



FAUNISTIC NOTE

Vespa orientalis, a new alien species in Romania

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Abstract

A new alien hornet species (*Vespa orientalis*) has been observed in the Northern part of Bucharest, Romania, and reported through to the social networking platform for naturalists and citizen scientists, iNaturalist. All records were taken in Bucharest during 2019 and 2020.

Keywords

Oriental hornet, alien species, Romania.

Introduction:

Vespa orientalis Linnaeus, 1771 (Hymenoptera: Vespidae: Vespinae) belongs to the large-sized wasp species, called hornets. The common names for this species are oriental hornet.

Length 19–32 mm. The queens are larger than the workers and males. The body colour is rusty red, with sulphur-yellow markings on the face and various parts of metasoma. (Abou-Shaara 2017; Sánchez et al. 2019) (Fig. 1). The males can be distinguished from the workers by the longer antennae. The colour and pattern difference between the oriental hornet (*Vespa orientalis*) and the European hornet (*Vespa crabro* Linnaeus, 1758) are illustrated in the Fig. 2.

The biology is rather similar to the European hornet (*Vespa crabro*) (Archer 1993). The fertilised queens do not return to their family nest, but acting alone and

hibernate in tree holes or cracks. In the spring, they will build a nest, in the soil or hollow walls, or other cavities in buildings or rocky substrate. The queen's nests, named embryonic nests, consist in one small comb, with 10–20 cells covered with a spheric two- or three-layered envelope (Archer 1998; Volynchik et al. 2009; Wenzel 2020). All is made by woody paste, chewed by the queen. In most cases, the oriental hornets do not build exposed nests. If the queen dies accidentally, or get killed by predators, the nest will die too. After the first workers emerge, they will take over the responsibilities step-by-step and the queen will become sedentary, her only function will be laying eggs. The adults feed mostly on sweet fluids, like nectar or fruit pulps, but the larvae are carnivorous, so queen and later mainly workers hunt to feed their offspring (Jeong et al. 2020). Unlike the European hornet, the oriental hornets are maximum active in the hottest time of the day, because their pigments can adsorb the sun beams and transform it in their own energy (Galushko et al. 2005). These hornets are ferocious predators of other social hymenopterans, such as bees or other wasps. They are not so specialized for bee larvae, like the Japanese giant hornet (*Vespa mandarinia* Smith), but they kill many bee and wasp workers, being a serious threat for the beekeepers. As well, if their nest is disturbed, they will defend it aggressively (Dehghani et al. 2019).

Vespa orientalis is naturally distributed mostly in eastern Mediterranean and Asia (Četković 2004). It was imported in Mexico (Dvořák 2006), Chile (Ríos et al. 2020) and Madagascar (Sánchez et al. 2019). Within the last years this species was recorded



Figure 1. *Vespa orientalis* worker collected in Bucharest, Romania, 25 November 2020. Scale bar = 23 mm.

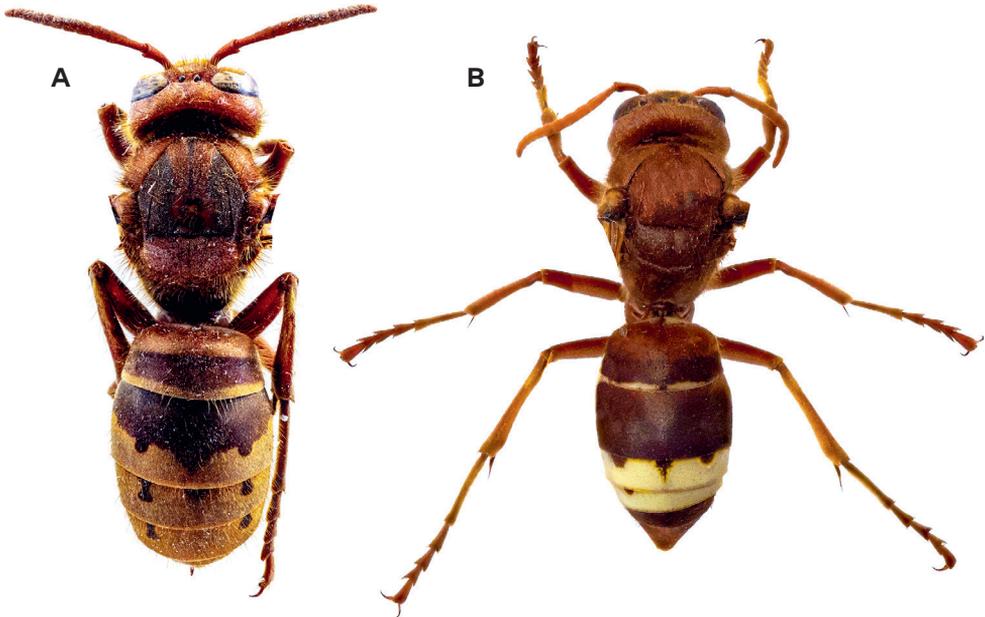


Figure 2. Body representation of the colour and pattern for *Vespa crabro* (A) and *V. orientalis* (B) (the wings were removed for a better visualization of the bodies). Photos by I. Iorgu (A) and A. Ruicănescu (B).

in other European regions (The Iberian Peninsula, Northern Italy, Bulgaria, Southern Romania¹, Ukraine, Kazakhstan and Germany) (Hernández et al. 2013; Temreshev 2018; Bressi et al. 2019) (Fig. 3).

