), skunk cabbage (*Symplocarpus foetidus*), mango (*Mangifera indica*), lychee (*Litchi chinensis*), and members of the carrot family like Queen Anne's lace (*Daucus carota*).

BIRDS

The I'iwi bird is known to pollinate the Ohia tree. Like many Hawaiian honeycreepers, the I'iwi bird is nectarivorous. These birds use their pointy bills to collect and feed on nectar, pollinating as they move from

plant to plant.

The brightly colored and aptly named Hummingbird Moth often causes confusion; but there are no hummingbirds, either native or introduced, in the Hawaiian Islands Province.

However, hummingbirds are the primary birds which play a role in pollination in the rest of North America. Their long beaks and tongues draw nectar from tubular flowers. Pollen is carried on both the beaks and feathers of different hummingbirds. The regions closer to the tropics, with warmer climates, boast the largest number of hummingbird species and the greatest number of native plants to support the bird's need for food. White-winged doves (*Zenaidura asiatica*) are also pollinators of the saguaro cactus (*Carnegeia gigantea*) in the south central United States.

Bright colored tubular flowers attract hummingbirds to gardens throughout the United States. Hummingbirds can see the color red; bees cannot.

BATS

Though Hawaii's lone native bat, the Hawaiian Hoary Bat, is primarily an insectivore, bats play an important role in pollination in the mainland southwest where they feed on agave and cactus. The long-nosed bats' head shape and long tongue allows it to delve into flower blossoms and extract both pollen and nectar.

PLANT TRAITS

WHICH FLOWERS DO THE POLLINATORS PREFER?

NOT ALL POLLINATORS ARE found in each North American province, and some are more important in different parts of the United States. Use this page as a resource to understand the plants and pollinators where you live.

Plants can be grouped together based on the similar characteristics of their flowers. These floral characteristics can be useful to predict the type of pollination method or animal that is most effective for that group of plants. This association between floral characteristics and pollination method is called a pollination syndrome.

The interactions of animal pollinators and plants have influenced the evolution of both groups of organisms. A mutualistic relationship between the pollinator and the plant species helps the pollinator find necessary pollen and nectar sources and helps the plant reproduce by ensuring that pollen is carried from one flower to another.

Plant Trait	Bats	Bees	Beetles
Color	Dull white, green or purple	Bright white, yellow, blue, or UV	Dull white or green
Nectar guides	Absent	Present	Absent
Odor	Strong musty; emitted at night	Fresh, mild, pleasant	None to strongly fruity or fetid
Nectar	Abundant; somewhat hidden	Usually present	Sometimes present; not hidden
Pollen	Ample	Limited; often sticky and scented	Ample
Flower Shape	Regular; bowl shaped – closed during day	Shallow; have landing platform; tubular	Large bowl-like, Magnolia

This chart and more information on pollinator syndromes can be found at:



AND THE POLLINATORS THEY ATTRACT

Pollinator

Birds	Butterflies	Flies	Moths	Wind
Scarlet, orange, red or white	Bright, including red and purple	Pale and dull to dark brown or purple; flecked with translucent patches	Pale and dull red, purple, pink or white	Dull green, brown, or colorless; petals absent or reduced
Absent	Present	Absent	Absent	Absent
None	Faint but fresh	Putrid	Strong sweet; emitted at night	None
Ample; deeply hidden	Ample; deeply hidden	Usually absent	Ample; deeply hidden	None
Modest	Limited	Modest in amount	Limited	Abundant; small, smooth, and not sticky
Large funnel like; cups, strong perch support	Narrow tube with spur; wide landing pad	Shallow; funnel like or complex and trap-like	Regular; tubular without a lip	Regular; small and stigmas exerted

<http://www.fs.fed.us/wildflowers/pollinators/syndromes.shtml>



DEVELOPING LANDSCAPE PLANTINGS THAT PROVIDE POLLINATOR HABITAT

WHETHER YOU ARE A FARMER of many acres, land manager of a large tract of land, or a gardener with a small lot, you can increase the number of pollinators in your area by making conscious choices to include plants that provide essential habitat for bees, butterflies, moths, beetles, and other pollinators.

FOOD:

Flowers provide nectar (high in sugar and necessary amino acids) and pollen (high in protein) to pollinators.

Fermenting fallen fruits also provide food for bees, beetles and butterflies.

Specific plants, known as host plants, are eaten by the larvae of pollinators such as butterflies.

- Plant in groups to increase pollination efficiency. If a pollinator can visit the same type of flower over and over, it doesn't have to relearn how to enter the flower and can transfer pollen to the same species, instead of squandering the pollen on unreceptive flowers.
- Plant with bloom season in mind, providing food year round (see Bloom Periods pp. 16-17).
- Plant a diversity of plants to support a variety of pollinators. Flowers of different color, fragrance, and season of bloom on plants of different heights will attract different pollinator species and provide pollen and nectar throughout the seasons.

- Many herbs and annuals, although not native, are very good for pollinators. Mint, sage, basil, rosemary, oregano, lavender, garlic, and chives area just a few herbs that can be planted. Old fashioned zinnias, cosmos, and single sunflowers support bees and butterflies.
- Learn and utilize Integrated Pest Management (IPM) practices to address pest concerns. Minimize or eliminate the use of pesticides.

SHELTER:

Pollinators need protection from severe weather and from predators as well as sites for nesting and roosting.

