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ISODONTIA MEXICANA (HYMENOPTERA, SPHECIDAE), A NEW INVASIVE WASP SPECIES IN THE FAUNA OF UKRAINE REARED FROM TRAP-NESTS IN THE CRIMEA

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***Isodontia mexicana* (Hymenoptera, Sphecidae), a New Invasive Wasp Species in the Fauna of Ukraine Reared from Trap-Nests in the Crimea. Fateryga, A. V., Protsenko, Yu. V., Zhidkov, V. Yu.** — The North American wasp *Isodontia mexicana* was found for the first time in Ukraine in trap-nests operated near Pushkino (southern coast of the Crimea) in 2012. Three nests contained five cocoons, from which only one adult wasp emerged in 2013, allowing the positive identification; other cocoons were either empty (one) or destroyed by *Melittobia acasta* (three). Such a find of a newly established invasive species in Ukraine represents the easternmost point in its European range and possibly the most remarkable jump-dispersal event in its distribution.

K e y w o r d s: digger wasps, *Isodontia mexicana*, distribution, invasive species, trap-nests, Crimea.

***Isodontia mexicana* (Hymenoptera, Sphecidae) — новый для фауны Украины инвазивный вид ос, выведенный из гнёзд-ловушек в Крыму. Фатерыга А. В., Проценко Ю. В., Жидков В. Ю.** — Североамериканский вид осы *Isodontia mexicana* обнаружен впервые для Украины в гнёздах-ловушках, выставленных близ Пушкино (ЮБК) в 2012 г. Три гнезда содержали пять коконов, из которых только одно имаго осы было получено в 2013 г., что позволило точно определить вид; остальные коконы были пустыми (1) либо поражёнными *Melittobia acasta* (3). Находка данного инвазивного вида, впервые зарегистрированного для Украины, представляет наиболее восточную точку европейской части его ареала и, возможно, наиболее примечательный скачок в его распространении.

К л ю ч е в ы е с л о в а: роющие осы, *Isodontia mexicana*, распространение, инвазивные виды, гнёзда-ловушки, Крым.

Introduction

The genus *Isodontia* Patton, 1880 is one of the two genera belonging to the tribe Sphecini (Sphecinae) and includes more than 60 species distributed worldwide (Pulawski, 2013). Two species are native to Europe and occur mainly in Mediterranean: *Isodontia paludosa* (Rossi, 1790) and *Isodontia splendidula* (A. Costa, 1858) (Barbier, 2004). The third species, North American *Isodontia mexicana* (de Saussure, 1867) was accidentally introduced to France in 1960. Its known distribution in Europe at present includes also Italy, Spain, Switzerland, Slovenia, Croatia, Germany, Hungary, Austria, Belgium, Corsica, the Netherlands, and Serbia (Ćetković et al., 2012; Smit, Wijngaard, 2010). Thus, the species has spread from France to 11 other countries during 50 years. *Isodontia mexicana* was also introduced to some Pacific islands and Iran (review in Ćetković et al., 2012).

In contrast to the ground-nesting genus *Sphex* Linnaeus, 1758, the only other genus of the tribe Sphecini, all species of the genus *Isodontia* nest mainly in preexisting cavities, e.g., hollow stems, burrows in wood made by other wasps, bees or beetles, etc.; partitions between cells and final plug of the nest are made mainly of grass stems and leaves or other plant material ("grass-carrying wasps"); some species lay several eggs into one cell, and their prey is orthopterans (usually crickets and katydids) (Medler, 1965; Krombein, 1967; Scaramozzino et al., 1991; Kazenas, 2001; O'Neill, O'Neill, 2003; Ćetković et al., 2012).

Neither native nor exotic species of the genus *Isodontia* were known in the fauna of Ukraine by far (Barbier, 2004; Shorenko, Konovalov, 2010; Protsenko et al., 2012). The purpose of this paper is to report about the first documented discovery of *I. mexicana* in Ukraine.

Material and methods

Isodontia mexicana was found in the trap-nest near the village of Pushkino in the vicinity of Alushta, the Crimea (44°35′44″ N, 34°20′45″ E). The trap was attached to a branch of sumach tree (*Rhus coriaria* L., Anacardiaceae) during the warm season of 2012 at the junkyard area of an opencast mine (fig. 1, *1*). The trap was made of reed stems (*Phragmites australis* (Cav.) Trin. ex Steud., Poaceae) arranged in a sheaf (fig. 1, *2*). In autumn the trap was removed, opened and examined in laboratory, and the contents of the cells were placed into glass vials to mature. Specimen reared from the nests was identified according to the key to North American Sphecidae (Ascher, 2013) and deposited in the collection of Taras Shevchenko Kyiv National University.

