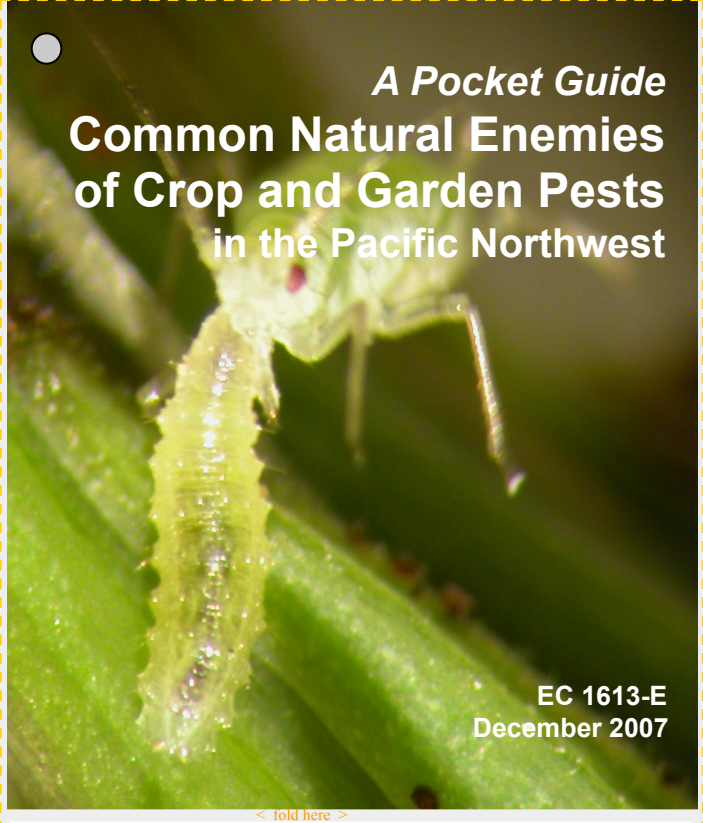

A Pocket Guide

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.

punch hole

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

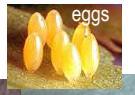
- When doing visual counts, also inspect the undersides of leaves.
- Approach fast-moving insects slowly, or use nets, beating trays, and traps to get a closer look.

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.

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

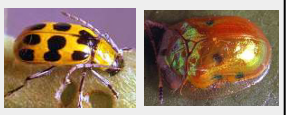
Olla abdominalis

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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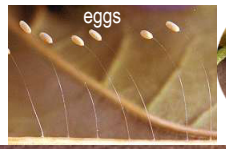
Green and Brown Lacewings

(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.*

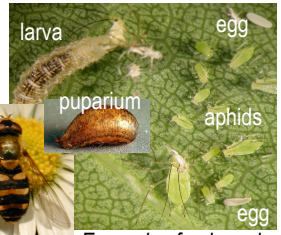
Predacious activity
Larvae and adults mostly prey on aphids, mealybugs, and other small insects.

1/2 –3/4"

Predacious Hoverflies

½ –¾"

(Diptera: Syrphidae)



Eupeodes fumipennis

Scaeva pyrastri

Sphaerophoria sulphuripes

Identification

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

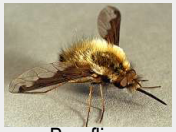
Observation tips

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

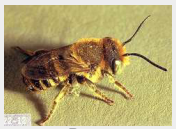
Predacious activity

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

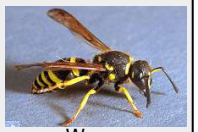
Other insects confused with hoverflies



Bee flies



Bees



Wasps

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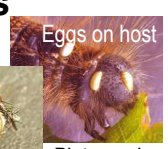
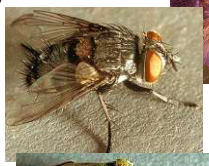
Parasitoid Tachinid Flies

(Diptera: Tachinidae)

⅓ –⅔"





Platyprepia guttata

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.

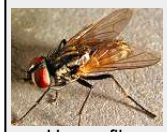
Parasitic activity

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

Observation tips

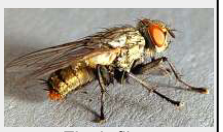
Adults seen on flowers; look for eggs *on* host, puparia *near* host

Flies commonly confused with tachinids



House flies

Blow flies



Flesh flies

Ground or "Carabid" Beetles

(Coleoptera: Carabidae)

Scaphinotus marginatus

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.

⅓ –2"

Pterostichus scitulus

Predacious activity

Prey mostly on soil organisms, some feed on seeds.

Other beetles confused with carabids

Tenebrionid beetles

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Rove Beetles

(Coleoptera: Staphylinidae)

Philonthus sordidus

Leptacinus batychrus

⅛ –⅓"

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 > ⅓")

Carrion beetles

Damsel or "Nabid" Bugs

⅓ –½"

(Hemiptera: Nabidae)

Nabis spp. feeding on Lygus bugs

Identification

Adults and nymphs long and thin with front legs slighty 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.