- Incorporate different canopy layers in the landscape by planting trees, shrubs, and different-sized perennial plants.
- Leave dead snags for nesting sites of bees, and other dead plants and leaf litter for shelter.
- Build bee boxes to encourage solitary, non-aggressive bees to nest on your property.
- Leave some areas of soil uncovered to provide ground nesting pollinators easy access to underground tunnels.
- Group plantings so that pollinators can move safely through the landscape protected from predators.
- Include plants that are needed by butterflies during their larval development.

WATER:

A clean, reliable source of water is essential to pollinators.

- Natural and human-made water features such as running water, pools, ponds, and small containers of water provide drinking and bathing opportunities for pollinators.
- Ensure the water sources have a shallow or sloping side so the pollinators can easily approach the water without drowning.

Your current landscape probably includes many of these elements. Observe wildlife activity in your farm fields, woodlands, and gardens to determine what actions you can take to encourage other pollinators to feed and nest. Evaluate the placement of individual plants and water sources and use your knowledge of specific pollinator needs to guide your choice and placement of additional plants and other habitat elements. Minor changes by many individuals can positively impact the pollinator populations in your area. Watch for - and enjoy - the changes in your landscape!

- **CAUTION:** Remember that pesticides are largely toxic to pollinators. Extreme caution is warranted if you choose to use any pesticide. Strategically apply pesticides only for problematic target species. Read the label. Look for bee caution statements.



FARMS



Macadamia nuts, watermelon, guava, and coffee are a few of the food crops in the Hawaiian Islands Province that will benefit from strong native bee populations that boost pollination efficiency. Incorporate different plants throughout the farm that provide food for native populations when targeted crops are not in flower.

Farmers have many opportunities to incorporate pollinator-friendly land management practices on their land which will benefit the farmer in achieving his or her production goals:

- Manage the use of pesticides to reduce the impact on native pollinators. Spray when bees aren't active (just after dawn) and choose targeted ingredients.

- Carefully consider the use of herbicides.
- Minimize tillage to protect ground nesting pollinators.
- Ensure water sources are scattered throughout the landscape.
- Choose a variety of native plants to act as windbreaks, riparian buffers, and field borders throughout the farm.
- Plant unused areas of the farm with temporary cover crops that can provide food or with a variety of trees, shrubs, and flowers that provide both food and shelter for pollinators.
- Check with your local Natural Resources Conservation Service (NRCS) office to see what technical and financial support might be available to assist you in your effort to provide nectar, pollen, and larval food sources for pollinators on your farm.

“**ADDING NATIVE PLANTINGS TO IMPROVE POLLINATOR HABITAT MAKES SENSE IN ADVANCING OUR FAMILY FARM’S CONSERVATION AND ECONOMIC OBJECTIVES, ENHANCING BENEFICIAL WILDLIFE AND IMPROVING POLLINATION IN OUR ORCHARD AND GARDEN.**”

—LEE MCDANIEL,
FARMER AND PRESIDENT,
NATIONAL ASSOCIATION OF
CONSERVATION DISTRICTS



Photo Danielle Downey

PUBLIC LANDS

“HAWAII’S ISOLATION HAS FOSTERED UNIQUE ECOSYSTEMS. POLLINATOR CONSERVATION SUPPORTS THESE THREATENED COMMUNITIES AND IS ALSO INTEGRAL TO FOOD SECURITY, AN IMPORTANT ISLAND CONSIDERATION.”

-DANIELLE DOWNEY,
APICULTURE SPECIALIST,
HAWAII DEPARTMENT OF
AGRICULTURE



Photo Lauren Rusert

Public lands are maintained for specific reasons ranging from high impact recreation to conservation. In the Hawaiian Islands Province many ecosystems have been destroyed or modified to allow for the expansion of development, especially within the tourism industry. This includes the alteration of watersheds and other natural areas to allow for roads, buildings, marinas, and man-made landscapes. Less disturbed natural areas can be augmented with plantings of native plant species. Existing plantings around buildings and parking areas should be evaluated to determine if pollinator-friendly plants can be substituted or added to attract and support pollinators. Public land managers have a unique opportunity to use their plantings as an education tool to help others understand the importance of

pollinators in the environment through signs, brochures, and public programs.

In an effort to increase populations of pollinators the land manager can:

- Inventory and become knowledgeable of local pollinators.
- Provide connectivity between vegetation areas by creating corridors of perennials, shrubs, and trees that provide pollinators shelter and food as they move through the landscape.
- Maintain a minimum of lawn areas that support recreational needs.
- Restrict the use of pesticides and herbicides.
- Provide water sources in large open areas.
- Maintain natural meadows and openings that provide habitats for sun-loving wildflowers and grasses.
- Remove invasive species and encroaching shrubs and trees.



“ A GARDEN IS ONLY AS RICH AND BEAUTIFUL AS THE INTEGRAL HEALTH OF THE SYSTEM; POLLINATORS ARE ESSENTIAL TO THE SYSTEM - MAKE YOUR HOME THEIR HOME. ”

**-- DERRY MACBRIDE
NATIONAL AFFAIRS AND
LEGISLATION CHAIRWOMAN,
GARDEN CLUB OF AMERICA**

Gardeners have a wide array of plants to use in their gardens. Native plants, and plants developed by professional and amateur breeders can be found in garden centers, in catalogs, and on web-sites. Use your knowledge of pollinator needs to guide your choices.

