Changing Pesticides for Utah Landscapes & Gardens

Diane Alston, Entomologist, USU

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Arthropod Plant Feeding Groups

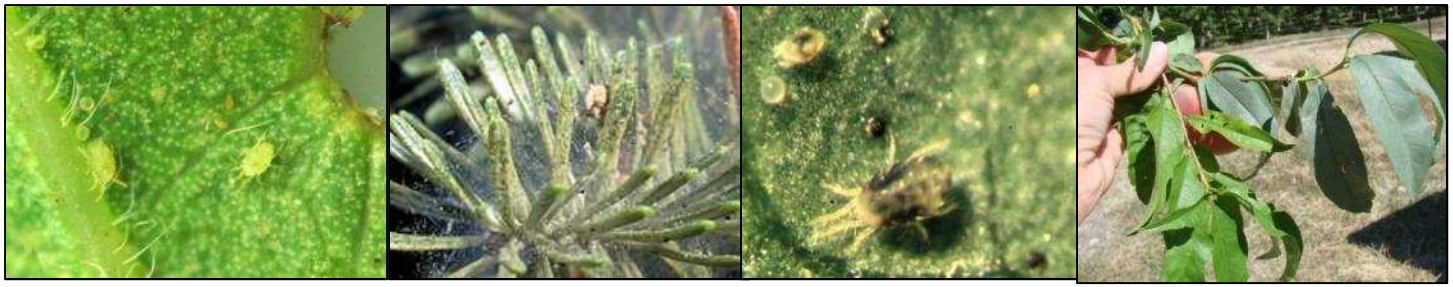
Defoliators, Fruit Tunnels (chew)

Stippling, Distortion (suck sap)

Borers (chew into trunks & stems)

Arthropod Groups

Mites (stippling, bronzing, webbing)



Nuisance & Stinging Insects

Insecticide Classes

IRAC - www.irac-online.org

- Mode-of-Action
  - Site of action within the insect
  - Similar chemistry within a class
  - Understand efficacy of chemicals; which insects will be susceptible; characteristics, such as residual, application method
- Goals: To select most effective chemistries for a pest & prevent development of resistance

Garden & Landscape Insecticide Classes

Class	Examples	MOA	Pest spectrum	Residual	Signal word
Carbamate (1A)	carbaryl	Nerve (AChE)	C,B, G, RM	Week (s)	Caution to Danger
Organophosphate (1B)	acephate malathion diazinon	Nerve (AChE)	C,S,B	Week (s)	Caution to Danger
Pyrethroid & Pyrethrin (3A)	bifenthrin cyfluthrin esfenvalerate permethrin	Nerve (Na channel)	C,S,B,N/St	Day (s) - Week	Caution to Warning Toxic to beneficials
Neonicotinoid (4A)	acetamiprid dinotefuran imidacloprid	Nerve (Nic ACh)	C,S,B	Weeks – Months Systemic	Warning Toxic to bees in pollen/nectar
Spinosyn (5)	spinosad spinetoram	Nerve (Nic ACh)	C,T,P,E	Days – Week (s)	Caution

Pest spectrum:
Chewing, **S**ucking, **B**orers, **N**uisance/**St**inging, **G**rasshoppers, **R**ust **M**ites, **T**hrips, **P**sylla, **E**arwigs

Garden & Landscape Insecticide Classes

Class	Examples	MOA	Pest spectrum	Residual	Signal word
IGR (JH – 7, Chitin - 16)	pyriproxyfen buprofezin	Insect growth	S,A	Weeks	Caution
Mite growth inhibitor (10)	clofentezine hexythiazox etoxazole	Mite growth	SM	Weeks	Caution
Bacillus thuringiensis (11)	Bt kurstaki Bt israelensis Bt tenebrionis	Microbial - insect midgut	caterpillars mosquitos beetles	Days	Caution
Diamide (28)	chlorantranili-prole	Nerve & muscle (Ryano)	C,B	Weeks – Months Systemic	None Commercial only

