Agrilus sulcicollis (Coleoptera: Buprestidae), a new alien species in North America

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Abstract—The European oak borer, *Agrilus sulcicollis* Lacordaire, a newly detected alien species in Canada, is reported from southern Ontario. This species is illustrated and diagnosed to facilitate its recognition among other North American species of *Agrilus* Curtis. Data are provided on its phylogenetic affinities, host plants, native distribution, and all North American records known to date. The other eight non-native *Agrilus* species known in North America (*A. cuprescens* (Ménétriés), *A. cyanescens* Ratzeburg, *A. derasofasciatus* Lacordaire, *A. hyperici* (Creutzer), *A. pilosovittatus* Saunders, *A. planipennis* Fairmaire, *A. sinuatus* (Olivier), and *A. subrobustus* Saunders) are briefly discussed.

Résumé—L'agrile européen du chêne, *Agrilus sulcicollis* Lacordaire, une espèce étrangère retrouvée récemment au Canada, est signalé dans le sud de l'Ontario. Nous présentons des illustrations et des diagnoses pour faciliter son identification parmi les autres *Agrilus* Curtis d'Amérique du Nord. Nous fournissons aussi des informations sur ses affinités phylogénétiques, ses plantes hôtes, sa répartition d'origine et l'ensemble des récoltes connues à ce jour en Amérique du Nord. Nous discutons brièvement des huit autres espèces non indigènes d'*Agrilus* retrouvées en Amérique du Nord (*A. cuprescens* (Ménétriés), *A. cyanescens* Ratzeburg, *A. derasofasciatus* Lacordaire, *A. hyperici* (Creutzer), *A. pilosovittatus* Saunders, *A. planipennis* Fairmaire, *A. sinuatus* (Olivier) et *A. subrobustus* Saunders).

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Introduction

Over the last few years "*Agrilus*" (Coleoptera: Buprestidae) has marched into the vocabulary of North Americans — professional entomologists and members of the public alike. It is the name of one of the largest genera in the Animal Kingdom, in the jewel beetle family, with 2783 currently valid species (Bellamy 2008). However, what is even more widely known is that this genus accommodates the infamous emerald ash borer, *A. planipennis* Fairmaire, one of the most recently found (Haack *et al.* 2002) and notorious invasive alien species of wood-borers threatening ash trees in eastern North America.

The emerald ash borer is among eight species of *Agrilus* Curtis native to the Asia Pacific region (People's Republic of China and adjacent territories) and other areas but now established in North America (see Discussion). In this paper we report yet another alien *Agrilus* species recently identified from various localities in southern Ontario, Canada, but this time originating from Europe.

A single female of a presumably alien *Agrilus* species, collected on a sticky trap in the vicinity of London, Ontario (42°59′N, 81°15′W), in August 2006 was brought to the attention of the senior author on 22 July 2008. This specimen was initially identified as *A. sulcicollis* Lacordaire, a species that develops in oaks and is native to most of Europe. *Agrilus sulcicollis* had not been previously reported from North America, although it had been intercepted at ports of entry into the United States of America (Haack *et al.* 2002). Since our initial identification, we have searched for additional specimens, particularly males, to confirm the identification and

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the establishment of this species in North America.

This paper reports our search for, and discovery of, additional female and male specimens of *A. sulcicollis*. This species is briefly redescribed, emphasizing and illustrating the main diagnostic characters to facilitate its recognition among other *Agrilus* species in North America. We also provide data on the phylogenetic affinities of *A. sulcicollis*, its host plants, and its native distribution, and cite all known North American records. In addition, we provide a list of nonnative *Agrilus* species known to be established in North America and briefly discuss the history of their introduction.

Materials and methods

The methodology and terminology used in this paper follow those previously employed in other papers on *Agrilus* by the first author (*e.g.*, Jendek 2006). Collection abbreviations follow Evenhuis (2009):

CNC Canadian National Collection of Insects, Arachnids and Arthropods, Ottawa, Ontario, Canada
DEBU Insect Collection, University of Guelph, Guelph, Ontario, Canada
GLFR Great Lakes Forest Research Centre, Canadian Forestry Service, Sault Ste. Marie, Ontario, Canada