- Choose a variety of plants that will provide nectar and pollen throughout the growing season.
- Resist the urge to have a totally manicured lawn and garden. Leave bare ground for ground nesting bees. Leave areas of dead wood and leaf litter for other insects.
- Strive to eliminate the use of all pesticides.
- Find local resources to help you in your efforts. Contact your local county extension agent or native plant society. Visit your regional botanic gardens and arboreta.

The scale of your plantings will vary but it is important to remember that you are trying to provide connectivity to the landscape adjacent to your property. Don't just look within your property boundaries. If your neighbor's property provides an essential element, such as water, which can be utilized by pollinators visiting your land, you may be able to devote more space to habitat elements that are missing nearby. It is best to use native plants which have evolved to support the needs of specific native pollinators. Some pollinators, however, are generalists and visit many different plants, both native and non-native. Be sure that any non-native plants you choose to use are not invasive. Remember that specialized cultivars sometimes aren't used by pollinators. Flowers that have been drastically altered, such as those that are double or a completely different color than the wild species, often prevent pollinators from finding and feeding on the flowers. In addition, some altered plants don't contain the same nectar and pollen resources that attract pollinators to the wild types.

- **CAUTION:** Take time to evaluate the source of your plant material. You want to ensure you get plants that are healthy and correctly identified. Your local native plant society can help you make informed decisions when searching for plants.



Photo Danielle Downey

PLANTS THAT ATTRACT POLLINATORS IN THE HAWAIIAN ISLANDS PROVINCE

The following chart lists plants that attract pollinators, are native to the Hawaiian Islands, and are available for purchase in the nursery trade. Not every plant listed is native to every Hawaiian Island, so try to select plants native to where they will be planted. This is not an exhaustive list, but provides guidance on where to start. Annuals, herbs, and cover crops provide food and shelter for pollinators, too. Unlike our other ecoregional planting guides, this particular guide includes plants that are rare, threatened, or endangered. Before purchasing plants, check for the official Department of Land and Natural resources tag that certifies that plants were collected and propagated legally.

Scientific Name	Common Name	Habit	Flower Color	Height (in feet)	Perennation and Bloom Period	Sun	Soil	Elevation (in feet)	Pollinators	Also a host
Forbs										
<i>Argemone glauca</i>	pua kala	Forb	White and Yellow	2-6'	Perennial	Full Sun	Well Drained	0-6200	bees, wasp	
<i>Astelia menziesiana</i>	pua'akuhinia	Forb	Purple, Red, White, and Yellow	1-6'	Perennial, April-June	Partial Sun - Shade	Well Drained	High wet forests only 2000-7000	bees, flies	
<i>Bacopa monnieri</i>	water hyssop	Forb	Pink, Purple, and White	<1'	Perennial, Year Round	Full Sun - Partial Shade	Moist	0-300	bees, flies	
<i>Bidens hawaiiensis</i>	ko'oko'olau	Forb/Subshrub	Yellow	2-6'	Perennial, Year Round	Full Sun	Moist	1600-4600	bees, flies (Bombilid bee flies)	
<i>Bidens torta</i>	ko'oko'olau	Forb/Subshrub	Yellow	4-10'	Perennial	Full Sun	Well Drained to Moist	650-4000	bees, flies (Bombilid bee flies)	
<i>Dianella sandwicensis</i>	'uki'uki	Forb	Light Blue to White	1-3'	Perennial, Year Round	Full Sun - Partial Shade	Dry to Moist	400-7000	bees, beetles	
<i>Heliotropium anomalum</i>	Polynesian heliotrope	Forb/Subshrub	Light Purple to White	<2'	Perennial, Year Round	Full Sun	Well Drained	Coastal	bees (small carpenter), small butterflies (skippers)	
<i>Heliotropium curassavicum</i>	salt heliotrope	Forb/Subshrub	Light Purple/Light Yellow to White	<2'	Annual or Perennial, Year Round	Full Sun	Well Drained	<6800	bees	
<i>Lipochaeta integrifolia (Melanthera integrifolia)</i>	nehe	Forb/Subshrub	Yellow	<1'	Perennial, Year Round	Full Sun - Partial Sun	Well Drained	<150	bee	
<i>Labellia hypoleuca</i>	opelu	Forb	Blue-Purple	6-12'	Perennial	Full Sun - Partial Shade	Dry-Moist	2000-5000	bee, moth (hummingbird moth), butterfly	
<i>Phyllostegia macrophylla</i>	Large leaved mint	Forb	White	3	Perennial	Shade	Well Drained - Moist	2400-4000'	bees, flies	
<i>Phytolacca sandwicensis</i>	Popolo ku mai-Hawaiian pokeweed	Forb	Pink, White	2-10+'	Perennial	Partial Sun	Well Drained-Wet, Moist	2200-6500	flies	
<i>Portulaca lutea</i>	native yellow purslane	Forb	Yellow	1'	Perennial, July-November	Full Sun	Well Drained	0-130	bees, flower flies	
<i>Portulaca molokiniensis</i>	'ihi	Forb	Yellow	1-1.5'	Perennial, Year Round	Full Sun	Well Drained	0-1000	bees, flower flies	
<i>Portulaca sclerocarpa</i>	'ihi makole	Forb	White - Pink	>1'	Perennial, Year Round	Full Sun - Partial Sun	Well Drained	3300-5300	bees, flower flies	
<i>Portulaca villosa</i>	hairy purslane	Forb	White	1-2.5'	Perennial, Year Round	Full Sun	Well Drained	0-2000	bees, flower flies	
<i>Scaevola coriacea</i>	dwarf naupaka	Forb/Subshrub	White	<2'	Perennial, Year Round	Full Sun	Well Drained	0-150	bees, flies, moth (with a long tongue)	
<i>Sesuvium portulacastrum</i>	shoreline seapurslane	Forb	Pink	<1'	Perennial, Year Round	Full Sun	Well Drained to Wet	0-150	bees, flies	
<i>Waltheria indica</i>	'uhaloa	Forb/Subshrub	Yellow	Up to 6'	Perennial	Full Sun	Well Drained to Moist	0-4000	bees, butterflies	
Vines										
<i>Bidens cosmoides</i>	ko'oko'olau	Vine/Forb	Yellow	Vine	Perennial, Year Round	Full Sun - Partial Sun	Moist	High elevation	Birds, flies (bee flies), bees	

