The Coleopterists Bulletin, 64(1): 13–20. 2010.

Trichoferus campestris (Faldermann) (Coleoptera: Cerambycidae), an Asian Wood-boring Beetle Recorded in North America

Vasily V. Grebennikov, Bruce D. Gill
Entomology Research Laboratory
Ottawa Plant and Seed Laboratories
Canadian Food Inspection Agency
K.W. Neatby Bldg., 960 Carling Avenue
Ottawa, ON K1A 0C6, CANADA
vasily.grebennikov@inspection.gc.ca

AND

Robert Vigneault
16 Mont St-Pierre, Oka, Quebec
J0N 1E0, CANADA

Abstract

Two adult specimens of *Trichoferus campestris* (Faldermann, 1835), a newly detected alien wood-boring beetle native to Asia (Coleoptera: Cerambycidae), were collected in Repentigny, Quebec, Canada in 2002 and 2006. Adults, pupae, and mature larvae of this species are described, illustrated and diagnosed to facilitate its recognition among other North American Cerambycidae. The mtDNA sequence of the COI " barcoding" region of a Canadian specimen was obtained and analyzed. We discuss taxonomic affinities of *T. campestris*, its native distribution, host plants, and significance as a quarantine pest in North America. The importance of solid wood-packaging material as a potential pathway for invasive wood-boring species is highlighted. Seven other non-native Cerambycidae species first recorded in North America since 1980 [*Tetropium fuscum* (Fabricius, 1787), *Anoplophora glabripennis* (Motschulsky, 1853), *Tetrops praeusta* (Linnaeus, 1758), *Callidiellum rufipenne* (Motschulsky, 1860), *Phoracantha semipunctata* (Fabricius, 1775), *Phoracantha recurva* Newman, 1842, and *Sybra alternans* (Wiedemann, 1825)] are briefly discussed.

Key Words: dunnage, *Hesperophanes*, introduction, invasive species, wood-packaging

---

Over the last few decades, a few high-profile species of wood-boring Coleoptera have unwittingly found their way across the oceans to invade North America. The most notable of these, *Anoplophora glabripennis* (Motschulsky, 1853), the Asian longhorned beetle (Cerambycidae), and *Agrilus planipennis* Fairmaire, 1888, the emerald ash borer (Buprestidae), have caused significant economic losses and generated unprecedented attention to the taxonomy and biology of xylophagous beetles alien to North America. Many newly-arrived beetle species that have established themselves in North America, like the two aforementioned, have originated in the Asia-Pacific Region (P. R. China, Russian Far East, and neighboring lands) and are poorly known taxonomically. In some cases, species identification of the first New World specimens was a task that exceeded the capacity of the entire North American entomological community, as with the emerald ash borer (Haack *et al.* 2002). Even for beetles as large and charismatic as *Anoplophora* Hope, a comprehensive generic revision did not exist at the time of the first North American record (Haack *et al.* 1996), but was provided later after having been triggered by the introduction (Lingafelter and Hoebeke 2002).

In this paper, we report the discovery of two North American specimens of yet another alien wood-boring beetle native to Asia, the longhorn *Trichoferus campestris* (Faldermann, 1835), a member of the taxonomically poorly understood *Trichoferus* Wollaston - *Hesperophanes* Dejean complex belonging to the cerambycine tribe Hesperophanini. Both genera include about 20 species widely distributed throughout the southern Palaearctic region from Japan, Korea and P. R. China (Gressitt 1951) through central Asia and the Caucasus region to southern Europe, the Middle East, and North Africa (Plavil'shchikov 1940; Švácha and Danilevsky 1988). *Hesperophanes pubescens* (Haldeman, 1847) is the only species native to the Western Hemisphere (Monné and Hovore 2006). Both North American specimens of *T. campestris* were hand-collected in August 2002 and July 2006 from a window screen in a residential

area of the city of Repentigny, near Montreal, Quebec, Canada. The homeowner forwarded both beetles to RV, who recognized them as a species new to his extensive collection of Quebec longhorns. This news eventually reached the Entomology Research Laboratory of Canadian Food Inspection Agency (CFIA) in Ottawa (via Yves Bousquet and Serge Laplante), thus initiating this project.

The goal of this paper is to hypothesize that *T. campestris* may have become established in North America. We report the discovery of two Canadian specimens and provide illustrated descriptions of adult, larval and pupal stages of this species, including male and female genitalia, as well as the genetic barcode DNA sequence. We also compare different life stages of this species with those of similar or related native North American Cerambycidae in order to facilitate the recognition of *T. campestris*. We discuss known biological attributes of this species and the likelihood of its establishment in North America, as well as the importance of solid wood-packaging as a pathway of introduction for alien wood-boring species. Finally, we list seven other non-native Cerambycidae either recorded or established in North America from about 1980 onwards.

