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Range expansion of *Trichoferus campestris* (Faldermann) (Coleoptera: Cerambycidae) in Europe with the confirmation of its presence in Romania

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The distribution of the alien longhorn beetle *Trichoferus campestris* in Europe is analyzed based on new and published data. A literature review revealed that the number of records of this species has increased during recent years. According to the geographic range of these records and their temporal distribution, the species might be already established in several European countries and is quickly spreading west. It is also confirmed in Romania based on specimens collected in different localities from the extra-Carpathian area and on the correction of a previously published misidentification. Phytosanitary interceptions of *Trichoferus campestris* in France and recently in Sweden (Lidhult, Halland region) have prevented its introduction and possible establishment in these countries.

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1. Introduction

Trichoferus campestris (Faldermann) is a wood-boring longhorn beetle with a natural range that extends from Japan, Korea and China to Central Asia. In the last forty years this species has been recorded in several European countries, but it was originally only known from the South of European Russia (Danilevsky & Miroshnikov 1985). Specifically, this record refers to a specimen collected in 1971 by A. Kompantzev from Astrakhan city (Danilevsky, M. L., pers. comm.), but actually *T. campestris* was present in the area at least from 1967 (Kasatkin 2006).

The species is polyphagous on both deciduous trees and conifers and represents a serious threat to forests, fruit orchards and ornamental trees as the larvae develop under the bark and in the wood of healthy or stressed trees causing weakness or even death (EPPO 2008). The insect may also develop in dry dead wood (Švácha & Danilevsky 1988) and can damage building timber (Kostin 1973) similarly to other cerambycids, such as *Hylotrupes bajulus* (Linnaeus) and *Stromatium unicolor* (Olivier), its attack being sometimes concomitant with the latter species (Serafim, pers. obs.).

The introduction of *T. campestris* in Europe is

most probably due to the increased transport of timber and wood-derived products via international trade, as is the case of most of the other 19 alien cerambycid species already established in Europe (Cocquempot & Lindelöw 2010). In France, for instance, it was reared in the quarantine area of Marseille harbour from willow timber imported from China (Cocquempot 2006). *Trichoferus campestris* is a quarantine species in Europe (EPPO 2008) and also in Canada (Canadian Food Inspection Agency 2008, 2011) and USA (Jackson *et al.* 2011). In North America it is frequently detected in warehouses in imported wood products but it is not clear, if the species is established in the region: a small infestation was detected near a storage site in New Jersey, but was eradicated (Cocquempot 2006). Two adult specimens were recently found near Montreal, far from any commercial facility, which does not necessarily indicate the existence of a viable population (Grebennikov *et al.* 2010).

2. Material examined

The following abbreviations are used below:

- NMNH: Grigore Antipa National Museum of Natural History, Bucharest
- NSMG: Natural Sciences Museum, Galați
- coll.: collection
- spec./specs.: specimen/s

Romania: 1 spec., Lunca Siretului, Iveşti, 18.VI. 2003, leg. C. Şerban (NSMG); 1 spec., Agigea Nature Reserve, 16.VII.2003, leg. R. Serafim (NMNH); 1 spec., Iaşi, 16.VI.2005, 1 spec., Iaşi, 25.VI.2012, leg. I. Popescu (Dascălu coll.); 4 specs., Craiova, IX.–X.2006 emerged from the wooden rafters of a house, leg. A. Sideri (NMNH); 1 spec., Bucureşti (park near NMNH), 8.VII.2011, leg. I. Matache (NMNH). Republic of Moldova: 1 spec., Chişinău, 12.VII.2000, leg. L. Fusu (Dascălu coll.); 2 specs., Chetrosu, VII.2005, leg. V. Chyubchik; 1 spec., Micăuți, 12.VII.2006, leg. A. Zubov (Zubov coll.). Russia: 1 spec., Primorsko Ahtarsk, 8.VII.2009, leg. A. Zubov (Zubov coll.). Sweden: 1 spec., Lidhult, Halland region, 15.IX.2011, emerged on 30.V.2012, leg. Å. Lindelöw; reared from wood packing material (conifer) imported from China.

