J. Acad. Entomol. Soc. 9: 4-7 (2013)

NOTE

Establishment of a European cockroach, *Ectobius lapponicus* (L.) (Dictyoptera: Blattodea), in the Maritime Provinces of eastern Canada

Jeff C. Clements, Denis A. Doucet and David B. McCorquodale

The Dusky Cockroach, *Ectobius lapponicus* (Linnaeus, 1758) (Dictyoptera: Blattodea), native to Europe, was first found in North America in southeastern New Hampshire in 1984 (Chandler 1985). Since then, this species has spread along the eastern seaboard of the United States to Maine, Massachusetts and Vermont, and in Canada in Ontario and Prince Edward Island (Chandler 1992; Hoebeke and Carter 2010). *Ectobius lapponicus* is one of four *Ectobius* species that have become established in northeastern North America (Chandler 1985, 1992; Hoebeke and Carter 2010). Here we provide evidence that a population of *Ectobius lapponicus* in Prince Edward Island has persisted for more than a decade and that there are established populations in New Brunswick and Nova Scotia.

Ectobius lapponicus has a two year life cycle with a year-long overwintering stage (Holuša and Kočárek 2000). Although the biology and ecology of this species is not described specifically for eastern North America, it has been described in the Czech Republic (Holuša and Kočárek 2000). In the Czech Republic, adults occur from the end of May to early September, with oothecae produced from June onwards, and carried by female roaches for approximately 24 hours after which they are deposited in leaf-litter (Brown 1973). Eggs hatch in the following June and nymphs develop through 4 instars after which they overwinter for a year before becoming adults starting the following May. Nymphs that don't reach the 4th instar overwinter in a dormant state. Adult and nymph males are typically found on low-lying vegetation, while females are more often found in leaf litter and decaying wood (Roth and Willis 1960). Males are typically active from noon to sunset, while nymphs and females are most active overnight (Holuša and Kočárek 2000). Although the feeding ecology of *Ectobius lapponicus* has not been explicitly described, most cockroaches inhabiting forests forage on vegetation (Schal et al. 1984). Furthermore, *Ectobius lapponicus*, is not known to prey on other insects. Anecdotal evidence suggests they can be found in buildings, (Chandler 1985, 1992; Mielke 2000; Weidner 1972), but this roach does not typically reside within buildings or houses (Mielke 2000). Given that *Ectobius lapponicus* is not considered invasive (i.e., negative ecological consequences) in natural habitats, nor as a human pest, its introduction can be considered relatively benign.

Ectobius cockroaches are typically brown-yellowish in colouration with clear margins. Females have much shorter wings than males (Bohn 1989). Although females are often larger than males for many *Ectobius* species (Encyclopedia of Life 2013), male *Ectobius lapponicus* (13—14 mm) are typically larger than females (9.5—10 mm) (Chandler 1985). The pronotum of *Ectobius lapponicus* has transparent margins with a central circular dark spot. The tegmen is brown to grey-brown spotted with numerous brown specks. Males and females can be distinguished by their tegmina, which are fully developed in males, but shortened in females. Additionally, males have a large, rounded or triangular impression on the base of the seventh tergite containing a pair of setae-covered tubercles. The combination of brown specks on the tegmina, the circularly-shaped dark spot on the pronotum, and the presence of tubercles in the impression on the seventh

Received 10 July 2013. Accepted for publication 13 November 2013. Published on the Acadian Entomological Society website at www.acadianes.ca/journal.html on 10 December 2013.

Jeff C. Clements: University of New Brunswick, Department of Biology, 100 Tucker Park Road, Saint John, NB, Canada, E2L 4L5.

Denis A. Doucet: Fundy National Park of Canada, PO Box 1001, Alma, NB, Canada, E4H 1B4.

David B. McCorquodale: Cape Breton University, Department of Biology, Sydney, Nova Scotia, Canada, B1P 6L2.

