



12 Under-appreciated Beneficial Insects In Texas Gulf Coast Gardens

When we think of insects that are beneficial to our gardens, the most common that quickly come to mind are lady bugs, earthworms, dragonflies, lacewings, bees, and butterflies. Nature, however, provides an enchanted cadre of other beneficials that you may not know about or possibly don't recognize.

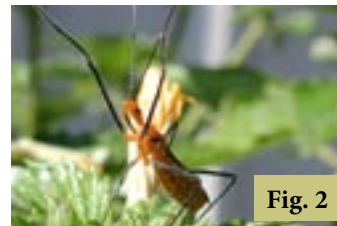
This educational pictorial guide will provide information on twelve underappreciated yet extremely industrious beneficials currently at work in our Galveston County gardens and landscapes. Do not confuse these with true insect pests. These lesser known beneficials are natural enemies of many unwanted garden pests and provide non-toxic, biological control for the "bad" garden pests and they help to reduce the need for pesticides. Unless otherwise noted, the size description below applies to the adult insect.

Did you know that we have 1,367 preserved insect specimens in our Entomology (Insect) Collection maintained at the Galveston County AgriLife Extension Office in La Marque? Visit our office or make an appointment to bring a group to view preserved and mounted specimens of the beneficial insects discussed in the publication.

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MILKWEED ASSASSIN BUG

Size: ½ to ¾ inch

Order: Hemiptera

Family: Reduviidae

Genus/Species: *Zelus longipes*

Active: Throughout the year during mild Gulf Coast winters

The milkweed assassin bug is sometimes confused with the milkweed bug (*Oncopeltus fasciatus*). It is also called the long-legged assassin bug. It is found throughout Texas Gulf Coast region. The milkweed assassin bug is a generalist predator and significant as a predator of important economic pests such as the fall armyworm, the Asian citrus psyllid, and the genista broom moth. They also prey on aphids, mosquitoes, houseflies and stinkbugs. While not a threat to humans, if not handled properly, a *Z. longipes* 'bite' can cause a burning sensation with swelling that may last for several days.

Adults are bright orange and black in color. Nymphs (Fig. 3) as well adults have pear-shaped heads, constricted necks and long hairy legs. They have piercing mouthparts. *Zelus longipes* catches its prey using the "sticky trap strategy." Like many ambush bugs, *Z. longipes* typically attacks prey after hiding inside foliage with its forelegs raised in the air. The forelegs of *Z. longipes* are covered with a viscous material that acts as glue, trapping the prey. *Z. longipes* then rapidly paralyzes its prey by inserting its needle-like stylets into the host body. *Z. longipes* can feed on prey that may be up to six times their own size.



Fig. 4

Also known as a mason wasp. Males have a five-sided spot on their face (Fig. 4) that is white to slightly yellow in color. Females have reddish coloration in the same area. Their body segments alternate between black and red (Fig. 5). Adults feed on nectar of flowers and are minor pollinators. The female red and black mason wasp will create nests for their offspring in hollow stems of plants, but prefers to recycle old mud dauber nests. When the nest is near completion the female collects several hairless or near-hairless caterpillars and beetle larvae (Fig. 4). The female wasp paralyzes her prey by stinging to supply her young in the nest with food. She then lays an egg on one of the paralyzed



Fig. 5



Fig. 6

RED & BLACK MASON WASP

Size: ½ inch
 Order: Hymenoptera
 Family: Vespidae
 Genus/Species: *Pachodynerus erynnis*
 Active Time: Summer (June - September)

caterpillars and, when hatched, the larval stage feeds on this caterpillar. Typical prey of the red and black mason wasp includes the very damaging Noctuidae caterpillars such as cutworms, cabbage loopers, armyworms and corn earworms. Red and black mason wasps are solitary and do not defend their nests. They are not aggressive unless mishandled. This wasp is sometimes confused with a potter wasp (*Eumenes fraternus*); however the *Pachodynerus erynnis* is the only red-marked species of *Pachodynerus* to occur in the United States. This wasp is plentiful throughout the Galveston-Houston region, but not well recognized.