3. Discussion

Although there is definitely an unpredictable delay between a species arrival in a country and the capture of the first specimen, the available data clearly indicate a rapid east to west expansion of the distribution of *T. campestris*. Judging from the high number of recent records and their temporal distribution (Fig. 1), the dispersal of *T. campestris* is based probably not only on human-mediated transport activities but also on natural dispersal. As far as we know, no data on the dynamics of the populations in different locations are available, but according to the distribution pattern of the currently available records, and the presence of the species in several natural habitats (Terekhova & Bartenev 2007, Hegyessy & Kutasi 2010, Kruszelnicki 2010), the species may have become established in several European countries, including Romania. Because of its biology (the adults are active at twilight and during the night) it is not often encountered, so most likely the current records reflect just a part of its real distribution.

Different hypotheses concerning the dispersal pathways in Eastern Europe have been proposed. To the north of European Russia, the species spread probably along the Volga River (Egorov 2005). The oldest record outside European Russia is from Ukraine in Crimea (Terekhova & Bartenev 2007), where the species was collected in 1992 (Terekhova, V. V. & Bartenev, A. F. unpubl.), arriving there probably through the Taman peninsula; it then spread to the North, either from Crimea or directly from the South of European Russia along the coastline of the Azov Sea or both ways (Zamoroka 2009). In 1998 the species was found in Kharkov (Danilevsky 2012) and Donetsk (Terekhova & Bartenev 2007) and two years later in Chişinău (Dascălu coll.). After reaching eastern Romania (the first known record being from 2003), the species could have spread towards northwest and southwest, surrounding the Carpathians. To the northwest, the known distribution area already includes Hungary, Slovakia, Czech Republic and Poland. In Hungary, the first specimens were found in 1997 in a localized population in Budapest, but from 2008, the species became more widespread (Hegyessy & Kutasi 2010). Probably, the first specimens