Pest spectrum:
Chewing, **S**ucking, **B**orers, **N**uisance/**St**inging, **G**rasshoppers, **R**ust **M**ites, **T**hrips, **P**sylla, **E**arwigs, **A**nts, **S**pider **M**ites

Homeowner & Commercial Applications

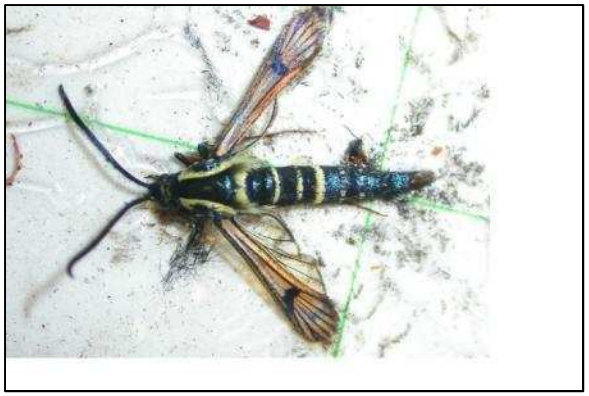
- Make sure that plant site is on the product label
  - e.g., bifenthrin is registered on pear, caneberry & citrus, but not other fruits
- Check the restricted entry interval & pre-harvest interval
- Check the rate range & maximum allowed for the season

Codling moth, Peach twig borer

- acetamiprid
- spinosad, spinetoram
- codling moth virus
- carbaryl
- malathion
- pyrethroids – kill beneficials, flare mites
  - bifenthrin
  - gamma-cyhalothrin
  - permethrin

Greater peachtree borer

- Spray lower trunk
  - o July – mid Sept
- carbaryl
- permethrin



Western cherry fruit fly

- spinosad
- pyrethrin
- gamma-cyhalothrin
- esfenvalerate
- malathion
- carbaryl

Aphids

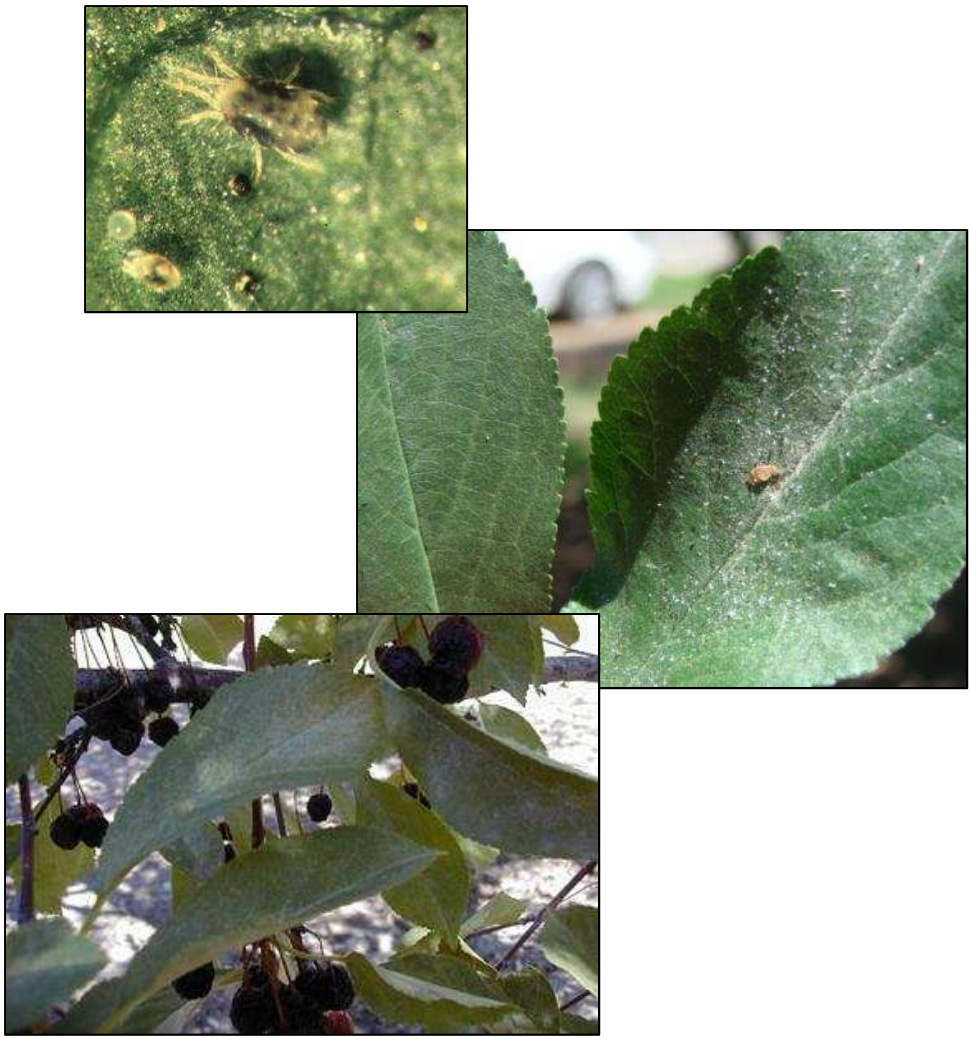
- dormant oil
- insecticidal soap
- horticultural oil
- azadirachtin/neem oil
- imidacloprid
- malathion
- pyrethroids