Material and methods

All observations and pictures were submitted to the naturalist citizen scientists' social network, named iNaturalist (https://www.inaturalist.org/observations?place_id=8858&taxon_id=83801) and then were transferred to the Global Biodiversity Information Facility (GBIF) (https://www.gbif.org/occurrence/search?offset=20&has_coordinate=true&has_geospatial_issue=false&taxon_key=10212955&occurrence_status=present). We collected only one specimen (worker) (25.nov.2020, 44.477718 lat., 26.096169 long.), which is photographed and illustrated in this paper (Fig. 1). The specimen is stored in Adrian Ruicănescu's collection.

We used the iNaturalist and GBIF information and created the maps using QGIS v3.9.

¹ Četković (2004) considers all previous records in Slovenia, Romania and Bulgaria, by Carpenter and Kojima (1997) as formally disputed, so the records as new species in Romania are valid.

Results and discussions

Ten individuals observed in the northern part of Bucharest, one of them observed on the 27th of September 2019, the other nine being observed between the 9th of August and the 25th of November 2020. These observations led us to conclude that there was at least one functional nest in the area, during the summer of 2020.

The oriental hornet (*Vespa orientalis*) has experienced certain spreading in Eurasia, probably due to the human transportation, when the hibernating queens may be moved within various packing material. Before 2000 only the Mediterranean parts of south-eastern Europe was confirmed as exact distribution (Četković 2004).

The distribution in Bucharest leads us to assumption it was a single nest in that region. No other occurrences were reported in Romania, yet (Fig. 4).

As usual for many alien species during the spreading into new territories, they firstly colonise the human inhabited areas (towns, villages) (Early et al. 2016). It is premature to assume if it can spread into the natural or quasi-natural areas. If it remains mainly in the urban or semiurban areas, the threat for the autochthonous species (including honey bee) is expected to be low. The risks for humans to get stung can be increased to some extent, since hornets defend their nests ferociously if provoked.

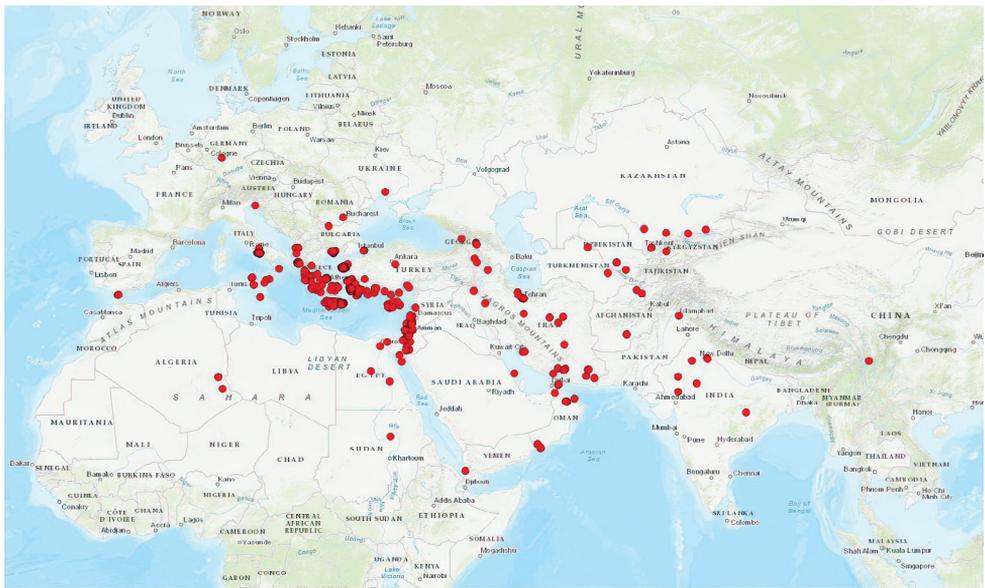


Figure 3. Actual distribution of the oriental hornet in Eurasia (GBIF) (GBIF, 2021).



Figure 4. The records of *Vespa orientalis* in Bucharest, in 2019 and 2020, also submitted and published in iNaturalist.

