Brazilian Journal of Biology®

ISSN 1519-6984 (Print)
ISSN 1678-4375 (Online)

Notes and Comments

Rediscovery of *Uzelothrips scabrosus* Hood, 1952, a recent representative of a basal Thysanoptera (Arthropoda: Insecta) lineage, in Brazil

Redescoberta de *Uzelothrips scabrosus* Hood, 1952, um representante recente de uma linhagem basal de Thysanoptera (Arthropoda: Insecta), no Brasil

J. M. Macedo[a], A. R. S. Alencar[a], L. M. R. Silva[a], N. M. O. Silva[a,b] and E. F. B. Lima[a,b*]

[a]Universidade Federal do Piauí – UFPI, Coleção de História Natural, *Campus* Amílcar Ferreira Sobral, Floriano, PI, Brasil

[b]Universidade Federal do Piauí – UFPI, Programa de Pós-graduação em Ciências Agrárias, *Campus* Professora Cinobelina Elvas, Bom Jesus, PI, Brasil

Uzelothrips scabrosus Hood, 1952 (Figure 1) is the only recent representative of Uzelothripidae. The species is very important for thrips evolution understanding because it is considered an early offshoot of sub-order Terebrantia (Mound and Marullo, 1996), without affinities with any other thrips taxa (Mound and Morris, 2007).

The lineage that originated the group is at least 53 million years-old, by judging from it the age of the fossil species *Uzelothrips eocenicus* Nel & Nel, 2013, collected from amber in France (Nel et al., 2013). Both species share unique morphological traits among Thysanoptera, such as forewing (when present) with no longitudinal veins but with cilia arising from sockets, antennae long and slender with circular sensorium ventrally on the apex of segment III, tentorium well developed and ovipositor membranous and with valves absent (Tree, 2009), but is tentatively classified in the suborder Terebrantia (Nel et al., 2013).

Apart from its morphology, the cryptic behavior and enigmatic disjunct distribution are also remarkable in *U. scabrosus*. Specimens are known from very few collections in each of the records, although in some of them as much as dozens of individuals were found. It is probably fungivorous, as individuals have been collected mostly from leaf litter or dead branches, and internal contents of *U. eocenicus* include Dothideomycetes fungi (Nel et al., 2013).

It has been recorded in all tropical continents in a disjunct way (Figure 2), such that it is difficult to trace the area of origin of the species. The species has been described from Belém, Pará state, Brazil, and collected from Southeast Asia, Australia, and Angola (Hood, 1952; Mound et al., 1980; Tree, 2009; Nel et al., 2013). A possibility is that it has been transported around the world by commercial trade (Tree, 2009).

Uzelothrips scabrosus was described from Brazil (Hood, 1952) and ever since the species has not been recorded in the National territory. In the present work, we report the rediscovery of the species in an area about 1,000 Km away from the type location. In addition, we modelled the possible distribution of the species around the globe.

Specimens were collected from 2019 to 2021 in Floriano, state of Piauí (details in Material Examined). The area is within a semi-arid tropical climate, with rainy and dry periods lasting around six months each. It presents average temperatures between 29 °C to 38 °C and "Cerradão" and "Campo Cerrado" vegetations (CEPRO, 2021). Individuals were mounted in permanent microscope slides following the technique available in Mound and Marullo (1996) and are deposited in the Coleção de História Natural da Universidade Federal do Piauí (CHNUFPI), Floriano, Brazil. Some specimens were kept in absolute alcohol for future possible molecular analyses.

Niche modelling for *U. scabrosus* was based on the geographic coordinates of nine specific locations of material deposited in scientific collections (Table 1). For non-georeferenced records, we used the label information to retrieve the most probable coordinates. A total of 19 environmental variables were used to estimate the potential distribution, which include precipitation, temperature, moisture index and radiation, at 10-minute spatial resolution. These were obtained from WorldClim dataset and cover climate information in the period 1970-2000. Modelling was performed through multivariate analysis and maximum entropy using MaxEnt 3.4.4 (Phillips et al., 2020). MaxEnt estimates the probability of occurrence based on environmental parameters and has predictive power even with small datasets (Wisz et al., 2008). Model settings were defined after a bias analysis using the software R 4.0.2. The chosen model, with the least delta AIC, included linear, quadratic, hinge, product and threshold features with regularization multiplier of 4.0.

The modelling results showed that the species finds suitable conditions to live especially in tropical areas. Most of the actual occurrence points are approximately +/- 5° latitude North or South, in hot and humid regions,

*e-mail: efblima@ufpi.edu.br
Received: April 22, 2021 – Accepted: June 4, 2021

Figure 1. Apterous adult female of *Uzelothrips scabrosus*.