Results

History of the discovery of *A. sulcicollis* in Ontario

Six days after examining the first specimen tentatively identified as *A. sulcicollis*, we conducted a collecting trip to Pinery Provincial Park (43°15′N, 81°50′W) in southern Ontario in search of more specimens of this species. No live adult specimens were discovered, likely because it was too late in the flight season of this species. Consequently, we modified our search strategy and focused on finding the characteristic D-shaped *Agrilus* exit holes on oaks (*Quercus* L., Fagaceae), which occasionally contain remnants of unemerged beetles embedded in the bark. After an extensive search we succeeded in finding remnants of two adult female *Agrilus*. We also collected oak branches with live *Agrilus* larvae, from which one adult *A. sulcicollis* was reared in early January 2009. These discoveries proved that the species is well established in southern Ontario and that oak is indeed a host plant.

In DEBU we discovered six additional conspecific female specimens, collected on various dates as early as 1995, also in Pinery Provincial Park, Ontario. Two males and one female were discovered in the collection of Philip Careless, a University of Guelph graduate student studying the foraging activity of a buprestid-hunting solitary wasp, *Cerceris fumipennis* Say (Hymenoptera: Crabronidae). The males were positively identified as the European *A. sulcicollis*. We later identified numerous males and females among *Agrilus* specimens collected by Barry Lyons and his colleagues in southern Ontario (GLFR).

Despite making a special effort to search for *A. sulcicollis*, we found none among 435 medium-sized metallic *Agrilus* specimens examined from the following entomological collections from areas of the United States of America adjacent to southern Ontario (with specimen number and name(s) of contact person(s) in parentheses): A.L. Cook Arthropod Research Collection, Michigan State University (90; A. Cognato, G.L. Parsons); Insect Division, Museum of Zoology, University of Michigan (127; M. O'Brien); Charles A. Triplehorn Insect Collection, Ohio State University (218; C.T. Freeman).

Common names for *Agrilus sulcicollis*

The English and French common names European oak borer and agrile européen du chêne, respectively, have been approved for this new exotic insect; these names best reflect its origin, principal host plant, and feeding habit.

