



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.

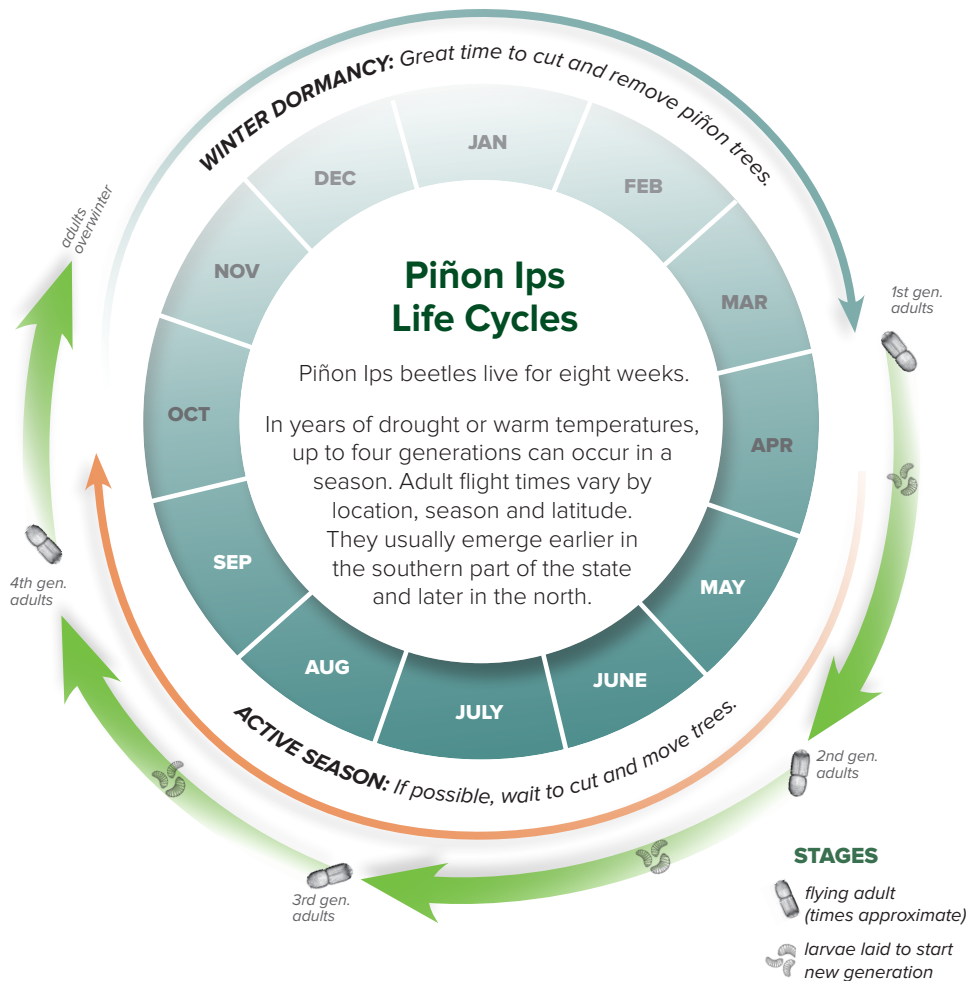
This Quick Guide is produced by the Colorado State Forest Service to promote knowledge transfer.



Piñon Ips beetle. Photo: Pest and Diseases Image Library, bugwood.org

QUICK FACTS

- » **IDENTIFICATION:** Piñon Ips bark beetles are often light to dark brown and small, about 4 millimeters long.
- » **ACTIVITY BEGINS:** once daytime temperatures are consistently above 50 degrees.
- » **ACTIVITY ENDS:** once daytime temperatures are consistently below 50 degrees.
- » Piñon Ips beetles prefer piñon and only rarely attack other pine species. They will not attack juniper (cedar) trees.
- » Ips is a common group of bark beetles that infests pine and spruce trees.
- » There are 11 species of Ips beetles in Colorado. Only *Ips confusus* specializes in attacking piñon pines here and around the southwestern United States.
- » All members of the Ips genus have spines along the ends of their wing covers (elytra).
- » Ips beetles rarely attack healthy trees. Most attacks occur to newly transplanted pines or when trees are under stress.
- » There are 45 species of Ips beetles worldwide, 31 of those are found in North America.