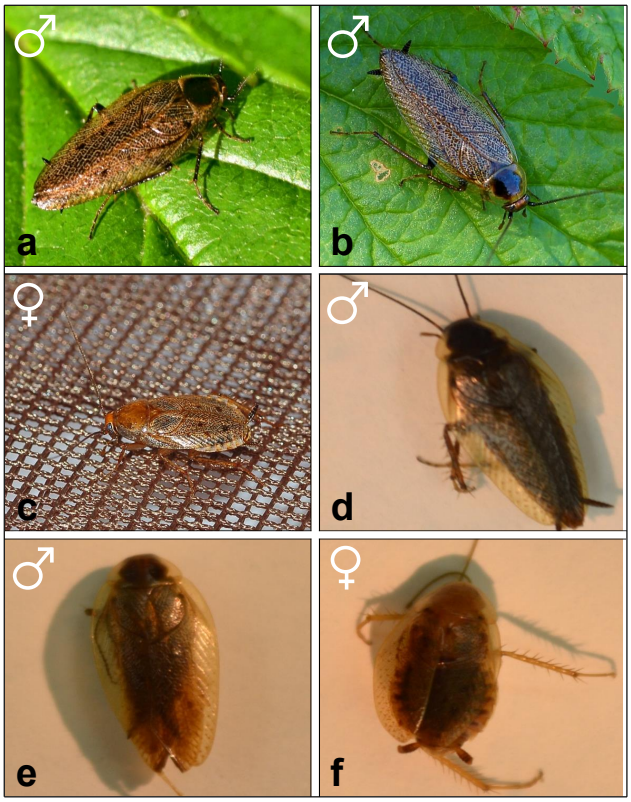
Corresponding author (email j.clements@unb.ca).

tergite distinguishes *Ectobius lapponicus* from other closely related species, such as *Ectobius pallidus* (Olivier, 1789), *Ectobius lucidus* (Hagenbach, 1822), and *Ectobius sylvestris* (Poda, 1761), which are not known to occur in Atlantic Canada (Chandler 1985; Hoebeke and Carter 2010).

On 3 July 2013, J.C. Clements photographed a single *Ectobius lapponicus* male (Figure 1a) near Lily Lake in Rockwood Park in Saint John, New Brunswick (45°17'34"N, 66°03'19"W) sitting atop the leaf of a *Viburnum* sp. shrub. On 25 July 2013, four more individuals (two males and two females) were photographed and collected in a similar habitat at Fundy National Park (45°35'38"N, 64°57'09"W) by D.A. Doucet and submitted to the New Brunswick Museum (Figure 1b,c; catalog numbers pending). There are specimens of *Ectobius lapponicus* from Nova Scotia and Prince Edward Island in the Cape Breton University insect collection. Those from Nova Scotia include juveniles collected by D.B. McCorquodale and C. D'Orsay at Petersfield Park in Westmount, Nova Scotia (46°06'36"N, 60°21'00"W) on 29 August 2008 and an adult male from Petersfield Park (46°08'49"N, 60°13'08"W) collected by S.A. Donovan and E.I. Byington on 17 June 2009 (Figure 1d). A photo of a male *Ectobius lapponicus* from Petersfield Park was also posted on BugGuide in 2010 (C. D'Orsay, 2010). From Prince Edward Island, there are two adult males and an adult female (Figure 1e,f) collected by D.B. McCorquodale on 1 August 2005 from Stanhope (46°25'29"N, 63°08'46"W). This site is approximately 3 km west of Stanhope Campground where Chandler (1992) reported *Ectobius lapponicus*.