(continued on page 17)

Scientific Name	Common Name	Habit	Flower Color	Height (in feet)	Perennation and Bloom Period	Sun	Soil	Elevation (in feet)	Pollinators	Also a host
<i>Canavalia galeata</i>	'awikiwiki	Vine/Forb	Pink-Purple	Vine	Perennial	Partial Sun	Moist	600-2600	bees	
<i>Canavalia hawaiiensis</i>	puakauhi	Vine/Forb	Pink-Purple	Vine	Perennial	Full Sun – Partial Sun	Moist	0-1000	bees	
<i>Canavalia kauaiensis</i>	Kauai jackbean	Vine/Forb	Pink	Vine	Perennial	Filtered	Well Drained - Moist	600 - 2600	bees	
<i>Canavalia pubescens</i>	lavafield jackbean	Vine/Forb	Pink-Purple	Vine	Perennial, Year Round	Full Sun – Partial Sun	Well Drained	0-2000	bees	
<i>Freycinetia arborea</i>	'ie'ie	Vine/Forb	Orange	Vine	Perennial, Year Round	Full Sun – Partial Sun	Well Drained - Moist	1000-5000	Birds, bees, wasps	beetles will likely eat pollen
<i>Ipomoea pes-caprae</i>	p huehue	Vine/Forb	Purple	Vine	Perennial, Year Round	Full Sun	Well Drained	0-2000	bees , flies	
<i>Jacquemontia ovalifolia</i>	pa' o Hi'iaka	Vine/Forb	Blue-White	Vine	Perennial, Year Round	Full Sun – Partial Sun	Well Drained	0-100	bees, flies	
<i>Smilax melastomifolia</i>	'hoi	Vine/Forb	White	Vine	Perennial	Shade	Well Drained - Wet	600-6800	bees, flies, moth	moth
<i>Vigna marina</i>	m hihih	Vine/Forb	Yellow	Vine	Perennial, Sporadic	Full Sun – Partial Sun	Well Drained	0-1000	bees	
Trees and Shrubs										
<i>Abutilon eremitopetalum</i>	hiddenpetal Indian mallow	Shrub	Green-Red	2'-10'	Perennial, February	Full Sun – Partial Sun	Well Drained	700-1700	bees, birds, butterflies	
<i>Abutilon menziesii</i>	ko'olua 'ula	Shrub	Pink-Red/Yellow	2'-10'	Perennial, Year Round	Full Sun – Partial Sun	Well Drained	650-1700	birds, butterflies, bees	
<i>Acacia koa</i>	koa	Tree	Yellow	15'- > 50'	Perennial, January-March	Full Sun - Partial Sun	Well Drained	200-6500	bees, flies	
<i>Acacia koaia</i>	koai'a	Tree	Yellow	76'-96'	Perennial, January-March	Full Sun - Partial Sun	Well Drained	150-4000	bees, flies	
<i>Alyxia stellata</i>	maile	Shrub/Vine	Green-White/ Yellow	2'-10'	Perennial, Fall, Winter	Full Sun – Partial Sun	Well Drained-Moist	150-5000	moths, bees	
<i>Antidesma platyphyllum</i>	Hame	Shrub/Tree	Green-White	15'-50'	Perennial, June-October	Partial Sun	Well Drained-Moist	1500-4000	bees, flies	
<i>Antidesma pulvinatum</i>	hame	Tree	Cream	15'-50'	Perennial, February-October	Full Sun – Partial Sun	Well Drained-Dry, Wet	0-5000	bees, flies	
<i>Artemisia mauiensis</i>	Maui wormwood	Shrub/Subshrub	Brown	2'-6'	Perennial	Full Sun – Partial Sun	Well Drained	6200-7500	bees, flies, butterflies, moths	
<i>Brighamia insignis</i>	'ālula	Shrub	Yellow	2'-15'	Perennial, September-October	Full Sun – Partial Sun	Well Drained	0-1300	moths, bees	
<i>Broussaia arguta</i>	kanawao	Shrub/Tree	Cream-Blue-Pink	6'-19'	Perennial	Partial Sun	Well Drained-Moist	1000-6000	bees, flies, wasps, moth	
<i>Caesalpinia kavaiensis</i>	'uhi'uhi	Tree	Pink-Red	10'-30'	Perennial, Year Round	Full Sun	Well Drained	250-3000	bees, moths	
<i>Capparis sandwichiana</i>	maiapilo	Shrub	White	2'-10'	Perennial, Spring-Summer	Full Sun	Well Drained	0-325	moths, bees	
<i>Cheirodendron trigynum</i>	'ōlapa	Tree	Purple	19'-57'	Perennial	Shade	Well Drained to Wet	1600-7000	birds, bees	
<i>Claoxylon sandwicense</i>	po'ola	Shrub	White- Pale Green	up to 8.5'	Perennial	Partial Sun – Partial Shade	Well Drained	Dry and mesic forests	bees, birds	
<i>Clermontia hawaiiensis</i>	'ohawai nui	Shrub	Green-White	2'-10'	Perennial, February-March and June-July	Partial Sun – Partial Shade	Moist	1000-5000	bees, birds	beetles will likely eat pollen
<i>Clermontia montis-loa</i>	'ohawai	Shrub	Pink-Purple	6-15'	Perennial, Year Round	Full Sun – Partial Shade	Well Drained - Moist	2500-6000	bees, birds	beetles will likely eat pollen
<i>Clermontia parviflora</i>	'ohawai	Shrub	Green-Purple-White	15'-30'	Perennial	Partial Sun	Well Drained-Moist	400-4600	bees, birds	beetles will likely eat pollen