Taxonomy

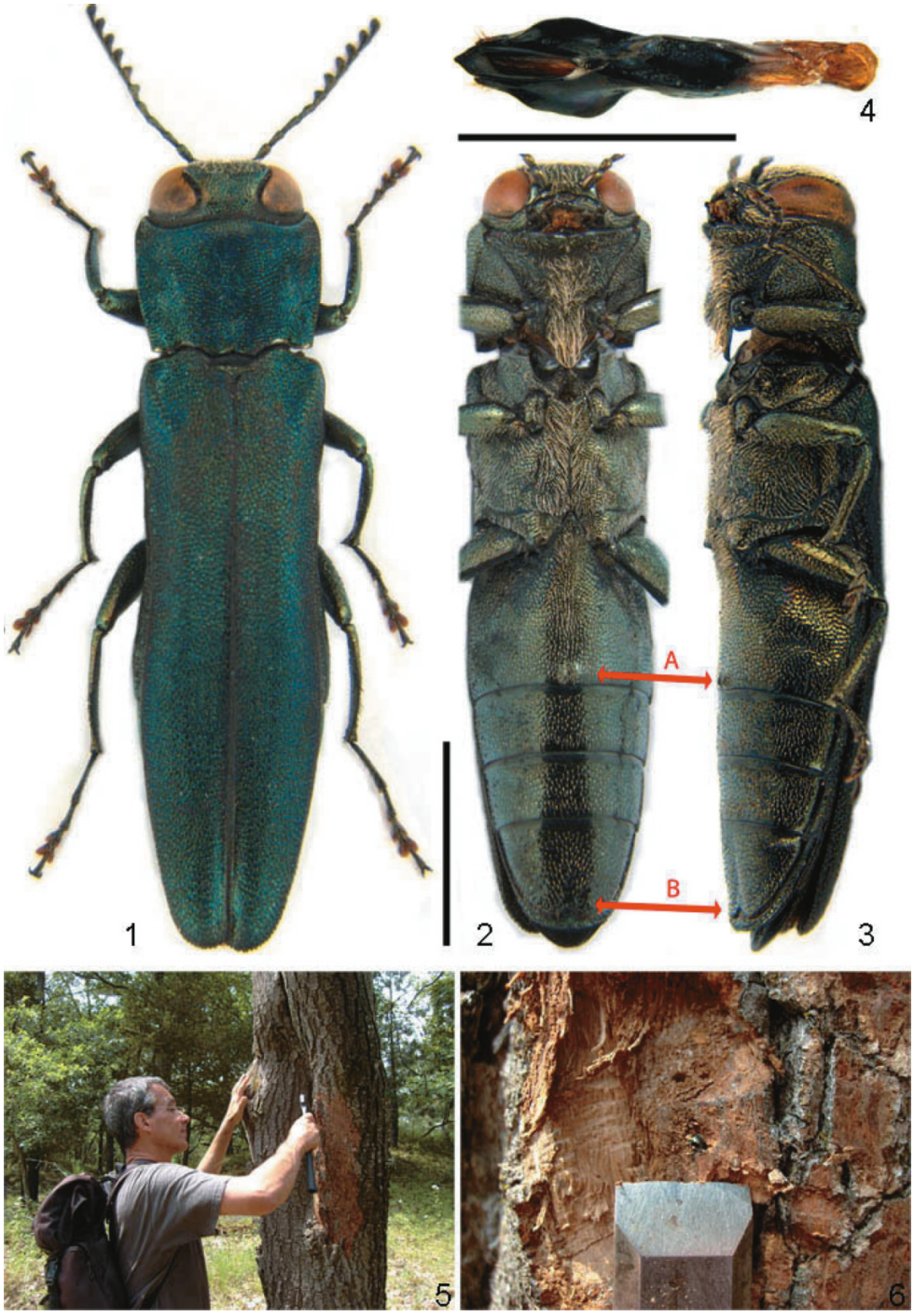
Agrilus sulcicollis Lacordaire

Agrilus sulcicollis Lacordaire, 1835: 614. **Type locality:** "Environs de Paris" [France].
Buprestis tenuis Ratzeburg, 1837: 53–54. **Type locality**: "Solling" [Germany].
Agrilus sahlbergi Mannerheim, 1837: 113–114. **Type locality**: "Fennia" [Finland].

Taxonomic position

Agrilus sulcicollis belongs to a large group of some 50 Palaearctic and Oriental *Agrilus* species that is characterized by having the apex of the last visible abdominal sternite distinctly incised, forming two arcuate lobes (Figs. 2, 3); the pronotal disc flat and laterally impressed; each elytral apex arcuate; and considerable sexual

Figs. 1–6. *Agrilus sulcicollis*: details of morphology, habitat, and host plant. 1, male habitus, dorsal view; 2, male habitus, ventral view, appendages omitted; 3, male habitus, lateral view, antennae omitted; 4, aedeagus, dorsal view; 5, host plant, red oak (*Quercus rubra*), in Pinery Provincial Park, Ontario; 6, remnant of a female embedded in the bark of the red oak depicted in Figure 5. The arrows indicate two tubercles, one on the second visible abdominal sternite (A) and one on the posterior incision of the last visible abdominal sternite (B); both characters are considered to be among the best for distinguishing *A. sulcicollis* from other North American *Agrilus* species.



dimorphism expressed as differences in the size of the eyes or the form of the antennae, the presence or absence of ventral pubescence, or the presence or absence of small tubercles on the second visible male abdominal sternite.

Species description

Adult. Body (Figs. 1–3) medium-sized (5–9 mm long), variable in color (green, bronze, or blue), shiny; elytra without conspicuous pubescence; pronotum expanded and distinctly wider anteriorly; pronotal disc with distinct medial sulcus and large lateral impressions; prosternal lobes narrow with anterior margin finely arcuately emarginated; marginal and submarginal pronotal carinae strongly convergent and merged in basal third of pronotum; each elytron with apex broadly arcuate. Apex of last visible abdominal incised, forming two arcuate lobes (Figs. 2, 3). Aedeagus strongly asymmetric (Fig. 4). Ovipositor distinctly longer than metatarsus. Males with posterior prosternal process covered with dense long white setae (Figs. 2, 3); metatarsi about as long as metatibiae, metatarsus 1 about as long as following three tarsomeres combined; two adjacent tubercles on second visible abdominal sternite (Figs. 2, 3, arrow A) and a deeper posterior incision on the last visible sternite (Figs. 2, 3, arrow B).

Larva. Typical *Agrilus* type with two terminal appendages (Rikhter 1950; Alexeev 1981).

