

Ips Bark Beetles in Western Colorado

Presented by:
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Bark beetles are Native



Illustration by Bill Mayer

- They are native to the U.S. and Colorado
- Bark beetles are host specific

Ips Bark Beetles on the West Slope

- Pinon Ips
 - *Ips confusus* > pinon
- Spruce Ips
 - *Ips hunteri* > blue and Engelmann spruce
- Pine Engraver
 - *Ips pini* > ponderosa, lodgepole, Austrian



Pinon Ips Bark Beetle

Ips confusus



Host specific: pinon pine

Will not attack
Juniper/Cedar trees

Adult Ips beetles: notice
the distinct indentation
and spines on the back
end

Pinon Ips Bark Beetle



Adults are small, brown, cylindrical bark beetle with spines on the distal portion (butt) of the abdomen.

Pinon ips has five spines.

The adult's length ranges between 1/8 and 1/4 inch

Spruce Ips Bark Beetle

Ips hunteri



Host specific:
most species of spruce

Adult Ips beetles:
notice the distinct
indentation and they
have spines on their
back end

Spruce Ips Bark Beetle

Adults are small beetles, also 1/8 to 1/4 inch long, and reddish brown to black in color.

They have a pronounced cavity at the rear end lined with three to six pairs of tooth-like spines.



Photo: TH Atkinson, Biodiversity Center, University of Texas at Austin

What's With the Spines?



What They Will Attack?

- Only host species
- Attack green material – has moisture in the wood
- Can be standing or on the ground
- They can reproduce in any material over 1 inch in diameter
 - Green firewood
 - Piles of branches or stems left on the ground after pruning or cutting green trees



Photo: Kamie Long, Colorado State Forest Service

“I call *Ips* the trailer trash of beetles. They’ll live in anything.” Reagan McGuire, Research assistant at Northern Arizona University

What They Will Attack?



Photo: William M. Ciesla, Forest Health Management International, Bugwood.org



Photo: <https://lowstump.com/portfolio/ips-beetle/>

- Attacks on spruce trees are concentrated at, and often limited to the tops.
- Spruce Ips are also commonly associated with wind-thrown or felled spruce in forest situations.
- They may outcompete spruce bark beetles (*Dendroctonus*) for breeding sites in these trees.

Signs and Symptoms of Ips Bark Beetles



Pitch tubes on trunk



Saw dust in bark crevices
and at trunk base

Not Ips > Other pests or environmental factors



Reddish color in bark cracks/splits
(no sawdust) = Pinon blister rust



Mass amount of pitch, usually near wounds,
sawdust in sap = Pinon pitch mass borer

Exit Holes



Too large, not round
= Not Ips



Very small, perfectly
round = Ips

Crown Indicators



Live & dead needles. Mixed w/ older dead branches.
Crown not dying at the same time = Not Ips

Crown/needles turned brown at the same time. No green mixed in = Ips

Not Ips > Other pests or environmental factors



Clear sap > no sawdust mixed in
= wound or bark crack



Crown not browning/dying at once, dieback in
individual branches = other pest/ drought stress

Ips Beetle: Timing



****Do not** cut green trees/branches and leave them onsite during summer months

- Adult beetles **emerge** in the spring = **daytime** temperatures **above** 50 degrees for a couple of weeks
- Should stop all green tree cutting when it is starting to warm up to allow time to remove material or let it dry

Ips Beetle: Timing



- Beetles begin to find their **hibernating** tree = daytime temperatures stay **under** 50 degrees for a couple of weeks
- Once it stays cool, can begin cutting green trees

****Look at where the root system is! In the top 12-18 inches of the soil profile.**

Fuels Reduction Work : Time of Year

- When Cutting Green (live) Trees:
 - Avoid in summer
 - If you must - remove *all* tree parts within 2-3 days
 - November to February are the best months to do green tree cutting
 - Winter is when beetle flights are over for the year and material will dry before they resume in spring