Material and Methods

News of the discovery of two specimens of a *Trichoferus* species reached the CFIA Entomology Laboratory in early August 2008. In late August 2008, a CFIA team set up four black-light traps for two nights in and around the residential property in Repentigny where both specimens had been found. No additional specimens of *Trichoferus* were collected. A search for more specimens of this species from North America in the Canadian National Collection in Ottawa, in the Lyman Entomological Museum in Montreal, and in the United States National Museum in Washington, D.C. revealed none. All material reported in this paper is deposited in the Canadian National Collection of Insects, Arachnids and Nematodes (CNC), Ottawa. Photographs were taken using a Nikon DXM1200F digital camera mounted on a Nikon SMZ1500 dissecting microscope. A few images of each specimen were taken with different focal depth and combined into a single sharp image using CombineZM (Hadley 2008).

Molecular laboratory work was performed at the Canadian Centre for DNA Barcoding in Guelph following the methods described by Ratnasingham and Hebert (2007). The GenBank accession number for the single newly-generated partial nucleotide sequence of the cytochrome oxidase subunit 1 (CO1) mitochondrial gene of the female *T. campestris* adults is GQ404374; DNA from the second specimen failed to amplify. This sequence is 658 nucleotides long and was compared with GenBank data using Blast algorithm (http://blast.ncbi.nlm.nih.gov/Blast.cgi; "nucleotide blast" and dataset: "others (nr etc.)"). The same sequence was compared with those from the Barcode of Life Data System (http://www.boldsystems.org/views/login.php) through "Identify Specimen" and "All Barcode Records on BOLD (493,412 sequences)".

Trichoferus campestris (Faldermann)

campestris Faldermann, 1835: 435 (*Callidium*).

Type locality: "China borealis". **Type series:** single female (holotype), in Zoological Institute, St. Petersburg, Russia (not examined).

=*turkestanicum* Heyden, 1886: 193 (*Stromatium*)

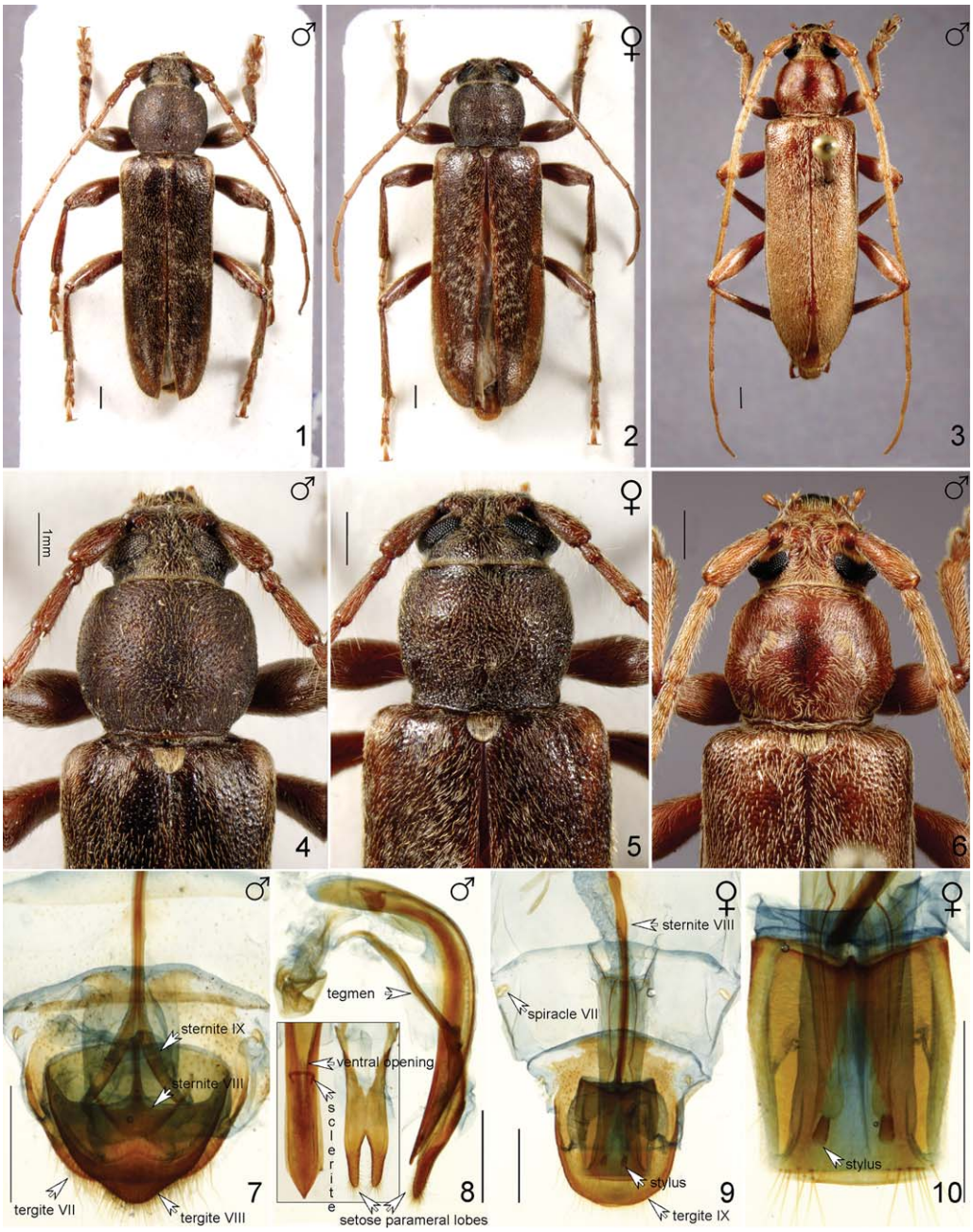
=*rusticus* Ganglbauer, 1886: 133 (*Hesperophanes*)

