Trypodendron domesticum (Linnaeus)

Coleoptera: Curculionidae

European hardwood ambrosia beetle

Host(s)	CAPS-Approved Survey Method
Acer spp. (Maple), *Acer macrophyllum* (Bigleaf maple), *Alnus glutinosa* (European alder), *Alnus incana* (Alder), *Betula* spp. (Birch), *Caragana* spp., *Carpinus betulus*, *Carpinus orientalis*, *Castanea sativa* (Chestnut), *Crataegus* spp. (Hawthorn), *Fagus* spp. (Beech), *Fagus sylvatica* (Common beech), *Fraxinus* spp. (Ash), *Ilex aquifolium* (English holly), *Juglans regia* (Persian walnut), *Malus domestica* (Apple), *Morus alba* (White mulberry), *Robinia pseudoacacia*, (Black locust), *Salix caprea* (Goat willow), *Sorbus aria* (Chess-apple), *Sorbus aucuparia* (European mountain ash), *Tilia* spp. (Linden) *Prunus* spp. (Stone fruit), *Quercus* spp. (Oak) (Dobesberger, 2004)	Lineatin in a multi-funnel trap. **Note that alpha-pinene should not be used in the same trap as the lineatin lure.**

Reason for Inclusion in Manual

Trypodendron domesticum was a target species in the original EWB/BB National Survey Manual.

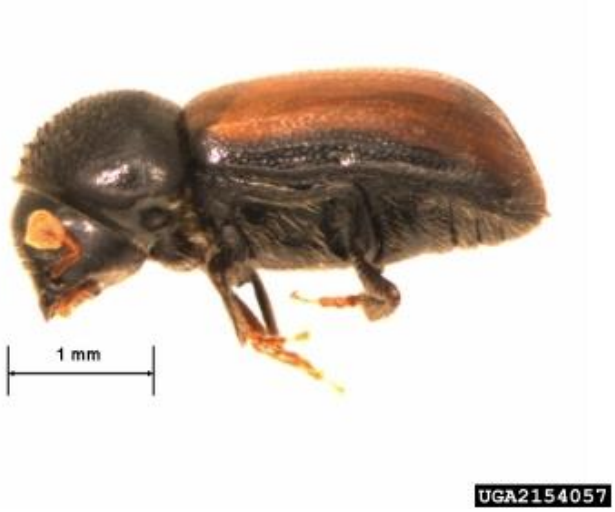
Pest Description

From "*Trypodendron domesticum*" (Dobesberger, 2004):

"Larvae are white, legless, c- shaped, with a small brownish head. Thoracic segments are pronounced and conspicuous (Novak et al. 1976). The pupa is excarate, white in color and somewhat glossy in appearance."

"Adults are black or dark brown with yellow-orange stripes on the wing covers (elytra) and 3-4 mm [approx. $^{1}/_{8}$ in] long. The head and thorax are darker in color than the elytra. The pronotum is also black but may occasionally be reddish-yellow. The last antennal segment is broad and oval. The lateral surface of the body is comprised of golden, densely packed hairs. These hairs are denser on males than females."

T. domesticum adult, dorsal view. (Maja Jurc, University of Ljubljana, Bugwood.org).



T. domesticum adult, left lateral view (Christopher Pierce, USDA APHIS PPQ, Bugwood.org)

Biology and Ecology

Adults attack sapwood of stressed or dying trees, dead trees (< 2 years), and recently cut logs. Host trees must have a high moisture content, have an acceptable soundness, and fall within a particular temperature range that is suitable for both larval and fungal development (reviewed in Dobesberger, 2004).

This species has one generation a year (Grüne, 1979). Adults become active when temperatures exceed 15°C (59°F) (Schwenke, 1974). Development is staggered meaning adults can be found from March to June (Dobesberger, 2004).

Females initiate attacks on host material and attract other adults by secreting an aggregation pheromone. Mating occurs on host trunks; females then bore a gallery, either in trunks or logs. These usually have 2 to 5 branches and can be up to 10 cm (approx. 3 $^{15}/_{16}$ in) (less in oak; 1 to 2 cm (approx. $^{3}/_{8}$ to $^{13}/_{16}$ in). Only one hole is formed for both entrance and exit. Spores of ambrosia fungi specific to *T. domesticum* (which are spread by adults) quickly germinate in galleries, creating dark stains around the edges. Females lay eggs in crevices perpendicular to

the gallery. Once hatched, larvae feed on ambrosia fungi (Dobesberger, 2004). Adult females remain in the gallery cleaning until pupation occurs. *T. domesticum* overwinters in the galleries (Gaubicher et al., 2003).

Adults can disperse several kilometers per year and may also be dispersed by wind (Dobesberger, 2004).

Countries of Origin

T. domesticum is native to Europe (Landry, 2009).

Current Distribution

This species is present in: Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Canada, Croatia, Czech Republic, Denmark, England, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Macedonia, the Netherlands, Norway, Poland, Romania, Russia, Sardinia, Scotland, Sicily, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, and Ukraine (Dobesberger, 2004; Alonzo-Zarazaga, 2004).

Distribution in United States

Landry (2009) reports Whatcom County, Washington as the first detection of this species in the United States. However, Georgia reported positive NAPIS survey data for 2002 but has not found the pest since 2008 (K. Handy, personal communication, 2009). Positive NAPIS survey data was reported in 2008 for Washington (K. Handy, personal communication, 2009).

