



FLORIDA FOREST SERVICE

Black Turpentine Beetle

Leaflet Number 4

OVERVIEW

Black turpentine beetle (*Dendroctonus terebrans*, or BTB) is a common and destructive pest of pine trees in the southeastern United States. It is the largest southeastern species of pine bark beetles, which are insects that feed and reproduce in the inner bark layers (phloem and cambium) of pine trees. BTB mainly attacks near the base of the trunk, up to about 2 to 3 meters high, where the inner bark is thickest. It primarily infests trees that are stressed, injured, declining or recently dead due to some other cause such as drought, flooding, lightning, wind damage, root disturbance, disease or other pests. Freshly cut stumps may also be infested. Healthy trees are rarely attacked by BTB and living trees can often tolerate and recover from a mild infestation, but heavily infested trees will usually die.

Hosts

All species of pine (*Pinus* spp.) found in Florida are potential hosts.

Identification

Adult black turpentine beetles are 5 to 8 mm long, dark brown to black, and roughly cylindrical in shape. They are quite similar in shape and color to the closely related southern pine beetle (*Dendroctonus frontalis*), but BTB is much larger. The larval (immature) stage is white, grub-like and legless, and grows up to 12 mm long. The pupal (intermediate) stage is whitish and similar in size to adults.

Top-down and side views of an adult black turpentine beetle.



Black turpentine beetle larva (top), pupa (middle) and adult (bottom), placed on millimeter grid paper for scale.

Signs and Symptoms of Infestation

Initial signs of infestation include whitish or reddish “pitch tubes” (clumps of resin and boring dust on the outer bark) at the points where beetles have tunneled into the tree. The size and location of pitch tubes often distinguishes BTB attacks from those of other southeastern pine bark beetle species. BTB pitch tubes can be quite large (up to 5 cm across), and are restricted to the base and lower stem of the tree (usually up to 3 meters high, but sometimes as high as 5 meters on larger trees). The consistency of the pitch tubes varies from runny to brittle, and they may be crumbly, smaller or absent if the tree is severely stressed or already dead when attacked. Reddish-brown boring dust and crystallized resin pellets are often pushed out of the entrance holes. Peeling back the outer bark reveals irregular galleries (tunnels) mined by the beetles and larvae. As a heavily infested tree dies, the needles gradually wilt, turning from green, to yellow, to reddish-brown.

Life Cycle and Biology

Female black turpentine beetles initiate the attack, attracted by the odors released by a pine in distress. As a beetle tunnels through the outer bark, it disrupts resin-filled vessels (resin canals) which are the tree’s primary defense. This releases a flow of resin which can potentially smother the beetle, and/or flush it out of the tree. That resin flow, combined with boring dust from the tunneling beetle, results in the pitch tube that forms at the site of attack. If the female overcomes this defense, it begins tunneling through the inner bark,



Base of pine tree with many pitch tubes from a heavy BTB infestation.

BLACK TURPENTINE BEETLE

where it will be joined by a male. They excavate a linear gallery, about 1 cm wide and 20 to 30 cm long, usually downward from the entrance hole. The female lays eggs along one side of this gallery. After the larvae hatch, they often feed alongside one another in an expanding, fan-shaped swath through the inner bark. As each larva matures, it will tunnel away from this area and create an oval chamber where it will enter a transitional form (pupa) and eventually develop into an adult beetle. The young adults will then tunnel out through the outer bark. They may re-infest the same tree if it is still suitable, or fly to find new hosts. BTB can have up to three overlapping generations per year in Florida, mostly during the warmer months; their development and activity slows down substantially during cold periods.

Management

Because black turpentine beetles mainly infest trees that are unhealthy or stressed, infestations can be best prevented by general forest management and tree care practices that enhance and preserve the health and vigor of pine trees.

In forested settings, it is not recommended to selectively remove infested trees. The root damage, stem injury, and other disturbances caused by vehicles and harvesting equipment tend to stress the remaining trees, thus increasing and prolonging the outbreak. Left alone, mortality due to BTB tends to be limited in scale unless there is a large-scale stress factor such as severe drought, flooding, wildfire, root disease or root disturbance. The presence of a few scattered BTB-infested trees in a forest stand is generally not cause for alarm. However, heavier activity should be closely monitored. If the damage threatens to exceed the landowner's tolerance for financial losses, the worst-affected areas can be salvaged by clearcutting in contiguous blocks.

Unlike infestations of pine engraver beetles or southern pine beetle, it is common for trees to tolerate and recover from a mild to moderate degree of BTB infestation. A rough rule can be used to evaluate a tree's chance of survival: if the tree has fewer pitch tubes than its diameter in inches, then it might survive. In such cases, it may be worthwhile to treat the tree with an approved insecticide to protect it from further attacks, particularly with high-value landscape trees. Thoroughly coating the bark of the base of the tree (up to 3 or 4 meters high) with an insecticide spray can temporarily prevent BTB from tunneling in, although it will not kill beetles or larvae that are already inside the tree. Such treatments are not always successful at saving the tree, and are rarely cost-effective for use in production forests. See Leaflet 14 ("Insecticides for Bark Beetle Management") for further details.

Quite often, black turpentine beetles may infest trees that are simultaneously infested with ips pine engraver beetles and/or southern pine beetle. In these cases it is unlikely that the trees will recover regardless of the level of BTB infestation, and no insecticide treatment of these types of infested trees should be attempted.

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Pitch tube on pine bark with an adult black turpentine beetle stuck to the outside.



Above left: Adult BTB constructing an egg gallery in inner bark. Above right: BTB larvae feeding in inner bark (image by James R. Meeker, USDA Forest Service, Bugwood.org).



BTB-infested pine tree with needles wilting and turning reddish-brown.