San Jose Scale

- dormant oil – bud break
- crawler stage:
  - horticultural oil
  - carbaryl
  - neem oil
  - pyriproxyfen

Spider Mites

- clofentezine
- etoxazole
- hexythiazox
- horticultural oil
- neem oil



Rust Mites

- At bud break & October
- wettable sulfur
- carbaryl

Raspberry Crown Borer

- Drench crown & soil in October
- 2+ years of treatment
- bifenthrin
- imidacloprid
- carbaryl
- malathion

Vegetable Defoliators

- spinosad
- acetamiprid
- Btk – caterpillars
- azadirachtin
- pyrethrin
- indoxacarb
- pyrethroids – careful of mite flare

Corn Earworm

- permethrin
- carbaryl
- corn
  - spinosad - weak
  - horticultural oil - weak
  - Btk – weak
- exposed crops (tomato, pepper)
  - ingested products effective

Squash Bug

- kaolin clay
- neem oil
- malathion
- pyrethroids
- pyrethrin
- carbaryl

Grasshoppers

- Must start when nymphs are small & suppress throughout the summer
- Community-wide treatments
- Floating row cover to protect plants
- Baits
  - bran or apple pomace base
  - carbaryl or *Nosema locustae*

Earwigs

- spinosad (& bait)
- carbaryl
- malathion
- pyriproxyfen
- pyrethroids
- pyrethrin

Tree Defoliators

Cankerworm, Tent Caterpillar, Spruce Budworm, etc.

- spinosad
- Btk – caterpillars
- acetamiprid
- pyrethroids – harsh on beneficials & pollinators, watch for mite flare
- indoxacarb
- carbaryl
- malathion
- azadirachtin
- pyrethrin
- chlorantraniliprole – commercial only

Scale

- dormant oil – bud break
- imidacloprid
- dinotefuran – armored scale
- horticultural oil – target crawlers
- pyriproxyfen
- buprofezin
- pyrethroids

Elm scale (soft)

Black pineleaf scale (armored)

Plant Bugs

- imidacloprid
- dinotefuran
- pyrethroids
- horticultural oil – nymphs
- insecticidal soap - nymphs

Sycamore plant bug

Honeylocust plant bug

Tree Borers

- carbaryl
- permethrin
- lambda-cyhalothrin
- imidacloprid – roundheaded & flatheaded beetles only
- chlorantraniliprole – clearwing moths only

IPM (Integrated Pest Management)

