Hylurgus ligniperda (Fabricius)

Coleoptera: Curculionidae

Red-haired pine bark beetle, golden-haired beetle

Host(s)	CAPS-Approved Survey Method
Major/Primary hosts *Pinus* spp. (pine), *Pinus sylvestris* (Scots pine) **Minor hosts** *Pinus brutia* (Calabrian pine), *Pinus canariensis* (Canary island pine), *Pinus elliottii* (Slash pine), *Pinus halepensis* (Aleppo pine), *Pinus montezumae* (Montezuma pine), *Pinus nigra* Arnold (Austrian pine), *Pinus nigra* ssp. *pallasiana* (Cyprus pine), *Pinus patula* (Mexican weeping pine), *Pinus pinaster* (Maritime pine), *Pinus pinea* (Italian stone pine), *Pinus radiata* (Monterey pine), *Pinus strobus* (Eastern white pine) **Other hosts** *Abies* spp. (Fir), *Larix* spp. (Larch), *Picea* spp. (Spruce), *Pseudotsuga* spp. (Douglas-fir), (Eglitis, 2001; USDA, n.d.)	Ethanol and alpha-pinene in multi-funnel trap.

Reason for Inclusion in Manual

Hylurgus ligniperda was a target species in the original EWB/BB National Survey Manual.

Pest Description

Adults:

"Adult 4.0-5.7 mm [approx. $^{3}/_{16}$ to $^{1}/_{4}$ in], black-brown, cylindrical, covered with rather long reddish hairs. The distinctive, dense hairs are thick, notched and branched. The elytral apex is convex with a slight indentation, and without teeth or other armature" (Walker, 2006).

H. ligniperda adult (Kent Loeffler, Cornell University, Bugwood.org)

H. ligniperda adult, lateral view of head (Pest and Diseases Image Library, Bugwood.org)

For a more detailed description, as well as information on the pest's biology and ecology, see the Pine Commodity-based Survey Reference.

Biology and Ecology

This species can have more than one generation per year. In France, there are two generations a year while in Chile, there are three generations a year with adults being found throughout most of the year. Adults can disperse several kilometers (Eglitis, 2001).

Adults may attack the bases of weakened or wounded trees or large exposed roots, breeding in the bark of unhealthy *Pinus* spp. (Browne, 1968; Eglitis, 2001). Adults can kill pine seedlings by attacking roots during maturation feeding (Ciesla, 1988; Eglitis, 2001).

Adults are monogamous (Browne, 1968). Mating occurs in fresh stumps, recently cut small trees and branches, and logs buried or touching soil (Ciesla, 1988; Tribe, 1992). Females initiate gallery building by boring through the bark and building a mating chamber. A male will then join and mate with the female. Females will then build an oviposition gallery laying eggs singly in niches cut in the gallery sides, laying up to 500 eggs (Eglitis, 2001). The full gallery consists of a single longitudinal or slanted egg gallery and long, intertwined larval feeding tunnels which end in pupal cells (Browne, 1968).

Once hatched, larvae feed beneath the bark; they pupate when mature (Eglitis, 2001). Adults often overwinter in groups in bark tunnels made in the root collars or larger roots of the same host tree (Browne, 1968).

Countries of Origin

Eglitis (2001) states that this pest is indigenous to the Azores Islands and the Madeira Islands of Portugal, the Canary Islands of Spain, and Morocco.

Current Distribution

This species is present in: Australia, Austria, Azores, Balearic Islands, Belarus, Belgium, Bosnia and Herzegovina, Brazil, Canary Islands, Chile, China, Corsica, Croatia, Cyprus, Czech Republic, Demark, England, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Japan, Latvia, Lithuania, Macedonia, Madeira Island, Moldova, Morocco, the Netherlands, New Zealand, Norway, Poland, Portugal, Russia, Saint Helena, Sardinia, Sicily, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Swaziland, Sweden, Switzerland, Turkey, Ukraine, and Uruguay (Eglitis, 2001; Alonzo-Zarazaga, 2004).

Distribution in United States

California: Established population of adults discovered in 2003 (Davis et al., 2008). Positive NAPIS data reported in 2003; a high number of positives in 2005 (K. Handy, personal communication, 2009).

