

On Invasion of an East Asian Seed Beetle, *Megabruchidius tonkineus* (Pic) (Coleoptera, Bruchidae), Developing in *Gleditsia* Seeds, in the Northwest Caucasus

B. A. Korotyaev

Zoological Institute, Russian Academy of Sciences, St. Petersburg, 199034 Russia

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Abstract—An East Asian bruchid, *Megabruchidius tonkineus* (Pic, 1914), which recently settled on *Gleditsia triacanthos* in Hungary, was recorded for the first time in Krasnodar in 2005 and was found in two examined localities in and near Krasnodar in November 2010. The species is likely to have become established in the Northwest Caucasus.

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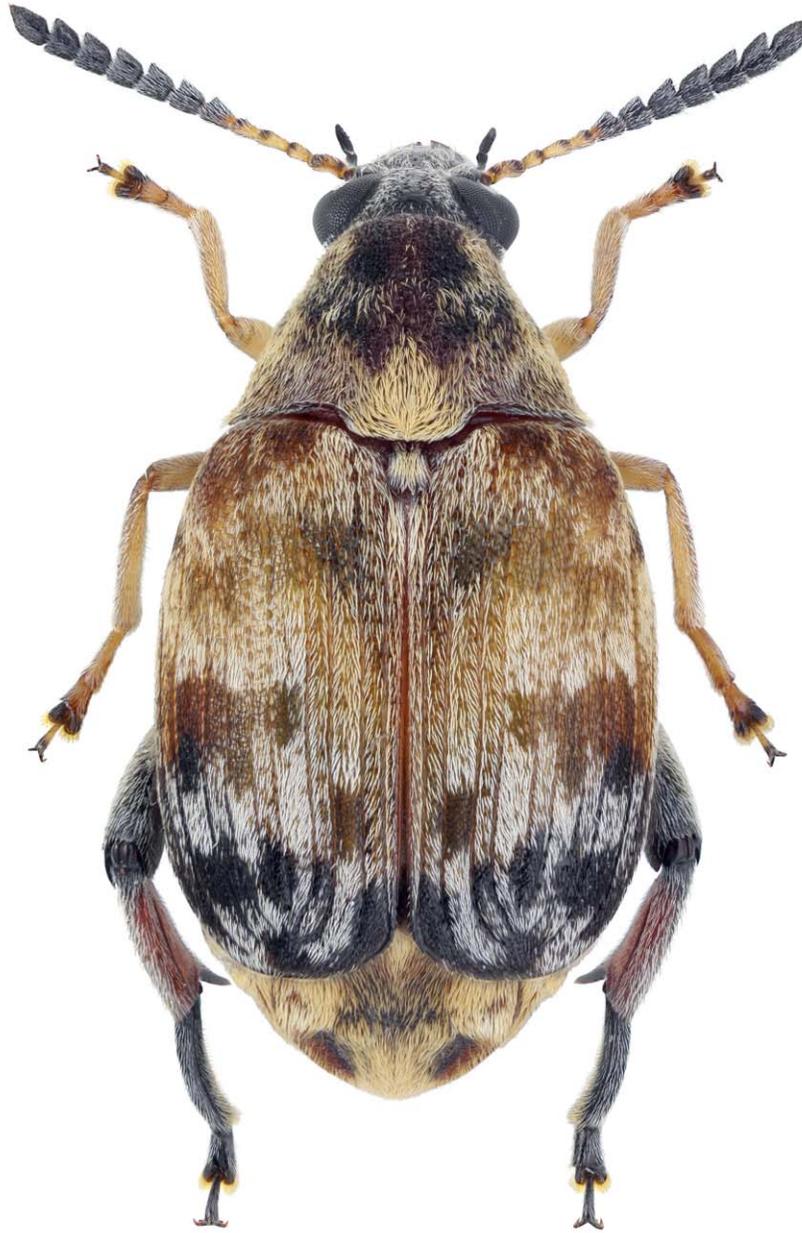
The East Asian genus *Megabruchidius* Borowiec, 1984 comprises four species (Anton, 2010; *M. sophorae* Tuda et Morimoto, 2004 from Japan: Tuda and Morimoto, 2004, cited after György, 2007, was not included in the catalogue). Two of them, *M. dorsalis* (Fähr.) and *M. tonkineus*, at the end of the XX and the beginning of the XXI century were introduced into Europe where they develop in honeylocust seeds (György, 2007). *Megabruchidius tonkineus* was for the first time recorded in Germany (Chemnitz, Saxony) in 1980 (Wendt, 1980, cited after György, 2007) but did not establish in that country. In Budapest, this bruchid was regularly and in quite large numbers reared from pods of the honeylocust *Gleditsia triacanthos* L. from 2001 to 2007.