- Sustainable
  - economics and environment
- IPM Strategies
  - Cultural (crop management)
  - Mechanical
  - Biological
  - Chemical
- Action Thresholds
  - Treat only when needed

Utah Pests Online Resources

utahpests.usu.edu

Fact Sheets

UTAH PESTS fact sheet — UtahState University extension

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Lilac-Ash Borer

Ryan S. Davis, Arthropod Diagnostician
Taun Beddes, Cache Co. Horticultural Agent
Jay B. Karren, Extension Entomology Specialist

What You Should Know

- Lilac-ash borer (*Podosesia syringae*), a clear-wing moth common in Utah, can be a destructive pest of many species of ash (*Fraxinus* spp.), privet (Ligustrum spp.), lilac (*Syringa* spp.), and related species.
- Adults emerge from host trees and lay eggs in the spring; larvae feed on wood within branches, overwinter in the heartwood, and emerge as adults the following spring.
- Diversifying species used in the landscape, maintaining optimum plant health, monitoring, and preventive sprays (if necessary) are the best methods for preventing infestations.
- Only preventive treatments exist. There are no insecticides registered that can eliminate borers once larvae are inside the plant.

Description, Biology, and Habits

The lilac-ash borer (*Podosesia syringae*), belongs to a group of insects known as the clear-winged moths. The wings of most sesiid moths in have at least partially transparent wings (devoid of the colored scales that coat most moth and butterfly wings). Many of them mimic bees or wasps and, unlike most moths, fly during the day.

Adult lilac-ash borers mimic the common paper wasp in color, size, shape, and flight habits (Fig. 1). Both the dark colored forewings and the transparent hind wings are narrow. The slender body is black in color with yellow banding on the abdomen. The wingspan varies from 1 to 1 1/8 inches. Females are somewhat larger than males.

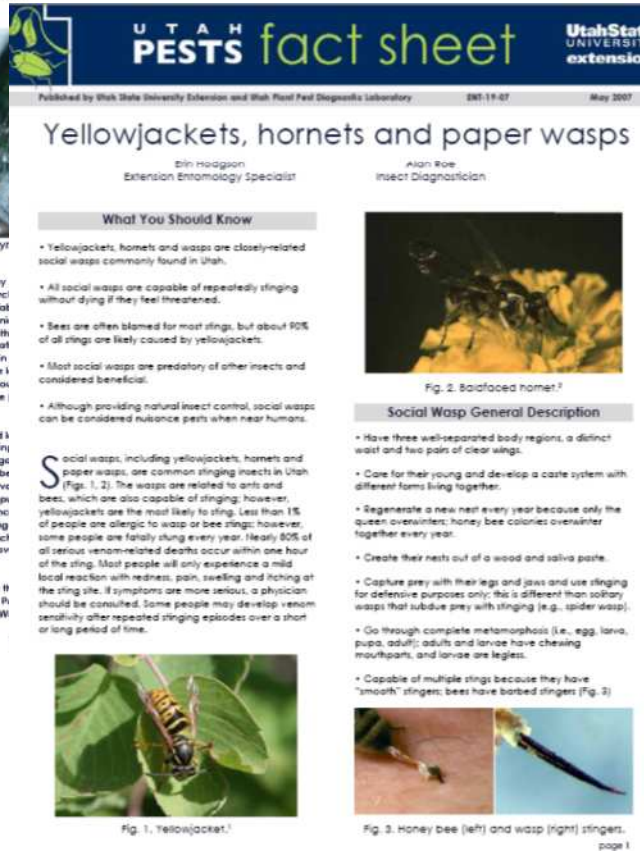
Lilac-ash borers are generally distributed throughout the United States and Canada. They feed primarily in the trunks and larger limbs of lilac, ash, and privet, but occasionally attack related plants in the family Oleaceae. Significant damage in Utah has been reported from ash, primarily in European, blue, and green ash, and lilacs.