Results

Three nests of *I. mexicana* were found in the single trap-nest. They were made in reed stems of following dimensions (length × inner diameter): 20 cm × 10.5 mm, 19 cm × 9.3 mm, and 16 cm × 8.3 mm, respectively (fig. 1, *3*). The first nest contained three cocoons of *I. mexicana* in two cells separated by partitions made of fragments of grass. The cocoon in the first cell was empty; adult wasp had probably emerged from it before the trap-nest was transported to the laboratory. Two other cocoons, placed in the second cell, were parasitized by *Melittobia acasta* Walker, 1839 (Hymenoptera, Eulophidae). The second nest contained one cell with one cocoon damaged by *M. acasta*. The third nest contained one cell with one cocoon too; adult female emerged from it on June 12, 2013. All nests were sealed by final plugs made also of fragments of grass. Remains of tree crickets (Orthoptera, Oecanthidae) were found in all cells, under the cocoons (fig. 1, *4*).

Discussion

The North American grass-carrying wasp, *I. mexicana*, is reported for the first time for the fauna of Ukraine. This is the third invasive wasp species of the family Sphecidae introduced to Ukraine. The first one was *Sceliphron caementarium* (Drury, 1773) discovered in Odessa Region in 1991 (Antropov, 1993) and then in the Crimea in 2007 (Shorenko, 2007; Shorenko, Konovalov, 2010). The second species was *Sceliphron curvatum* (F. Smith, 1870) which appeared in Ukraine in 1999 and has already become abundant in several regions after four years, in 2003 (Fateryga, Kovblyuk, 2013). It is well known that females of *I. mexicana* can build their nests in anthropogenic sites (e.g., storm window tracks) (Jacobs, 2003) and obviously they can also easily enter the freight containers. This habit could facilitate transportation between continents and expansion within the newly colonized continent. Thus, the expansion of *I. mexicana* may be associated with human impact in similar way as in the invasive species of the genera *Sceliphron* Klug, 1801 and *Chalybion* Dahlbom, 1843 (Hymenoptera, Sphecidae, Sceliphrinae), e. g., *S. curvatum* or *Chalybion bengalense* (Dahlbom, 1845) (Schmid-Egger, 2005; Ćetković et al., 2011; Mei et al., 2012; Fateryga, Kovblyuk, 2013). However, natural spreading of both native and introduced species of the genus *Sceliphron* along river valleys and other favorable landscapes, without direct human assistance, is also common (Mader, 2013); obviously, this is possible in the case of *Isodontia* as well.

The previous findings of *I. mexicana* in Europe nearest to Ukraine were from Szeged in Hungary in 2009, and from Belgrade in Serbia in 2010 (Ćetković et al., 2012), both areas being about 1,100 km apart from our finding (linear distance). Obviously, the species could not easily spread across the Carpathian Range, lying in between; hence, it must have crossed even larger distance in two or three years. Such expansion rate is quite rapid, so spread was most probably assisted by means of human transportation (e. g., along the Danube River as a frequent traffic corridor). We do not have any evidence whatsoever that introduction into Ukraine took place from the closest known established populations (in Pannonian Plains and central Balkan Peninsula), but currently it seems as the most plausible scenario. In any case, this record represents the easternmost known location in the European range of *I. mexicana* and possibly the most remarkable jump-dispersal event in its spreading from southwestern through central Europe.