(continued on page 18)

(continued from page 17)

PLANTS THAT ATTRACT POLLINATORS IN THE HAWAIIAN ISLANDS PROVINCE



Scientific Name	Common Name	Habit	Flower Color	Height (in feet)	Perennation and Bloom Period	Sun	Soil	Elevation (in feet)	Pollinators	Also a host
<i>Coprosma ernodeoides</i>	'aiakanene	Shrub	Cream-Yellow	2'-6'	Perennial, Spring-Summer	Full Sun – Partial Sun	Well Drained	4000-8500	wind pollinated (bees and moths will visit)	
<i>Coprosma pubens</i>	pilo	Tree	White	10-30'	Perennial	Full Sun – Filtered Sun	Well Drained - Wet	1200-6200	wind pollinated (bees and moths will visit)	
<i>Cyrtandra platyphylla</i>	'ilihia	Shrub	White	3'	Perennial	Shade	Well Drained - Moist	1200-4500	flies	
<i>Delissea rhytidospema</i>	Kauai delissea	Shrub	Green-White	2-10'	Perennial, June-December	Partial Sun	Well Drained-Moist	980-3300	bird, moth, bee	
<i>Diospyros hillebrandii</i>	elama	Tree	Cream	15-50'	Perennial	Partial Sun – Shade	Well Drained	490-2500	bee, fly	
<i>Diospyros sandwicensis</i>	lama	Tree	White	6-35'	Perennial, Year Round	Full Sun – Partial Sun	Well Drained	0-4000	bee, fly	
<i>Erythrina sandwicensis</i>	wili wili	Tree	Orange-White-Yellow	15-50'	Perennial, Spring-Summer	Full Sun	Well Drained	0-1950	bird, butterfly, moth, bee	
<i>Euphorbia celastroides</i> var. <i>kaenana</i>	'akoko	Shrub/Tree	Brown/White	2-6'	Perennial, Year Round	Full Sun	Well Drained	0-1000	bee, fly, moth	
<i>Gardenia brighamii</i>	nā'ū	Shrub/Tree	White	6-30'	Perennial, Year Round	Full Sun	Well Drained	1100-1700	moth, bee	
<i>Gossypium tomentosum</i>	ma'ō	Shrub	Yellow	2-6'	Perennial, Year Round	Full Sun	Well Drained	<400	bee, moth, butterfly	
<i>Hibiscus amottianus</i>	O'ahu koki'o ke'oke'o	Shrub/Tree	White	10-50'	Perennial, Year Round	Full Sun – Partial Sun	Well Drained-Moist	390-2500	bird, moth, bee	
<i>Hibiscus brackenridgei</i>	ma'ō hau hele	Shrub/Tree	Yellow	2-10'	Perennial, February-May	Full Sun – Partial Sun	Well Drained	400-2600	bird, moth, bee	
<i>Hibiscus clayi</i>	koki'o 'ula	Shrub/Tree	Red	10-30'	Perennial, Year Round	Full Sun – Partial Sun	Well Drained	150-2000	bird, moth, bee	
<i>Hibiscus kokio</i>	koki'o	Shrub/Tree	Red, Orange, Yellow	2-50'	Perennial, Year Round	Full Sun – Partial Sun	Well Drained	500-3000	bird, moth, bee	
<i>Hibiscus waimeae</i>	Kaua'i koki'o ke'oke'o	Shrub/Tree	White	10-50'	Perennial, Year Round	Full Sun – Partial Sun	Well Drained	2000-3000	bird, moth, bee	
<i>Ilex anomala</i>	kawa'ū	Shrub/Tree	White	10-50'	Perennial	Full Sun – Partial Sun	Well Drained-Moist	2000-4500	bee, fly	
<i>Kadua affinis</i>	manono	Tree/Shrub/Vine	Green, Purple	6-30'	Perennial	Partial Sun	Well Drained-Moist	850-6690	moth	
<i>Metrosideros polymorpha</i>	'ohi'a lehua	Shrub/Tree	Red, Pink, Orange, Yellow	2-50+'	Perennial, Year Round	Full Sun – Partial Sun	Well Drained Dry and Moist	0 - 7200+	bird, wasp, bee	
<i>Myoporum sandwicense</i>	naio	Shrub/Tree	White-Pink	2-50+'	Perennial, Year Round	Full Sun	Well Drained	0 - 7700+	fly, bee	
<i>Myrsine lessertiana</i>	kolea lau nui	Shrub/Tree	Pink-Purple	15-30'	Perennial, Year Round	Full Sun – Partial Sun	Well Drained	700-7200+	moth, fly, bee	
<i>Myrsine sandwicensis</i>	kokea lau li'i	Shrub/Tree	Pink	13-25'	Perennial	Full Sun – Partial Sun	Well Drained - Moist/Wet	1000-4800	fly, moth, bee	
<i>Nesoluma polynescicum</i> (<i>Sideroxylon polynescicum</i>)	keahi	Shrub/Tree	Green-White	6-50'	Perennial, May-September	Full Sun – Partial Sun	Well Drained	425-2100	fly, moth, bee	
<i>Nestegis sandwicensis</i>	olopua	Shrub/Tree	White, Yellow	30-50+'	Perennial	Full Sun – Partial Sun	Well Drained	100-4265	bee, fly	
<i>Ochrosia compta</i>	holei	Tree	White	15-50'	Perennial, Year Round	Full Sun – Partial Sun	Well Drained	975-1625	moth	
<i>Osteomeles anthyllidifolia</i>	'ūlei	Shrub	White	2-30'	Perennial, Spring, Winter	Full Sun – Partial Sun	Well Drained	0-7600	bees, flies	
<i>Perrottetia sandwicensis</i>	olomea	Shrub/Tree	Red	6-50'	Perennial, Year Round	Partial Sun – Shade	Well Drained-Wet	1000-4000	flies	
<i>Pisonia sandwicensis</i>	aulu	Tree	Brown-White	30-50'	Perennial, June, July, August	Full Sun – Partial Sun	Well Drained	850-3400+	bees, flies	
<i>Pisonia umbellifera</i>	pāpala kēpau	Shrub/Tree	White, Pink	10-50'	Perennial	Full Sun – Partial Sun	Well Drained	295-2625	moth, fly, bee	
<i>Pittosporum confertiflorum</i>	ho'awa	Shrub/Tree	White, Cream	2-50'	Perennial	Full Sun – Partial Sun	Well Drained	550-7000	moth, fly, bee	