=*flavopubescens* Kolbe, 1886: 219 (*Hesperophanes*)

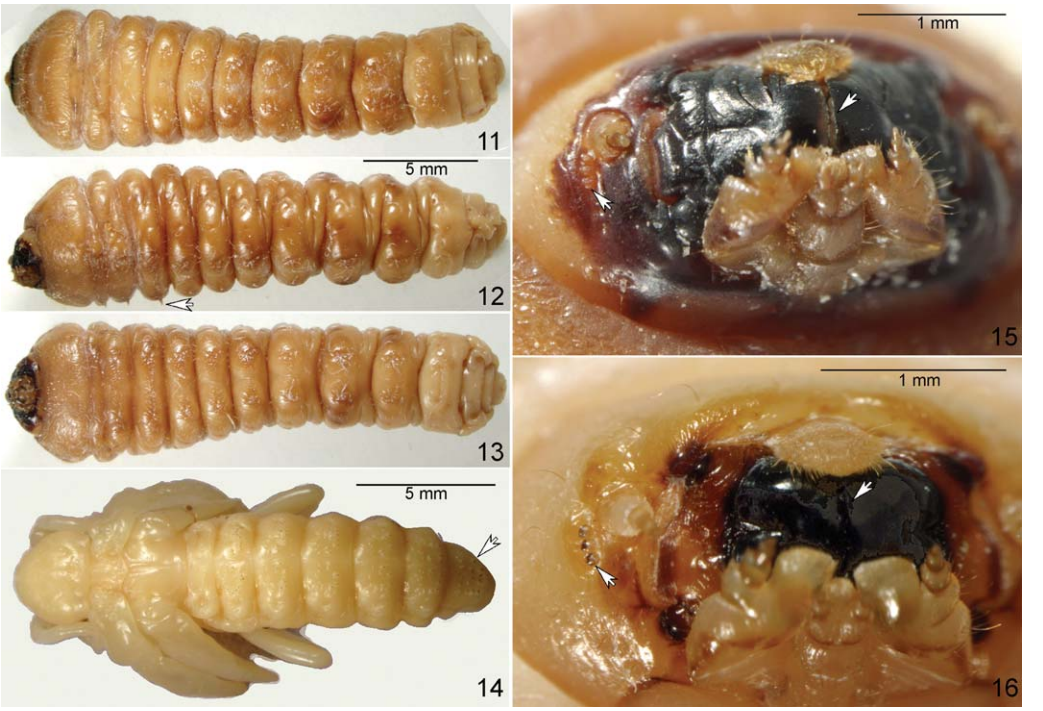
Material Examined. Adults: ♂, CANADA: Quebec, Repentigny, 05–VIII–2002, P. Chagnon, CVCCOLVG00000051; ♀, same data as ♂, except 10–VII–2006, CVCCOLVG00000052. Numerous adults, larvae and a single pupa intercepted by CFIA inspectors mainly at the Port of Vancouver from wooden dunnage in containers arriving from P. R. China (including Hong Kong).

Morphological Description. Adult. Length 16 mm (n=2) and parallel-sided, uniformly brown-black (Figs. 1, 2), not shiny; antenna about 90% and 70% of body length in male and female, respectively; body dorsally with short, uniform pubescence and with sparsely distributed, long, erect setae exceeding pilosity height by 3–4 times; pronotum with fine uniform sculpture; male genitalia as in Figs. 7 and 8; female genitalia as in Figs. 9 and 10. **Adult sexual dimorphism.** Females with pronotum narrower in relation to elytra (Figs. 2, 5) than in males (Figs. 1, 4); posterior margin of abdominal sternum VI (visible ventrite 4) straight in females and widely notched at middle in males. **Pupa.** Body length 18 mm (n=1); white-beige (Fig. 14); with sclerotized dark spines on terga, most noticeable on tergum VI. **Mature larva.** Length 15–30 mm (n=10); white when live and white-beige when blanched and stored in alcohol; with six short thoracic legs (Figs. 11–13); abdominal apex without urogomphi or other projections or sclerotized structures; labrum much narrower than clypeus; mandibles with the spoon-shaped apices meeting at the medial line; each side of head with three stemmata arranged in vertical row (Fig. 15, left arrow); anterior part of head capsule dark.