Diagnosis

Some *Agrilus* species closely resemble, and are possibly related to, *A. sulcicollis*. *Agrilus buresi* Obenberger, 1935 was proposed as a subspecies of *A. sulcicollis*. Niehuis and Tezcan (1993) elevated it to species level, based on characters of the aedeagus, which is less asymmetric than that of *A. sulcicollis*. *Agrilus buresi* is known from southeastern Europe (Balkan Peninsula), Turkey, Iran, and Armenia. The status of this taxon is unclear and it may be either a subspecies of, or conspecific with, *A. sulcicollis*. *Agrilus angustulus* (Illiger, 1803), also a European species, is most similar to *A. sulcicollis* externally, but is smaller and has a wider frons and a much smaller aedeagus. Large females of *A. angustulus* are very difficult to distinguish from small females of *A. sulcicollis*. *Agrilus adelphinus* Kerremans, 1895 is an East Palaearctic species found in China, Japan, the Korean peninsula, and the Russian Far East; it is similar to *A. sulcicollis*, but males of *A. adelphinus* have a symmetric aedeagus and lack tubercles on the second visible abdominal sternite. Species identification of *A. sulcicollis* based on female morphological characters may not always be possible.

Comparison of the diagnostic features of *A. sulcicollis* and North American *Agrilus* species

The markedly asymmetric aedeagus (Fig. 4) readily distinguishes *A. sulcicollis* from all native and introduced *Agrilus* species in North America.

Blue specimens of *A. sulcicollis* may be confused with another exotic borer, *A. cyanescens* Ratzeburg, which has similar coloration and a deep incision on the last visible abdominal sternite, forming two arcuate lobes. However, in males of *A. cyanescens* the medial part of the venter of the body is glabrous (versus densely pubescent in *A. sulcicollis*; Fig. 2) and the second visible abdominal sternite is not tuberculate. Specimens of *A. sulcicollis* may be confused with those of *A. bilineatus* (Weber, 1801) or its relatives lacking pubescent elytral stripes, such as *A. carpini* Knull, 1923 and *A. criddlei* Frost, 1920. However, unlike males of these species, males of *A. sulcicollis* lack a projecting carina on the pygidium and have long, erect pubescence on the ventral side of the body (Fig. 2) and a strongly asymmetric aedeagus (Fig. 4).

Distribution

Agrilus sulcicollis is native throughout Europe except the northernmost parts (Fig. 7). In the Balkan Peninsula and western part of Asia it is replaced by *A. buresi* (see above). The eastern distributional limit of the species is unclear.

Natural distribution

Europe: Albania, Austria, Belarus, Belgium, Bosnia and Herzegovina, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Moldova, the Netherlands, Norway, Poland, Romania, Serbia and Montenegro, Russia (Belgorod, Chelyabinsk, Krasnodar, Kursk, Leningrad, Moscow, Saratov, Tatarstan, Voronezh), Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine (including the Crimean Peninsula), and the United Kingdom. **Asia:** Azerbaijan, Georgia, and Kazakhstan (these Asian records very probably pertain to *A. buresi*).

Fig. 7. *Agrilus sulcicollis*: native European distribution.

North American records (in chronological order; Fig. 8)