New York: Colony of adults discovered in 2000 (Davis et al., 2008). Positive NAPIS data reported in 1994, 1995, 2000, 2001, and 2004 (K. Handy, personal communication, 2009). No positives were reported in 2008 (K. Handy, personal communication, 2009).

H. ligniperda was first detected in the United States in Pennsylvania in 2001 and has also been reported in Ohio (Haack, 2006).

Pathway

According to AQAS records, *H. ligniperda* has been intercepted in the United States. Most interceptions were on general cargo but also occurred on mail and permit cargo. The pest has been found on non-host plant parts (bulb, cutting, fruit, leaf, root), but most interceptions occurred on wood products (AQAS accessed October 10, 2009).

All stages of *H. ligniperda* may be transported in infested conifer logs and cargo crates containing strips of bark (CABI, 2007; Scott, 2003). Plant parts associated with life stages of *H. ligniperda* include: bark, roots, stems, shoots, trunks and branches (CABI, 2007).

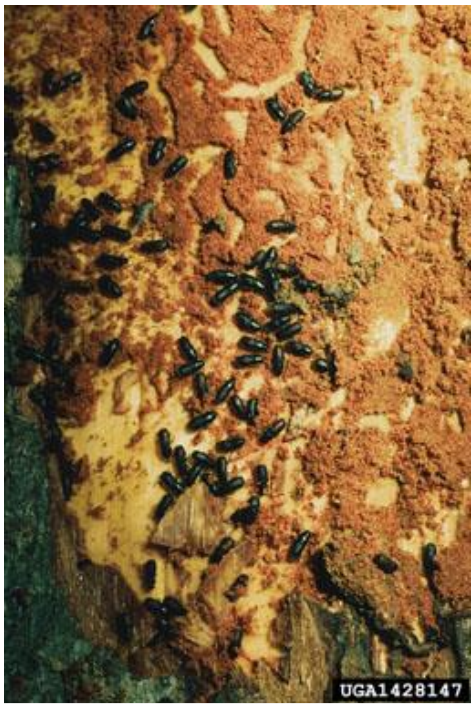
Pathogens Vectored

In South Africa, blue stain and other fungi associated with *H. ligniperda* (Tribe, 1991a; 1991b), include *Ceratocystiopsis minuta*, *Leptographium procerum*, *L. truncatum* (*=L. lundbergii*), *Ophiostoma galeiformis*, and *O. ips* (reviewed in Eglitis, 2001; Zhou et al., 2004).

The spread of *H. ligniperda* to the western United States is a concern because this pest could vector *Leptographium wagneri*, a major root disease of several western pines, and increase the distribution of the less common pathogen, *L. procerum*, to conifer plantations where it has not previously occurred (reviewed in Eglitis, 2001). *L. procerum* is a weakly pathogenic fungus associated with bark beetles and weevils (Viiri, 2004). It can infect a range of conifers and causes root decline in *Pinus strobus* (Viiri, 2004).

Damage

External evidence of maturation feeding and mining by adult beetles on young shoots includes discoloration of dying or dead shoots, loosened bark, and tree death. Dark-colored boring dust on the bark surface provides evidence of breeding attacks. The gallery system constructed beneath the bark gives internal evidence of attack. Secondary infection of vascular tissue by blue-stain fungi may be observed in the xylem. Adult females construct long, curving galleries in the inner bark and outer sapwood. Egg galleries are perpendicular to larval galleries. *H. ligniperda* may attack stems of *Pinus* spp. with thick bark, usually near the tree base or exposed areas of the root collar (reviewed in Eglitis, 2001). It may be difficult to distinguish the causes of damage in areas with several populations of bark beetles (Lieutier, 2004).



H. ligniperda adults under bark (William M. Ciesla, Forest Health Management International, Bugwood.org)

H. ligniperda egg gallery in freshly cut pine stump (William M. Ciesla, Forest Health Management International, Bugwood.org)

Survey

1.1 Survey Site Selection

Identify known or prospective hosts of *H. ligniperda* and follow the general instructions on **General Site Considerations for Trap Placement** in the manual section **Planning a Survey**.