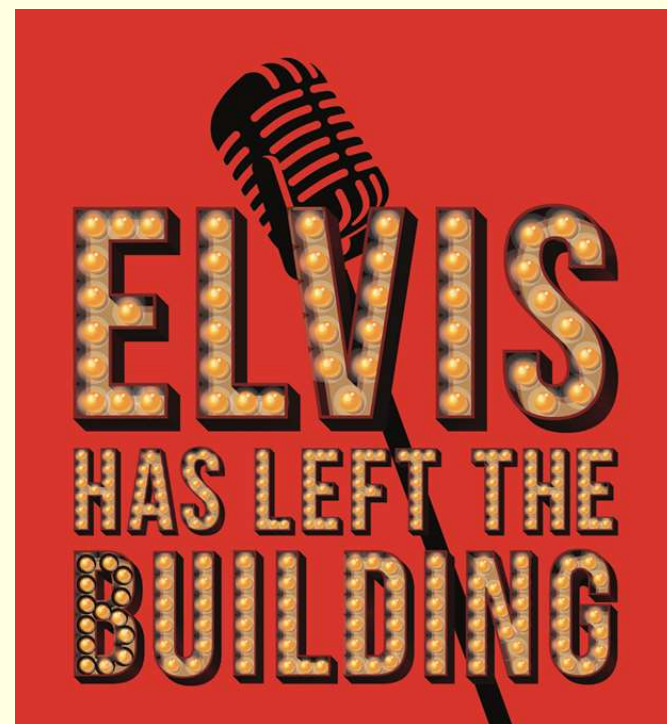
Options when Removing **Dead** Trees

— Can be done any time of the year

Dead trees do **Not** have Ips beetles

- Chipping
- Burning *****
- Remove from site
- Lop and scatter smaller branches
- Use for firewood

You will find other insects inside dead material > these are decomposers



What To Do With Dead Leaders?



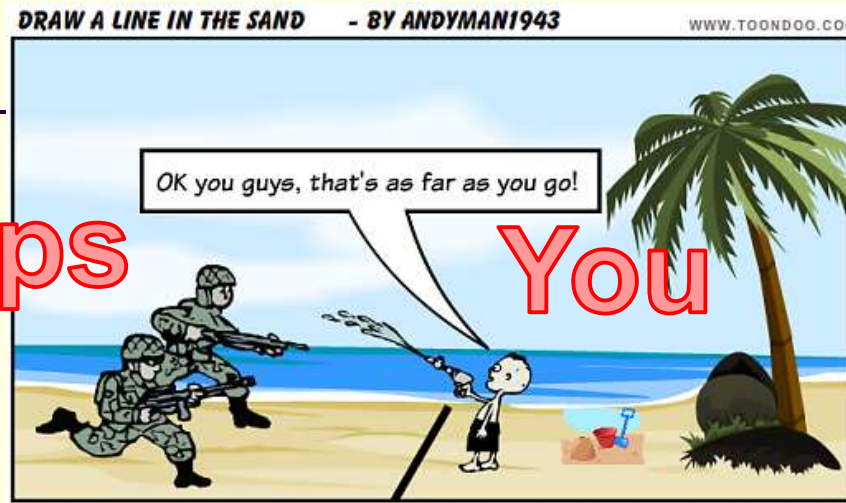
William M. Ciesla, Forest Health Management International,
Bugwood.org



<https://lowstump.com/portfolio/ips-beetle/>

- - Remove affected material (usually tree tops)
 - Tree will look ridiculous
 - Conifer tree's structure doesn't rebound like deciduous tree can
- Remove whole tree (usually best option)
- Monitor nearby spruce trees for signs of Ips attacks.
 - Treat if possible

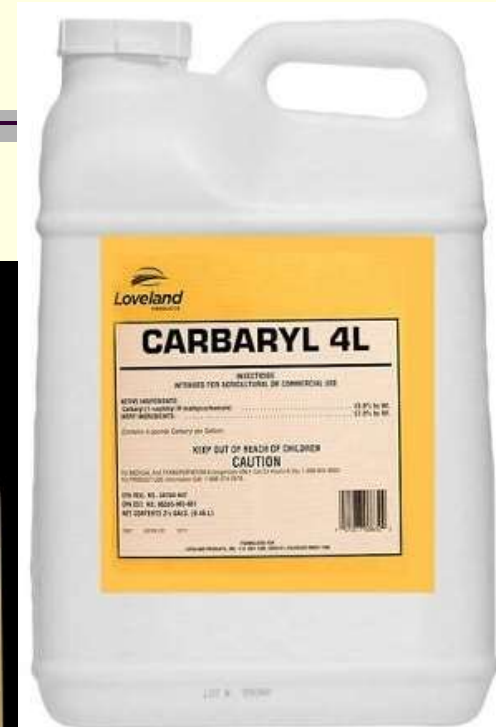
Can't Save Every Tree



- If in a rural environment - determine the 'landscape' trees vs forest trees
- Those trees will receive special care
 - Supplemental watering
 - Preventative spraying
 - Adjacent tree reduction / thinning to improve residual tree health

Preventative Spray Guidelines

- Must be done BEFORE the live trees are attacked
- Carbaryl and Permethrin are registered pesticide products
- Must be sprayed 2x year. Spring (April) and Fall (August).
- Ideal to spray all tree parts greater than 1 inch
 - At least spray the larger branches, trunk
- Read the label!