CANADA. Ontario: 1 ♀ (DEBU): Lambton Co., Pinery Prov. Park, 10.vi.1995, J. Skevington; 4 ♀♀ (DEBU): Lambton Co., Pinery Prov. Park, emergence trap over red oak, 13–21.vi.1995, J. Skevington; 1 ♀ (DEBU): Lambton Co., Pinery Prov. Park, 27.vi.–10.vii.1995, J. Skevington, woodyard emergence trap over red oak; 1 ♀ (DEBU): Essex Co., Windsor, Ojibway Prairie, unburnt prairie, yellow pans, 3–8.v.2001, S. Paiero, debu01100931 [misidentified as *Agrilus cyanescens* (Ratzeburg)]; 7 ♀♀ (GLFR): Windsor, W. O'Neil property, 25.vi.2003, D.B. Lyons, sticky band on *Fraxinus* L. (Oleaceae); 1 ♀ [GLFR]; Windsor, W. O'Neil's (G3), 9.vii.2003, D.B. Lyons, sticky band on *Fraxinus* sp., tree #9 and #43; 2 ♀♀ (GLFR): Windsor, W. O'Neil property, 7.viii.2003, D.B. Lyons, sticky band on *Fraxinus* sp., tree #9; 1 ♂, 1 ♀ (GLFR): Windsor, W. O'Neil's (G3), 9.vi.2004, G.C. Jones, sticky band on *Fraxinus* sp., trees #26 and #19; 1 ♂ (GLFR): Essex Co., W. O'Neil's (G3), 22.vi.2005, D.B. Lyons, N. O'Brien, & S. Woodcock, sticky band on *Fraxinus* sp., tree #43; 1 ♀ (DEBU): Waterloo Reg., Blair, RARE, Cruickston Crk., 43°22′40″N, 80°20′58″W, field, YPT, 9–12.vi.2006, D.K.B. Cheung, debu00266630; 1 ♂ (DEBU): Waterloo Reg., Blair, RARE, Blair Trail, 43°22′38″N, 80°20′34″W, 12.vi.2006, D.K.B. Cheung, debu00271274; 1 ♂ (DEBU): Waterloo Reg., Blair, RARE, Cruickston Creek, 43°22′40″N, 80°20′58″W, riparian, 12.vi.2006, M.D. Bergeron, debu00265623; 1 ♀ (CNC): London, S Prospect Hill, 17 484650 4770742, 13.viii.2006, host *Carya cordiformis* (Wangenh.) K. Koch (Juglandaceae), sticky trap–nonbaited, *Agrilus cyanescens*, Forest Health Collection, Coll. L. Tucker 06–5–1841 Det. K. Nystrom; 1 ♀ (GLFR): Essex Co., W. O'Neil's (G3), 16.x.2007, G.C. Jones, sticky band on *Fraxinus* sp. tree #4; 1 ♀ (GLFR): Essex County, W. O'Neil's (G3), 12.vi.2007, D.B. Lyons, N. O'Brien, & S. Woodcock, sticky band on *Fraxinus* sp., tree #45; 2 ♀ (GLFR): Elgin County, Dutton-401, Tree P1, Tree 1738, 17.vii.2007, N. O'Brien & A. Sauve, sticky band on *Fraxinus* sp.; 1 ♀ (GLFR): Elgin County, Dutton-401, tree P5, 5.vii.2007, G.C. Jones, sticky band on *Fraxinus* sp.; 1 ♀ (GLFR): Middlesex London–Carol, Tree L32, 5.vii.2007, G.C. Jones, sticky band on *Fraxinus* sp.; 3 ♀♀ (GLFR): Essex County, W. O'Neils (G3), 16.vii.2007, N. O'Brien & A. Sauve, sticky band on *Fraxinus* sp., trees #44, #52; 3

♀♀ (GLFR): Essex County, W. O'Neil's (G3), 4.vii.2007, G.C. Jones, sticky band on *Fraxinus* sp., tree #51; 1 ♀ (GLFR): Essex County, W. O'Neil's (G3), 21.viii.2007, A. Kent & A. Sauve, sticky band on *Fraxinus* sp., trees #44; 1 ♀ (GLFR): Middlesex London–Doon, Tree 109, 22.viii.2007, A. Kent & A. Sauve, sticky band on *Fraxinus* sp.; 4 ♀♀ (GLFR): Essex County, W. O'Neils (G3), 30.v.2008, G.C. Jones, sticky band on *Fraxinus* sp., trees #19, #20, #26; 1 ♂, 4 ♀♀ (GLFR)]: Essex County, W. O'Neils (G3), 8.vi.2008, D.B. Lyons, N. O'Brien, & S. Woodcock, sticky band on *Fraxinus* sp., trees #39, #35, #22, #50, #38; 2 ♀ (GLFR): Lambton County, McKeough Floodway G1–5B, G1–13G (42.69493N, 82.40401W), 24.vi.2008, N. O'Brien & A. Kent, purple prism trap on *Fraxinus* sp.; 1 ♂, 3 ♀♀ (GLFR): Lambton County, Holt Line (42.69388N, 82.42563W), 24.vi.2008, N. O'Brien, A. Kent, & G. Grant, purple prism trap on *Fraxinus* sp.; 2 ♀♀ (GLFR): Essex County, W. O'Neils (G3), 20.vi.2008, D.B. Lyons, N. O'Brien, & S. Woodcock, sticky band on *Fraxinus* sp., trees #37, #34; 1 ♀ (GLFR): Lambton County, Holt Line, G2–13W (42.69368N, 82.42732W), 8.vii.2008, N. O'Brien & J. St. Amour, green prism trap on *Fraxinus* sp.; 3 ♀♀ (GLFR): Essex County, W. O'Neils (G3), 6.vii.2008, G.C. Jones, N. O'Brien, & S. Woodcock, sticky band on *Fraxinus* sp., trees #4, #50; 1 ♀ (GLFR): Lambton County, Ward Line, G4–27Y (42.66933N, 82.49230W), 8.vii.2008, N. O'Brien & J. St. Amour, sticky band on *Fraxinus* sp.; 2 ♀♀ (GLFR): Lambton County, Holt Line, G1–56B, G1–50E (42.69388N, 82.42563W), 8.vii.2008, N. O'Brien & J. St. Amour, purple prism trap on *Fraxinus* sp.; 3 ♀♀ (CNC): Pinery Prov. Park, N43°15′, W81°50′, 180 m, 29–31.vii.2008, E. Jendek & V. Grebennikov leg. (torso of two adults in bark of *Quercus* trunk; three adults reared from larvae in January 2009].