Fig. 7

Hover flies are also known as flower flies, hover bee, or syrphid flies. Hover flies mimic the look of small bees or wasps with yellow and black striped abdomens; the whitish or greenish slug-like (maggot) larvae are tapered toward the heads (Fig. 8 & 9) and develop into pear-shaped pupae. Adults are less than ½ inch, larva ⅛ to ¼ inch. Adult hover flies are attracted to flowers to feed on nectar and pollen (Fig. 7). They also feed on honeydew produced by aphids. The larvae feed on aphids, thrips, caterpillars, mealybugs, scale, leafhoppers, and corn earworms in tight places where other beneficials can't go, and are especially helpful in early spring before other beneficial insects are active. Hover flies are remarkably abundant in the Texas Upper Gulf region and very



Fig. 8



Fig. 9

HOVER FLY

Size: less than ½ inch
 Order: Diptera
 Family: Syrphidae
 Genus/Species: Several including *Allograpta obliqua* and *Toxomerus geminatus*
 Active Time: Spring through Fall

likely to be overlooked/misidentified by gardeners. Adult males have a unique hovering and darting habit with shorter antennae than wasps. They commonly raise and lower their abdomen when resting and have two wings whereas bees and wasps have four. Wings are held out to the side at rest, bees fold theirs in. Hover flies can remain perfectly motionless in air where bees and wasps bob up and down. Hover flies do not bite or sting. Adults are attracted to flower and ornamental gardens, vegetable crops, especially cole crops and sweet corn, where females are likely to lay eggs among insect pets. Attract these insect friends with sweet alyssum, dill, fennel, yarrow, daisies, coreopsis and scabiosa.



Fig. 10



Fig. 11



Fig. 12

ROBBER FLY

Size: ½ to ¾ inch

Order: Diptera

Family: Asilidae

Genus/Species: *Laphria* spp., *Diogmites* spp. and others

Active Time: Summer

Robber flies are voracious predators of a wide variety of pests: beetle grubs, mosquitoes, wasps, grasshoppers, leafhoppers, wasps, houseflies and others. Some species of robber flies are called “Bearded Robber Flies” because of the many stiff hairs located around the mouthparts (Fig. 11). At least 250 species of this insect live in Texas. The most commonly seen of the species have gray, brown or black bodies (Fig. 10). Adults have a large head, prominent eyes and proboscis, a bristly humped thorax, long legs, and a thin tapering abdomen. Some resemble bumble bees. They are true flies (Order: Diptera, having two wings). The charac-

teristic that distinguishes them from other flies is a hollow space between their two large eyes. Most family members have a long, narrow, tapering abdomen containing segments. They piercing mouthparts (Fig 12). The six legs are usually long, bristled, and strong for grabbing and holding prey. The life cycle of the robber fly is a complete metamorphosis. Robber flies overwinter as larvae and pupate in the soil. As the weather warms up, the puparia migrate to the surface and emerge as adults. The entire life cycle takes at least a year. Robber flies are among the few insects that catch their prey in mid-flight.



Fig. 13



Fig. 14



Fig. 15

PAPER WASP

Size: ¾ to 1 inch

Order: Hymenoptera

Family: Vespidae

Genus/Species: *Polistes* spp.

Active Time: Spring through Fall

Paper Wasps are also known as yellow jackets and are yellow and black wasps. When at rest, wings are folded and held out to the side versus over the back like other wasps. Nests are papery, slightly rounded, 4 inches or greater in diameter; they hang upside down. Paper wasp nests are open and cells are not covered with a cap (in an envelope). Paper wasps are social insects with queens, males and workers. Their habitat is sheltered spots under the eaves and overhangs of buildings, in barns, chicken houses and out buildings. Adults feed on flower nectar or fruit that has been pecked by birds. Wasp larvae are carnivorous and are fed moth and butterfly larvae that has been chewed up by adult

wasp workers. Paper wasps help control nuisance caterpillars of moths and butterflies. They forage during the day and rest at night on their nest.

