

The linden bark borer (Lepidoptera: Agonoxenidae) infesting European linden in Nova Scotia

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The Holarctic genus *Chrysoclista* (Lepidoptera: Agonoxenidae) consists of very distinctive, small, brightly coloured moths whose larvae bore in the bark of deciduous trees. There are seven species worldwide including three found in Europe, two found in the Caucasus, and two Nearctic species, *C. cambiella* (Busck, 1915) and *C. villega* (Busck, 1904). In addition, the Palearctic species *C. linneella* (Clerck, 1759) has been introduced to North America (Karsholt 1997).

In Europe, *C. linneella* is found across most of the continent, in all of the Baltic and Fennoscandian countries, Great Britain, the Netherlands, Belgium, Luxembourg, Germany, Poland, Czech Republic, Slovakia, Hungary, Austria, Switzerland, France, Spain, Italy, Rumania, Russia (Karsholt and Razowski 1996), Turkey, and Ukraine (S. Koster, personal communication).

Chrysoclista linneella was first reported in North America from specimens collected in New York City in 1928 (Klots 1942). In the United States there are reports and records from other parts of New York State, New Jersey, near Boston, Massachusetts (Baker 1972), Connecticut, and Vermont (D.L. Wagner, personal communication). In Canada the only specimens indicated in the National Forest Health and Biodiversity Database were collected between 1964 and 1966 in St. Catharines and Fort Erie, Ontario (J.R. Trinnell, Canadian National Collection of Insects, Ottawa, Ontario). Rose and Lindquist (1997) also listed Ottawa as a locality, although subsequent investigation by K. Nystrom (who revised this publication) was unable to determine the source of this report (K. Nystrom, personal communication).

The larvae of this species feed in the bark of European linden (*Tilia xeuropaea* L.; Tiliaceae), extruding a rusty-coloured frass. Pupation takes place in the bark in the early spring, when the larvae are approximately 6 mm long. Adults (a

single generation) then emerge and are present from May to August. Bark, honeycombed by larval boring, can be found from ground level on the stem to high in the crown (Karsholt 1997; Rose and Lindquist 1997).

A taxonomic note: members of this genus have until recently often been placed in the genus *Glyphipterix* Hübner and the specific name *linneella* has also frequently been misspelled as *lineella*, *linnaeella*, and *linnaeanella*. *Chrysoclista linneella* is now considered the correct name and placement (Tubbs 1986).

In 2000, in the context of research on the insect fauna of Point Pleasant Park, Halifax, Nova Scotia, a number of specimens of *C. linneella* were collected. Subsequent investigations from 2001 to 2004 in other areas of the city have shown the species to be present throughout peninsular Halifax. Adults have been collected from 30 June through 23 September (C.G. Majka collection, Halifax). Almost every *T. xeuropaea* tree examined showed extruded frass from the boring of the larvae, and when the surface of the bark was cut away with a penknife, the pale white larvae could be seen. In some instances the outer portions of the bark were honeycombed to such a degree by larval tunneling as to allow the bark to be crumbled by hand.

At various times, particularly from mid-July to early September, adults could be exceedingly abundant. Clouds of hundreds or even thousands of individual moths could be observed during daylight hours flying around all portions of affected trees. Beyond these observations, no attempt has been made to survey the extent of the infestation. The long- and short-term effects of this infestation on *T. xeuropaea* trees have also to be investigated.

Tilia xeuropaea originates in Europe and has been extensively planted (occasionally escaping) in the Halifax metropolitan area. It is also found in Bridgewater, Wolfville, Truro, and

Received 26 January 2005. Accepted 26 August 2005.

Sydney in the province (Roland 1998). It is unknown how long *C. linneella* has been present in Nova Scotia; however, the Nova Scotia Museum of Natural History contains extensive holdings of microlepidoptera collected in Nova Scotia in general, and Halifax in particular, by Douglas C. Ferguson (between 1945 and 1965) and Barry Wright (between 1965 and 1993), both eminent lepidopterists and successive curators of entomology at the Museum. There are no specimens of *C. linneella* in this material and it seems highly improbable that, were it present at that time, it would have escaped their notice. Thus, indications are that the species was introduced after 1993. This population is clearly significantly disjunct from the United States eastern seaboard and southern Ontario population and may represent a separate introduction to the continent. The port of Halifax is well known historically as a source for the introduction of exotic insects (Majka and Klimaszewski 2004).

Many thanks to D. Bright (Agriculture Canada), R. Brown (Mississippi Entomological Museum), J.B. Heppner (Florida State Collection of Arthropods), O. Karsholt (Zoologisk Museum, Denmark), S. Koster (Zoological Museum Amsterdam), K. Nystrom (Canadian Forest Service), E. van Nieukerken (National Museum of Natural History, the Netherlands), and D. Wagner (University of Connecticut) for their assistance. Thanks to C. Ewing and A.

Hebda (Nova Scotia Museum) for continuing support and encouragement.

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