Pheromone packets



→ Verbenone Repellents

Order verbenone pouches, flakes, splat tubes and past, and protect your land with pheromone repellent for mountain pine, southern pine, and ips beetles.

Lies

How It Works

Mountain pine beetles, southern pine beetles, ips beetles, bark beetles, and many other insects communicate using pheromones. Verbenone is a synthetic pheromone treatment for high-value pine trees that replicates the beetle pheromone, sending a message that the tree is full and that the food supply is insufficient for additional beetles. Arriving beetles receive the "verbenone message" that they should look elsewhere for a suitable host.

- Will **NOT** work to repel Pinon or Spruce Ips bark beetle.
- Pheromones are very insect species specific
- Only in production for Mountain Pine Beetle (Verbenone) and Douglas-fir bark beetle (MCH)



Bark Beetle Control

1. **Cut down** and depending on the time of year, deal with infested trees by burning, chipping, or hauling to a safe site.
2. Use a **preventative spray** for high-value trees near homes. Spray 2 times per year for Ips bark beetle.
3. Consider **thinning** your property for long-term health, as well as wildfire hazard mitigation.
4. Provide supplemental **water**. Especially during dry period, i.e.. before monsoon season, before spring moisture.

Aphids on Shade & Ornamental Trees

- Aphids are the most common insects found on trees, shrubs, and garden ornamental plants
- Over 350 different aphid species occur in Colorado but most are genus or species specific
- Most species rarely injure plants but a few aphid species do cause problems



Aphids that are found on Shrubs and Flowers in Colorado

Scientific name - Common name	Host plant – shrubs/flowers
<i>Aphis helianthi</i> - Sunflower aphid	Red twig dogwood, yucca and many flowering plants in summer
<i>Aphis spiraeicola</i> - Spirea aphid	Spirea
<i>Aphis viburnicola</i> - Snowball aphid	Snowball viburnum
* <i>Cryptomyzus ribis</i> - Currant aphid	Currant
<i>Macrosiphum rosae</i> - Rose aphid	Rose
<i>Macrosiphum euphorbiae</i> - Potato aphid	Rose, many flowers
<i>Macrosiphum albifrons</i> - Lupine aphid	Lupine
* <i>Myzus ceraki</i> - Black cherry aphid	Tart Cherry
<i>Nasonovia aquilegiae</i> - Columbine aphid	Columbine
<i>Rhopalosiphum cerasifoliae</i> - Chokecherry aphid	Chokecherry, pin cherry

* commonly cause leaf curling distortions in new growth

Aphids that are found on Trees in Colorado

Scientific name - Common name	Host plant – trees
* <i>Brachycaudus helichrysi</i> - Leafcurl plum aphid	American Plum
<i>Chaitophorus populicola</i>	<i>Populus</i>
<i>Chaitophorus populifolii</i>	<i>Populus</i>
<i>Chaitophorus viminalis</i>	Willow
<i>Cindara</i> spp. - Giant conifer aphids	Pines, juniper, spruce
* <i>Dysaphis plantaginea</i> - Rosy apple aphid	Apple
<i>Eriosoma lanigerum</i> - Woolly apple aphid	Elm, apple, crabapple
* <i>Eriosoma americanum</i> - Woolly elm aphid	Elm, Serviceberry
<i>Essigella</i> spp.	Pines
<i>Eulachnus</i> spp.	Pines
<i>Hyalopterus pruni</i> - Mealy plum aphid	<i>Prunus</i>
* <i>Meliarhizopagous fraxinifolii</i> - Leafcurl ash aphid	Green ash