How Piñon Ips Attack

Piñon Ips beetles target piñon pines, which typically grow in harsh, low elevations below mixed-conifer/ponderosa pine forests of Colorado. Piñons often grow in proximity to juniper trees and lowland shrubs, where conditions are dry and precipitation fluctuations are normal.

These beetles are attracted to piñon trees with weakened defenses. Piñon Ips usually limit their attacks to trees that are in decline due to root injuries, wounding, compacted soil, winter damage, underwatering or overwatering. However, during high-stress environmental situations, such as drought, beetle populations can increase and pose a considerable threat, even to healthy trees. These beetles kill piñon trees by attacking in mass numbers, and they have to work fast because they only live for about eight weeks.

The trees die when adult beetles create galleries (tunnels) between the bark and wood of the trunk and branches, where they mate and lay eggs.

Piñon Ips beetle flight activity begins in early spring with an emergence of adults

that overwintered underneath the bark. This first generation infests stressed trees, freshly cut green logs or firewood, or any green branches removed after tree cutting (called slash). The smell of fresh piñon sap attracts the beetles.

Before piñon Ips die, they mate and lay eggs to ensure another generation will survive. Piñon Ips beetles are prolific breeders and can produce up to four generations a year.

Once hatched, larvae begin creating small galleries in the tree layers under the bark (called phloem), which provide the tree with water and nutrients. The larval galleries cut off nutrients and water supply to the whole tree. This kills the tree by slowly starving it to death.

During development, larvae increase in size. Once they grow into adult beetles and harden their exoskeleton, they chew their way out of the bark. These new adult beetles must seek live or recently cut green piñon tree material to survive — suitable material that has nutrients to sustain larval growth within its phloem.

Signs and Symptoms of an Infestation



When piñon ips attack, needles throughout the tree fade quickly to a straw color, then red and brown as the tree dies. Photo: Luke Dittrich, CSFS



Pitch tubes are a sign the tree has tried to drown the piñon ips beetle with sap as the insect bores into the tree. Photo: Kamie Long, CSFS

Fading Needles

Following a successful beetle attack on a piñon, needles fade from green to a straw or rust color. On infested trees, needles continue to die, turning red and eventually brown.

By the time a piñon appears to be dying, the beetles likely have already emerged, moved on and attacked a new tree. In dry years, it is not unusual for needles to start fading just weeks after infestation. But in years with adequate precipitation, needles may slowly fade for several months after attack.

Pitch Tubes

These are a sign the tree's defense system has attempted to flush the wound and drown the beetle as it enters the bark. Pitch tubes are small, thumbnail-sized clumps of sap that appear on the bark where the beetles attempted to or successfully entered the tree. They have a reddish hue from the sawdust the beetles create as they bore through the bark. Pitch tubes only appear if the tree has enough moisture and energy available to produce sap to defend itself during an attack.



Piñon ips exit holes, at the top of this section of bark, are small and concise, like BB holes. The larger hole, at center, is indicative of woodpecker activity feeding on larvae underneath the bark. Photo: Kamie Long, CSFS



Piñon ips bore through a tree's bark, creating tunnel-like galleries underneath. Photo: Jerald E. Dewey, USDA Forest Service, bugwood.org

Entry and Exit Holes

One easy way to tell if a tree is or was infested is to look for entry and exit holes in the bark. Entry holes can be accompanied by other signs, like pitch tubes and sawdust. Exit holes are nearly round and the size of a pinhead or BB pellet, made when adult beetles emerge from under the bark. If exit holes are present, even if the tree is still green, the beetles have likely emerged and flown to another tree.