Figure. 1. Adult lilac-ash borer (*Podosesia syringae*)[1].

Depending on your location in Utah, adults may emerge from infested hosts as early as late March (usually late April) and continue until mid-July (late). Females emit a pheromone (chemical communication signal), which attracts males for mating, within 14 days after emergence. Within an hour of mating females are able to lay the tan, elliptical eggs in crevices, and wounds in the bark. Eggs can be laid singly or in clusters. A single female can lay about eggs. Eggs hatch within 14 days, and the larvae tures) bore into the plant (Fig. 2).

Initial feeding occurs just beneath the bark and tends into the sapwood. Larvae continue feeding sapwood as summer progresses. Their tunnels (galleries) eventually turn upward and terminate just be the bark surface by the end of the season. Larvae enlarge their galleries as they grow, frequently pu frass (sawdust-like excrement) out of the entrance Completed galleries may be over 12 inches long 1/3 inch wide. Full grown larvae are about 1 inch and white with a brown head. Mature larvae ov ter in the heartwood.

In spring, a larva will cut an emergence hole in th bark, leaving a thin flap of tissue over the hole. Pr (formation of a cocoon) occurs in the burrow. W



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Yellowjackets, hornets and paper wasps

Erin Hodgson, Extension Entomology Specialist
Alan Roe, Insect Diagnostician

What You Should Know

- Yellowjackets, hornets and wasps are closely-related social wasps commonly found in Utah.
- All social wasps are capable of repeatedly stinging without dying if they feel threatened.
- Bees are often blamed for most stings, but about 90% of all stings are likely caused by yellowjackets.
- Most social wasps are predatory of other insects and considered beneficial.
- Although providing natural insect control, social wasps can be considered nuisance pests when near humans.

Social wasps, including yellowjackets, hornets and paper wasps, are common stinging insects in Utah (Figs. 1, 2). The wasps are related to ants and bees, which are also capable of stinging; however, yellowjackets are the most likely to sting. Less than 1% of people are allergic to wasp or bee stings; however, some people are fatally stung every year. Nearly 60% of all serious venom-related deaths occur within one hour of the sting. Most people will only experience a mild local reaction with redness, pain, swelling and itching at the sting site. If symptoms are more serious, a physician should be consulted. Some people may develop venom sensitivity after repeated stinging episodes over a short or long period of time.

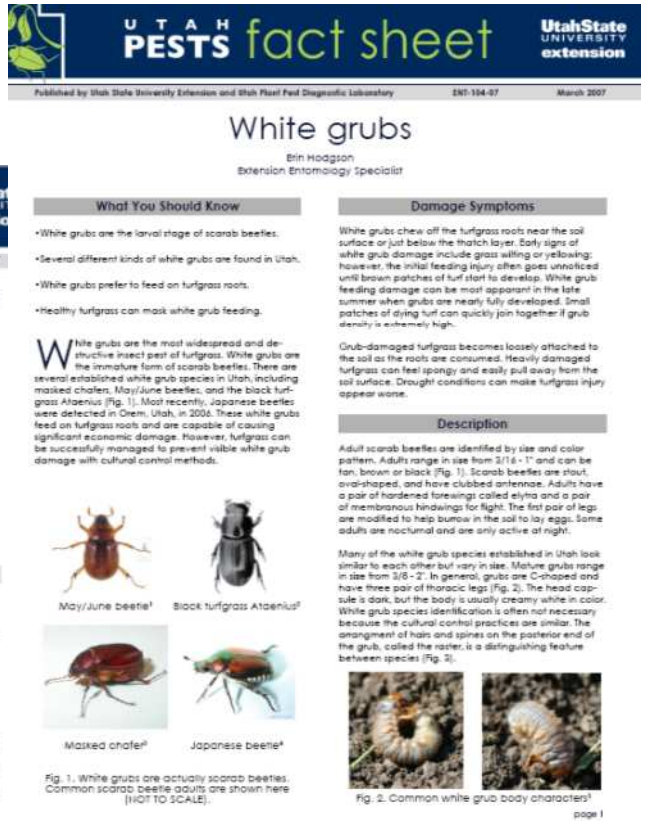
Fig. 1. Yellowjacket.[1]