Morphological Diagnosis. An attempt to identify adults of *T. campestris* using available keys



Figs. 1–10. *Trichoferus campestris* (1–2, 4–5, 7–10) and *Hesperophanes pubescens* (3, 6; Canada, Quebec, Eardley, 16–VII–1991, S. Laplante leg.), adult beetles, habitus and genitalia. **1–3)** Habitus, dorsal view; **4–6)** Anterior part of body, dorsal view; **7)** Male genital sclerites (aedeagus and tegmen removed), ventral view; **8)** Aedeagus and tegmen, ventral view (apices of aedeagus and tegmen are boxed, right lateral view); **9)** Female genital sclerites, ventral view; **10)** Apex of ovipositor, ventral view. Scale bars = 1 mm.



Figs. 11–16. *Trichoferus campestris* (11–15) and *Hylotrupes bajulus* (16; intercepted in Vancouver, Canada in sea cargo dunnage from Hong Kong), larvae and pupa. **11–13)** (Intercepted in Vancouver, Canada in sea cargo dunnage from Korea), grown larva, dorsal view (11), left lateral view (12, arrow indicates right hind leg) and ventral view (13); **14)** Pupa, dorsal view (arrow indicates sclerotized spines; intercepted in Vancouver, Canada in sea cargo dunnage from P. R. China); **15–16)** Head, frontal view (left arrows indicate the lowest stemma on the vertical row of three right stemmata; right arrows indicate the spoon-shaped mandibular apices characteristic of Cerambycinae larvae).

for the North American Cerambycidae (Linsley 1962; Yanega 1996; Turnbow and Thomas 2002; Lingafelter 2007) lead to the native *H. pubescens*, the only species of the *Trichoferus-Hesperophanes* complex native to the Western Hemisphere (Figs. 3, 6). *Hesperophanes pubescens* is distributed throughout eastern North America from Quebec and Ontario south to Georgia and Alabama and west to Minnesota and Iowa (Linsley 1962), is rarely encountered, and its host plant, an undetermined oak species (*Quercus* sp.), was only recently discovered (Vlasak and Vlasakova 2002). Both species are known to occur near Montreal, Quebec (McNamara 1991). Adults of *T. campestris* are somewhat darker (Figs. 1, 2 as compared to Fig. 3) and can be distinguished from *H. pubescens* by the presence of a few sparse, long, erect setae protruding above the pubescence (Fig. 5; best visible on lateral side of pronotum just dorsal to the profemora). Cerambycidae pupae are too inadequately known to allow pupal diagnosis of *T. campestris* (Fig. 14), although the latter has unusual sharp, sclerotized dark projections on abdominal terga I–VI, most developed on tergum VI. Mature larvae of the genus *Trichoferus*, having all characteristic features of the subfamily Cerambycinae (such as short legs, mandibles with spoon-shaped apices meeting at the medial line (Figs. 15, 16, arrow), labrum much narrower than clypeus; see more in Švácha and Danilevsky 1988), differ from most others by having three stemmata (instead of two, one, or none) arranged in a vertical row (Fig. 15). This rare feature is known elsewhere in Cerambycinae only from *Hesperophanes*, *Hylotrupes* Serville, 1834, and a few others, most notably, although not exclusively, members of the tribe Cerambycini that are exotic to North America. Larvae of *Hylotrupes bajulus* (Linnaeus, 1758), a Palaearctic species established in the USA since at least the last century (Linsley 1964), is only doubtfully known from Canada, based on a single Quebec specimen collected in the 1800s (Laplante 1989; McNamara 1991). Larvae of that species are most reliably distinguished from those of *Trichoferus* by their lighter-colored head capsules (Fig. 16), especially by the lack of pigmentation behind the stemmata. Švácha and Danilevsky (1988) used the presence of "large rugose transverse protuberance immediately behind

stemmata" to distinguish larvae of *Hesperophanes* from those of *Trichoferus*, although they did not have larvae of the North American *H. pubescens*, which are still unknown.

