

## FIRST RECORD OF *OBAMA NUNGARA* IN SLOVAKIA (PLATYHELMINTHES: GEOPLANIDAE)

Ján Čapka<sup>1</sup> – Tomáš Čejka<sup>2\*</sup>

### Short communication

#### ABSTRACT

In June 2021, one specimen of the terrestrial flatworm *Obama nungara* Carbayo, Álvarez-Presas, Jones & Riutort, 2016 was found in a horticultural centre in the town of Šamorín–Čilistov. In this paper, we discuss its distribution, and marginally discuss the biology of the species and its impact on the native soil fauna.

#### KEY WORDS

terrestrial flatworms, land planarians, alien invasive species

#### INTRODUCTION

Land flatworm *Obama nungara* Carbayo, Álvarez-Presas, Jones & Riutort, 2016 is native from South America. Populations in the two southernmost Brazilian states, Santa Catarina and Rio Grande do Sul are most certainly native. The species is also found in Argentina, where it may be native or introduced. It is very common in human-disturbed areas, especially gardens and parks (LAGO-BARCIA, 2015).

Since 2008, a large land planarian has been found in several localities in Europe, including Great Britain (including Guernsey), France, Belgium, Spain (including Canary Islands), Switzerland, Italy and, more recently, Germany (KUTSCHERA & EHNS, 2021); on iNaturalist.org, a social network for global biota mapping, the occurrence of *Obama nungara* is also listed in Portugal, USA and Costa Rica (iNATURALIST, 2021).

*Obama nungara* has been reported to feed on earthworms and land snails. As a result, it may pose a threat to native populations of these groups in Europe (CARBAYO et al., 2016).

#### MATERIAL EXAMINED

On June 4, 2021, a conspicuous, one individual ca. 40 mm long, brown leaf-like flatworm was found in horticultural centre Abies in the town of Šamorín, municipal district Čilistov (WGS: 48.0126°N, 17.3063°E; 125 m a.s.l.). The individual was found

---

<sup>1</sup> Botanical garden, Comenius University in Bratislava, Botanická 3, SK – 841 04 Bratislava, Slovak Republic; e-mail: jan.capka@rec.uniba.sk

<sup>2</sup> Institute of Botany, Plant Science and Biodiversity Centre, Slovak Academy of Sciences, Dúbravská cesta 9, SK – 845 23 Bratislava, Slovak Republic; e-mail: t.cejka@gmail.com

\* corresponding author

on the soil surface under the plastic plant pot coming from Netherlands. A close inspection of this land planarian revealed that it morphologically resembles *Obama nungara*, as described by CARBAYO et al. (2013) and JUSTINE et al. (2020).

The identification was later confirmed by Leigh Winsor (James Cook University, Townsville, Australia) on the basis of a photo (see Figure 1 below) that was published by the authors on the iNaturalist server. A molecular determination was not made because the material was inadvertently degraded prior to preservation. For this reason, it was not possible to take further measurements of the found individual at a later date.

## RESULTS AND DISCUSSION

*Obama nungara* was first recorded as an exotic land planarian in Europe in various localities of France (JUSTINE et al., 2014a), Spain and England (ÁLVAREZ-PRESAS et al., 2014) but without a specific identification. Later on, LAGO-BARCIA et al. (2015) identified Spanish and Argentinean specimens as *Obama marmorata* (Schultze & Müller, 1857). However, CARBAYO et al. (2016) studied specimens from Europe and Brazil and assigned the species spreading across Europe to the new species: *Obama nungara*. The same year, ALDRED (2016) provided a new record of the species in Oxfordshire, United Kingdom, in a plant pot coming from the Netherlands. LAGO-BARCIA et al. (2019) extended the European distribution of *O. nungara* to Portugal and other regions of Spain.



**Figure 1.** An individual of *Obama nungara* from the horticultural centre in Šamorín-Čilistov, Slovak Republic.

Molecular data (LAGO-BARCIA et al., 2019) showed that this species is formed by three different clades and while one of these clades is restricted to Brazil, the other ones are found in Europe. This study also identified Argentina as the country of origin of the two invasive clades found in Europe. SOORS et al. (2019) identified specimens of *O. nungara* in Belgium. Their molecular data showed that the specimens from Belgium are members of the main clade spreading across Europe. Recently, JUSTINE et al. (2020) performed a molecular study with a large number of individuals collected in France, reaching the same conclusions of LAGO-BARCIA et al. (2019) about the Argentinean origin of the European specimens.