Fig. 2. Baldfaced hornet.[2]

Social Wasp General Description

- Have three well-separated body regions, a distinct waist and two pairs of clear wings.
- Care for their young and develop a caste system with different forms living together.
- Regenerate a new nest every year because only the queen overwinters; honey bee colonies overwinter together every year.
- Create their nests out of a wood and saliva paste.
- Capture prey with their legs and jaws and use stinging for defensive purposes only; this is different than solitary wasps that subdue prey with stinging (e.g., spider wasp).
- Go through complete metamorphosis (i.e., egg, larva, pupa, adult); adults and larvae have chewing mouthparts, and larvae are legless.
- Capable of multiple stings because they have "smooth" stingers; bees have barbed stingers (Fig. 3)

Fig. 3. Honey bee (left) and wasp (right) stingers.



UTAH PESTS fact sheet — UtahState University extension

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White grubs

Erin Hodgson, Extension Entomology Specialist

What You Should Know

- White grubs are the larval stage of scarab beetles.
- Several different kinds of white grubs are found in Utah.
- White grubs prefer to feed on turfgrass roots.
- Healthy turfgrass can mask white grub feeding.

White grubs are the most widespread and destructive insect pest of turfgrass. White grubs are the immature form of scarab beetles. There are several established white grub species in Utah, including masked chafers, May/June beetles, and the black turfgrass Ataenius (Fig. 1). Most recently, Japanese beetles were detected in Orem, Utah, in 2006. These white grubs feed on turfgrass roots and are capable of causing significant economic damage. However, turfgrass can be successfully managed to prevent visible white grub damage with cultural control methods.

May/June beetle[1]

Black turfgrass Ataenius[2]

Masked chafer[3]

Japanese beetle[4]

Fig. 1. White grubs are actually scarab beetles. Common scarab beetle adults are shown here (NOT TO SCALE).

Damage Symptoms

White grubs chew off the turfgrass roots near the soil surface or just below the thatch layer. Early signs of white grub damage include grass wilting or yellowing; however, the initial feeding injury often goes unnoticed until brown patches of turf start to develop. White grub feeding damage can be most apparent in the late summer when grubs are nearly fully developed. Small patches of dying turf can quickly join together if grub density is extremely high.

Grub-damaged turfgrass becomes loosely attached to the soil as the roots are consumed. Heavily damaged turfgrass can feel spongy and easily pull away from the soil surface. Drought conditions can make turfgrass injury appear worse.