Molecular Identification. A GenBank Blast search indicated that the sequence most similar to that of the single sequenced specimen (see above) was that of *T. campestris*, accession number DQ224241, 454 nucleotides long, with Identities= 407/417 (97%), uploaded by An *et al*., Jiangsu Entry-Exit Inspection and Quarantine Bureau, Laboratory of Plant Quarantine, 99 Zhonghua Road, Nanjing, Jiangsu 210001, China. This is the only orthologous sequence of a Hesperophanini beetle currently available at GenBank (accessed on February 4, 2009). The second most similar sequence was EU877950, corresponding to *Shaperius* Waltl sp. (Sphaeriusidae), a myxophagan beetle, with Identities=83%. A Barcode of Life search indicated that the three most similar sequences were those of a species named "*campestris*" (either under the generic name *Trichoferus* or *Hesperophanes*), with the following associated data: "*H. campestris*, CERPA289-08, Canada, British Columbia" (two sequences, similarity 98.27 and 98.14%), and *T. campestris*, Russia, Primorskiy Kray, similarity 98.25%. The origin of these two "*H. campestris*" specimens marked "British Columbia" is unclear, because the species has never been reported to be found in western Canada, except for specimens intercepted in imported goods at Canadian ports of entry. Specimens of *H. pubescens* ranked in similarity number four and five with the values of 84.81% and 84.42%, respectively. These five sequences were, apparently, all of the currently sequenced representatives of Hesperophanini uploaded at the Barcode of Life site (accessed on February 04, 2009).

Taxonomic Identity and Position. The identity of the species commonly referred to as "*T. campestris*" is far from certain. As currently accepted, this species has a relatively widespread distribution (see below) extending throughout half of the Palaearctic region. Numerous narrowly distributed xerophilous *Trichoferus* species have been described from the eastern part of the Mediterranean region (Sama 1994; Kadlec and Rejzek 2001; Sama and Makris 2001; Kadlec 2005; Sama *et al.* 2005) and sometimes it is difficult to distinguish them from the sympatrically distributed *T. campestris*. This species is well-known partly because it is widespread and locally abundant in the eastern part of its native range. As a result, the majority of *Trichoferus* interceptions from P.R. China and surrounding territories were attributed to this species, although there is no certainty whether they might or might not be conspecific with the true *T. campestris*. Both *Trichoferus* and *Hesperophanes* require careful taxonomic revision to delimit species concepts and to solve the long-standing uncertainty on the taxonomic status of *Trichoferus*, which is considered as either a valid genus (Plavil'shchikov 1940; Gressitt 1951; Švácha and Danilevsky 1988), a subgenus (Villiers 1978; Turnbow and Thomas 2002; Niisato 2007), or a junior synonym (Linsley 1962; Monné and Hovore 2006) of *Hesperophanes*. This issue, however, is outside the scope of the present paper.

Native Distribution. *Trichoferus campestris* is native to the southeastern part of the Palaearctic region from Japan (Niisato 2007), the Russian Far East, Korean peninsula, Mongolia and most of P.R. China (Gressitt 1951; Cherepanov 1981), continuing westwards through the southern Ural Mountains in Russia (Shapovalov *et al.* 2006) and Central Asia eastwards up to Armenia and the southeastern part of European Russia (Danilevsky and Miroshnikov 1985). It is not known to be native to Central and Western Europe.

Biology. Iwata and Yamada (1990) indicated about 40 genera of woody spermatophyte plants, both conifers and angiosperms, as host plants for *T. campestris* and concluded that this species can potentially attack most woody plants. Švácha and Danilevsky (1988) reported that the larvae live under bark and in dry dead wood and complete their development in two or more years. Adults emerge from July to August and readily fly.

Pathways, Quarantine Significance, and Likelihood of Establishment in North America. Like most other alien Cerambycidae (Cocquempot 2006), the Montreal specimens of *T. campestris* most likely arrived in North America via international solid wood-packaging material (=dunnage). Dunnage is normally made from low quality wood that is often infested by live wood-dwelling insects, predominantly beetles. The genus *Trichoferus* (51 records under the names *Hesperophanes* and two records under the name *Trichoferus*) was the fourth most commonly intercepted cerambycid genus at the US ports of entry for the period between 1985 and 2000 (Haack 2006), following the genera *Monochamus* Dejean, 1821 with 432 records, *Xylotrechus* Chevrolat, 1860 with 126 records and *Ceresium* Newman, 1842 with 114 records. Characteristic larvae of *Trichoferus* are often found in the dunnage of containers from P.R. China at Canadian ports of entry (Cavey 1998; Grebennikov 2005). *Trichoferus campestris* has been reported to emerge in European quarantine facilities from wood imported from P.R. China (Cocquempot 2006). In 1997, a small, localized infestation of this species occurred in a storage site in New Brunswick, New Jersey (not New Brunswick, Canada), but was later eradicated (Cocquempot 2006). The species is considered a quarantine pest in Europe and is included

Table 1. Non-native Cerambycidae introduced into North America since the early 1980s.