(continued on page 19)

Scientific Name	Common Name	Habit	Flower Color	Height (in feet)	Perennation and Bloom Period	Sun	Soil	Elevation (in feet)	Pollinators	Also a host
<i>Pittosporum glabrum</i>	ho'awa	Tree	White, Cream	15-30'	Perennial, Year Round	Full Sun – Partial Sun	Well Drained-Moist	785-6465	moth, fly, bee	
<i>Pittosporum hawaiiense</i>	ho'awa	Tree	Cream	10-25'	Perennial	Full Sun – Partial Sun	Well Drained-Moist/Wet	1700-6000	moth, fly, bee	
<i>Pittosporum hosmeri</i>	ho'awa	Tree	White, Cream	10-30'	Perennial, Year Round	Full Sun – Partial Sun	Well Drained	1200-3500	moth, fly, bee	
<i>Polyscias hawaiiensis</i>	'ohe'ohe	Tree	Red	15-50+'	Perennial	Full Sun – Partial Sun	Well Drained-Moist	500-3500	fly, moth	
<i>Polyscias racemosa</i>	false 'ohe	Tree	Red, Yellow	15-30'	Perennial, Year Round	Full Sun – Partial Sun	Well Drained	395-1300+	fly, moth	
<i>Polyscias sandwicensis</i>	'ohe makai	Tree	Purple	15-50+'	Perennial, Fall	Full Sun – Partial Sun	Well Drained	100-2600+	fly, moth	
<i>Pritchardia</i> spp.	loulu	Tree	Yellow	15-60'	Perennial	Full Sun	Well Drained	Variable	fly	
<i>Psychotria greenwelliae</i>	kōpiko nui	Tree	White	15'	Perennial	Full Sun – Partial Sun	Well Drained - Moist	2000 - 4000	fly, bee, moth	
<i>Psychotria mariniana</i>	kōpiko	Tree	White	15-50+'	Perennial, Year Round	Full Sun – Partial Sun	Well Drained-Moist	200-4000	moth, bee, fly	
<i>Psychotria mauianensis</i>	'opiko	Shrub/Tree	White-Green	10-45'	Perennial	Partial Sun	Moist	500-5000	fly, bee, moth	
<i>Psydrax odorata</i>	alaha'e	Shrub/Tree	White	10-50'	Perennial, Year Round	Full Sun – Partial Sun	Well Drained	0-2700	moth, bee, fly	
<i>Rhus sandwicensis</i>	neneleau	Tree	White	6-30'	Perennial	Full Sun – Partial Sun	Well Drained-Moist	500-2500	bees, flies, honey bee favorite	
<i>Rubus hawaiiensis</i>	'akala	Subshrub	Pink	6-10'	Perennial, April-July	Full Sun – Partial Sun	Moist	2000-10000	bees	
<i>Rumex giganteus</i>	wet forest dock Pawale	Subshrub/Shrub	Pink-Red	Up to 6.5'	Perennial	Full Sun	Mesic-Wet	2000-10000	bee, fly, butterfly	
<i>Rumex skottsbergii</i>	pawale	Subshrub/Shrub	Cream-Green	3-5'	Perennial	Full Sun	Well Drained	Variable	bee, fly, moth	
<i>Santalum paniculatum</i>	dry-mesic 'iliahi	Shrub/Tree	Green to Yellow and Orange/Brown	10-35'	Perennial, Year Round	Full Sun – Partial Sun	Well Drained-Moist	1500-6500	bee, fly	
<i>Santalum freycinetianum</i>	'iliahi	Shrub/Tree	Red, Pink	2-50'	Perennial, Year Round	Full Sun – Partial Sun	Well Drained-Moist	800-3000	butterfly, bee, bird	
<i>Sapindus oahuensis</i>	lonomea	Shrub/Tree	White	30-50+'	Perennial, Spring, Summer and Winter	Full Sun – Partial Sun	Well Drained	200-2000	bee, fly, moth	
<i>Scaevola chamissoniana</i>	mountain naupaka (Puna)	Shrub/Tree	White	2-10'	Perennial, Year Round	Full Sun – Partial Sun	Well Drained-Moist	1500-3500	fly, bee, moth	