Note: Texas yellow jackets are closely-related but different species and live in nests in the ground and are very aggressive. In late summer, queens stop laying eggs and the colony begins to decline. In the fall, mated female offspring of the queen seek overwintering sites such as old squirrel nests, dead palm leaves or garden debris. The remainder of the colony does not survive the winter.



Fig. 16



Fig. 17



Fig. 18

MEALYBUG DESTROYER

Size: 1/6 inch (adults and larvae)
 Order: Coleoptera
 Family: Coccinellidae
 Genus/Species: *Cryptolaemus montrouzieri*
 Active Time: In sunlight in warm weather

Adult and larvae Mealybug Destroyers feed on insect eggs and young larvae. Citrus mealy bugs are their favorite food but they will also eat aphids, scale and other soft-bodied small insects. Mealybug Destroyer larvae usually pierce and suck the contents from their prey. Older larvae and adults chew and consume their entire prey. Larvae are active, elongate, have long legs, and produce distinctive rows of white cottony waxy filaments.

The adult Mealybug Destroyer (Fig. 18) is small, measuring 3 – 4 mm (1/6 inch) long and is mostly dark brown or blackish with an orange-ish head and tail. Larvae grow up to 1.3 cm (1/2 inch) long and are covered with waxy white curls making it difficult

to see their legs. Larvae resemble, and are often mistaken to be, mealybugs except that they are larger and more active. The wax can be scraped off larvae to reveal the pale, alligator-shaped beetle larvae. *C. montrouzieri* eggs are yellow ovals and are laid among the cottony egg sacks of mealybugs. Pupation occurs in sheltered places on stems or other substrate. The mealybug destroyer undergoes complete metamorphosis and has about four generations per year. *C. montrouzieri* are most effective at controlling mealybugs when the mealybug population is high. *C. montrouzieri* is found throughout Galveston County and adults can overwinter if our winter is mild.



Fig. 19



Fig. 20



Fig. 21

TIGER BEETLES

Size: 1/4 to 3/4 inch
 Order: Coleoptera
 Family: Cicindelidae
 Genus/Species: Many
 Active Time: Summer

There are many species of this insect predator throughout the country. Two commonly occurring species in the Galveston-Houston region are *Megacephala carolinacarina* (Fig 19) and *Cicindela ocellata rectilatera* (Fig. 21). Adult size vary by species. Some species are grayish brown to black with white spots and markings on wing covers (elytra). Others are iridescent dark blue-green or bronze with other bright-colored markings. Adults have large bulging eyes, pointed mandibles and long antennae and legs. Tiger beetles have a narrow thorax which differentiates them from ground beetles whose head is wider than the thorax. The tiger beetle uses its long spindly legs to hold its body off the

ground. They are fast runners, strong fliers and make a buzzing sound. They have acute vision and wait for their prey to pass by, and then they lunge to grab their target (like a tiger). Tiger beetles are among the most recognizable beetles. Most species are active during sunny days and in sandy areas along the shores of rivers and streams. Adults and larvae eat many plant eating insects such as caterpillars, flies, grasshopper nymphs, and spiders. Ants are a favorite food. Adults are attracted to light at night. Don't use bug light traps as you will likely kill off tiger beetle populations in the area. Tiger beetles are closely related to ground beetles.

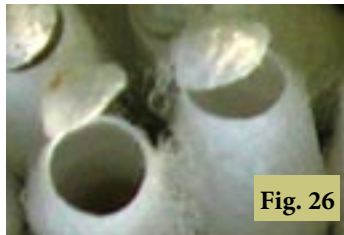


TEXAS LONG-LEGGED FLIES

Size: ¼ to 3/8 inch
 Order: Diptera
 Family: Dolichopodidae
 Genus/Species: *Condylostylus* spp.
 Active Time: Late Spring and Summer

