

# A Pocket Guide Common Natural Enemies of Crop and Garden Pests in the Pacific Northwest

EC 1613-E  
December 2007

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## Using this Guide

The cards in this guide are designed to help you quickly learn the main groups of natural enemies of crop and garden pests, their predacious activity, and tips for observing them. Photographs are of the most common species in the Pacific Northwest.

Use this guide as a field supplement to other publications that provide more detail on how to scout for and manage specific pests and natural enemies.

Print each sheet on regular paper or cardstock. Then fold on the central horizontal line and cut on the dotted orange lines to create three 2-sided cards. (Laminate if needed.)

Most of the photographs in this pocket guide are from the Ken Gray collection.

All other photographs are from the author.

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## Biological Control

Determine the relative populations of pests and natural enemies with preliminary monitoring. Then use the following tactics to enhance biological control as part of an IPM program.

- Protect natural enemies from disturbances such as pesticides, other management practices, their own natural enemies (e.g., ants), or adverse environmental conditions.
- Provide supplementary nectar or pollen sources, alternate hosts, or shelter.
- Manipulate the behaviors of natural enemies with attractants or with plant structure and arrangement.
- Augment natural enemy populations with mass releases of lab-reared individuals.
- Introduce natural enemies that are absent from the area.

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## General Observation Tips

- When doing visual counts, also inspect the undersides of leaves.
- Approach fast-moving insects slowly, or use nets, beating trays, and traps to get a closer look.

## Distinguishing Natural Enemies from Plant Pests in General

- Observe the specimen to see whether it feeds on animals or plants.
- To see whether a particular natural enemy attacks a target pest species, place individuals of both species together in an enclosed environment that allows them room to move.

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## Lady Beetles

(Coleoptera: Coccinellidae)

### Identification

Adults orange to red with black spots, or mostly black; larvae longer; eggs in clusters.

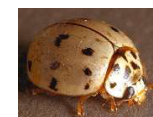


*Adalia bipunctata*

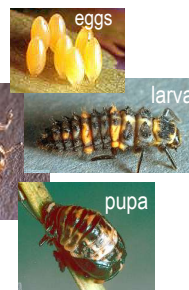
1/8 - 1/3"



*Coccinella novemnotata*



*Olla abdominalis*



*Hippodamia convergens*

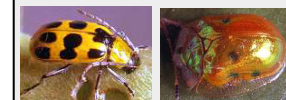
### Observation tips

All stages found on plants.

### Predacious activity

Adults and larvae prey on aphids, scale insects, mites, and other small insects.

### Similar beetles



Chrysomelid beetles

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## Green and Brown Lacewings

(Neuroptera: Chrysopidae and Hemerobiidae)

### Identification

Light green or brown, large wings, long antennae; larvae flat with long mouthparts; eggs on stalks.



Green lacewings, e.g., *Chrysopa californica*

### Observation tips

Adults often seen flying or on plants; eggs and larvae on plants.



Brown lacewings, e.g., *Hemerobius* spp.

### Predacious activity

Larvae and adults mostly prey on aphids, mealybugs, and other small insects.

1/2 - 3/4"

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## Predacious Hoverflies

1/2 - 3/4"

(Diptera: Syrphidae)

### Identification

Adults mimic wasps and bees, but fly more quickly and hover, often have yellow markings; larvae maggotlike; eggs small, whitish, and oblong.

### Observation tips

Eggs, larvae, and larlike excrement are found at aphid colonies; adults mostly on or hovering at flowers.

### Predacious activity

Larvae prey mostly on aphids and scale insects; adults feed on flower feeders; some species not predacious.

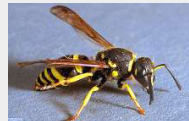
### Other insects confused with hoverflies



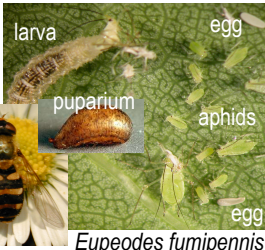
Bee flies



Bees



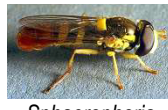
Wasps



*Eupeodes fumipennis*



*Scaeva pyrastris*



*Sphaerophoria sulphuripes*

## Parasitoid Tachinid Flies

(Diptera: Tachinidae)

1/3 - 2/3"

### Identification

Adults similar to houseflies, but with very long bristles on tail end; puparia red to brown and oblong; larvae inside host; eggs white and oblong on host.