<i>Scaevola gaudichaudiana</i>	naupaka kuahiwi	Shrub	White	2-30'	Perennial, Year Round	Partial Sun-Shade	Well Drained-Moist	555-2600	fly, bee, moth	
<i>Scaevola kilaueae</i>	huahekili uka	Shrub	White	2-10'	Perennial	Full Sun	Well Drained	3000-5000	fly, bee, moth	
<i>Scaevola sericea</i>	beach naupaka	Shrub	White	2-10'	Perennial, Year Round	Full Sun	Well Drained	Coastal	fly, bee, moth	
<i>Sesbania tomentosa</i>	'ohai	Shrub	Orange, Red, Yellow	2-30'	Perennial, Year Round	Full Sun – Partial Sun	Well Drained	< 2500	bird, bee	
<i>Sophora chrysophylla</i>	mamani	Shrub/Tree	Yellow	6-50'	Perennial, July-November	Full Sun – Partial Sun	Well Drained	1400-10000+	bird, bee	
<i>Styphelia tameiameiae</i>	pūkiawe	Shrub	Yellow	Up to 15'	Perennial	Full Sun	Well Drained to Wet	0-10000	bees, flies	
<i>Vaccinium calycinum</i>	ohelo kau la'au	Shrub	Pink	2-30'	Perennial, Year Round	Full Sun – Partial Sun	Well Drained-Wet, Moist	1600-5800	bees, flies	
<i>Vaccinium reticulatum</i>	ohelo 'ai	Shrub	Red	2-10'	Perennial, Year Round	Full Sun – Partial Sun	Well Drained-Moist	2100-12000	bees, flies	
<i>Vitex rotundifolia</i>	pōhinahina	Shrub	Blue, Purple	2-10'	Perennial, Year Round	Full Sun	Well Drained	0-50	bee, butterfly	
<i>Wikstroemia sandwicensis</i>	Mesic Tree Akia	Shrub/Tree	Green, Yellow	2-10'	Perennial, Fall-Winter	Filtered Sun	Well Drained - Wet	10 - 5000	butterfly, moth, bee	
<i>Wikstroemia phillyreifolia</i>	Hawai'i 'ākia	Shrub/Tree	Yellow	2-15'	Perennial	Full Sun	Well Drained	0-7500+	butterfly, moth, bee	
<i>Wikstroemia uva-ursi</i>	hillside false ohelo	Shrub	Yellow	2-6'	Perennial, Fall-Winter	Full Sun – Partial Sun	Well Drained	0-1375+	moth, butterfly	

BEE-POLLINATED PLANTS OF THE HAWAIIAN ISLANDS PROVINCE

Common Bee-Pollinated Ornamentals and Crops				
	Large Carpenter	Small Carpenter	Leafcutter	Yellow-faced
FLOWERS				
Aster	x	x	x	x
Beebalm			x	
Black-eyed Susan	x		x	
Catnip		x		x
Coneflower	x		x	
Cow parsley				x
Goldenrod		x	x	x
Irises	x			
Lavender	x		x	
Morning glory		x		
Oregano		x		x
Passion flowers	x		x	
Penstemon	x		x	
Phacelia		x	x	
Potentilla				x
Rose	x	x		x
Rosemary	x		x	x
Sage	x		x	
Salvia	x		x	
Saxifrage				x
Sorrel		x		
Sunflowers	x	x	x	
Verbena			x	
Yarrow		x	x	x

Common Bee-Pollinated Ornamentals and Crops				
	Large Carpenter	Small Carpenter	Leafcutter	Yellow-faced
CROPS				
Eggplant	x			
Cucumber	x			
Squash	x			
Pumpkins	x			
Gourds	x			
Tomatoes	x			
Thyme			x	
TROPICAL FRUITS				
Citrus		x	x	
Cherimoya		x		
Durian	x			
Eucalyptus	x	x	x	x
Guava		x		x
Loquat		x	x	
Lychee		x	x	
Macadamia nut			x	x
Mango		x	x	
Mangosteen		x		x
Palms		x		
Passion fruit	x		x	
Rambutan		x		x
Soursop		x		
Starfruit		x		x
Surinam cherry			x	

Wild honey bee on *bidens* sp. courtesy Kim Dillman



“CONSERVE HAWAII’S UNIQUE NATIVE PLANTS BY INCLUDING THEM IN HOME LANDSCAPING. NATIVE PLANTS ADD BEAUTY, VARIETY AND FOOD SOURCES FOR NATIVE POLLINATORS AND HONEY BEES.”

