Tetropium fuscum (Fabricius)

Coleoptera: Cerambycidae

Brown spruce longhorned beetle

Hosts	CAPS-Approved Survey Method
Hosts reported in native range *Abies* spp. (Fir), *Abies alba* (Silver fir), *Larix* spp. (Larch), *Larix decidua* (European larch), *Picea* spp. (Spruce), *Picea pungens* (Blue spruce), *Picea sitchensis* (Sitka spruce), *Pinus* spp. (Pine), *Pinus strobus* (Eastern white pine), *Pinus sylvestris* (Scots pine), *Pseudotsuga* spp. (Douglas-fir) **Hosts reported in Canada** *Picea abies* (Norway spruce), *Picea glauca* (White spruce), *Picea mariana* (Black spruce), *Picea rubens* (Red spruce) (Kolk and Starzyk, 1996; Smith and Humble, 2000; USDA, 2000; O'Leary et al., 2003; Dobesberger, 2005)	Spruce blend, geranyl acetol, and ethanol in a cross-vane panel trap.

Reason for Inclusion in Manual

Tetropium fuscum was a target species in the original EWB/BB National Survey Manual.

Pest Description

Eggs:

The egg of *T. fuscum* is 1 to 2 mm (approx. $^{1}/_{16}$ in) long by 0.2 to 0.3 mm wide with an oval, oblong shape (Dobesberger, 2005). Eggs are white with a hint of green and are smooth (Dobesberger, 2005). A band of microsculpture runs about 20% of the egg length on the end with the developing larva's head (Dobesberger, 2005). Differentiation between eggs of *Tetropium* species is not possible.

Larvae:
Larvae of *T. fuscum* are "virtually indistinguishable from other *Tetropium* species" (Smith and Humble, 2000).

"The larva is yellow-white in color, with conspicuous legs on the thorax, the tarsi of which bear tiny spinules ... Mature larvae are about 14-28 mm [approx. $^{9}/_{16}$ to 1 $^{1}/_{8}$ in] long, and are slightly flattened. The head is about 0.8 mm wide ... Hairs on the sides of the head are sparse and the head is reddish brown in color. The head capsule bears a narrow lateral white band, typical of the genus. Long, but sparse setaceous hairs (about 10 to14 hairs per tuft) occur in the anterior half with a sclerotized base. The lateropraesternum is entirely reticulately microspiculate, without a large central smooth area ... Sclerotized spinules occur on the posterior margin of abdominal tergum IX, which look like spots and are separated by a space greater than the diameter of the spinule. The spinules are set on their tubercular base with extensive, but indistinct sclerotization" (Dobesberger, 2005).

T. fuscum larva. (Stephanie Sopow, Natural Resources Canada, Bugwood.org)

Pupa of *T. fuscum* with larval exuvia (Stephanie Sopow, Natural Resources Canada, Bugwood.org)

Pupae:
"The pupa is white in color, about 17 mm long (range 10-17 mm) [approx. $^{3}/_{8}$ to $^{11}/_{16}$ in] and about 3.8 mm [1/8 in] wide ... The mesonotum is slightly raised and is devoid of large spinules. The pronotum bulges and is rounded laterally, narrowing more anteriorly (i.e., the sides become parallel), with a short longitudinally grooved fold along the sides of the disk, and minute uneven spinules. In the region of the scutellum, the mesonotum is slightly raised and minute spinules occur that are barely visible under high magnification. The abdominal tergites bulge in the posterior half, with acute spinules along the sides of a common longitudinal groove forming a

transversely elongate band that narrows laterally. Tergum VII has minute spinules behind the middle form an indistinct transverse row" (Dobesberger, 2005).

Adults:
"The adult is black or dark brown, with a flattened body that varies in length from 8-17 mm [approx. $^{5}/_{16}$ to $^{5}/_{8}$ in] ... The elytra range in color from brown to reddish or yellow-brown or straw-yellow and bear 2 to 3 distinct longitudinal stripes ... A broad whitish to beige pubescent band is present at the base of the elytra ... and the 5th sternite is distinctly truncated (flat edge). Short gray-yellow densely packed hairs cover the first quarter of the elytra. The short antennae are red-brown in color and the legs are dark brown and short. A deep groove is found on the head between the antennae. The mat-like pronotum is almost as wide as it is long. Viewed from the side, the pronotum is angular and wide, with dense granulation. It also bears a dense, wrinkled and punctured plate that has a longitudinal hole ... The pronotum is usually black with a notable bulge and sometimes with a rusty border at the base and apex ... Fine short hairs cover the body and various diverse forms in color and size occur" (Dobesberger, 2005).