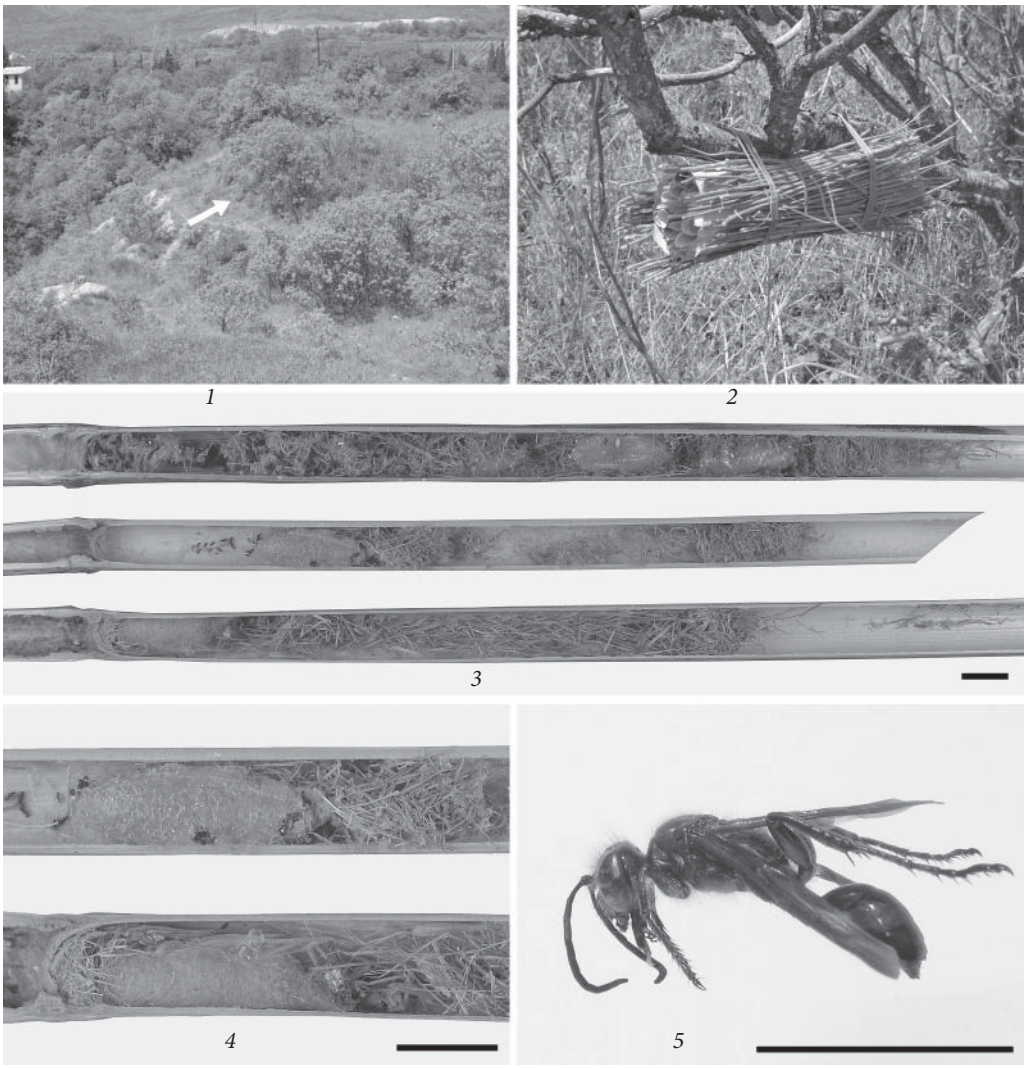

Fig. 1. Nesting site, nests, and imago of *Isodontia mexicana*: *1* — nesting site (arrow indicates the position of trap-nest); *2* — trap-nest containing three wasp nests; *3* — dissected nests in reed stems; *4* — cells with cocoons and remains of tree crickets; *5* — female reared from one nest. Scale bars 1 cm.

Рис. 1. Стация гнездования, гнёзда и имаго *Isodontia mexicana*: *1* — стация гнездования (стрелкой показано расположение гнезда-ловушки); *2* — гнездо-ловушка с тремя гнёздами осы; *3* — вскрытые гнёзда в стеблях тростника; *4* — ячейки с коконами и останками стеблевых сверчков; *5* — самка, выведенная из гнезда. Масштабные линейки 1 см.

It is not possible to predict the speed of further spreading and population build up of *I. mexicana* in Ukraine, but it seems to be somewhat lower in comparison with *S. curvatum*; *I. mexicana* has one generation per year (although this can be facultative, see above) in contrast to *S. curvatum* which is mainly bivoltine in Ukraine (Fateryga, Kovblyuk, 2013). Further tracking of *I. mexicana* expansion within Ukraine will be easy, since it is readily recognized among all other species of the family Sphecidae in the fauna of Ukraine by completely black body coloration and dark wings with distinct metallic tincture (fig. 1, *5*).

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