– KIM DILLMAN, BIG ISLAND PLANTS, VOLCANO, HAWAII



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HABITAT AND NESTING REQUIREMENTS OF NATIVE HAWAIIAN BEES

Large carpenter bees:

Soft dead wood, poplar, cottonwood or willow trunks and limbs, structural timbers including redwood. Depending on the species, there may be one or two brood cycles per year. These bees can be active all day even in the hottest weather.

Small carpenter bees:

Pithy stems including roses and blackberry canes. These bees are more active in the morning but can be found at other times.

Leafcutter bees:

Pre-existing circular tunnels of various diameters in dead but sound wood created by emerging beetles, some nest in the ground. Leave dead limbs and trees to support not just pollinators but other wildlife. Leafcutter bees can be seen foraging throughout the day even in hot weather.

Yellow-faced bees:

In dead stems. These bees are more active during morning hours.

BECOME FAMILIAR WITH POLLINATORS IN YOUR LANDSCAPE.

- ✿ Watch for activity throughout the day and the seasons.
- ✿ Keep a simple notebook of when and what comes to your garden.
NOTE: It is not necessary to identify each species when you first get started. Simply note if it is a bee that likes the yellow flower that blooms in the fall.
- ✿ Consult a local field guide or web site (www.pollinator.org) when you are ready to learn more details.

ADD NATIVE PLANTS TO ATTRACT MORE NATIVE POLLINATORS.

- ✿ List the plants you currently have in your landscape.
- ✿ Determine when you need additional flowers to provide nectar and pollen throughout the growing season.
- ✿ Add plants that provide additional seasons of bloom, create variable heights for shelter, and attract the types of pollinators you want.
- ✿ Don't forget to include host plants that provide food and shelter for larval development.
- ✿ Contact your local native plant society or extension agent for more help.

USE POLLINATOR FRIENDLY LANDSCAPE PRACTICES TO SUPPORT THE POLLINATORS YOU ATTRACT.

- ✿ Use Integrated Pest Management Practices to address pest concerns.
- ✿ Tolerate a little mess – leave dead snags and leaf litter, keep areas bare for ground nesting pollinators, and leave some weeds that provide food for pollinators.
- ✿ Provide safe access to clean water.

NOTICE THE CHANGES THAT YOU HAVE HELPED TO CREATE!

“MONARCH BUTTERFLIES NEVER FAIL TO CATCH THE VISITOR’S EYE AND ALWAYS LEAD TO A TEACHABLE MOMENT.”

-- LOGAN LEE,
PRAIRIE SUPERVISOR
MIDWIN NATIONAL
TALLGRASS PRAIRIE



RESOURCES

Many books, websites, and people were consulted to gather information for this guide. Use this list as a starting point to learn more about pollinators and plants in your area.

BAILEY'S ECOREGION MAPS

USDA Forest Service

http://www.fs.fed.us/land/ecosysmgmt/ecoreg1_home.html

POLLINATION/POLLINATORS

Pollinator Partnership

www.pollinator.org

Natural Resources Conservation Service

www.nrcs.usda.gov

North American Pollinator Protection Campaign

www.nappc.org

USDA Forest Service

www.fs.fed.us/wildflowers/pollinators/

Wild Farm Alliance

www.wildfarmalliance.org

The Xerces Society

www.xerces.org

Illinois Natural History Survey

www.inhs.uiuc.edu

Buchmann, S.L. and G.P. Nabhan. 1997. *The Forgotten Pollinators*. Island Press: Washington, DC.

Committee on the Status of Pollinators in North America. 2007. *Status of Pollinators in North America*. The National Academies Press: Washington, DC.

NATIVE PLANTS

Plant Pono

www.plantpono.org/

Plant Conservation Alliance

www.nps.gov/plants

Lady Bird Johnson Wildflower Center

www.wildflower.org/plants/

USDA Hardiness Zone Map

www.usna.usda/Hardzone/

USDA, NRCS. 2007. The PLANTS Database

www.plants.usda.gov, 19 July, 2007
National Plant Data Center,
Baton Rouge, LA 70874-4490 USA

NATIVE BEES

National Sustainable Information Service

"Alternative Pollinators: Native Bees" by Lane Greer, NCAT Agriculture Specialist, Published 1999, ATTRA Publication #IP126
www.attra.ncat.org/attra-pub/nativebee.html

Agriculture Research Service

Plants Attractive to Native Bees table
www.ars.usda.gov/Research/docs.htm?docid=12052

BUTTERFLIES AND MOTHS

Opler, Paul A., Harry Pavulaan, Ray E. Stanford, Michael Pogue, coordinators. 2006. *Butterflies and Moths of North America*. Bozeman, MT: NBII Mountain Prairie Information Node.
www.butterfliesandmoths.org/
(Version 07192007)

Pyle, Robert Michael. 1981. *National Audubon Society Field Guide to Butterflies*. Alfred A. Knopf: New York, NY.

North American Butterfly Association

www.naba.org

FEEDBACK

We need your help to create better guides for other parts of North America. Please e-mail your input to feedback@pollinator.org or fax to 415-362-3070.

✿ How will you use this guide?

✿ Do you find the directions clear? If not, please tell us what is unclear.

✿ Is there any information you feel is missing from the guide?

✿ Any other comments?

**THANK YOU
FOR TAKING
THE TIME TO HELP!**

**POLLINATOR
PARTNERSHIP**



NAPPC



Plant Conservation Alliance



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