Galleries

Another way to diagnose if a tree is infested with piñon ips is by peeling a piece of bark off of the outside of the tree and looking for galleries in the inner bark (phloem and cambium). These characteristic tunnels are made by ips adults and larvae underneath the bark, and usually form a Y or H shape. Piñon ips galleries are typically free from boring dust created by their excavation, which sets ips beetles apart from other bark beetles found in pine species.

Treatment and Prevention Tips

The best way to prevent Ips beetle attacks is to maintain a healthy forest. Thinning your forest, by spacing trees farther apart and removing those that are unhealthy or have dwarf mistletoe, may help increase individual tree health. Consult

your local CSFS forester for information.

If dying or recently killed piñon trees are detected, or Ips beetles identified, all surrounding green trees should be inspected to determine if the beetles have successfully attacked other piñons.

Currently infested trees are usually still green and should be promptly removed. It is important to remove trees with beetle larvae or pupae from the property before they emerge and attack other green piñon trees. (See section: *How to Handle Wood*).

Cutting Trees

- » Remove trees infested with piñon Ips as soon as they are identified.

- » To prevent colonization, ensure all material is dry (no green wood remaining) or removed from the site before late March.

- » When bark is cracking and splitting from the wood, the tree is dry and beetles have already left. This wood is safe to move.

- » Remove dead trees as time and money allow for wildfire hazard reduction and aesthetics. This can be done any time of year since there is no sap produced to attract these beetles.

- » **BETWEEN APRIL AND OCTOBER:** Cutting during this time is not recommended unless personal safety is a concern. If green material must be cut when Ips beetles are most active, remove all material from site as quickly as possible (within days) and bury the stump to reduce chances of attracting beetles.

- » **IN OCTOBER AND NOVEMBER:** As daytime temperatures fall below 50 degrees, beetles are unlikely to search out new material. This is a good time to split and scatter wood larger than 4 inches in diameter and cut branches into short pieces, leaving it in sunny locations to encourage rapid drying. That's important because early next spring, beetles may still attack previously cut material that is still green.

- » **BETWEEN NOVEMBER AND FEBRUARY:** Winter is the beetle's inactive period and the best time to cut and remove infested green trees if beetle populations are high. Ensure any slash, chips or wood created is dry prior to beetle emergence in the spring.

- » Thin forests during winter months to allow for more water, nutrients and sunlight for each tree. Creating more space between trees improves individual tree health and reduces wildfire intensity.

Winter Watering

- » Watering favorite trees in the summer in periods of drought and also in winter months can help protect against tree stress.

- » Conifer trees release moisture through their needles all year long in a process called transpiration. When the soil is dry from lack of moisture (snow or rain), trees can become stressed.

- » During the winter, water favorite trees about once a month when there is no snow on the ground and the temperature is above 40 degrees. In some areas, this may only occur in the fall and early spring.

- » Apply water at the edge of the tree crown's drip line, where rain would drip off. This area is where most of the absorbing tree roots are located. The root system of piñon trees includes tap and spreading roots, which can reach deep and out to twice the height of the tree.

Spraying

- » Spray favorite trees with a preventive chemical at least two times per year to prevent bark beetle attack when beetle populations are high in the area.

Environmental and economic concerns around insecticide spraying exist, so homeowners must choose which trees to protect rather than treating large areas. Chemical treatments should never be applied on piñon trees that provide nuts for human consumption.

- » Treatment options may include external sprays or injections. Follow insecticide labels for application. Depending on the insecticide, multiple treatments per year may be needed.

- » Many products on the market contain ingredients necessary to kill bark beetles. Look at labels for active ingredients such as carbaryl, permethrin or bifenthrin.

- » Use insecticides as a drenching spray on the entire trunk and all branches greater than 1 inch in diameter. Follow the manufacturer's recommendation for bark beetle treatment.

- » Once a tree is infested, preventive insecticide treatments are ineffective and should not be used. Infested trees should be removed and disposed of properly.