* commonly cause leaf curling distortions in new growth

Aphids that are found on Trees in Colorado

Scientific name - Common name	Host plant – trees
<i>Monellia caryae</i> - American walnut aphid	Walnut
<i>Myzocallis tiliae</i> - Linden aphid	Linden
<i>Myzocallis alhambra</i> - Western dusky-winged oak aphid	Bur oak
<i>Myzocallis ulmifolii</i> - Elm leaf aphid	Elm
* <i>Myzus persicae</i> - Green peach aphid	Peach, apricot, other <i>Prunus</i>
<i>Nearctaphis bakeri</i> - Shortbeaked clover aphid	Hawthorn
<i>Periphyllus lyropictus</i> - Norway maple aphid	Norway maple
<i>Prociphilus fagi</i> - Woolly beech aphid	Beech
<i>Pterocomma bicolor</i>	<i>Populus</i>
<i>Pterocomma smithiae</i> - Black willow aphid	Willow
<i>Tuberolachnus salignus</i> - Giant willow aphid	Willow

* commonly cause leaf curling distortions in new growth

How to Identify

- Aphid peach large,
- The c specie green,
- They a appare being cornic poster



How to Identify

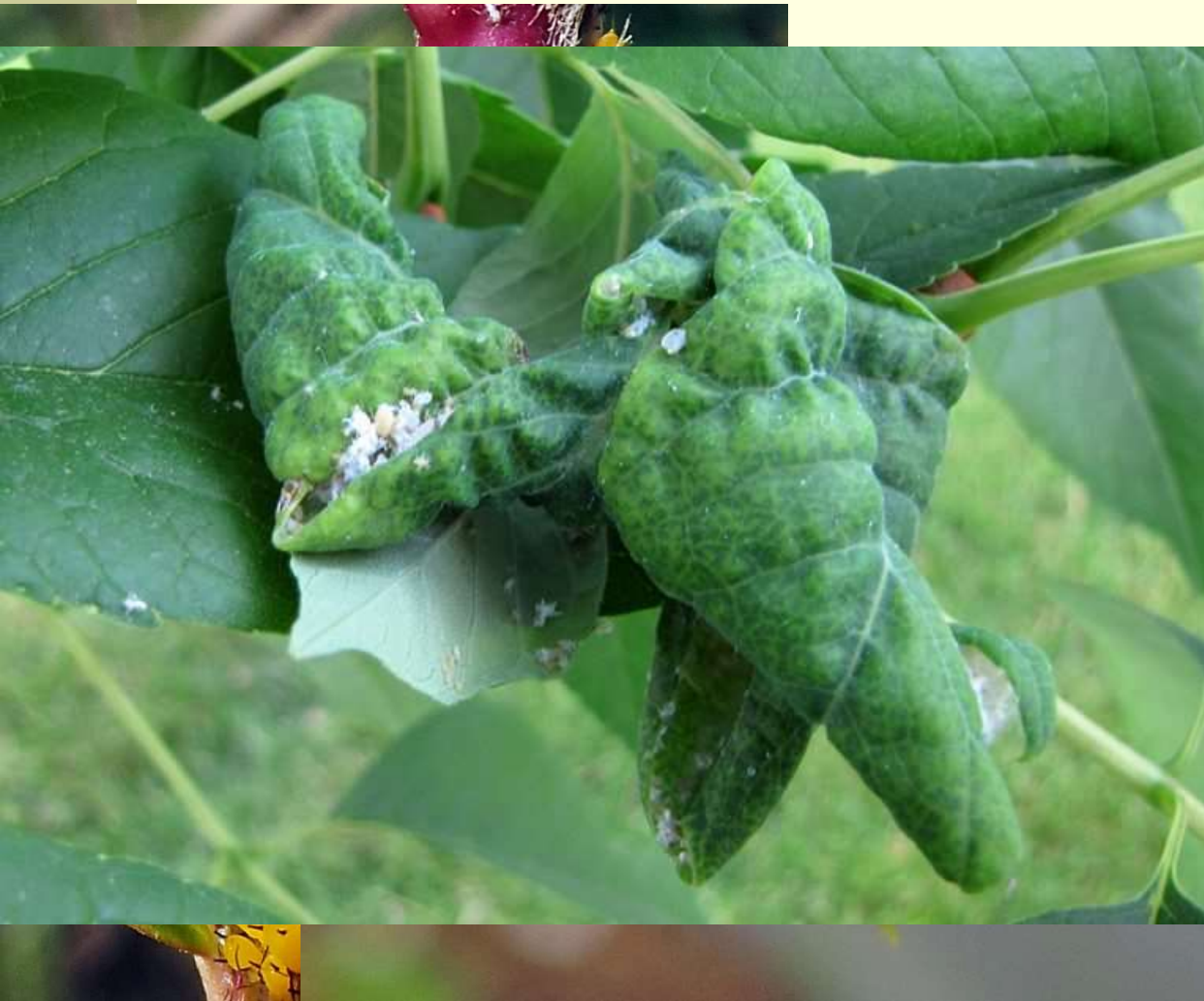
- Adult aphids may be winged or wingless
- Some, such as the cabbage aphid or wooly apple aphid, secrete a white or gray waxy substance that covers the body
- Production of honeydew and sooty mold on plant and surfaces below the plant
- Seeing predators of aphids in larger number



