Beneficial Bugs

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I. What are beneficial bugs?

Insects that benefit humans by reducing the population of some organism considered to be a pest.

II. Why are beneficial bugs important to humans?

A. They can be a safe, non-toxic method of pest control

-help us reduce reliance on pesticides and have a more environmentally friendly garden

B. They are target specific

-most beneficials target a certain species or small group of species

-the downside—we must be sure we are using the right beneficial

III. Using Beneficial Bugs for Biological Control

A. Conservation of existing insects:

1. Restrict or eliminate the use of pesticides in the garden

-many insecticides are broad spectrum and kill beneficials too

-consider spot treatments if using pesticides

-use lower toxicity options like insecticidal soap or horticultural oil

2. Provide a variety of flowers in the garden, including natives

-many adult beneficials feed on nectar and pollen

-they need flowers all season

-they need a diversity of flowers

-native plants are sources of food for native beneficials

3. Provide a water source, if possible

-beneficial insects will need water

-be careful that it does not become a mosquito haven

B. Adding beneficials to the garden

1. Buy the right one for the problem

-they are target specific

-all beneficials are not created equal

2. Buy from a reputable company

3. Provide a healthy environment (water, alternate food, no pesticides)

4. Expect to buy more next year

-lab-reared insects may not be native and may die or move away

-these beneficials will not always reproduce in the garden

IV. Types of Beneficial Bugs

Predator: An insect that attacks, kills and feeds on another organism

-often larger than their prey and consume a large number of prey

-the young, the adult or both may be the predator

Parasitoid: An insect that spends the immature stage of its life, feeding and developing on another organism. The host is usually killed as the parasitoid reaches maturity.

A. Predators

Beetles

1. Common name: Lady beetles or Lady bugs
Common hosts: aphids, scale, mites, white fly, mealybug
Predator stage: larva and adult Alternate food for adults: nectar and pollen
Overwintering stage: adult

2. Common name: Ground beetles
Common hosts: soil-dwelling insects, snails, slugs, caterpillars
Predator stage: larva and adult
Overwintering stage: adult

3. Common name: Soldier beetles
Common hosts: aphids, grasshopper eggs, cucumber beetles, caterpillars
Predator stage: larva and adult (some) Alternate food for adults: nectar and pollen
Overwintering stage: larva or pupa depending on species

Lacewings

1. Common name: Green lacewings
Common hosts: aphids, mites, leafhoppers, caterpillars, mealybugs,
Predator stage: larva (and sometimes adult, depending on species)
Alternate food for adults: honeydew, nectar and pollen
Overwintering stage: pupa or adult (depending on species)

Flies

1. Common name: Hover flies (Syrphid flies, flower flies)
Common hosts: aphids, scale
Predator stage: larva Alternate food for adults: nectar and pollen
Overwintering stage: pupa

True bugs

1. Common name: spined soldier bugs (stink bugs)
Common hosts: caterpillars, larvae of leaf feeding beetles
Predator stage: nymph and adult
Overwintering stage: adults

2. Common name: Minute pirate bugs
Common hosts: spider mites, thrips, aphids, insect eggs
Predator stage: nymph and adult Alternate food for adults: pollen
Overwintering stage: adult

3. Common name: Assassin bugs
Common hosts: caterpillars, aphids, leaf feeding beetles
Predator stage: nymph and adult
Overwintering stage: nymph, adult or egg depending on species

Praying Mantids

1. Common name: Praying mantid (or mantis)
Common hosts: general feeders (also eat beneficials and each other)
Predator stage: Nymph and adult
Overwintering stage: eggs

Arachnids (spiders and mites)

1. Common name: Spiders
Common hosts: general feeders (depends on species of spider)
Predator stage: immature and adult

2. Common name: Predatory mites
Common hosts: small insects, insect eggs, other mites, nematodes
Predator stage: immature and adult Alternate food for adults: honeydew and pollen

B. Parasitoids

Wasps

1. Common name: Braconid wasps
Common hosts: caterpillars, flies, sawflies. borers, aphids and others
Stage at which host is attacked: usually larva (nymph), (eggs or adults sometimes)
Parasitizing process: Adult female inserts eggs into the host body using her long, sharp ovipositor; eggs hatch and larvae feed inside the host (some feed externally); most pupate on the outside of the host
Food for adults: nectar and pollen
Overwintering stage: larva or pupa

2. Common name: Ichneumonid wasps
Common hosts: caterpillars, sawflies. beetles (most species have a narrow host range)
Stage at which host is attacked: larva (nymph) or pupa
Parasitizing process: Adult female inserts eggs into the host body using a very long, threadlike ovipositor; eggs hatch and larvae feed inside the host; pupation occurs inside host
Food for adults: nectar, pollen, sometimes body fluids from hosts
Overwintering stage: larva or pupa

3. Common name: Chalcid wasps. (Well-known species in this group: *Trichogramma, Encarsia)*
Common hosts: wide range of host insects (some have a wide range of hosts, some narrow)
Stage at which host is attacked: egg or larva (nymph)
Parasitizing process: *Trichogramma* lays eggs in host eggs; parasitoid egg hatches into larva; larva eats host egg contents, pupates within host egg and emerges as an adult; *Encarsia* lays eggs in whitefly nymphs; parasitoid pupates in larva and emerges as an adult
Food for adults: body fluids from hosts
Overwintering stage: larva

Flies

1. Common name: Tachinid fly
Common hosts: caterpillars, beetles, sawflies, true bugs, grasshoppers
Stage at which host is attacked: larva (nymph) or adult
Parasitizing process: In many species, adult female lays eggs on plant foliage near the host; the eggs hatch and the host ingests the parasitoid larva during feeding; other species attach their eggs to the host and when they hatch, the maggots penetrate the host body. Some species have a piercing ovipositor to place eggs in host body.
Food for adults: nectar and honeydew
Overwintering stage: larva