Is The Wood Still Useable?



Once trees are identified as having a piñon Ips infestation, removing the wood should be done cautiously to avoid spreading the insect further. Cut material left at the base of live trees draws beetles in and allows them to overcome otherwise healthy trees. Move cut material at least 1 mile from any piñons. Photo: Austin Shelby, CSFS

Six Ways to Handle Infested Wood

Wood material infested with piñon Ips beetles should be handled cautiously, as should any previously cut green wood on a property. After cutting, piñon material may give off a scent that attracts beetles for up to six months.

Solar treatments, with or without clear plastic, are not effective at destroying the beetles, primarily because of their short life cycle.

Wood may be treated in the following ways to prevent this insect from spreading:

- 1. GRIND (MASTICATE) OR CHIP LOGS AND SLASH.** This destroys the larvae and quickly dries the slash, making it useless for beetle reproduction. Grinding and chipping should be done ideally in November or December, when beetles are dormant and the material will have time to dry before more beetles emerge the next spring. On larger acreages, professional mastication may be an economical method of treatment.
- 2. SPLIT AND SCATTER, DON'T STACK.** Wood larger than 4 inches in diameter should be split and scattered to encourage rapid drying before beetle flight resumes in the spring.
- 3. TRANSPORT GREEN MATERIAL** to a site that is farther than 1 mile from any piñon trees.
- 4. BURN INFESTED OR GREEN MATERIAL,** if burning regulations allow. Take care to remove cut green material from the site, instead of piling it, while beetles are active.
- 5. BURY THE MATERIAL** more than 8 inches in the soil.
- 6. DEBARK LARGE LOGS** with chainsaw attachments that assist stripping bark from logs. This exposes beetles to the elements.



Piñon wood that shows cracking, splitting and chipping bark is dry and safe to use. Photo: Adam Moore, CSFS

Piñon Ips beetles do not damage the wood inside a tree; it can still be used for lumber, firewood or other products once it has dried out. If bark is splitting or cracking, the wood is dry and safe to use.

If exit holes are present on standing dead trees, or all the needles have fallen off the tree, piñon Ips beetles likely have flown to another tree. Once beetles have left the tree, it can be removed any time of year and used for firewood or other purposes.



Piñon pines in southwest Colorado show fading, one of the symptoms of a piñon Ips beetle attack. Photo: Dan West, CSFS

Learn More

about piñon Ips bark beetle and piñon-juniper tree management on the CSFS website at csfs.colostate.edu, or contact your local foresters at the nearest Colorado State Forest Service field office.

The Colorado State Forest Service is a service and outreach agency of the Warner College of Natural Resources at Colorado State University. CSFS programs are available to all without discrimination. No endorsement of products or services is intended.

062020.3000

References

Douglas, H.B., Cognato, A.I., Grebennikov, V., and Savard, K., 2019. Dichotomous and matrix-based keys to the Ips bark beetles of the World (Coleoptera: Curculionidae: Scolytinae). Canadian Journal of Arthropod Identification, 38: 234 pp.

Furniss, R.L. and Carolin, V.M., 1977. Western Forest Insects. Volume 1339.

Acknowledgements

Thank you to the CSFS personnel who provided production assistance:

Dan West, Fort Collins state office
Katelynn Martinez, Fort Collins state office
Kamie Long, Grand Junction field office
Adam Moore, Alamosa field office
Luke Dittrich, Durango field office
Jodi Rist, Montrose field office
Austin Shelby, Montrose field office
Luke Cherney, Cañon City field office



**WARNER COLLEGE
OF NATURAL RESOURCES**
COLORADO STATE UNIVERSITY

.....

Colorado State University
1401 Campus Delivery
Fort Collins, CO 80523-1401
(970) 491-4994
warnercnr.colostate.edu



.....

Colorado State University
5060 Campus Delivery
Fort Collins, CO 80523-5060
(970) 491-6303
csfs.colostate.edu