The habitats of these four sites were similar and comprised a mix of shrubs and grass in anthropogenically disturbed areas. The Rockwood Park individual was found on trailside vegetation in a clearing at the edge of a mixed forest comprising Mountain Maple (*Acer spicatum* Lam.) (Aceraceae), American Beech (*Fagus grandifolia* Ehrh.) (Fagaceae), spruce (*Picea* spp.) (Pinaceae), Trembling Aspen (*Populus tremuloides* Michx.) (Salicaceae), and Eastern White Cedar (*Thuja occidentalis* L.) (Cupressaceae)) (Figure 2a). Understory vegetation was dominated by various grasses (Poaceae), alders (*Alnus* spp.) (Betulaceae), Burdock (*Arctium* sp.) (Asteraceae), asters (Asteraceae), goldenrods (*Solidago* spp.) (Asteraceae), and viburnum shrubs (*Viburnum* sp.) (Caprifoliaceae). Similarly, the individuals found in Fundy National Park were located in the shrub layer of Bunchberry (*Cornus canadensis* L.) (Cornaceae), buttercups (*Ranunculus* sp.) (Ranunculaceae), brambles and raspberries (*Rubus* spp.) (Rosaceae), willows (*Salix* spp.) (Salicaceae), goldenrods

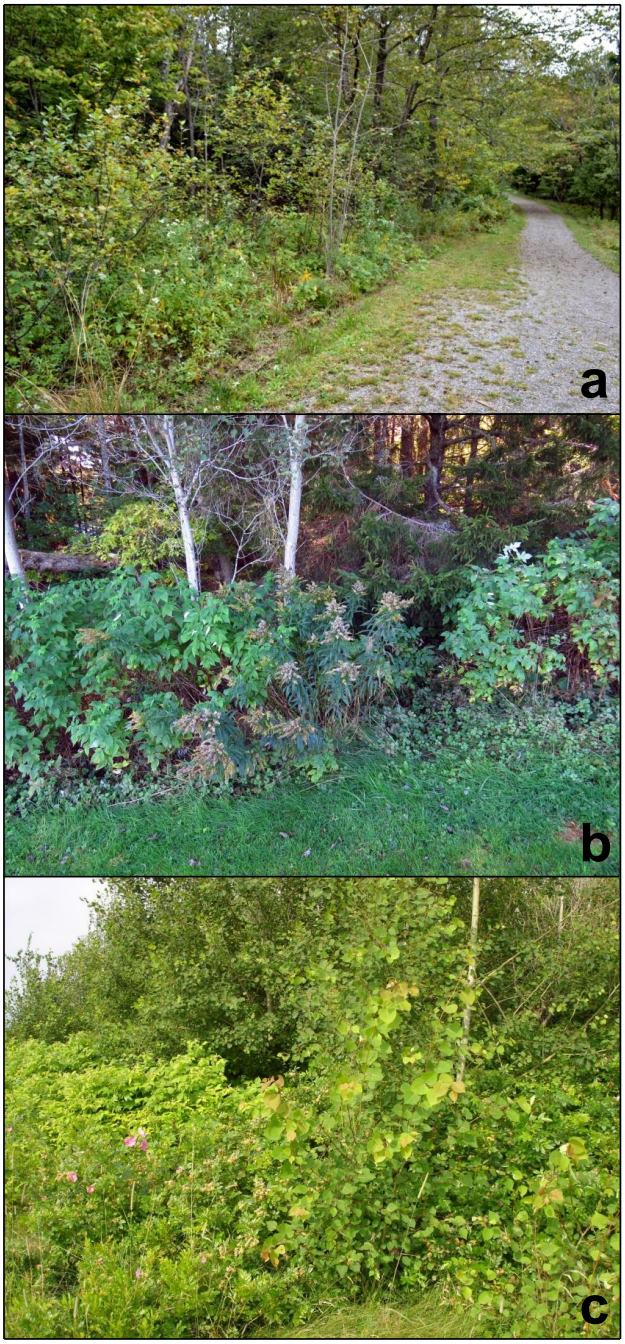
Figure 1. Dusky Cockroach, *Ectobius lapponicus*, a) male photographed near Lily Lake in Rockwood Park in Saint John, New Brunswick (45°17'34"N, 66°03'19"W) 3 July 2013; b) male, and c) female Fundy National Park, New Brunswick (45°35'38"N, 64°57'09"W) 25 July 2013; d) male collected in Petersfield Park, Nova Scotia (46°08'49"N, 60°13'08"W) 17 June 2009; e) male and f) female collected at Stanhope Bayshore (46°25'29"N, 63°08'46"W) on 1 August 2005.