Biology of *A. sulcicollis* and its establishment in North America

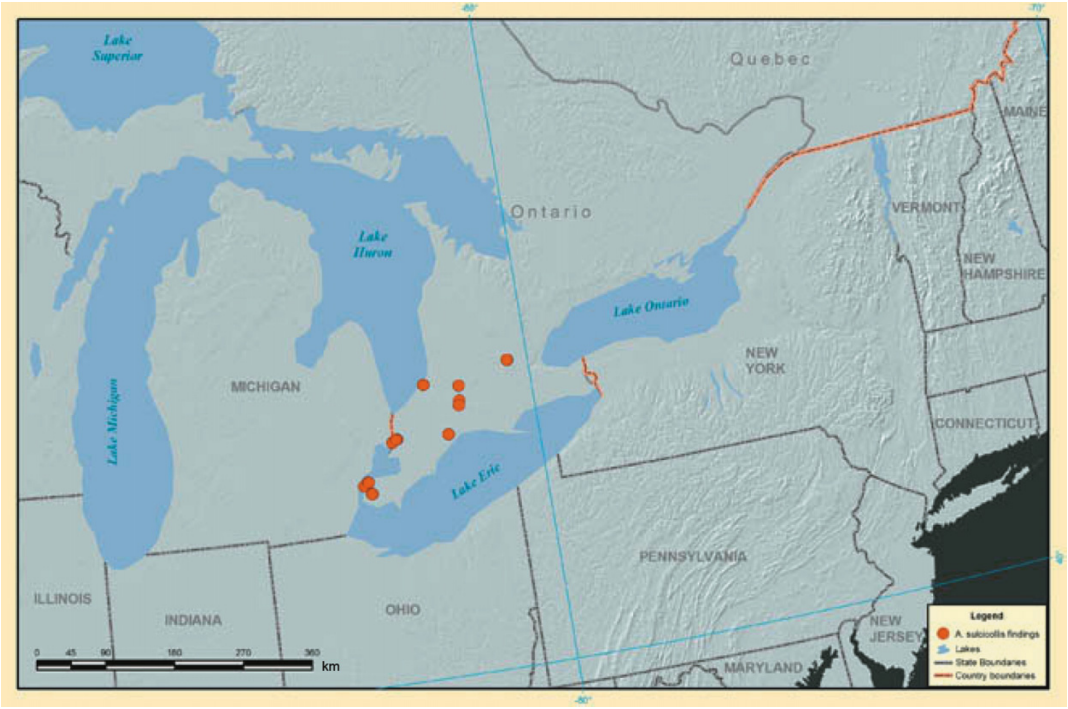
Oaks are the principal host plants of *A. sulcicollis* in Europe, where it has been reported from at least seven species (Schimitschek 1944; Bílý 2002). Additional known host plants include *Fagus sylvatica* L. (Fagaceae) and *Carpinus betulus* L. and *Castanea* Mill. (Fagaceae) (Curletti 1994; Bílý 2002; Niehuis 2004).