T. fuscum adult (Georgette Smith, Canadian Forest Service, Bugwood.org)

T. fuscum adult (Stanislaw Kinelski, Bugwood.org)

Biology and Ecology

Both the biology and life cycles of *Tetropium fuscum* and *Tetropium castaneum* are similar and both have one generation every one to two years, depending on climate and nutritional requirements (Dobesberger, 2005; Kolk and Starzyk, 1996). Neither species undergoes maturation feeding (Kolk and Starzyk, 1996).

Females lay an average of 80 eggs either singly, in pairs or groups (Davis et al., 2008). Eggs are laid in early June (NPAG, 2000) and hatch approximately two weeks later (Davis et al., 2008).

Larval galleries lightly etch the sapwood (Smith and Humble, 2000) and are filled with frass (Kimoto and Duthie-Holt, 2006; NPAG, 2000).The mature larvae gallery depth is 2–4 cm (approx. 1 $^{13}/_{16}$ to 1 $^{9}/_{16}$ in) perpendicular to the bark and then curves in a parallel direction to the stem axis where it continues for another 3–4 cm (approx. 1 $^{3}/_{16}$ to 1 $^{9}/_{16}$ in), making a hook-like tunnel (Novak et al., 1976). Wood may be stained by associated *Ophiostoma* fungi (Smith and Humble, 2000).

The pupal chamber is at the end of the mature gallery (Novak et al., 1976).

Exit holes are elliptical in shape (Novak et al., 1976) and are 4–6 mm (approx. $^{3}/_{16}$ to ¼ in) in diameter (Kimoto and Duthie-Holt (2006). These holes may be plugged with coarse sawdust (Kimoto and Duthie-Holt, 2006). Emergence of adults depends on location and climate. In northern Europe, *Tetropium fuscum* emerges before May. It most frequently emerges in June, and in extreme northern regions emerges at the end of July and August (Novak et al., 1976). Adults live for approximately 3 weeks (Davis et al., 2008). During the summer, all life stages can be found in the host tree (Smith and Humble, 2000). In Canada, *Tetropium fuscum* can complete development in a year within its host with the larval stage overwintering (Smith and Humble, 2000).

Adults prefer host trees of more than 10 cm (3 $^{15}/_{16}$ in) in diameter (Cunningham, 2006). They are also attracted to damaged host trees.

Countries of Origin

T. fuscum is native to northern and central Europe as well as western Siberia (Smith and Humble, 2000).

Current Distribution

T. fuscum is currently distributed in Austria, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Italy, Japan, Kazakhstan, Latvia, Lithuania, Moldova, Montenegro, Netherlands, Norway, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Sweden, Switzerland, Ukraine, and Turkey (USDA-APHIS, 2010).

Distribution in United States

According to NAPIS survey data, this pest has not been found in the United States (K. Handy, personal communication, 2009).

Pathway

According to AQAS records, *T. fuscum* has been intercepted in the United States several times in the last 20 years. All interceptions were on general cargo with most being found on wood products such as wood, crating and dunnage (AQAS, accessed October 8, 2009).