Species	Native to	Introduced to	First North American detection	Reference	Economic consequences
Trichoferus campestris (Faldermann, 1835)	Eastern Palaearctic	Montreal area	2002	this paper	not assessed
Tetropium fuscum (Fabricius, 1787)	Europe	Atlantic Canada	1999	Smith and Hurley 2000	significant
Anoplophora glabripennis (Motschulsky, 1853)	Asia Pacific	Chicago, New York City, Toronto	1996	Cavey *et al.* 1998	significant
Tetrops praeusta (Linnaeus, 1758)	Europe	Northeastern USA, Quebec	1996	Yanega 1996; Landry 2001	not assessed
Callidiellum rufipenne (Motschulsky, 1860)	Asia Pacific	Eastern USA	1998	Maier and Lemmon 2000	moderate
Phoracantha semipunctata (Fabricius, 1775)	Australia	California	1984	Scriven *et al.* 1986	moderate
Phoracantha recurva Newman, 1842	Australia	California	1995	Hanks *et al.* 1998	moderate
Sybra alternans (Wiedemann, 1825)	Asia Pacific	Florida	Early 1990s	Thomas 2000	not assessed

by the European and Mediterranean Plant Protection Organization (EPPO) in the EPPO A2 List of pests recommended for regulation (Anonymous 2007, 2008).

Has *T. campestris* become established in North America? Available material does not permit a definitive answer. The discovery of two adult specimens near Montreal, collected four years apart in a residential area, distant from an international port or a commercial facility, indicates that the species was present, at least temporarily, in Canada. It seems unlikely that such a residential neighborhood would have been the original point of outbreak for an introduced population. The lack of additional records might be a result of (A) collected specimens were single individuals that failed to establish a population, or (B) our collecting efforts were inadequate to detect an infestation due to, for example, being too late in the adult flight season for this species. Considering, however, that this species is often intercepted in North America from wood-packaging material of Asian origin, as well as its previous introductions into Europe and North America, it is plausible to assume that *T. campestris* has a high likelihood of becoming established in the temperate regions of the New World.

Overview of Recent Introductions of Alien Cerambycidae to North America. Besides *T. campestris*, seven other alien cerambycid species were introduced into North America during the last two or three decades (Haack 2006); these events are summarized in Table 1. Among them, *Tetropium fuscum* (Fabricius, 1787) is currently under regulatory action in Atlantic Canada; its introduction is feared to cause large economic losses. *Anoplophora glabripennis* (Motschulsky, 1853) is, arguably, the most publicized alien beetle species, which attracted significant attention to the problem of invasive alien species. The recent record of *Heterachthes rugosicollis* Martins, 1970 (Swift 2008) most likely represents a natural range expansion of this species native to Mexico.

Acknowledgments

Yves Bousquet and Serge Laplante (both Ottawa, Canada) brought the specimens reported in this paper to the attention of VG, thus initiating this project. Yves Bousquet also called our attention to the most distinctive features of *T. campestris* as compared to *H. pubescens*, which were partly used in the diagnostic section of this paper. Petr Švácha (České Budějovice, Czech Republic) identified numerous cerambycid larvae from our collection, including those of *T. campestris* and *H. bajulus* depicted in Figs. 11–13, 15 and 16. He, as well as Carolus Holzschuh (Villach, Austria) and Gianfranco Sama (Cesena, Italy) provided comments on the taxonomy of the *Trichoferus-Hesperophanes* complex. Christian Schmidt and Hume Douglas (both Ottawa, Canada) joined VG and BG in the 2008 fieldwork to search for additional specimens of *T. campestris*. Terry A. Wheeler and Stéphanie Boucher (Ste-Anne-de-Bellevue, Canada) facilitated our access to the Lyman Entomological Museum, McGill University, while Steven W. Lingafelter and Natalia Vandenberg (Washington, D.C.) did likewise for the United States National Museum collection. Robert Hanner (Guelph, Canada) facilitated our access to the Canadian Centre for DNA Barcoding. Andrey L. Lobanov (St. Petersburg, Russia)

helped in obtaining images of the relevant pages from the Faldermann's species description. Karen McLachlan Hamilton, Hume Douglas, and Louise Dumouchel (all Ottawa, Canada) commented on early drafts of the manuscript; E. Richard Hoebeke (Ithaca, U.S.A.) reviewed our manuscript and called our attention to the *T. campestris* infestation in New Brunswick, New Jersey. The help of these individuals is sincerely acknowledged.

References Cited

Anonymous. 2007. EPPO Reporting Service 2007: 1–16.

Anonymous. 2008. *Hesperophanes campestris*. Bulletin OEPP/EPPO 38: 60–63.

Cavey, J. F. 1998. Solid wood packaging material from China. Initial pest risk assessment on certain wood boring beetles known to be associated with cargo shipments: Asian longhorned beetle (*Anoplophora glabripennis*), *Ceresium*, *Monochamus* and *Hesperophanes*. US National Identification Service. Available from: https://web01.aphis.usda.gov/oxygen_fod/fb_md_ppq.nsf/0/1ee6a51987e30589852568f60057868f/$FILE/0511.pdf (Accessed on 3 February 2009).

Cavey, J. F., E. R. Hoebeke, S. Passoa, and S. W. Lingafelter. 1998. A new exotic threat to North American hardwood forests: an Asian longhorned Beetle, *Anoplophora glabripennis* (Motschulsky) (Coleoptea: Cerambycidae). I. Larval description and diagnosis. Proceedings of the Entomological Society of Washington 100: 373–381.