In Canada, adults have been collected from emergence traps on red oak (*Quercus rubra* L.). This host record is supported by our finding remnants of two females from the bark of a red oak trunk (Figs. 5, 6), as well as an adult reared from red oak branches. One Canadian record cites *A. sulcicollis* collected from a nonbaited sticky trap hung on hickory (*Carya cordiformis* (Wangenh.) K. Koch (Juglandaceae)) which may indicate that *A. sulcicollis* has the capacity to attack a wider spectrum of trees, or may represent an accidental catch of a highly mobile flying beetle. The numerous records of *A. sulcicollis* trapped on ash (*Fraxinus* sp.) may have resulted from a trapping bias toward this host tree during a targeted study of the emerald ash borer (*A. planipennis*).

The biology of *A. sulcicollis* was recently studied by Bílý (2002), Brechtel and Kostenbader (2002), Niehuis (2004), and Stumpf *et al.* (2001). These sources indicate that this species attacks the trunk or larger branches of weakened oaks. Females lay eggs by inserting the very long ovipositor into cracks and crevices in the bark. The larvae feed between the bark and phloem or solely in the bark if it is thick enough. The larval galleries are S-shaped, firmly packed with frass, and gradually widen as the larva increases in size. The pupal cell is oval, is usually located entirely within the bark, and contains the a partly prebored D-shaped exit hole typical of the majority of *Agrilus* species. Fully grown larvae (sometimes termed prepupae) overwinter in the pupal cell, with the complete developmental cycle lasting 1 or 2 years. In Europe, adults can be found feeding on the foliage or wood of host plants from May to July, with maximum appearance from mid-May to late June. *Agrilus sulcicollis*, together with other *Agrilus* species living on oaks in Europe, might play a significant role as vectors of tracheomycosis caused by fungi of the genera *Ceratocystis* Ellis et Halst. and *Ophiostoma* H. et P. Sydow (Szontagh 1987; Oszako 1992; Hartmann 1996).

The majority of records of adults from Ontario date from early May to early July. A few records from August likely refer to the removal of the sticky trap with the attached dead beetle, rather than the actual capture. Females occur about 10 times more frequently than males in our material. *Agrilus sulcicollis* is apparently well established in southern Ontario, given that museum specimens date from 1995, and that none of the four Ontario collection sites are located near major international seaports or airports. These considerations allow us to assume

Fig. 8. *Agrilus sulcicollis*: known North American records.



that this species entered North America at least a few years prior to 1995. In addition, it is highly likely to be present also in adjacent Michigan in the United States of America. In view of the fact that a specimen was incidentally caught during a field survey using unbaited sticky traps, it is plausible that *A. sulcicollis* is already a common element of the local insect fauna. This is further suggested by our finding the remnants of two dead adults in oak bark after only a short survey period. In addition, *A. sulcicollis* was recorded in Ontario from both relatively undisturbed forest (Pinery Provincinal Park) and an agriculturally modified landscape (the Prospect Hill area northeast of London).

A short overview of non-native North American *Agrilus* species

As well as the newly discovered European oak borer, *A. sulcicollis*, eight other non-native *Agrilus* species, all known to occur in the Asia Pacific region (among other areas), have been recorded from North America (Haak *et al.* 2002; Bellamy 2008). Seven of these are accidental introductions. North American distribution data for the following species are taken from Bellamy (2008).

Agrilus cuprescens (Ménétriés, 1832) is a native of mild climatic regions of Eurasia. Host plants: *Rubus* L. and *Rosa* L. (Rosaceae). It was first recorded from North America by Weiss (1914) as *Agrilus politus* (Say) from New Jersey. Distribution in North America: **Canada:** New Brunswick, Nova Scotia, Ontario, Quebec; **United States of America:** Colorado, Connecticut, Idaho, Illinois, Indiana, Iowa, Maine, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebrasca, New Hampshire, New Jersey, New York, North Dacota, Ohio, Oregon, Pennsylvania, Rhode Island, South Dakota, Utah, Vermont, West Virginia.

Agrilus cyanescens Ratzeburg, 1837 is a native of mild climatic regions of Eurasia. Host plants: *Lonicera* L. and *Symphoricarpos* Dill. *ex* Juss. (Caprifoliaceae) and *Rhamnus* L. (Rhamnaceae). Frost (1922) published the first North American record under the name *A. coeruleus* Rossi, 1790. Distribution in North America: **Canada:** Ontario, Quebec; **United States of America:** Colorado, Connecticut, Illinois, Massachusetts, Michigan, Missouri, New Hampshire, New York, Ohio, Rhode Island, Utah, Virginia, West Virginia, Wisconsin.