(*Solidago* spp.), other asters (Asteraceae) and grasses (Poaceae) at the edge of a mixed forest patch comprising mostly Balsam Fir (*Abies balsamea* (L.) Mill.) (Pinaceae), Sugar Maple (*Acer saccharum* Marshall) (Aceraceae), Yellow Birch (*Betula alleghaniensis* Britt.) (Betulaceae), and Red Spruce (*Picea rubens* Sarg.) (Pinaceae) (Figure 2b). The habitat associated with the Prince Edward Island collection was also very similar, with specimens obtained from an area of shrubby vegetation (*Rosa* sp., *Populus tremuloides*) at the edge of a clearing (Figure 2c). Petersfield is an estate from the late 1800s which has been turned into a provincial park. *Ectobius lapponicus* specimens were swept from ornamental shrubs along the edge of lawns, with a young maple-birch-aspen-spruce forest nearby.

In anthropogenically disturbed habitats, many species of insects are non-native (e.g., Hobbs and Huenneke 1992; D'Antonio and Dudley 1995). This habitat is consistent

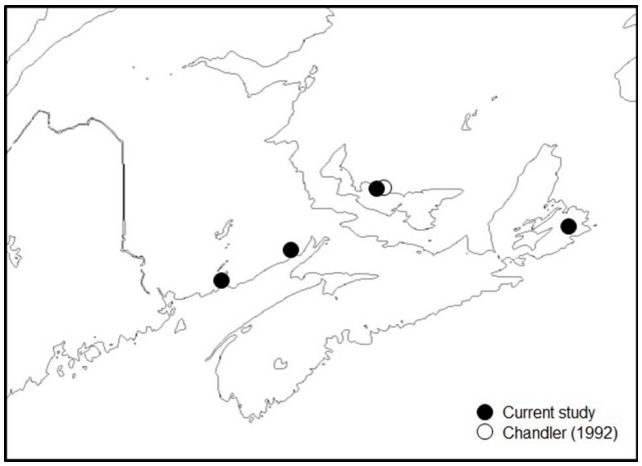
Figure 2. Habitat of Dusky Cockroach, *Ectobius lapponicus*, at a) Lily Lake in Rockwood Park in Saint John, New Brunswick (45°17′34″N, 66°03′19″W) on 3 July 2013; b) Fundy National Park, New Brunswick (45°35′38″N, 64°57′09″W) on 25 July 2013; and c) Stanhope, PEI (46°25′29″N, 63°08′46″W) on 1 August 2005.



with that of all reported *Ectobius lapponicus* specimens in this study. The presence of individuals in Prince Edward Island approximately 3 km and 13 years apart indicates an established population. Furthermore, given that males and females were found in both collections and the fact that these roaches can overwinter in similar climates, it is highly likely that a single breeding population occurs at this location in Prince Edward Island. Individuals at Petersfield Park on Cape Breton Island collected in three consecutive years also suggest that *Ectobius lapponicus* can overwinter and are established, although no further monitoring has been conducted. In addition, the presence of multiple individuals of both sexes in two places (approximately 95 km apart) in New Brunswick suggests that *Ectobius lapponicus* is established as well. With established populations in Maine, Prince Edward Island, and Cape Breton Island, *Ectobius lapponicus* is likely to have been in New Brunswick for quite some time, despite this being the first record. Collectively, these records suggest that *Ectobius lapponicus* is widely established in the Maritime Provinces of Canada.