Pathway

According to the AQAS database, *T. domesticum* has been intercepted 10 times since 1989. Most interceptions occurred in general cargo on wood products (AQAS, accessed October 8, 2009).

From "Exotic Forest Pest Information System for North America: *Trypodendron domesticum*." (Dobesberger 2004):

> "*Trypodendron domesticum* has been intercepted in Canada from hardwood crating imported from Germany (Phillippe et al. 1998). Both *T. domesticum* and *T. signatum* have been intercepted in wooden crating at U.S. ports of entry, carrying various products from Europe (Haack 2001b)…. Larvae, pupae and brood adults can be easily moved over long distance via international trade in wood products including unprocessed logs, green lumber, crating, pallets and dunnage. Transport of fuel wood is a potential source of short distance spread."

Pathogens Vectored

From "Exotic Forest Pest Information System for North America: *Trypodendron domesticum*." (Dobesberger 2004):

> "Spores of ambrosia fungi, which adhere to the adults, quickly germinate in the galleries and create a dark stain around their edges. These fungi are specific to *Trypodendron domesticum*. Two species of ambrosia fungi have been isolated from the galleries of *T. domesticum* in beech: *Ceratocystis bacillospora* Butin et Zimmermann and *C. torulosa* Butin et Zimmermann (Butin and Zimmermann 1972)."

Gallery of *T. domesticum* (Gyorgy Csoka, Hungary Forest Research Institute, Bugwood.org).

Damage

From "*Trypodendron domesticum*" (Dobesberger 2004):

> "Damage caused by *Trypodendron domesticum* and its associated ambrosia fungi is boring damage and discoloration of wood. This reduces the quality of wood products, especially high quality hardwood veneer stock. This insect usually confines its attacks to stressed, dying or recently dead trees….Logs or tree boles infested by ambrosia beetles are usually peppered with pinholes about 2 mm [approx. $^{1}/_{16}$ in] in diameter. The entrance/exit holes are surrounded by a powdery, light yellow wood dust produced during gallery excavation. The wood is riddled with galleries and larval cradles and a dark stain is present along the galleries. These symptoms apply to all ambrosia beetles and are not specific to *Trypodendron domesticum*."

Survey

1.1 Survey Site Selection

Traps should be placed in hardwood stands with minimal amounts of coniferous species. This will limit the number of the non-target species, *Trypodendron lineatum*, (a pest of conifers) that are collected (L. Humble, personal communication, 2009).

1.2 Trap and Lure

The CAPS-approved survey method for *T. domesticum* is the lineatin lure in a multi-funnel trap (Paiva and Kiesel, 1985; L. Humble, personal communication, 2009). The lineatin lure simulates the aggregation pheromone used by a similar species, *Trypodendron lineatum* (Olivier) (MacConnell et al., 1977).

The release rate of this lure is highly temperature-dependent. However, CAPS has listed a conservative length of effectiveness (12 weeks) that will be effective for even the warmest climates in the CAPS community.

IPHIS Survey Supply Ordering System Product Names:

1) Lineatin Lure
2) Multi-funnel Trap, 12 Funnel, Wet or
3) Multi-funnel Trap, 8 Funnel, Wet

Note that alpha-pinene should not be used in the same trap as the lineatin lure.

1.3 Trap Placement

Place traps in open areas within the hardwood stand. Many hardwood species are a host to this pest; however, major hosts include alder, birch, maple, and cherry (L. Humble, personal communication, 2009).

Very high populations have been recovered from declining/decaying hybrid birch stands with significant branch die back caused by the bronze birch borer, *Agrilus anxius* Gory (L. Humble, personal communication, 2009).

T. domesticum is attracted to hardwood species. Compounds released by conifers (i.e., alpha-pinene) can act as a repellent to this beetle; therefore, traps for *T. domesticum* should not be hung on or near conifers.

1.4 Time of year to survey

It is not known how many generations *Trypodendron domesticum* goes through in North America. Two to three peak capture periods have been reported in Canada and Luxembourg (L. Humble, personal communication, 2009; Petercord, 2006). Detection of *T. domesticum* requires trapping very early in the season (i.e., beginning in January in British Columbia, Canada; middle of March in Luxembourg) (L. Humble, personal communication, 2009; Petercord, 2006). Several days of temperatures over 10 to 12°C (50 to 53°F) appear to lead to flight and attack (L. Humble, personal communication, 2009).

In addition, trapping early in the season, before the peak flight of the native species, *Trypodendron lineatum,* can reduce the number of *T. lineatum* caught in traps (L. Humble, personal communication, 2009). Trap catches of this native, non-target species can be substantial and can reduce the efficiency of the identification process. Traps should be kept in the field for a 12 week period.

Identification

CAPS-Approved Method

Morphological. Examine specimens under a good quality, high powered (preferably with up to 90X) dissecting microscope, with the help of screening aids and a reference collection. Use screening aid for relevant geographical area. Use Humble (n.d.) to differentiate from native *Trypodendron* species.

Mistaken Identities

T. domesticum can be mistaken with other families of small beetles with the naked eye as well as other Scolytinae. Large numbers of the similar-looking, native species, *Trypodendron lineatum*, are drawn to the same lure used to trap *T. domesticum*.

Resources and High Resolution Images

Images

http://www.forestryimages.org/browse/subthumb.cfm?sub=4161&Start=1&display=60&sort=2

Screening aids

Humble, L. M. No date. Distinguishing native and non-indigenous *Trypodendron* species in surveillance trap captures.
http://caps.ceris.purdue.edu/dmm/130.

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