These attractive shiny flies are small-slender to medium sized with metallic green, blue, or copper-colored bristly bodies and long legs. One description says they look like flying jewelry (Fig. 24). Wings are much longer than the body and are clear or marked with darker areas toward the wing tips. Mouthparts are for piercing (with a short proboscis). They live in lightly shaded areas, meadows, woodlands, ornamental and vegetable gardens in wet soil, rotten wood, bark, plant stems and around swamps and streams. Adults are general feeders. They are predaceous on

soft-bodied insects including thrips, aphids, larvae of many other small insects, and spider mites. Some feed on flower nectar. Larval stages are primarily aquatic or sub-aquatic. Immature stages of some species are believed to be scavengers. These insects are widespread across our region, but are seldom recognized.



BRACONID WASP ON HORNWORM

Size: less than 1/8 inch
 Order: Hymenoptera
 Family: Braconidae
 Genus/Species: *Cotesia congregatus*
 Active Time: Summer

The *Cotesia congregatus* wasp helps to keep hornworm populations in check. This insect is part of the Braconid family, which is made up of over 1000 species of tiny wasps that pose no threat to humans. Insects in this family act as parasitoids, which are organisms that spend most of their life attached in some way to their hosts, which will eventually die. Wasps in this family provide biological control for a number of harmful insect pests in gardens and landscapes including caterpillars, aphids, and other pests. *Cotesia congregatus* is less than 1/8 inch long, black with yellowish legs and clear wings (Fig. 27). The larval stage is the beneficial stage. It feeds on both tobacco and tomato hornworms (Fig 25). Hornworms found on tomatoes grown in the Texas Upper

Gulf Coast are very likely to be tobacco hornworms (Fig. 25) not tomato hornworms. The wasp lays its eggs just under the skin of the hornworm. Larvae feed on the insides of the hornworm, essentially eating it alive. When the juvenile wasps have matured, they chew through the skin of the hornworm, and spin their cocoons. The cocoons appear as white projections protruding from the hornworms body. If such projections are observed, the hornworms should be left in the garden to conserve the beneficial parasitoids. The wasps will kill the hornworms when they emerge from the cocoons (Fig.27) and will seek out other hornworms to parasitize.



This is another small Braconid wasp that is a parasitoid whose larval stage is the beneficial stage. It only feeds on aphids (Fig. 28). During their larval stage, most *Aphidius* spp. feed within the body of an aphid. These parasitoids work by laying eggs in aphids. They can lay 200 – 300 eggs into the body of a single aphid! The wasps' larvae hatch from the eggs, slowly weaken its host as it feeds and eventually kill its host from within (endoparasitism). The aphids then turn into "mummies" (Fig. 29) as the wasps pupate. The life-span of these parasitoids is roughly two weeks in their immature stages, then two weeks as adults. The conditions for optimum



BRACONID WASP ON APHIDS

Size: less than 1/8 inch
 Order: Hymenoptera
 Family: Aphidiidae *Aphidius matricariae*
 Genus/Species: *Aphidius colemani* and many other species
 Active Time: Spring to Fall

performance will be between 64 to 75°F with a relative humidity of around 80%. But these are optimum conditions and not necessarily a prerequisite of successful implementation. Significantly cooler or warmer temperatures and humidity fluctuations may hamper reproduction and development to a certain degree.



This solitary wasp has black or rusty brown and yellow markings. Wings are russet colored. It is the largest of all the various wasps. Females can sting but are rarely aggressive; males can't sting but are territorial defenders. They spend winters underground in the larval or pupae stage emerging only in summer when cicadas are active (usually July and August in Galveston County). Cicada killer tunnels are built in the ground and usually have a distinctive U-shaped collar of loose soil around the opening, about the size of a quarter. The first chamber is about a foot or so from the entrance. There are an average of 15 egg-shaped side chambers and a



CICADA KILLER WASP

Size: 1½ to 2 inch
 Order: Hymenoptera
 Family: Sphecidae
 Genus/Species: *Sphecius speciosus*
 Active Time: Summer

tunnel, each containing one to three paralyzed cicadas and an egg which hatches in two to three days. The grub-like wasp larva feeds for about 10 days, leaving only the cicada's outer shell. During the fall, the larva spins a silken case, shrinks, and prepares to overwinter. Development will be completed when wasps emerge next summer. Once the female lays her eggs, she closes the tunnel and flies away never to return. There is one generation each year. Adults eat nectar from summer flowers. Cicada killer wasps are active around lawns, vegetable gardens and oak trees.