This paper is the first report of a non-native European cockroach, *Ectobius lapponicus*, in New Brunswick and Nova Scotia, and provides evidence of the established populations of this species in anthropogenically disturbed habitats in all three Maritime Provinces (Figure 3). This is consistent with the range extension and distribution pattern of *Ectobius lapponicus* in northeast North America since its introduction in 1984, and extends the work of Chandler (1985, 1992), who noted the presence of *Ectobius lapponicus* in Vermont, Maine, New Hampshire, and Prince Edward Island. Interestingly, however, no specimens have been recorded from mainland Nova Scotia or central-northern New Brunswick (Figure 3), warranting targeted collecting to determine presence and abundance in those areas. Furthermore, future monitoring in southern New Brunswick and Cape Breton should be considered to determine the establishment of this species, and potentially others, over multiple years. Other *Ectobius* species (*Ectobius lucidus*, *Ectobius pallidus*, and *Ectobius sylvestris*) are also found as close as Massachusetts and New York (Hoebeke and Carter 2010). Of these species, *Ectobius pallidus* is the most likely to be found in the Maritimes, because it occurs as close as Massachusetts and in a habitat similar to that of *Ectobius lapponicus* (Hoebeke and Carter 2010). Finally, given that this is the first record of *Ectobius lapponicus* in New Brunswick, it is possible that this species has only recently arrived in the province, and so an attempt should be made to determine the source of the initial introduction, as this could help to further understand the spread of this species in New Brunswick and elsewhere.

Figure 3. Reported distribution of *Ectobius lapponicus* in the Maritime Provinces of eastern Canada from Chandler (1992) and this study.



ACKNOWLEDGEMENTS

The authors would like to thank Dr. Donald Chandler of the University of New Hampshire for expert identification and Dr. Don McAlpine at the New Brunswick Museum for the curation of New Brunswick specimens.

REFERENCES

Bohn, H. 1989. Revision of the sylvestris group of *Ectobius* Stephens in Europe (Blattaria: Blattellidae). Entomologica scandinavica, **20:** 317–342.

Brown, V.K. 1973. The overwintering stages of *Ectobius lapponicus* (L.) (Dictyoptera: Blattidae). Journal of Entomology Series A, General Entomology **48:** 11-24.

Chandler, D.S. 1985. A new introduction of a European cockroach, *Ectobius lapponicus*. Entomological News **96:** 98-100.

Chandler, D.S. 1992. New records of *Ectobius lapponicus* in North America (Dictyoptera, Blattellidae). Entomological News **103:** 139-141.

D'Antonio, C.M., and Dudley, T.L. 1995. Biological invasions as agents of change on islands versus mainlands. In: Vitousek, P.M., Loope, L.L. and Adsersen, H. (Editors). Islands: Biological diversity and ecosystem function. Springer-Verlag, New York, USA. pp. 103-121.

D'Orsay, C. 2010. Cockroach - *Ectobius lapponicus*? - *Ectobius lapponicus* [online]. Available from http://bugguide.net/node/view/425737/bgimage [accessed 02 October 2013].

Encyclopedia of Life. *Ectobius* [online]. Available from http://eol.org/pages/35558/details [accessed 08 October 2013].

Hoebeke, E.R., and Carter, M.E. 2010. First North American record of *Ectobius lucidus* (Hagenbach) (Blattodea: Blatellidae: Ectobiinae), with notes on recognition characters and seasonal history, and additional records for other *Ectobius* species in the northeastern United States. Proceedings of the Entomological Society of Washington **112:** 229-238.

Holuša, J., and Kočárek, P. 2000. Seasonal dynamics of the dusky cockroach *Ectobius lapponicus* (Blattodea, Blattellidae) in the eastern part of the Czech Republic. Biologia, Bratislava **55:** 483-486.

Hobbs, R.J., and Huenneke, L.F. 1992. Disturbance, diversity, and invasion: Implications for conservation. Conservation Biology **6:** 324-337.

Mielke, V.U. 2000. On the occurrence of the dusky cockroach (*Ectobius lapponicus* (Linne, 1758)) in buildings. Journal of Pest Science **73:** 152-154.

Roth, L.M., and Willis, E.R. 1960. The biotic associations of cockroaches. Smithsonian Miscellaneous Collections vol. 141. The Lord Baltimore Press Inc, Baltimore, Maryland, USA. 518pp.

Schal, C. Gautier, J.Y., and Bell, W.J. 1984. Behavioural ecology of cockroaches. Biological Reviews **59:** 209-254.

Weidner, V.H. 1972. *Ectobius lapponicus* as potential pests in vacation homes. Journal of Pest Science **45:** 75-76.