1.2 Trap and Lure

The CAPS-approved survey method for *H. ligniperda* is ethanol and ultra-high release alpha-pinene in a multi-funnel trap (Petrice et al., 2004). Ethanol is released by microorganisms in decaying woody tissue and is used by insects to locate stressed trees (Byers, 1992). Alpha-pinene is a host volatile released by pine trees. It is a generic attractant for many pine-attacking wood-borers and bark beetles.

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

IPHIS Survey Supply Ordering System Product Names:

1) Alpha Pinene UHR Lure
2) Ethanol Lure
3) Multi-funnel Trap, 12 Funnel, Wet or
4) Multi-funnel Trap, 8 Funnel, Wet

There are two alpha pinene products available in the IPHIS Survey Supply Ordering System: 1) Alpha Pinene Lure and 2) Alpha Pinene UHR Lure. The Alpha Pinene Lure is an un-gelled lure in a bottle dispenser that is used by the PPQ Program for *Tomicus piniperda* (pine shoot beetle). This lure should only be used for the program survey.

The Alpha Pinene UHR Lure is a polysleeve, ultra-high release dispenser used for other EWB/BB targets. This lure should be used with the Ethanol Lure for the following four EWB/BB targets: *Hylurgops palliatus, Hylurgus ligniperda, Monochamus alternatus,* and *Tomicus destruens*.

1.3 Trap Placement

Follow the general instructions on **Trap Placement** and **Trap Setup** for multi-funnel traps in the manual section **Conducting a Survey**.

1.4 Time of year to survey

In New York, *H. ligniperda* is reported to complete two generations, the first from May to mid-July and the second from mid-July to September (NAPPO, PAS, 2002). In New York, "adult flight activity was heaviest from September to November, corresponding with the second generation's emergence" (NAPPO, PAS, 2002).

Identification

CAPS-Approved Method

Morphological: Examine specimens under a good quality, high powered (preferably with up to 90X) dissecting microscope, with the help of a reference collection. Use the screening aid(s) for the relevant geographical area.

Mistaken Identities

With the naked eye, *H. ligniperda* could be confused with other families of small beetles. Upon magnification, *H. ligniperda* could be confused with other scolytids, *Dendroctonus* species, or *Tomicus* species.

Hylastes porculus is a similar-looking species present in the United States.

Resources and High Resolution Images

Images

http://www.forestryimages.org/browse/subthumb.cfm?sub=885&Start=1&display=60&sort=2

Screening Aids

Baker, J.R., J. LaBonte, T.H. Atkinson, and S. Bambara. 2009. An Identification Tool for Bark Beetles of the Southeastern United States. http://keys.lucidcentral.org/keys/v3/bark_beetles_v2/Key/whole_site_media/About%20this%20Tool.htm

Brown, B. 2009. Screening Aid to Separate Scolytinae Bark Beetles from other Similar Appearing Bark Beetles. http://caps.ceris.purdue.edu/screening/scolytinae_versus_similar_bark_beetles.

Cavey, J., S. Passoa, and D. Kucera. 1994. Screening Aids for Exotic Bark Beetles in the Northeastern United States. NA-TP-11-94. Northeastern Area: U.S. Department of Agriculture, Forest Service. (Key should be used for surveys in the Northeastern U.S. only.) http://caps.ceris.purdue.edu/screening/exotic_bark_beetles_of_northeast.

LaBonte, J. R., S.A. Valley, E.R. Hoebeke, and R.J. Rabaglia. No date. Screening Aid for Eastern Scolytinae. (Key should be used for surveys in the Eastern U.S. only.) http://caps.ceris.purdue.edu/screening/scolytinae_eastern.

LaBonte, J.R., S.A. Valley, and J.J. Vlach. No date. Screening Aid for Western Scolytinae. (Key should be used for surveys in the Western U.S. only.) http://caps.ceris.purdue.edu/screening/scolytinae_western.

References

Alonzo-Zarazaga, M. A. 2004. Fauna Europaea: *Hylurgus ligniperda*. Fauna Europaea version 2.4, http://www.faunaeur.org

AQAS. 2009. Interception data for *Hylurgus ligniperda*. Accessed October 10, 2009 from: https://mokcs14.aphis.usda.gov/aqas/HomePageInit.do

Browne, F. G. 1968. Pests and Diseases of Forest Plantation Trees: An annotated list of the principal species occurring in the British Commonwealth. Clarendon Press, Oxford.