So far, most of the *O. nungara* records outside its native range are from urban areas, gardens and greenhouses (e.g. LAGO-BARCIA et al., 2015, 2019; SOORS et al., 2019; JUSTINE et al., 2020; NEGRETE et al., 2020). The single exception is the record from L'Albufera (Spain), where this invasive land flatworm has been recorded in a natural

ecosystem with high ecological, conservation and social values (THE LOCAL, 2019). It is noteworthy that the most comprehensive study on the distribution of *Obama nungara* across mainland Europe showed that the 500 meters of altitude level could represent an ecological barrier to the dispersal of this species (JUSTINE et al., 2020). However, the record from Açores is well above this altitude level (LAGO-BARCIA et al., 2020).

Although invasive *O. nungara* populations in Europe seem to be persistent and capable of surviving different climatic conditions and temperatures (SLUYS, 2016; SOORS et al., 2019; JUSTINE et al., 2020; NEGRETE et al., 2020), so far, the presence of this species in non-disturbed natural environments is still limited (THE LOCAL, 2019; LAGO-BARCIA et al., 2020).

*Obama nungara* represents a new addition of alien flatworm species and a new concern for conservation in Slovakia. As BOLL & LEAL-ZANCHET (2016) showed, this species is a very efficient predator of diverse components of the soil fauna, such as gastropods, earthworms and other planarians. Soil fauna is a keystone component to ensuring the well-functioning of organic matter decomposition, nutrient recirculation and other ecological services provided by this important ecosystem (COLEMAN & WALL, 2015). It has been shown that other invasive land planarians can produce huge effects on other soil fauna members, leading to species local extinction (e.g. JUSTINE et al., 2014b) or even wider ecological damages, such as the ability of the soil to retain water in a particular area (e.g. HARIA et al., 1998). Therefore, the early detection, monitoring and control of new invasive soil predators is extremely important to reduce important ecological cascade effects in new areas of occurrence.

#### ACKNOWLEDGEMENTS

We thank Leigh Winsor (James Cook University, Townsville, Australia) for confirming our preliminary species identification. We would like to thank the owners of ABIES Horticultural Centre for allowing us to carry out the faunistic survey. This work was supported by the grant agency VEGA, projects no. 2/0079/18, 2/0024/19, 2/0108/21 and by the Slovak Research and Development Agency under the contract no. APVV-19-0134.

#### REFERENCES

- ALDRED, J., 2016. Warning over invasive flatworm posing threat to UK wildlife, The Guardian, London. Available from: <https://www.theguardian.com/environment/2016/nov/03/warning-over-invasive-flatworm-which-poses-threat-to-uk-wildlife> [ver. 2021-07-21].
- ÁLVAREZ-PRESAS, M. – MATEOS, E. – TUDÓ, À. – JONES, H. – RIUTORT, M., 2014. Diversity of introduced terrestrial flatworms in the Iberian Peninsula: a cautionary tale. PeerJ, 2(2): e430.
- BOLL, P. K. – LEAL-ZANCHET, A. M., 2016. Preference for different prey allows the coexistence of several land planarians in areas of the Atlantic Forest. Zoology, 119(3): 162-168.
- CARBAYO, F. – ÁLVAREZ-PRESAS, M. – OLIVARES, C. U. T. – MARQUES, F. P. L. – FROELICH, E. X. M. – RIUTORT, M., 2013. Molecular phylogeny of Geoplaninae (Platyhelminthes) challenges current classification: Proposal of taxonomic actions. Zoologica Scripta, 42(5): 508-528.
- CARBAYO, F. – ÁLVAREZ-PRESAS, M. – JONES, H. D. – RIUTORT, M., 2016. The true identity of *Obama* (Platyhelminthes: Geoplanidae) flatworm spreading across Europe. Zoological Journal of the Linnean Society, 177(1): 5-28.