Photos: Joseph Berger, Bugwood.org

Photos: Wisconsin Horticulture - Division of Extension.

Aphids – How They Cause Damage

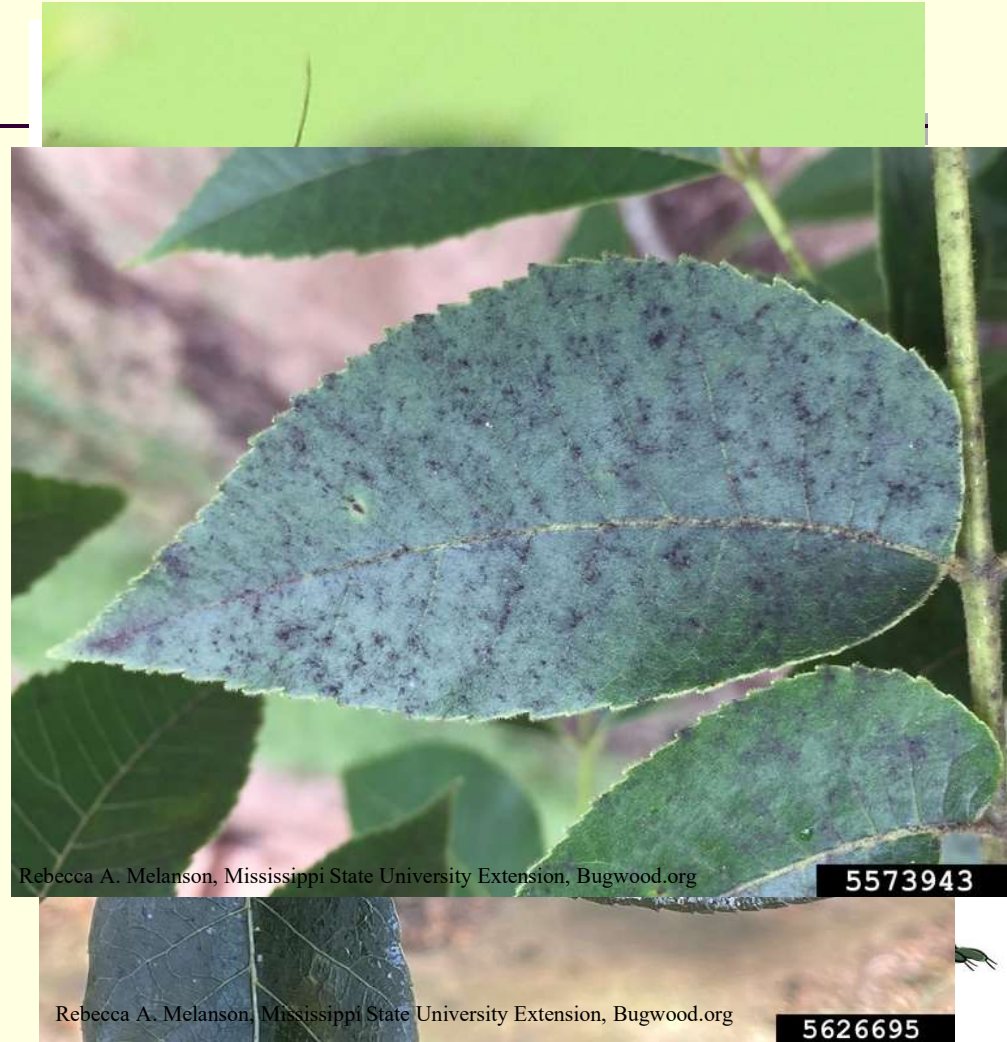


- Aphids feed by sucking sap from plants
- With very high numbers of aphids for an extended period, their feeding can cause wilting and sometimes even dieback of shoots and buds
- Some aphids can cause leaf curling when the insect infests emerging leaves