Conclusion

There is a possibility that this species may acclimate in the fauna of Romania, at least in the southern part of the country. We will keep watching the further dynamics of the population of *Vespa orientalis* in Bucharest and surroundings, but also, we will search for the new occurrences in other areas of Romania.

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References

- Abou-Shaara H (2017) Morphological characterization and wing description of *Vespa orientalis orientalis* queens. *Biotechnology in Animal Husbandry* 33(2): 251–259.
- Archer ME (1993) The life history and colonial characteristics of the hornet, *Vespa crabro* L. (Hym. Vespinae). *Entomologist's monthly magazine* 129: 151–163.
- Archer ME (1998) Taxonomy, distribution and nesting biology of *Vespa orientalis* L. (Hym., Vespidae). *Entomologist's Monthly Magazine* 134: 45–51.
- Bressi N, Colla A, Tomasini G (2019) Orientali verso nord: insediamento di una popolazione urbana di Calabrone Orientale (*Vespa orientalis* Linnaeus, 1771) a Trieste, NE Italy

- (Hymenoptera, Vespidae). *Atti del Museo Civico di Storia Naturale di Trieste* 60(11): 273–275. [in Italian]
- Carpenter JM, Kojima J (1997) Checklist of the species in the subfamily Vespinae (Insecta: Hymenoptera: Vespidae). *Natural History Bulletin of Ibaraki University* 1: 51–92.
- Četković A (2004 [2002]) A review of the European distribution of the oriental hornet (Hymenoptera, Vespidae: *Vespa orientalis* L.). *Ekologija* 37(1–2): 1–22.
- Dehghani R, Kassiri H, Mazaheri-Tehrani A, Hesam M, Valazadi N, Mohammadzadeh M (2019) A study on habitats and behavioral characteristics of hornet wasp (Hymenoptera: Vespidae: *Vespa orientalis*), an important medical-health pest. *Biomedical Research* 30(1): 61–66.
- Dvořák L (2006) Oriental Hornet *Vespa orientalis* Linnaeus, 1771 found in Mexico (Hymenoptera, Vespidae, Vespinae). *Entomological Problems* 36(1): 80
- Early R, Bradley B, Dukes J, Lawler JJ, Olden JD, Blumenthal DM, Gonzalez P, Grosholz ED, Ibañez I, Miller LP, Sorte CJB, Tatem AJ (2016) Global threats from invasive alien species in the twenty-first century and national response capacities. *Nature Communications* 7, 12485. <https://doi.org/10.1038/ncomms12485>
- Galushko D, Ermakov N, Karpovski M, Palevski A, Ishay JS, Bergman DJ (2005) Electrical, thermoelectric and thermophysical properties of hornet cuticle. *Semiconductor Science and Technology* 20: 286–289.
- GBIF.org (05 April 2021) GBIF Occurrence Download <https://doi.org/10.15468/dl.nkarmq>
- Hernández R, García-Gans FJ, Selfa J, Rueda J (2013) Primera cita de la avispa oriental invasora *Vespa orientalis* Linnaeus 1771 (Hymenoptera: Vespidae) en la Península Ibérica. *Boletín de la Sociedad Entomológica Aragonesa (S.E.A.)* 52: 299–300. [in Spanish]
- Jeong H, Kim JM, Kim B, Nam J-O, Hahn D, Choi MB (2020) Nutritional value of the larvae of the alien invasive wasp *Vespa velutina nigrithorax* and amino acid composition of the larval saliva. *MDPI. Foods*, 9, 885, doi:10.3390/foods9070885
- Ríos MV, Barrera-Medina R, Contreras JMF (2020) Primer reporte del género *Vespa* Linnaeus (Hymenoptera: Vespidae: Vespinae) en Chile. *Revista Chilena de Entomología* 46(2): 237–242. [in Spanish]
- Sánchez I, Fajardo MC, Castro M (2019) Primeras citas del avispon oriental *Vespa orientalis* Linnaeus 1771 (Hymenoptera: Vespidae) para Andalucía (España). *Revista de la Sociedad Gaditana de Historia Natural* 13: 11–14. [in Spanish]
- Temreshev II (2018) On the expansion of the areas of *Vespa orientalis* and *Polistes wattii* (Hymenoptera: Vespidae) on the territory of the Republic of Kazakhstan. *Acta Biologica Sibirica* 4(1): 38–45.
- Volynchik S, Plotkin M, Bergman DJ, Ishay DS (2009) Polyethism in an Oriental Hornet (*Vespa orientalis*) Colony. *Scholarly Research Exchange*, ID 243436: 1–8 <https://doi.org/10.3814/2009/243436>
- Wenzel JW (2020) Nest Structure: Social Wasps. In: Starr C (Ed.) *Encyclopedia of Social Insects*. Springer, Cham. https://doi.org/10.1007/978-3-319-90306-4_146-1