

Tetropium fuscum

System: Terrestrial

Kingdom	Phylum	Class	Order	Family
Animalia	Arthropoda	Insecta	Coleoptera	Cerambycidae

Common name

Synonym

Callidium fuscum , (Fabricius, 1787)

Similar species

Summary

Tetropium fuscum (the brown spruce longhorn beetle) is a high risk invasive species native to Europe and Asia that has been introduced to Nova Scotia, Canada where it has ravaged red spruce (*Picea rubens*) stands. Eradication efforts by the Canadian Food Inspection Agency (CFIA) were deemed ineffective. Quarantine and preventative measures are being employed while other methods of control are investigated.



[view this species on IUCN Red List](#)

Species Description

The brown spruce longhorn beetle (*Tetropium fuscum*) is a small beetle 8-19 mm long. It has a black or dark-brown head covered with long hairs and a longitudinal groove between its long, thin reddish-brown antennae. The black pronotum is angular, wide, and bulging with a punctured plate and a longitudinal hole. It has an elongate and flattened body. The elytra are brown, tan, or yellowish with 2-3 longitudinal grooves. Its legs are short and dark brown or reddish brown with reddish-brown tarsi. Larvae have a segmented yellowish-white body with a reddish-brown head bearing a lateral white band, characteristic to its genus. They are 14-28 mm long and have prominent legs. Pupa are white and are about 17 mm long and 4 mm wide. They have a bulged pronotum and a slightly raised mesonotum and bulging abdominal tergites with acute spinules alongside a common longitudinal groove. The most easily distinguishable characteristic is its asperate, rough, pronotum, a feature not exhibited by any other *Tetropium* spp. in eastern North America (Dobesberger, 2005; CFIA, 2005; Kolk & Starzyk, 1996; Smith and Hurley, 2000).

Notes

The fungus *Ophiostoma tetropii* is believed to have been introduced to Canada from Europe along with *Tetropium fuscum*, since it is morphologically and phylogenetically identical to European specimens, found only in trees infested by *T. fuscum*, and bears no record in North America prior to the introduction of *T. fuscum*. Ophiostomatoid fungi are a known associate of *Tetropium* spp. *Ophiostoma piceae* is a known associate of North American native beetle *Tetropium cinnamopterum*. Some believe *O. tetropii* has good potential as an indicator for *T. fuscum*, as existing keys are incomplete and identification can be difficult (Jacobset *al.* 2003; Smith and Harrison 2007).

Lifecycle Stages

Brown spruce longhorn beetle (*Tetropium fuscum*) larvae hatch 10-14 days after oviposition. Larvae proceed to bore through the phloem and cambium feeding under bark and upper wood, producing extensive, irregular galleries about 2cm wide that are filled with frass. They molt 4 times within about a 2 month period of feeding. Upon maturation the larvae begin to tunnel horizontally about 2-5 cm, then vertically for 3-4cm where they construct a pupal chamber filled with and closed off by frass. Pupation lasts about 14 days and sexually mature adults emerge from holes 4-7 mm in diameter. This cycle requires about 120 days but may take 360 days depending on environmental or nutritional conditions, as larvae often overwinter inside the wood (Dobesberger, 2005; Kolk & Starzyk, 1996).

Habitat Description

The brown spruce longhorn beetle (*Tetropium fuscum*) occurs in conifer forests where they parasitize spruce (*Picea* spp.), pine (*Pinus* spp.), and fir (*Abies* spp.) trees. In Europe it attacks Norway spruce (*Picea abies*), Sitka spruce (*Picea sitchensis*), blue spruce (*Picea pungens*), Scotch pine (*Pinus sylvestris*), silver fir (*Abies alba*), and occasionally larches (*Larix* spp.). In the introduced range in Nova Scotia, Canada, red spruce (*Picea rubens*) is the preferred host of *T. fuscum*, although it is known to infest white spruce (*Picea glauca*), black spruce (*Picea mariana*), and Norway spruce (Dobesberger, 2005). In Canada *T. fuscum* only attacks *Picea* spp. and has not been found on other genera of conifers such as *Abies* or *Larix* spp. (Dobesberger, 2009).

Reproduction

Sexual. Oviparous. Brown spruce longhorn beetle (*Tetropium fuscum*) adults are sexually mature upon emergence seeking mates immediately. They are generally active June through August. Adults emerge staggeredly and live for about three weeks. Copulation takes place in minutes. A few days following copulation, females oviposit about 80-150 eggs into bark crevices singly or sometimes several clusters of 10 eggs. Presumably, females deposit associate fungus *Ophiostoma tetropii* spores along with eggs, as in the case of other insect/fungi parasite relationships (Kolk & Starzyk, 1996; Dobesberger, 2005; Jacobs *et al.* 2003).