Fig. 34



Fig. 35



Fig. 36

BARKLICE

Size: less than 1/8 to 1/4 inch depending on species
 Order: Psocoptera
 Family: Psocidae
 Genus/Species: *Archipsocus nomas*
 Active Time: Late : Summer on various hardwood trees

Also known as bark louse, tree cattle or bark cattle. There are two species common in Galveston County: *Archipsocus nomas* (Fig. 34) and *Cerastipsocus venosus*. *Archipsocus nomas* is more common. Adults are less than 1/8 inch long and are soft bodied resembling aphids. *Cerastipsocus venosus* are larger, about 1/4 inch long. Adults have shiny black wings, which are held in tent-like fashion over their abdomens and look like a brown lacewing. Nymphs appear dark gray and have pale yellow banding between abdominal segments. Adults and nymphs have round heads and conspicuous antennae. They are typically encountered in a colony. They

are communal web spinners. When disturbed they move in mass around the tree trunk and then return. When nature says it's time, bark lice form a silvery web on trunks of trees that look "ghostly" or like a silken glove. This usually occurs in the summer or fall after a long period of moisture or rain. This magically seems to happen overnight. The web lasts a few days then mystically disappears again. The web is not to trap prey, but to protect the bark louse while they feed. Bark lice feed on fungi, lichens, scale, aphids and other dead insects on the hardwood tree bark of oaks, pecans and other shade trees. They are not harmful to humans or animals.

ATTRACTING AND CONSERVING BENEFICIAL INSECTS

Barklice and Braconid Wasps, Mealybug Destroyers and Milkweed Assassin Bugs – not necessarily dinner conversation...

However, if you've read this article, you will better appreciate that not all entomos are bad and some are actually quite beautiful. We want to attract and conserve these beneficial insects. We need to include plants in our gardens that not only invite these friends to visit, but to make a home for them to ensure they stay around and help us control our specific horticultural habitat. So what do you do?

What you do is be smart. Decide what you want: a flower garden or a vegetable garden; fruit trees or Daturas; because defining a destructive critter is relative. A butterfly gardener and a citrus grower could come to heated disagreements over which is good and which is bad. Each one has a role in maintaining a specific ecosystem. Consequently, you need to provide an environment by choosing a variety of plants that bloom during their respective seasons. Start with integrating disease resistant plants and keep them healthy by knowing their culture; temperature, water, food, and air circulation. Mulch properly. Avoid over-fertilizing and over-watering as those two encourage aphids and mites and can potentially deter the development of the plant.

Okay, now that your garden is in order, what do you do when you are strolling around admiring your hard work and effort and suddenly see something inching its way along a plant? Do you immediately reach for that can of pesticide? Of course you don't as you employ Integrated Pest Management (IPM) practice. Instead, you take a moment and look closer. Is it a predator or parasitoid? Perhaps it's a pollinator or recycler/decomposer. You watch where this critter is headed and see exactly what it is doing on your plant. Then you think back to what you have read or seen in the past. What plant is it on? Is the plant healthy? Are there a lot of them or just one or two? If you're not sure, you take a picture and compare it with sources that are readily at hand.

Smacks of effort? Not really. Considering all of the time we spend nurturing our gardens, another fifteen minutes of identification seems worthwhile if we can increase our beneficial insect population. We need these to flourish as much we want our gardens to flourish. If we don't take care of them, they will go somewhere that will.

*Approved for publication by Dr. William M. Johnson, Galveston County Extension Agent - Horticulture & MG Program Coordinator
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