### Parasitic activity

Important endoparasitoids of many worm, beetle, sawfly, and bug pests; populations can increase rapidly.

### Observation tips

Adults seen on flowers; look for eggs on host, puparia near host

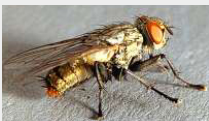
### Flies commonly confused with tachinids



House flies



Blow flies



Flesh flies

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## Ground or "Carabid" Beetles

(Coleoptera: Carabidae)

### Identification

Adults are dark or metallic with ridged wing covers; larvae grublike with large mandibles.

### Observation tips

Adults mostly active at night; look for fast-running adults under objects on soil surface or in soil samples, larvae in soil samples.

### Predacious activity

Prey mostly on soil organisms, some feed on seeds.

### Other beetles confused with carabids



Tenebrionid beetles



*Scaphinotus marginatus*



larva



*Pterostichus scitulus*

1/3 - 2"

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## Damselfly or "Nabid" Bugs

1/3 - 1/2"

(Hemiptera: Nabidae)

### Identification

Adults and nymphs long and thin with front legs slightly enlarged for grabbing prey.

### Observation tips

Most commonly found running on low, dense vegetation.

### Predacious activity

Adults and nymphs prey on other insects in same habitat.



*Nabis* spp. feeding on *Lygus* bugs

### Other bugs confused with nabid bugs



Some of the thinner mirid bugs



Assassin bugs



Stilt bugs

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## Rove Beetles

(Coleoptera: Staphylinidae)



*Leptacinus batychrus*



*Philonthus sordidus*

1/8 - 1/3"

### Identification

Adults small with short wing covers not covering abdomen.

### Predacious activity

Prey mostly on small soil organisms.

### Observation tips

Adults mostly active at night; look for fast-running adults under objects on soil surface or in soil samples.

### Insects confused with rove beetles



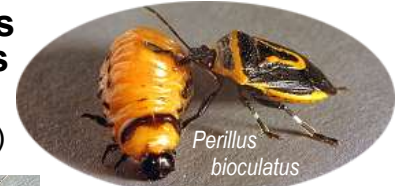
Earwigs (adults > 1/3")



Carion beetles

## Predacious Stink Bugs

(Hemiptera: Pentatomidae)



*Perillus bioculatus*

### Identification

Adults and nymphs have a broad pentagon or shield shape, usually brown or grey rather than green.

### Observation tips

Found on vegetation; may have to observe activity to determine whether the species is predacious or herbivorous.



*Brochymena* sp.

### Predacious activity

Adults and nymphs prey on other insects in same habitat.

### Similar-looking herbivorous stink bugs



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## Minute Pirate Bug

(Hemiptera: Anthocoridae)

### Identification

Adults with a black and white cross pattern; nymphs orange to dark red.

### Predacious activity

Adults and nymphs prey on other small insects in same habitat.



### Observation tips

Found on vegetation and flowers; more easily monitored with nets or beating trays due to small size.

### Other similar-looking small bugs



Big-eyed bug nymphs



Chinch bugs



Some plant bug nymphs

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## Big-eyed Bugs

(Hemiptera: Lygaeidae)

### Identification

Adults and nymphs with big eyes; fast-moving and slightly larger than minute pirate bugs.

### Observation tips

Found on vegetation or the ground; more easily monitored with nets or beating trays due to speedy flight and small size.



Geocoris pallens



### Predacious activity

Adults and nymphs prey on other small insects in same habitat.

### Other similar-looking small bugs



Chinch bugs



Some plant bug nymphs



Minute pirate bugs

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## Assassin Bugs

(Hemiptera: Reduviidae)

### Identification

Adults and nymphs resemble damsel bugs, but larger, with a wider abdomen, thinner neck, and often with spines.

### Predacious activity

Adults and nymphs prey on many types of insects in same habitat.



nymph



nymph

### Observation tips

Found on vegetation and flowers.

### Other bugs confused with assassin bugs



Damsel bugs



Ambush bugs



Stilt bugs

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## Ambush Bugs

(Hemiptera: Phymatidae)

### Identification

Adults and nymphs are often camouflaged like leaves and flowers to ambush prey.

### Observation tips

Found on flowers and vegetation.