Other bugs confused with nabid bugs

Some of the thinner mirid bugs

Assassin bugs

Stilt bugs

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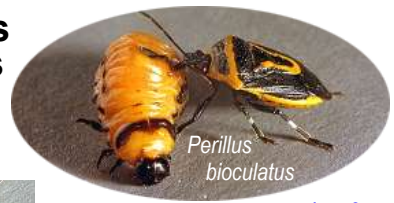
Predacious Stink Bugs

(Hemiptera: Pentatomidae)



Perillus bioculatus

Brochymena sp.

Identification

⅓ –⅔"

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

Predacious activity

Adults and nymphs prey on other insects in same habitat.

Observation tips

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

Similar-looking herbivorous stink bugs

Minute Pirate Bug

(Hemiptera: Anthocoridae)

< 1/8"

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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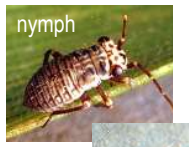
Big-eyed Bugs

(Hemiptera: Lygaeidae)



< 3/16"

Geocoris pallens

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

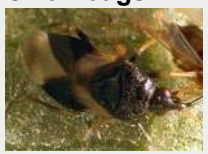
Observation tips
Found on vegetation or the ground; more easily monitored with nets or beating trays due to speedy flight and small size.

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

Other similar-looking small bugs


Chinch bugs


Some plant bug nymphs

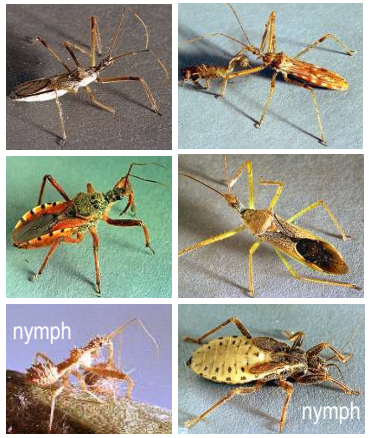

Minute pirate bugs

14

Assassin Bugs

1/3 –1"

(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.

Observation tips
Found on vegetation and flowers.

Other bugs confused with assassin bugs


Damsel bugs


Ambush bugs


Stilt bugs

15

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Ambush Bugs

(Hemiptera: Phymatidae)

1/3 –2/3"

Phymata metcalfi

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.

Similar-looking bugs


Assassin bugs


Leaf-footed bugs


Alydid bugs

16

Tiger Beetles

(Coleoptera: Cicindellidae)


Cicindela oregona

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

1/3 –2/3"

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


Cicindela longilabris columbiana

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

Similar beetles


Soft-winged flower beetles


Ground beetles

17

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Soldier Beetles

(Coleoptera: Cantharidae)

1/2 –1"


Cantharis sp.

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


Podabrus cavicollis

Podabrus sp.

Observation tips
Found on leaves and flowers.


Podabrus pruinosus

Predacious activity
Adults prey on other insects in same habitat.

Similar types of beetles


Soft-winged flower beetles


"Fireflies"

18

Thread-waisted Wasps

(Hymenoptera: Sphecidae)

Trypoxylon sp.

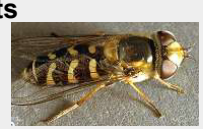
Identification
Stout-bodied to slender, often with a very narrow waist and wide head.

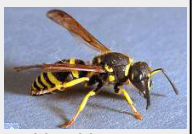
Observation tips
Active near open sandy areas and flowers.

¼ –2"

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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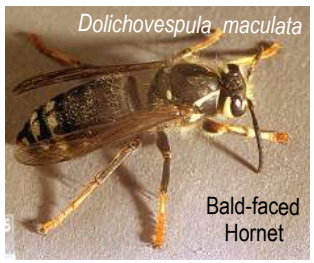
Vespid Wasps (Yellowjackets, Hornets) (Hymenoptera: Vespidae)

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

½ –1½"



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

Other insects confused with vespid wasps

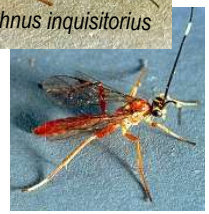

Thread-waisted wasps

Larger Parasitoid Wasps

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

Identification
Braconids are < ½", Ichneumonids are usually larger with a longer abdomen.

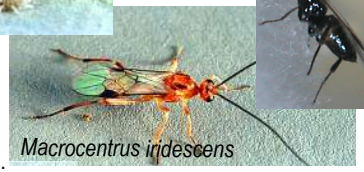
Ichneumonid wasps



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

Braconid wasps

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



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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.

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

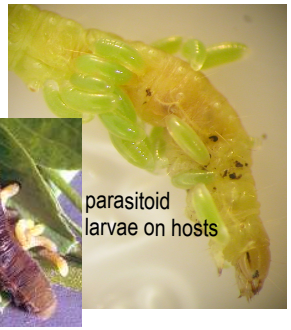

Chalcid wasp

Encrytid wasp

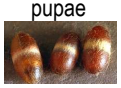
Pteromalid wasp

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.



pupae



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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