Photos 1,2: Wisconsin Horticulture - Division of Extension. Photo 3: Utah State University Extension

Honeydew = Aphid Waste Material = Sugar Water

- Honeydew is excreted by aphids and certain other **phloem-sucking** insects, e.g., soft scales, whiteflies, some leafhoppers
- It covers anything that lies beneath infested plant material
- Grayish sooty mold grows on the honeydew
- Ants, yellowjacket wasps, flies, and bees are usually attracted to honeydew



What's the Connection Between Aphids and Ants?

- Considered a mutualistic relationship
 - Ants provide protection and aphids provide sugar-rich honeydew
- Protection from: predatory midges, parasitoid wasps, lacewing larvae, rove beetles, hoverfly larvae and ladybirds (aka ladybugs)



The Interesting Life Cycle of the Aphid



- Most aphids usually develop into the wingless form to remain and reproduce on the plant
- Winged forms are produced when colonies
 - get overcrowded
 - plants decline in quality
 - environmental cues favor dispersal
- Life span is ~1 month unless eaten or parasitized 😊

The Interesting Life Cycle of the Aphid



- Essentially all aphids, regardless of their form, are females
- Males, if they do occur, are present only in late summer/early fall during the last outdoor generation
- Males are produced to mate with the females to allow for egg laying for overwintering

The Interesting Life Cycle of the Aphid

- Females give live birth to a genetically identical daughter aphid through asexual reproduction
- The newly born aphid can develop rapidly, typically becoming full-grown in about 10 to 14 days
- Female adults can produce three to five young per day over the course of their lifetime



Photo: Melissa Schreiner, Colorado State University, Bugwood.org



Photo: Jim Baker, North Carolina State University, Bugwood.org

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The Interesting Life Cycle of the Aphid

Photo: Whitney Cranshaw, Colorado State University, Bugwood.org



Photo: Wayne Brewer, Auburn University, Bugwood.org

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- At the end of the summer, different forms of aphids are produced, including special sexual form males and females
- After mating, these females can lay eggs, with they typically lay eggs in crevices around buds or on stems

The Interesting Life Cycle of the Aphid

- The egg stage is how aphids normally survive winter during outdoor conditions in Colorado
- Eggs hatch the following spring, shortly after bud break, and the normal life cycle resumes
- Hatched eggs = nymph = immature adult



Photo: Whitney Cranshaw, Colorado State University, Bugwood.org

PBS – Deep Look video series



Treatment Options – Monitoring



- Check plants regularly – catch infestations early
 - Especially the undersides of leaves
- Most damage caused in late spring
- Look for signs of natural enemies
- Look for ants
- Watch for honeydew

Treatment Options – Biological Control



Photo: Winston Beck, Iowa State University, Bugwood.org



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- Natural enemies:
 - Lady beetles, Lacewings, Syrphid fly larvae, Soldier beetles
 - Parasitic wasps – look for mummy aphids
- Important for controlling populations
- Be very careful when using pesticides that could harm this population

Treatment Options – Cultural Control

- With low aphid populations (limited to a few curled leaves or new shoots), the best control may be to prune out these areas and dispose of them
- High levels of nitrogen fertilizer favor aphid reproduction, so never use more nitrogen than necessary



Treatment Options – Cultural Control

- Slow-release fertilizers such as organic fertilizers or urea-based time-release formulations are best
- Plants are more susceptible to aphids in the seedling stage
 - Reduce losses by growing seedlings under protective covers in the garden or in a greenhouse
- If on sturdy plants, knock off the insects with a strong spray of water



Photo: lavizzara/Shutterstock



Treatment Options – Chemical Control

- Most larger plants can tolerate light to moderate levels of aphids with little damage
- Insecticidal soaps and oils are the best choices for most situations
- Oils may include petroleum-based horticultural oils or plant-derived oils such as neem or canola oil



Treatment Options – Chemical Control



- Products kill primarily by smothering the aphid, thorough coverage of infested foliage is required
- Apply these materials with a high volume of water, follow label instructions, target the underside and tops of leaves
- Soaps, neem oil, and horticultural oil kill only aphids present on the day they are sprayed, so applications may need to be repeated