In the territory of Russia, the first specimen of *Megabruchidius tonkineus* (Pic) was found by N.M. Paramonov (the Zoological Institute, Russian Academy of Sciences, St. Petersburg; ZIN), who reared it from honeylocust seeds collected by him in the park of Kuban State University in Krasnodar on September 1, 2005 (Korotyaev et al., 2010). Early in November 2010, I collected honeylocust pods in the city cemetery of Krasnodar and on the bank of Shapsugskoye Reservoir in Adygeya, not far from Krasnodar. In January 2011, in St. Petersburg, the beetles began to emerge from the seeds of both samples and their emergence continued till mid-June 2011. Therefore, the seed beetle may be supposed to have existed in nature in the precincts of Krasnodar at least since 2005. According to the Wikipedia data, the minimal temperature of January, the coldest month in Krasno-

dar, for the period 2005–2011, was -33.7°C (24.01.2006). In Chemnitz in 1980–2001 and in Budapest in 2001–2011, the temperature never dropped below -20°C . Acclimation of *Megabruchidius tonkineus* in the environs of Krasnodar in spite of severe though short winter frosts occurring almost every year suggests that spreading of southern species to the north is often limited by the heat needed for completion of the life cycle (Berman et al., 2007), rather than by the cold tolerance of the insect.

Megabruchidius tonkineus is larger than all the other bruchid species present in the Northwest Caucasus; the adults are usually about 5 mm long (4.5–5.5 mm). They are easily recognizable by the bright coloration of the dorsum (see figure) which clearly distinguishes this species from the largest local representatives of the genus *Bruchus*, which are uniform-black. Very small adults, only about 3 mm long, can sometimes be found; according to György (2007), such individuals develop when two larvae happen to be present in a honeylocust seed, instead of only one. Males can be easily distinguished from females by the presence of a large round spot of short pale hairs on abdominal sternite I and by a noticeably convex and almost one-colored pygidium. Females are recognized by the presence of dark elongate impressions (well seen in the photograph) along the edges of the weakly convex pygidium.

György (2007) did not give any specific biological data on the adults in Hungary, though the level of infestation of honeylocust pods may be very high in the



Megabruchidius tonkineus (Pic), female. Body length 5 mm.

environs of Budapest. In Krasnodar, I could not find any adults in early June 2011 on examining the flowering honeylocust trees and a few flowering ornamental herbaceous plants for half an hour in the place where the infested pods had been collected on November 3, 2010. The host plants of *Megabruchidius tonkineus* in Vietnam and China are also unknown. Since *Gleditsia triacanthos* is a species of North American origin while the genus *Megabruchidius* is known only from East Asia, the main host plants of *M. tonkineus* should belong to the East Asian flora. On January 9, 1989, I collected, together with a large series of the weevil *Pseudopiezotrachelus collare* (Schils.), one specimen

of this bruchid in Thanh Hóa Province in the north of Vietnam, on the flowers of the lablab bean *Dolichos lablab*, but this beetle must have been just feeding on them. On December 29, 1988, 15 specimens of *M. tonkineus* were collected by me in Hanoi on the flowers of the marigold *Tagetes* sp. Activity of this bruchid during the coldest season in Vietnam and its wide distribution in the anthropogenically disturbed regions of the north part of the tropical zone might have been prerequisites to penetration of *M. tonkineus* into Europe. The very poor collections of phytophagous beetles made by me in December 1988 and January 1989 in Thanh Hóa Province mostly con-

sisted, besides *M. tonkineus*, of the weevils *Sitophilus oryzae* L., *Polytus melleborgi* Boh. (Dryophthoridae), the already mentioned *Pseudopiezotrachelus collare* (Apionidae), and the coffee-bean weevil *Araecerus fasciculatus* (DeG.) (Anthribidae), widespread in different continents; among the scarce bruchids, species of the genus *Callosobruchus* Pic occurred most frequently.

The history of introduction of *M. tonkineus* into Europe is unknown. This species was initially supposed to have been brought to Chemnitz with haricot beans, but laboratory studies did not reveal the ability of *M. tonkineus* to develop in seeds of 10 haricot varieties. Under laboratory conditions, the beetles can inhabit dry honeylocust seeds though females prefer to lay their eggs in the crevices of pod walls; the pods lying on the ground were also inhabited (György, 2007). Examination of no less than 50 honeylocust pods collected under the tree on the bank of Shapsugskoye Reservoir in Adygeya on November 3, 2010, revealed no beetle exit openings or traces of seed damage; yet under laboratory conditions in St. Petersburg, beetles continued to emerge in small numbers from these seeds until mid-June 2011. In a separately stored series of about 50 seeds from pods with beetle exit openings, collected in the cemetery in Krasnodar on November 6, 2010, beetles emerged from all the seeds by the end of June 2011, and one can positively state that some of them developed from eggs laid in the cage.

Since *M. tonkineus* is biologically similar to the dangerous pest of haricots, the bean weevil *Acanthoscelides obtectus* Say, the dynamics of its acclimation in the North Caucasus and its biology both in Europe and East Asia deserve further study. In the future, *M. tonkineus* may become a common species in the fauna of South Russia, like the North American bruchid *Acanthoscelides pallidipennis* Motsch. developing on the introduced American shrub *Amorpha fruticosa*, but it is also possible that the species in question will be included into the quickly growing group of invasive pests (Izhevskii, 2008).

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