Cherepanov, A. I. 1981. Longhorn Beetles of Northern Asia (Cerambycidae). Nauka Press, Novosibirsk, Russia. 216 pp (in Russian). English translation: Cerambycidae of Northern Asia. Volume 2, Part 1 Cerambycinae. E.J. Brill, Leiden, The Netherlands. 292 pp.

Cocquempot, C. 2006. Alien longhorned beetles (Coleoptera Cerambycidae): original interceptions and introductions in Europe, mainly France, and notes about recently imported species. Redia 89: 35–50.

Danilevsky, M. L., and A. I. Miroshnikov. 1985. Longhorn beetles of Caucasus (Coleoptera, Cerammbycidae). Taxonomic Keys. Nauka Press, Krasnodar, Russia. 419 pp (in Russian).

Faldermann, F. 1835. Coleopterorum ab illustrissimo Bungio in China boreali, Mongolia, et montibus Altaicis collectorun, nec non ab ill. Turczaninoffio et Stchukino e provincia Irkutzk missorum illustrations. Mémoires présentés à l'Académie Impériale des Sciences de Saint-Pétersbourg 2: 337–464.

Ganglbauer, L. 1886. Die Bockkäfer der Halbinsel Korea. Horae Societatis Entomologicae Rossicae 20: 133–138.

Grebennikov, V. V. 2005. International dunnage as an important pathway of transmitting wood-dwelling beetles across borders (as viewed from Canadian perspective). "Insects, Nature, and Humans" Proceedings of the Fifth Asia-Pacific Congress of Entomology, Jeju, Korea, October 18–21, 2005. 103 pp.

Gressitt, J. L. 1951. Longicorn Beetles of China. Longicornia 2: 1–667.

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.

Haack, R. A., J. F. Cavey, E. R. Hoebeke, and K. Law. 1996. *Anoplophora glabripennis*: a new tree-infesting exotic cerambycid invades New York. Newsletter of the Michigan Entomological Society 41: 1–3.

Haack, R. A., E. Jendek, H. Liu, K. P. Marchant, T. R. Petrice, T. M. Poland, and H. Ye. 2002. The emerald ash borer: a new exotic pest in North America. Newsletter of the Michigan Entomological Society 47: 1–5.

Hadley, A. 2008. CombineZM. Published by the author. Available from: http://www.hadleyweb.pwp.blueyonder.co.uk/CZM/combinezm.htm (Accessed on 21 November 2007).

Hanks, L. M., T. D. Paine, J. C. Millar, and C. Campbell. 1998. Another tree-killing pest of eucalyptus invades California. California Plant Pest and Disease Report 16: 19–21.

Heyden, L. F. J. D. von. 1886. Beiträge zur Coleopterun-Fauna von Turkestan, namentlich des Alai-Gebirges. Deutsche Entomologische Zeitschrift 30: 177–194.

Iwata, R. and F. Yamada. 1990. Notes on the biology of *Hesperophanes campestris* (Faldermann) (Col., Cerambycidae), a drywood borer in Japan. Material und Organismen 25: 305–313.

Kadlec, S. 2005. Two new species [sic] longicorn beetles (Coleoptera: Cerambycidae) from western Palaerctic [sic] region. Studies and Reports of District Museum Prague-East 1: 103–107.

Kadlec, S. and M. Rejzek. 2001. *Trichoferus samai*, a new species from Turkey (Coleoptera: Cerambycidae). Biocosme Mesogeen 17(2000): 295–302.

Kolbe, H. L. 1886. Beiträge zur Kenntnis der Coleopteren-Fauna Koreas. Archive für Naturgeschichte 52: 139–240.

Landry, L. P. 2001. *Tetrops praeusta* (Linné), une addition à la faune des Cerambycidae (Coleoptera) du Québec. Fabreries 26: 26–27.

Laplante, S. 1989. Contribution à l'inventaire des Cerambycidae (Coleoptera) de la province de Québec. Fabreries 14: 56–83.

Lingafelter, S. W. 2007. Illustrated key to the longhorned woodboring beetles of the Eastern United States. Special publication No. 3, The Coleopterists Society. 206 pp.

Lingafelter, S. W., and E. R. Hoebeke. 2002. Revision of *Anoplophora* (Coleoptera: Cerambycidae). Miscellaneous Publication of The Entomological Society of Washington. 236 pp.

Linsley, E. G. 1962. The Cerambycidae of North America. Part III. Taxonomy and classification of the subfamily Cerambycinae, tribes Opsimini through Megaderini. University of California Publications in Entomology volume 20. 188 pp.

Linsley, E. G. 1964. The Cerambycidae of North America. Part V. Taxonomy and classification of the subfamily Cerambycinae, tribes Callichromini through

Ancylocerini. University of California Publications in Entomology volume 22. 197 pp.