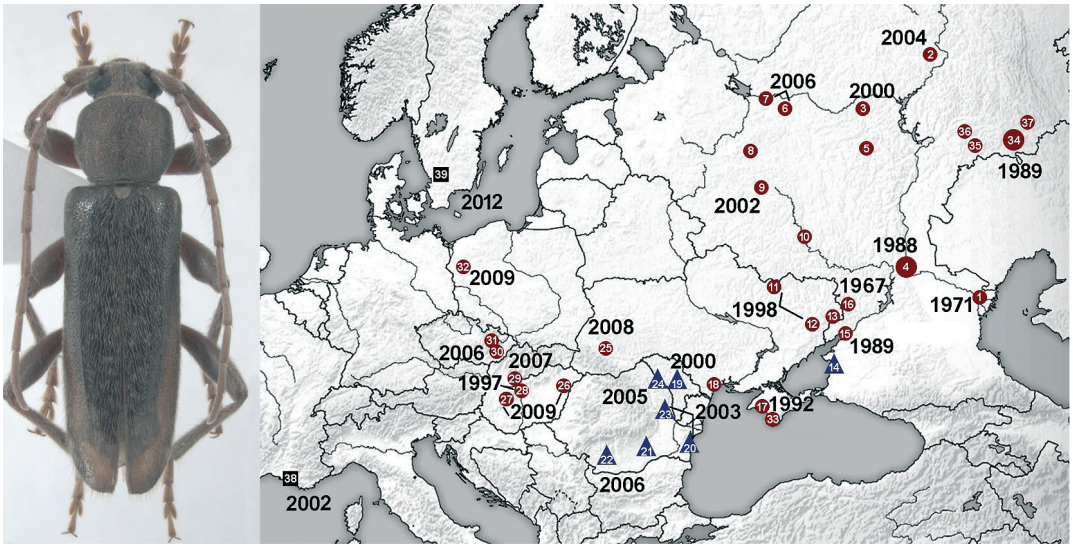

Fig. 1. Habitus of *Trichoferus campestris* and its distribution in Europe: 1 – South of European Russia, Astrakhan (Danilevsky & Miroshnikov 1985, Danilevsky, M. L. pers. comm.); 2 – Malaya Purga, Udmurt Rep. (Dedyukhin 2005); 3 – Morgaushskiy dist., Chuvash Rep. (Egorov 2001); 4 – Volgograd and surrounding area (Kalyuzhnaya *et al.* 2000, Kasatkin 2006); 5 – Saransk, Mordovia Rep. (Ruchin 2008); 6 – Ivanovo, 7 – Yaroslavl, 8 – Moscow (Danilevsky 2012); 9 – Odoyev, Tula Oblast (Nikitsky & Mamontov 2008); 10 – Voronezh, 11 – Kharkov (Danilevsky 2012); 12 – Donetsk, 13 – Dyakove, Luhansk Oblast (Terekhova & Bartenev 2007); 14 – Primorsko Ahtarsk (Zubov coll.); 15 – Rostov on Don and Taganrog bay area, 16 – Kamensk, Rostov Oblast (Kasatkin 2006); 17 – Crimea, Evpatoria, 18 – Odessa (Terekhova & Bartenev 2007); 19 – Chişinău (Dascălu coll.), Chetrosu, Orhei (Chyubchik 2010), Micăuți (Zubov coll.); 20 – Agigea Natural Reserve, Constanța, 21 – Bucureşti, 22 – Craiova (NMNH); 23 – Iveşti, Galați (NSMG); 24 – Iaşi (Dascălu coll.); 25 – Kryvets, Ivano-Frankivsk Oblast (Zamoroka 2009); 26 – Debrecen, 27 – Várpalota, 28 – Budapest (Hegyessy & Kutasi 2010); 29 – Štúrovo, 30 – Otrokovice, 31 – Olomouc (Sabol 2009); 32 – Łasko, Bierzwnik (Kruszelnicki 2010); 33 – Sevastopol (Zamoroka 2009); 34 – Orenburg and surrounding area, 35 – Bogdanovka, Totsky dist., 36 – Buzuluksky dist., 37 – Saraktashsky dist. (Shapovalov 2006); 38 – Marseille (Cocquempot 2006); 39 – Lidhult, Halland reg. (Lindelöw coll.). Dots: published records, large dots represent several distant localities situated in the same area; Triangles: unpublished data; Squares: interceptions in quarantine. The years represent the oldest collecting data for a region.

were accidentally introduced and formed a viable population on the spot but the most recent records are the result of the current expansion of the species range across Europe. Concerning southeast Europe there is insufficient distribution data but this might be an artifact of lesser collecting in the Balkan area. The phytosanitary measures at country borders have prevented, for the moment, its introduction from Asia into Western and Northern Europe, the species being intercepted only in quarantine facilities in France (Cocquempot 2006) and Sweden (one specimen reared in 2012 from wood packaging material from China, imported to Sweden in 2011). Despite these measures, judging from the current records, the species might reach the Atlantic in the near future through natural dispersal from Eastern Europe.

Does the natural distribution suggest what climate the beetle may tolerate? Is the climate in Northern and Western Europe appropriate for its establishment? Currently, it is difficult to properly analyze the eco-climatic suitability of Europe for *T. campestris* as it is not always clear, if the record for a given locality is based on an established population or on accidentally introduced individual/s.

The delay between capture and publication of a record has been caused, in some cases, by the difficulties in identifying a non-native species. For instance, *Trichoferus campestris* was first misidentified and published as *T. griseus* Fabricius by Serafim and Maican (2004) whereas the

first proper record of *T. campestris* in Romania appears in the Catalogue of Palaearctic Coleoptera (Löbl & Smetana 2010) without further details. Here we confirm its presence based on numerous specimens from different museum and private collections as listed under the Material examined -section. These taxonomic impediments have been overcome now with the publication of useful illustrations and keys for adults which facilitate the identification (Grebennikov *et al.* 2010, Hegyessy & Kutasi 2010, Zamoroka & Panin 2011); the larvae have been described in details by Švácha and Danilevsky (1988).

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