Nutrition

The brown spruce longhorn beetle (*Tetropium fuscum*) relies solely on nutrition attained from its larval and pupal stages which bore through the phloem and cambium of hosts feeding on woody tissue. Adults do not feed. As *T. fuscum* is found in conjunction with associate fungus *Ophiostoma tetropii*, one may conclude that it is essential in breaking down plant tissue, weakening the tree, and maybe even providing a direct source of nourishment for the beetle larvae and pupae as with more closely studied insect/fungus parasite complexes (Kolk & Starzyk, 1996; Jacobs *et al.* 2003).

General Impacts

The brown spruce longhorn beetle (*Tetropium fuscum*) is considered a very high risk invasive species. Outside of its native range, it is a primary pest of spruce and pine trees and is high risk species for spread, establishment, and reproduction potential, as well as inflicting economic and environmental damage. It is only a secondary pest in its native range, usually attacking only weakened and dying trees, while it attacks healthy, vigorous trees in Canadian forests where trees lack developed defense mechanisms, and specific predators or parasites are not present. Outbreak levels may persist for a decade inflicting continual damage over extensive conifer tracts. In Point Pleasant Park, Halifax, Nova Scotia, *T. fuscum* has ravaged red spruce trees with mortality rates estimated up to 70% and managed to escape its previous containment area. Spruce accounts for 60% of Nova Scotia's forest volume and *T. fuscum* poses a serious threat to the conifer lumber industry. Further infestation in Canada is likely to result in large scale ecological changes and biodiversity reduction by changing forest composition. Even control and eradication programs are likely to have environmental effects. Mass tree infestations also cause increased wildfire frequency and intensity (Dobesberger, 2005; NAPPO, 2000).

Management Info

Preventative measures: Preventative measures are the best means of managing the brown spruce longhorn beetle (*Tetropium fuscum*). Great care should be taken to quarantine invasive populations and prevent their spread. The Canadian Food Inspection Agency (CFIA) passed *The Brown Spruce Longhorn Beetle Infested Places Order* shortly after its introduction in Canada which established a containment area and restricted the movement of unprocessed wood. Heat treatment of 56° for 30 minutes is required on wood large enough to bear any form of *T. fuscum*, an adequate phytosanitary requirement.

Trapping and visual ground surveys are being conducted to monitor any further spread. Traps baited with high-release host-volatile lures and brown spruce longhorn beetle pheromones were deployed extensively around the containment area and in neighboring provinces. Cross-vane pan traps, IPM Intercept PT traps, and polyester quilt bands were all effective traps. Recommended baits include spruce blend with ethanol lures and brown spruce longhorn beetle pheromones. Visual inspection detecting trees with excessive resin flow and elliptical exit holes 4 mm in diameter should raise caution. The use of bioclimatic analysis to provide for rapid spatial assessments of possible distributions and potential impacts may be of use in preventing the spread of *T. fuscum* and other invasives (McKenney *et al.* 2003; Sweeney *et al.* 2004(a)(b); CFIA, 2005; CFIA 2007; Mushrow *et al.* undated).

Recent work by Silk *et al.* (2007) found that *Tetropium fuscum* and *Tetropium cinnamopterum* males emit a pheromone called fuscumol, which was attractive to males and females when combined with host volatiles. Further study by Sweeney *et al.* (2008) determined that the most effective lure combination consisted of a blend of racemic (50:50 ratio of S and R isomers) and host volatiles. This will be a useful tool for early detection and survey of *T. fuscum* in high risk areas (Sweeney *et al.* 2008).

Physical: Physical removal and chipping or incineration of infested trees was practiced in Canada in attempts to control *T. fuscum* infestations. This was found to be an ineffective means of eradication by the Canadian Food Inspection Agency in 2005. The CFIA has since shifted efforts towards containment. There is presently no effective treatment for infected trees (CFIA, 2005; CFIA, 2007).

Biological: Natural control agents native to North America include woodpeckers and the parasitic wasp, *Rhyssa persuasoria* and possibly *Rhyssa lineolata* and *Rhimphoctona macrocephala* which have been reared in red spruce logs in Pleasant Park, Nova Scotia, in attempts to control *T. fuscum* there. Natural enemies in the beetle's native range include parasitoids: *Townesia tenuiventris*, *Dolichomitus dux*, *Dolichomitus terebrans*, *Dolichomitus tuberculatus*, *Neoxorides collaris*, *Odontocolon spinipes*, *Odontocolon dentipes*, *Xorides praecatorius*, *Rhimphoctona obscuripes*, *Rhimphoctona megacephalus*, *Atanycolus initiator*, *Atanycolus sculpturatus*, *Doryctes mutillator*, *Doryctes obliterated*, *Wroughtonia dentator*, and *Billaea trianglifera*; and predators: *Laphria gilva*, *Thanasimus* spp, *Athous subfuscus*, *Raphidia* spp., *Phaestigma notata*, *Inocellia crassicornis*, *Palloptera usta*, and many woodpecker species. Finally, soil-borne fungus *Beauveria bassiana* may be a potential control which can be applied to tree bands or bait logs (Dobesberger, 2005; Sweeney *et al.* 2005).

Principal source: [Dobesberger, E.J. 2005. *Tetropium fuscum*. Science Division, Canadian Food Inspection Agency.](#)

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