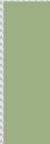




Beneficial Insects



Your best buddies for pest control

Convergent Lady Beetle

- ▶ Adults are generalist predators (especially aphids), also feed on chinch bugs, whiteflies, mites and many other soft-bodied insects and eggs that reside above the soil
- ▶ Usually purchased in the adult stage
- ▶ Each adult consumes about 5,000 aphids
- ▶ Within 8 to 10 days of release, each female lays 10-50 eggs daily on the underside of leaves
- ▶ In 2-5 days the larvae emerge
- ▶ The larvae eat 50-60 aphids per day.
- ▶ Optimum Temperatures: 62°-88°F
- ▶ Release at evening
- ▶ Provide water, prey



Soldier Beetles



- ▶ Adults eat mostly aphids
- ▶ Soil-dwelling larvae eat beetle & moth eggs & larvae
- ▶ Not commercially available



Ground Beetles

- ▶ Adults eat soil-dwelling insects like cutworms
- ▶ Larvae live in soil & leaf litter and eat any invertebrate
- ▶ Are predators of slugs
- ▶ Not commercially available



Green Lacewings



- ▶ Larvae feed on aphids, mealybugs, spider mites, leafhopper nymphs, moth eggs, scales, thrips and whiteflies..
- ▶ In gardens and greenhouses, release eggs at approximately 1,000 eggs per 2,000 sq. ft.
- ▶ Once the larvae emerge, they feed for 1-3 weeks before becoming adults. The adults are minor pollinators and eat pollen, honey, and nectar.
- ▶ To establish a preventative colony, release green lacewing eggs several times at intervals of at least one week. For best results, begin releasing at the beginning of each growing season at 1 - 2 week intervals.
- ▶ For severe infestations - Repeat releases every 7-14 days.

Parasitic Wasps



- ▶ Lots of different kinds

- ▶ Aphid Parasite (*Aphidius colemani*)

- ▶ Moth Egg Parasites (*Trichogramma platneri*)

Trichogramma parasitize the eggs of more than 200 pests, including borers, webworms, loopers, leafworms, fruitworms, cutworms, bollworms, and armyworms

- ▶ Commercially shipped as “mummies” or adults

- ▶ Lay eggs in aphids or caterpillars

- ▶ Larvae consume host



Syrphid Fly

- ▶ Larvae love aphids, also eat soft-bodied mealybugs, psyllids, and whiteflies
- ▶ Adults are great pollinators



Assassin Bugs

- ▶ Adults are generalist predators that feed on a variety of small to medium sized plant pests including aphids, mealybugs, small caterpillars, thrips and more.
- ▶ Begin feeding immediately after hatching, 2 month life span, stay in place
- ▶ Inject salivary fluids that digest the prey from the inside
- ▶ Intense burning feeling and an itchy bump at the site of the bite or sting.
- ▶ Pain and burning from such a bite is instant and extreme.
- ▶ Can cause anaphylactic shock, Chagas Disease



Minute Pirate Bugs



- ▶ Adults and nymphs feed on tiny insects, such as eggs & thrips
- ▶ Minute Pirate Bugs reproduce quickly, completing a total life cycle in just 3-4 weeks
- ▶ Will continue to kill even when they do not need to eat



Spiders

- ▶ Prey on insects & other pests
- ▶ May trap prey in webs (garden spider, orb weavers, common house spider)
- ▶ Others stalk & pounce on prey (jumping spiders, wolf spiders)



Beneficial Nematodes



- ▶ Parasitize insect pests that develop a larval or pupal stage in the soil
- ▶ Mix with water & spray
- ▶ *Steinernema glaseri* or *Heterorhabditis bacteriophora*
 - ▶ Often sold to control grubs & weevils in lawns
- ▶ *Steinernema feltiae*
 - ▶ Parasitizes mobile pests that include fungus gnats, ticks, thrips, leafminers, caterpillars, cutworms, sod webworms, onion maggots, subterranean termites and more.
 - ▶ Used for foliar and greenhouse applications
- ▶ *Steinernema carpocapsae*
 - ▶ Controls mobile pests such as fleas, caterpillars, cutworms, sod webworms, pill bugs, maggots, worker and soldier ants
 - ▶ Used outdoors & gardens



Good or Bad??



- ▶ **Praying Mantids**
 - ▶ Not selective in their prey – will eat good & bad bugs
- ▶ **Earwigs**
 - ▶ Eat aphids & other insects
 - ▶ Not good in vegetable garden, fruit or herbaceous flowering plants
 - ▶ Good in lawn & landscape



Sources



- ▶ **Beneficial Insectary**
 - ▶ Located in Redding
- ▶ [www. Insectary.com](http://www.Insectary.com)
- ▶ Greenmethods.com
- ▶ Arbico Organics



Other uses of beneficial insects

- ▶ Fly Parasites
- ▶ Natural enemies of invasive weeds
 - ▶ Yellow Star Thistle bud weevil
 - ▶ Puncture Vine weevil
 - ▶ Klamath Weed beetle
- ▶ Pollinators