Maier, C. T., and C. R. Lemmon. 2000. Discovery of the smaller Japanese cedar longhorned beetle *Callidiellum rufipenne* (Motschulsky) (Coleoptera: Cerambycidae), in live arborvitae in Connecticut. Proceedings of the Entomological Society of Washington 102: 747–754.

Monné, M. A., and F. T. Hovore. 2006. Checklist of the Cerambycidae, or longhorned beetles, of the Western Hemisphere. BioQuip Publications, Rancho Dominguez, CA. 395 pp.

McNamara, J. 1991. Family Cerambycidae (longhorn beetles). [pp. 277–300]. *In*: Checklist of Beetles of Canada and Alaska (Y. Bousquet, editor). Research Branch, Agriculture Canada, Ottawa, Canada. 430 pp.

Niisato, T. 2007. Cerambycinae. [252–281, 423–512]. *In*: Longicorn Beetles of Japan (N. Ohbayashi and T. Niisato, editors). Tokai University Press, Kanagawa, Japan. 818 pp.

Plavil'shchikov, N. N. 1940. Fauna USSR. Insecta: Coleoptera: Cerambycidae. Vol. 22. Akademia Nauk USSR, Moscow, Russia. 784 pp. (in Russian).

Ratnasingham, S., and P. D. N. Hebert. 2007. BOLD: the Barcode of life data system (http://www.barcodinglife.org). Molecular Ecology Notes 7: 355–364.

Sama, G. 1994. Deuxième note sur les Cerambycidae de Chypre. Révision de la collection du Department of Agriculture de Chypre avec description d'un nouveau *Leiopus* Serville et de deux *Trichoferus* Wollaston du Ciste. (Coleoptera, Cerambycidae). Biocosme Mésogéen 11: 37–47.

Sama, G., M. Fallahzadeh, and P. Rapuzzi. 2005. Notes on some Cerambycidae (Coleoptera) from Iran with description of two new species (Insecta Coleoptera Cerambycidae). Quaderno di Studi e Notizie di Storia Naturale della Romagna 20: 123–132.

Sama, G., and C. Makris. 2001. Description of *Trichoferus georgioui* sp. nov. from Cyprus (Coleoptera: Cerambycidae). Entomologische Zeitschrift 111: 166–167.

Scriven, G. T., E. L. Reeves, and R. F. Luck. 1986. Beetle from Australia threatens *Eucalyptus*. California Agriculture 40: 4–6.

Shapovalov, A. M., V. A. Nemkov, A. V. Rusakov, and D. F. Shovkun. 2006. Longhorned beetles (Coleoptera, Cerambycidae) of Orenburg Region. Vestnik Orenburgskogo Universiteta, Supplement 4: Abstracts of the III International Conference "Biodiversity and Biological Resources of Ural and Neighboring Lands". Orenburg State University Press, Orenburg, Russia pp. 105–109. (in Russian).

Smith, G., and J. F. Hurley. 2000. First North American record of the Palearctic species *Tetropium fuscum* (Fabricius) (Coleoptera: Cerambycidae). The Coleopterists Bulletin 54: 540.

Švácha, P., and M. L. Danilevsky. 1988. Cerambycoid larvae of Europe and Soviet Union (Coleoptera, Cerambycoidea). Part II. Acta Universitatis Carolinae – Biologica 31: 121–284.

Swift, I. 2008. *Heterachthes rugosicollis* Martins: a new cerambycid to the North American fauna (Coleoptera: Cerambycidae), and a key to the genus. The Coleopterists Bulletin 62: 545–549.

Thomas, M. C. 2000. *Ficus aurea* (Florida strangler fig, golden fig) – *Sybra alternans* (Wiedemann), a longhorned beetle. Tri-ology Technical Report, 39(3). Florida Division of Plant Industry, Gainesville, FL. Available from: http://www.doacs.state.fl.us/pi/enpp/00-may-jun.html#ent (Accessed on 13 February 2008)

Turnbow, R. H., and M. C. Thomas. 2002. Family 120. Cerambycidae Leach 1815 [pp. 568–601]. *In*: American Beetles. Polyphaga: Scarabaeoidea through Curculionoidea (R. H. Arnett, M. C. Thomas, P. E. Skelley, and J. H. Frank, editors). CRC Press, Boca Raton, FL. 861 pp.

Vlasak, J., and K. Vlasakova. 2002. Records of Cerambycidae (Coleoptera) in Massachusetts with notes on larval hosts. The Coleopterists Bulletin 56: 203–219.

Villiers, A. 1978. Cerambycidae I. Faune des Coléoptères de France. Éditions Lechevalier S.A.R.L., Paris, France. 611 pp.

Yanega, D. 1996. Field Guide to Northeastern Longhorned Beetles (Coleoptera: Cerambycidae). Illinois Natural History Survey, Champaign, IL. 174 pp.

(Received 23 March 2009; accepted 28 July 2009. Publication date 17 April 2010.)