Agrilus derasofasciatus Lacordaire, 1835 is a native of central and southern Europe, North Africa, and west and southwestern Asia. Host plant: *Vitis* L. (Vitaceae). Baudyš (1940) reared it from *Pistacia* L. (Anacardiaceae). Malkin (1941)

first recorded this species in North America (subsequently corroborated by Hoebeke 1980). Distribution in North America: **United States of America:** New York.

Agrilus hyperici (Creutzer, 1799) is a native of central and southern Europe and western Asia. It was intentionally introduced to the United States of America and Canada repeatedly, beginning in 1953, as a biological control agent for St. John's wort (*Hypericum perforatum* L., Clusiaceae). Campbell and McCaffrey (1991) provided an extensive overview of the history of the introduction of *A. hyperici*, and considered it to have contributed significantly to the suppression of St. John's wort in Idaho. Distribution in North America: **United States of America:** California, Idaho, Montana, Oregon, Washington.

Agrilus pilosovittatus Saunders, 1873 is a native of China and Japan. Host plant: *Wisteria* Nutt. (Fabaceae). It was first recorded from North America by Hespenheide (1968). Distribution in North America: **United States of America:** Maryland, New Jersey, New York, North Carolina, Pennsylvania.

Agrilus planipennis Fairmaire, 1888 is a native of China, North and South Korea, Japan, and eastern Russia. Host plant: *Fraxinus* L. Recorded also from *Ulmus* L. (Ulmaceae) and *Pterocarya* Nutt. *ex* Moq. and *Juglans* L. (Juglandaceae) (Mühle 2003). Haack *et al.* (2002) recorded it for the first time from North America. Distribution in North America: **Canada:** Ontario. **United States of America:** Indiana, Maryland, Michigan, Ohio, Virginia.

Agrilus sinuatus (Olivier, 1790) is a native of Europe and western Asia. Host plants: at least eight genera of Rosaceae. It was first reported in North America from New Jersey (Anonymous 1894). Distribution in North America: **United States of America:** Connecticut, New Jersey, New York, Pennsylvania, Rhode Island.

Agrilus subrobustus Saunders, 1873 is a native of China, North and South Korea, and Japan. Host plant: *Albizia julibrissin* Durazz. (Fabaceae). The first North American record of this species was from Georgia (Westcott 2007). Distribution in North America: **United States of America:** Georgia.

Agrilus prionurus Chevrolat, 1938 is a Mexican species recently reported from Texas (Haack 2003; Wellso and Jackman 2006). *Agrilus coxalis* Waterhouse, 1889, reported as new oak pest in California (Coleman 2008), is native to Mexico and the southwestern United States of America (Arizona) (Bellamy 2008).

Acknowledgements

Anthony Davies (Agriculture and Agri-Food Canada, Ottawa) recognized the peculiarity of the very first specimen of *A. sulcicollis* and brought the specimen to the attention of the first author, thus triggering investigation of this species in North America. Steve A. Marshall and Matthias Buck (Department of Environmental Biology, University of Guelph) provided access to, and facilitated our work in, the University of Guelph Insect Collection. Philip Careless (Department of Environmental Biology, University of Guelph) introduced us to the colony of buprestid-hunting *Cerceris* wasps. Barry Lyons (Canadian Forest Service, Sault Ste. Marie) sent us numerous *Agrilus* specimens, including our target species, from his trapping experiments in southern Ontario. Curators of three entomological collections in the United States of America (see the text) facilitated specimen loans, thus assisting our unsuccessful search for records of *A. sulcicollis* from there. E. Richard Hoebeke (Department of Entomology, Cornell University) sent us a reprint of his difficult-to-obtain 1980 publication. Serge Laplante and Jean-François Landry (Agriculture and Agri-Food Canada, Ottawa) and Michèle Roy (Laboratoire de diagnostic en phytoprotection, Québec) assisted in choosing appropriate common English and French names for *A. sulcicollis*. Karen McLachlan Hamilton (Canadian Food Inspection Agency) and Robert A. Haack (United States Forest Service) commented on the manuscript before submission. Help from these individuals is sincerely appreciated.

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