Treatment Options – Chemical Control

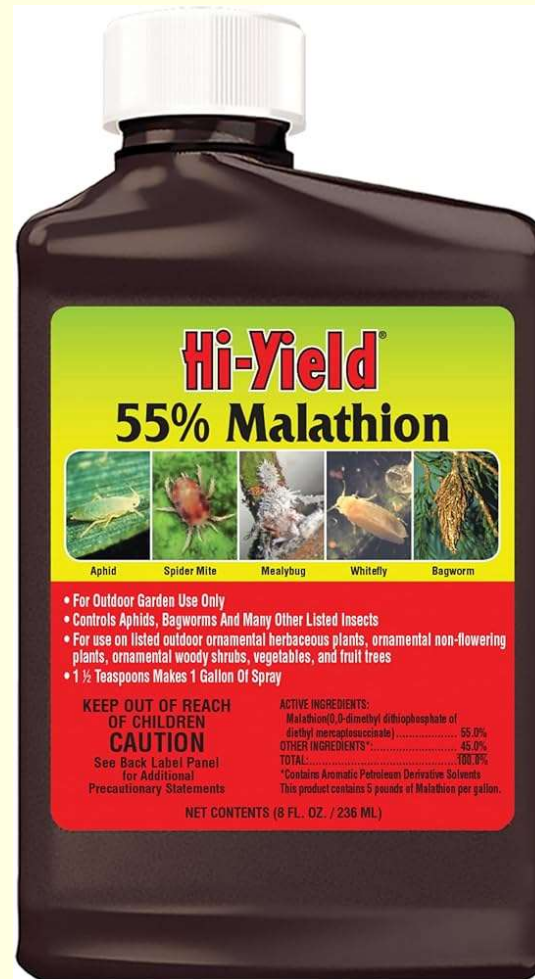
- Don't use soaps or oils on water-stressed plants or when the temperature exceeds 90°F
- They may be phytotoxic to some plants, check labels and test the materials on a portion of the foliage several days before full treatment
- They can kill some natural enemies that are present on the plant and hit by the spray
- Don't leave a toxic residue, so won't kill natural enemies that migrate in after the spray



New growth is blue, but older needles were sprayed with a dormant oil in late winter. Photo credit: SK Rettke

Treatment Options – Chemical Control

- Other insecticides are available to control aphids
 - Foliar-applied formulations of malathion, permethrin, and acephate (nonfood crops only).
- These materials may kill higher numbers of aphids than soaps and oils, their use should be limited,
- They also kill the natural enemies that provide long-term control of aphids and other pests,
- Are associated with bee kills and environmental problems



Treatment Options – Chemical Control



- Contact-only insecticides are generally ineffective in preventing damage from aphids such as the leaf curl plum aphid or the woolly ash aphid
- Systemic insecticides are available, primarily for woody ornamentals
- Systemics, such as imidacloprid, are very effective and are especially useful for serious infestations of aphids

Treatment Options – Chemical Control



- Imidacloprid can have negative impacts on predators, parasitoids, and pollinators
- Use should be avoided where soaps and oils will provide adequate control
- To protect pollinators, **don't** apply imidacloprid or other systemic insecticides to plants in bloom or prior to bloom

Insecticides to protect hemlock trees can be applied as a soil drench. <https://www.canr.msu.edu/>



Four Main Management Options

- To manage aphids, will take a combination of all of them
- Consider the nonchemical controls as most insecticides will destroy beneficial insects along with the pest
 - Monitoring
 - Biological control
 - Cultural control
 - Chemical control



QUICK GUIDE SERIES FM 2020-6
Piñon Ips Bark Beetle



A northwest Colorado landowner points to an adult piñon ips beetle discovered making a gallery underneath piñon pine bark. Photo: Dennis Brock, for CSFS

The piñon ips beetle (*Ips confusus*) is a native Colorado insect with a notable ability to take advantage of environmental changes and spread rapidly. In the southwest part of the state, this insect kills more mature piñon pine trees than any other pest.

Colorado's weather patterns help create ideal conditions for many bark beetle populations to increase, including piñon ips. Oscillations between warm and dry spells throughout much of the state have become all too frequent. During periods of below average precipitation and warmer than average temperatures, trees become stressed from a lack of water. Stressed trees have a difficult time defending themselves against beetles and succumb to infestations easier than healthy

trees. As more trees become infested, beetle populations increase, resulting in widespread tree mortality.