- COLEMAN, C. D. – WALL, D. H., 2015. Chapter 5. Soil Fauna: Occurrence, Biodiversity, and Roles in Ecosystem Function. In: PAUL, E. A. (ed.), Soil Microbiology, Ecology and Biochemistry. Fourth Edition. Academic Press, London, pp. 111-149.
- HARIA, A. H. – MCGRATH, S. P. – MOORE, J. P. – BELL, J. P. – BLACKHAW, R. P., 1998. Impact of the New Zealand flatworm (*Artiosthia triangulata*) on soil structure and hydrology in the UK. The Science of the Total Environment, 215: 259-265.
- iNATURALIS, 2021. *Obama ungaru*, distribution map. Available from <https://www.inaturalist.org>. [ver. 2021-07-18].
- JUSTINE, J. L. – THÉVENOT, J. – WINSOR, L., 2014a. Les sept plathelminthes invasifs introduits en France. Phytoma, 674: 28-32.
- JUSTINE, J. L. – WINSOR, L. – GEY, D. – GROS, P. – THÉVENOT, J., 2014b. The invasive New Guinea flatworm *Platydemus manokwari* in France, the first record for Europe: time for action is now. PeerJ, 2: e297.
- JUSTINE, J. L. – WINSOR, L. – GEY, D. – GROS, P. – THÉVENOT, J., 2020. *Obama* chez moi! The invasion of metropolitan France by the land planarian *Obama nungara* (Platyhelminthes, Geoplanidae). PeerJ, 8: e8385.
- KUTSCHERA, U. – EHNS, I., 2021. *Obama nungara*: A flatworm from South America invades Germany. Science, E-letter, May 12, 372/581: 1-2.
- LAGO-BARCIA, D. – FERNÁNDEZ-ÁLVAREZ, F. A. – NEGRETE, L. – BRUSA, F. – DAMBORENEA, C. – GRANDE, C. – NOREÑA, C., 2015. Morphology and DNA barcodes reveal the presence of the non-native land planarian *Obama marmorata* (Platyhelminthes: Geoplanidae) in Europe. Invertebrate Systematics, 29(1): 12-22. 33
- LAGO-BARCIA, D. – FERNÁNDEZ-ÁLVAREZ, F.Á. – BRUSA, F. – ROJO, I. – DAMBORENEA, C. – NEGRETE, L. – GRANDE, C. – NOREÑA, C., 2019. Reconstructing routes of invasion of *Obama nungara* (Platyhelminthes: Tricladida) in the Iberian Peninsula. Biological Invasions, 21(2): 289-302.
- LAGO-BARCIA, D. – GONZALEZ-LOPEZ, J. R. – FERNANDEZ-ÁLVAREZ, F. A., 2020. The invasive land flatworm *Obama nungara* (Platyhelminthes: Geoplanidae) reaches a natural environment in the oceanic island of São Miguel (Açores). Zootaxa, 4830(1), 197-200.
- NEGRETE, L. – LENGUAS FRANCAVILLA, M. – DAMBORENEA, C. – BRUSA, F., 2020. Trying to take over the world: Potential distribution of *Obama nungara* (Platyhelminthes: Geoplanidae), the Neotropical land planarian that has reached Europe. Global Change Biology, 26(9): 4907-4918.
- SLUYS, R., 2016. Invasion of the flatworms. American Scientist, 104: 288-295.
- SOORS, J. – VAN DEN NEUCKER, T. – HALFMAERTEN, D. – NEYRICK, S. – DE BAERE, M., 2019. On the presence of the invasive planarian *Obama nungara* (Carbayo, Álvarez-Presas, Jones & Riutort, 2016) (Platyhelminthes: Geoplanidae) in an urban area in Belgium. Belgian Journal of Zoology, 149(1): 43-47.
- THE LOCAL, 2019. *Obama* worm: Flesh eating flatworm with hundreds of eyes poses new threat to Spanish wildlife. The Local Europe AB, Stockholm. Available from: <https://www.thelocal.es/20190723/obama-worm-flesh-eating-flatworm-with-hundreds-of-eyes-poses-new-threat-to-spanish-wildlife> [ver. 2021-07-18].