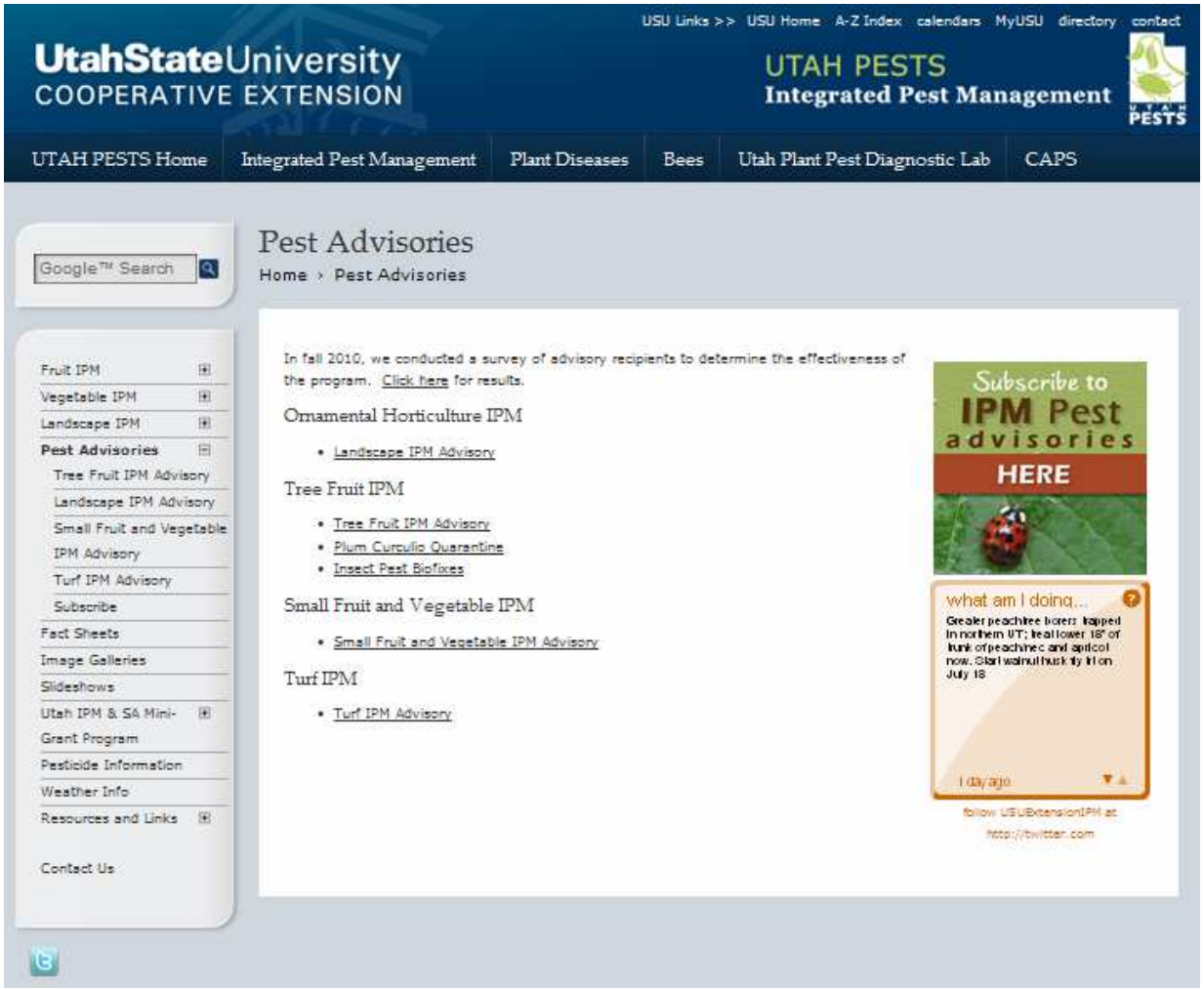
Description

Adult scarab beetles are identified by size and color pattern. Adults range in size from 3/16 - 1" and can be tan, brown or black (Fig. 1). Scarab beetles are stout, oval-shaped, and have clubbed antennae. Adults have a pair of hardened forewings called elytra and a pair of membranous hindwings for flight. The first pair of legs are modified to help burrow in the soil to lay eggs. Some adults are nocturnal and are only active at night.

Many of the white grub species established in Utah look similar to each other but vary in size. Mature grubs range in size from 3/8 - 2". In general, grubs are C-shaped and have three pair of thoracic legs (Fig. 2). The head capsule is dark, but the body is usually creamy white in color. White grub species identification is often not necessary because the cultural control practices are similar. The arrangment of hairs and spines on the posterior end of the grub, called the raster, is a distinguishing feature between species (Fig. 2).

Fig. 2. Common white grub body characters[5]

Pest Advisory
(integrated pest management)



utahpests.usu.edu/ipm

Free subscription

Timely info on pest activity
- -insects
- -mites
- -diseases
- -nutrient deficiencies
- -environmental stress

Lots of images!

IPM recommendations

Effective pesticides

Pest Diagnostics

Utah Plant Pest Diagnostic Lab
utahpests.usu.edu/uppdl

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