### Predacious activity

Adults and nymphs prey on other insects in same habitat.



Phymata metcalfi



nymph

### Similar-looking bugs



Assassin bugs



Leaf-footed bugs



Alydid bugs

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## Tiger Beetles

(Coleoptera: Cicindellidae)

### Identification

Adults shiny with large eyes and mandibles; very fast runners and flyers.

### Observation tips

Adults usually seen flying over and running on light and sandy soils.

### Predacious activity

Adults and larvae prey on many types of insects in the same habitat.



Cicindela oregona



Cicindela longilabris columbiana

### Similar beetles



Soft-winged flower beetles



Ground beetles

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## Soldier Beetles

(Coleoptera: Cantharidae)

### Identification

Adults are long and thin with long antennae, often with red or orange markings.

### Observation tips

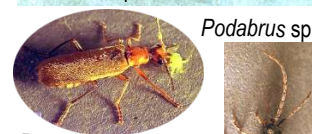
Found on leaves and flowers.

### Predacious activity

Adults prey on other insects in same habitat.



Cantharis sp.



Podabrus sp.

Podabrus cavicolis



Podabrus pruinosus

### Similar types of beetles



Soft-winged flower beetles



"Fireflies"

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## Thread-waisted Wasps

(Hymenoptera: Sphecidae)

### Identification

Stout-bodied to slender, often with a very narrow waist and wide head.

### Observation tips

Active near open sandy areas and flowers.



*Tropoxylon* sp.

1/4 - 2"



*Sceliphron caementarium*

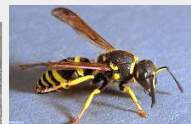
### Predacious activity

Many species specialize on various insect prey species. Females capture prey and bring back to larvae in nests.

### Other insects confused with thread-waisted wasps



Hoverflies



Vespid wasps

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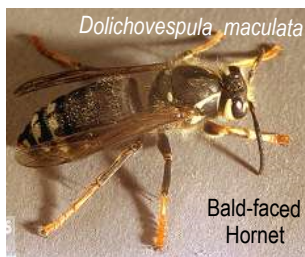
## Vespid Wasps (Yellowjackets, Hornets)

(Hymenoptera: Vespidae)

### Identification

Medium to large, black with yellow or white markings; wings smoky and folded longitudinally.

1/2 - 1 1/2"



*Dolichovespula maculata*

Bald-faced Hornet



*Vespula pensylvanica*

Western yellowjacket

### Predacious activity

Adults bring masticated insects, meat, and nectar of many types back to larvae in large nests.

### Other insects confused with vespid wasps



Hoverfly



Thread-waisted wasps

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## Larger Parasitoid Wasps

(Hymenoptera: e.g., Ichneumonidae, Braconidae)

### Identification

Braconids are < 1/2", Ichneumonids are usually larger with a longer abdomen.



*Ischnus inquisitorius*

Ichneumonid wasps

### Parasitic activity

Kill hosts by parasitism or by piercing and feeding; hosts include insect larvae, pupae, and aphids.



Braconid wasps



*Apanteles aristoteliae*

### Observation tips

Adults found at flowers or looking for hosts; monitor by looking for parasitized hosts (p. 23).



*Macrocentrus iridescens*

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## Smaller Parasitoid Wasps

(Hymenoptera: e.g., Chalcididae, Eulophidae, Encyrtidae, Trichogrammatidae, Aphelinidae, Pteromalidae)

### Identification

Mostly < 1/8"

### Parasitic activity

Kill hosts by parasitism; hosts include insect eggs, larvae, and pupae.



Chalcid wasp

### Observation tips

Monitor by looking for parasitized hosts (p. 23).



*Chrysocharis* sp.

Eulophid wasp



*Aphelinus perpalidus*

Encyrtid wasp



*Microgaster* sp.

Pteromalid wasp

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## Parasitized and Diseased Insect Pests

### Identification and observation tips

Parasitoid larvae and pupae are difficult to identify. One of the best identification methods is to collect hosts that look unusual and hold in a container until the parasitoid develops into an adult.



Aphid "mummies"

pupae



parasitoid larvae on hosts



Individuals with a viral or bacterial infection often are darkened or watery. Individuals with a fungal infection often look fuzzy.



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Any comments or questions regarding the content of this pocket guide are welcomed and can be directed to:

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