Not only can piñon ips beetles attack stressed trees, they also can reproduce in any fresh, green, recently cut material over 1 inch in diameter, such as green firewood or piles of branches left on the ground after pruning or cutting live piñon trees. Paying attention to how wood is stored is of the utmost importance when considering beetle life cycles and mitigating risk.

Homeowners and landowners can play a crucial role in minimizing the spread of piñon ips by following the tips offered in this Quick Guide. Concentrated outbreaks can be addressed with a few simple actions that help keep populations of this insect in check.

Questions? & Thank you

Kamie Long Colorado State Forest Service



COLORADO STATE UNIVERSITY
EXTENSION

Aphids on Shade Trees and Ornamentals

Fact Sheet No. 5.511

Insect Series | Trees & Shrubs

by W.S. Cranshaw¹ (1/19)

Aphids are the most common insects found on trees, shrubs, and garden ornamental plants. Over 350 different aphid species occur in the state but most can feed on only a few species of plants. However, with so many kinds of aphids, few plants grown in Colorado do not support at least one aphid. Most species rarely injure plants or even attract attention, but a few aphid species do cause problems (Table 1).

Aphids feed by sucking sap from plants. When the number of aphids on a plant are very high for an extended period, their feeding can cause wilting and sometimes even dieback of shoots and buds. Some aphids can cause leaf curling when the insect infests emerging leaves.

Sometimes problems with aphids do not primarily involve plant injury but instead their production of sticky honeydew. Honeydew is the waste material excreted by aphids and certain other phloem-sucking insects (e.g., soft scales, whiteflies, some leafhoppers). It may cover leaves, branches, sidewalks and anything that lies beneath a infested plant material. Grayish sooty mold grows on the honeydew, further detracting from plant appearance. Ants, yellowjacket wasps, flies, and bees are usually attracted to plants that are covered with honeydew.

Life History and Habits

Aphids are small insects that may be found on leaves, stems and sometimes branches of plants. They have an oval body form and a pair of pipe-like structures (cornicles) usually can be seen protruding from the back of the body. Colors are widely variable among the different aphid species – ranging from very pale yellow to dark, nearly black. Most have shades of green or orange and a few species are even bright red. Upon close inspection, many aphids can be seen to

¹Colorado State University Extension entomologist and professor, bioagricultural sciences and pest management. 1/19

have intricate body patterning. All aphids are small, ranging from 1.5-5.0mm, with the larger species found on stems and branches.

Some aphids obscure their body by covering themselves with waxy threads. These are known as "woolly aphids." The woolly apple aphid is a common woolly aphid that clusters on the limbs of apples and crabapples. Aphids that cluster within leaves that curl, such as the leaf-curl ash aphid, are wax covered as are most aphids that live on plant roots. On conifers a related group of insects occur, the adelgids, which similarly cover themselves with waxy threads.

Colonies of aphids often consist of a mixture of winged and wingless forms. The great majority of aphids usually develop into the wingless form to remain and reproduce on the plant. More winged forms tend to be produced when colonies get overcrowded, plants decline in quality, or environmental cues favor dispersal to new plants.

Essentially all aphids, regardless of their form, are females. Males, if they do occur, are present only in late summer/early autumn, during the last outdoor generation. The normal habit of aphids is for a female to give live birth to a genetically identical daughter aphid through asexual reproduction (parthenogenesis). The newly born aphid can develop rapidly, typically becoming full-grown in about 10 to 14 days. Adults usually can produce three to five young per day over the course of their lifetime, which may extend to about a month but is usually shortened by natural enemy activities.

There is a shift in the life cycle of aphids to handle the challenge of winter, when plants are not active and cold temperatures would be lethal. At the end of the summer, different forms of aphids are produced, including special sexual form males and females. After mating, these females can lay eggs, with they typically lay eggs in crevices around buds or on stems. This egg is the stage that the aphid normally survives winter during outdoor conditions in Colorado. Eggs hatch the fol-



Quick Facts

- Aphids are found on almost all types of plants and a few species can cause plant injury.
- Some aphid species can curl the new leaves of some types of plant.
- Feeding aphids excrete honeydew, a sticky fluid that can cause nuisance problems.
- Natural enemies of aphids include lady beetles, flower fly larvae, lacewing larvae, and parasitic wasps.
- Exposed aphids can be controlled by insecticides, insecticidal soaps and sometimes with a strong jet of water.

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