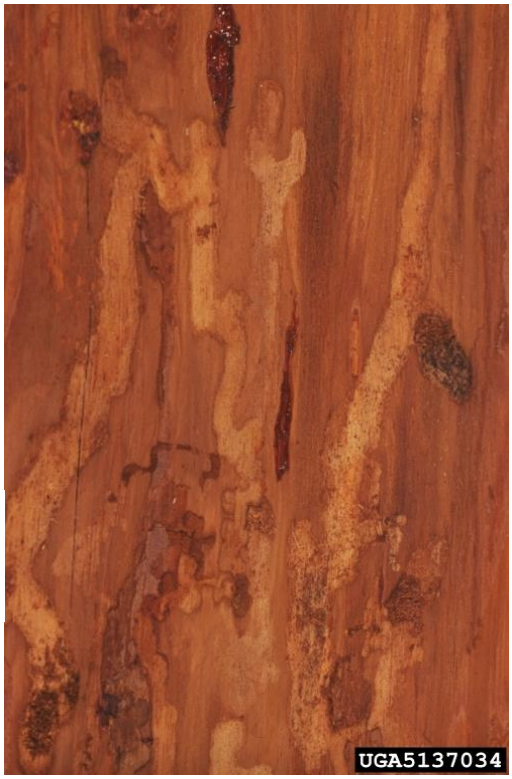
Pathogens Vectored

Two fungal pathogens are associated with *T. fuscum*, *Ophiostoma tetropii* and *Pesotum fragrans* (Harrison et al., 2004; Jacobs and Seifert, 2004a; 2004b). *O. tetropii* is thought to have been introduced with the pest into Nova Scotia (Jacobs et al., 2003). This pathogen is a blue stain fungus thought to be of low virulence (Humble and Allen, 2006).

Damage

Damage caused by *T. fuscum* may be similar to that caused by native species; therefore, it is essential to investigate more closely if suspected damage is observed. The primary symptom of an infestation is abnormally heavy sap flow, scattered streams of resin the length of the trunk from (usually) lower areas on the trunk. The needles turn progressively yellow to brown and are lost from portions of the crown. When the tree dies, the remaining foliage turns reddish brown. Exit holes are round to oval in the bark (approx. 3/16 in diameter), and L-shaped feeding tunnels wind through the wood under the bark (up to 6 mm diameter).

Abnormally heavy resin flow may indicate the presence of the brown spruce longhorned beetle (Canadian Food Inspection Service)



Damage by *T. fuscum* larvae (Georgette Smith, Canadian Forest Service, Bugwood.org)

Survey

1.1 Survey Site Selection

Select plantings or natural settings with *Picea* and/or *Pinus* species present, preferably near warehouses or other businesses that receive wood crating, pallets and dunnage from foreign sources. Follow the general instructions on **General Site Considerations for Trap Placement.**

1.2 Trap and Lure

The CAPS-approved survey method for *T. fuscum* is a cross-vane panel trap with a three lure combination: 1) spruce blend, 2) geranyl acetol, and 3) ethanol. Refer to **Appendix C: Assembly Instructions for Cross-vane Panel Traps** for guidance on assembling cross-vane panel traps. The spruce blend lure simulates monoterpenes that are emitted from red spruce, a host of *T. fuscum* (Sweeney et al., 2004; Sweeney et al., 2006). The geranyl acetol lure simulates the male-produced sex pheromone emitted by *Tetropium fuscum* (F.) and *Tetropium cinnamopterum*) (Silk and Sweeney, 2007; Silk et al., 2007). Ethanol is released by microorganisms in decaying woody tissue and is used by insects to locate stressed trees (Byers, 1992).

The release rates of these lures are highly temperature-dependent. However, CAPS has listed a conservative length of effectiveness (8 weeks all three lures) that will be effective for even the warmest climates in the CAPS community.

IPHIS Survey Supply Ordering System Product Names:

1) Spruce Blend Lure,
2) Geranyl Acetol Lure,
3) Ethanol Lure,
4) Cross Vane Panel Trap, Black

1.3 Trap Placement

Follow the general instructions on **Trap Placement** and **Trap Setup** for cross-vane panel traps.

1.4 Time of year to survey

Kolk and Starzyk (1996) report that *T. fuscum* adults are active from June to August in their native range.

Identification

CAPS-Approved Method

Morphological.

Mistaken Identities

T. fuscum can be mistaken for other indigenous *Tetropium* species. This species was first found in Canada in 1999 but was initially misidentified as *T. cinnamopterum* (O'Leary et al., 2003). A consistent and reliable characteristic to distinguish *T. fuscum* from relatives found in eastern North America is the aspirate pronotum (Smith and Hurley, 2000). *T. fuscum* is also similar to *T. castaneum* which is present in the United States.

Resources and High Resolution Images

http://www.uochb.cas.cz/~natur/cerambyx/tefus.htm

http://www.invasive.org/browse/subject.cfm?sub=4117

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