Byers, J.A. 1992. Attraction of bark beetles, *Tomicus piniperda*, *Hylurgops palliatus*, and *Trypodendron domesticum* and other insects to short-chain alcohols and monoterpenes. Journal of Chemical Ecology. 18(12): 2385-2402.

CABI. 2007. *Hylurgus ligniperda*. Crop Protection Compendium. Accessed October 10, 2011 from: http://www.cabi.org/cpc.

Ciesla, W. M. 1988. Pine bark beetles: A new pest management challenge for Chilean forests. Journal of Forestry 86(12): 27-31.

Davis, E.E., E.M. Albrecht, and R.C. Venette. 2008. Pine Commodity-based Survey Reference. USDA-APHIS.

Eglitis, A. 2001. Exotic Forest Pest Information System for North America: *Hylurgus ligniperda*. North American Forestry Commission.

Haack, R. A. 2006. Exotic bark- and wood-boring Coleoptera in the United States: recent establishments and interceptions. Canadian Journal of Forest Research, 36:269-288.

Handy, K. J. 2009. NAPIS data for EWB/BB target species. Personal communication (email) to L. Jackson on 23 March 2009, from KJ Handy (USDA-APHIS-PPQ-EDP).

Lieutier, F. 2004. Host Resistance to Bark Beetle and its Variations, pp. 135-180. In F. Lieutier, K. R. Day, A. Battisti, J. C. Gregoire and H. F. Evans (eds.), Bark and Wood Boring Insects in Living Trees in Europe, a Synthesis. Kluwer Academic Publishers, London.

NAPPO, PAS. 2002. *Hylurgus ligniperda* Fabricius: An infestation of a bark beetle species capable of vectoring pathogenic fungi was recently found in North America. North American Plant Protection Organization, Phytosanitary Alert System.

Petrice, TR, RA Haack, and TM Poland. 2004. Evaluation of three trap types and five lures for monitoring *Hylurgus ligniperda* (Coleoptera: Scolytidae) and other local scolytids in New York. Great Lakes Entomologist 37: 1-9.

Scott, S. 2003. NPAG Report: *Hylurgus ligniperda* Fabricius, Red Haired Pine Bark Beetle. USDA-APHIS-PPQ-CPHST-New Pest Advisory Group. 2 pp.

Tribe, G. D. 1991a. Phenology of three exotic pine bark beetle species (Coleoptera: Scolytidae) colonising *Pinus radiata* logs in the south-western Cape Province. South African Forestry Journal 157: 27-31.

Tribe, G. D. 1991b. Phenology of *Pinus radiata* log colonization by the red-haired pine bark beetle *Hylurgus ligniperda* (Fabricius) (Coleoptera: Scolytidae) in the south-western Cape Province. Journal of the Entomological Society of Southern Africa 54: 1-7.

Tribe, G. D. 1992. Colonisation sites on *Pinus radiata* logs of the bark beetles, *Orthotomicus erosus*, *Hylastes angustatus* and *Hylurgus ligniperda* (Coleoptera: Scolytidae). Journal of the Entomological Society of South Africa 55: 77-84.

USDA. No date. Pest Alert, New Introduction: the Red-haired Bark Beetle, *Hylurgus ligniperda* Fabricius (Coleoptera: Scolytidae). USDA-Forest Service, Northeastern Area, NA-PR-03-02.

Viiri, H. 2004. Fungi associated with *Hylobius abietis* and other weevils, pp. 381-393. *In* F. Lieutier, K. R. Day, A. Battisti, J. C. Gregoire and H. F. Evans (eds.), Bark and Wood Boring Insects in Living Trees in Europe, a Synthesis. Kluwer Academic Publishers, London.

Walker, K. 2006. Goldenhaired bark beetle (*Hylurgus ligniperda*). Pest and Diseases Image Library. Available on-line at: http://www.padil.gov.au/. Accessed 28 March 2007.

Zhou, X. D., Z. W. de Beer, R. Ahumada, B. D. Wingfield, and M. J. Wingfield. 2004. *Ophiostoma* and *Ceratocystiopsis* spp. associated with two pine-infesting bark beetles in Chile. Fungal Diversity 15: 261-274.