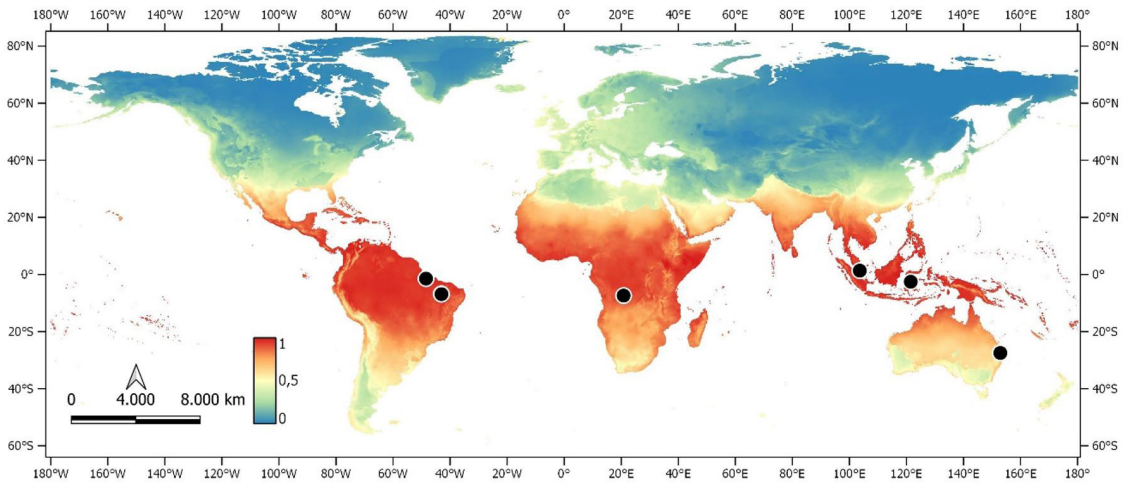

Figure 2. Confirmed records (black dots) and niche modelling distribution of *Uzelothrips scabrosus* (color gradation (0 to 1) indicates the probability of favorable conditions for species establishment).

Table 1. Geographic coordinates of nine specific locations of specimens of *Uzelothrips scabrosus* deposited in scientific collections.

Country	Location	Coordinates	Collection
Angola	Cambuacala River area, nearby Dundo	20.850844, -7.379856	MNHM
Indonesia	Sulawesi	121.527606,-2.529386	NHM
Singapura	Singapura	103.647278, 1.358056	NHM; Tokyo University of Agriculture, Japan
Brazil	Belém, Pará state	-48.442508, -1.440103	USNM
Brazil	CTF, Floriano, Piauí state	-43.061431, -6.767761	CHNUFPI
Brazil	CTF, Floriano, Piauí state	-43.063925, -6.773944	CHNUFPI
Brazil	Floriano, Piauí state	-43.015150,-6.871953	CHNUFPI
Australia	Brisbane Forest Park, Enoggera State Forest	152.891, -27.433	Entomology Collection, Primary Industries and Fisheries, Brisbane, Queensland, Australia
Australia	Brisbane Forest Park, Gap Creek Reserve	152.929, -27.479	Entomology Collection, Primary Industries and Fisheries, Brisbane, Queensland, Australia

CHNUFPI = Coleção de História Natural da Universidade Federal do Piauí, Piauí, Brazil; CTF = Colégio Técnico de Floriano, Piauí, Brazil; MNHM = Muséum national d'Histoire naturelle, Paris, France; NHM = Natural History Museum, London, United Kingdom; USNM = Smithsonian National Museum of Natural History, Washington, USA.

except for Australia, where the species was found at around 27°S (Table 1). This area of the globe is exactly the least surveyed for thrips. Tropical Africa, for example, accounts for around 200 recorded species – whereas the United States alone accounts for more than 700 species (Mound, 2014; ThripsWiki, 2021). Therefore, efforts to find new thrips taxa necessary to a better understanding of the group could result in finding additional specimens of *U. scabrosus* from different locations. These specimens can be used for many purposes, such as studies on molecular phylogenetics, population genetics or phylogeography. Such research can help understanding the evolution of the Thysanoptera as a whole and indicate the area of origin of *U. scabrosus*.

Material Examined. Brasil. Piaui: *Floriano*, on dead twigs, 1 female, 16.iv.2019 (E.F.B. Lima col.); 3 females, 14.ii.2020 and 1 female, 4.ii.2020 (J.M. Macedo col.); 2 females, 30.i.2021 (E.F.B. Lima col.) (CHNUFPI).

Acknowledgements

Fieldwork was carried out during the granting period of a master's scholarship (CAPES) to NMOS and scientific initiation scholarships (PIBIC/CNPq and PIBIC/UFPI) to JMM, ARSA and LMRS.

References

FUNDAÇÃO CENTRO DE PESQUISAS ECONÔMICAS E SOCIAIS DO PIAUÍ – CEPRO, 2021 [viewed 20 February 2021]. *Socioeconomic diagnosis: municipality of Floriano* [online]. Available from: http://www.cepro.pi.gov.br/

HOOD, J.D., 1952. Brasilian Thysanoptera III. *Proceedings of the Biological Society of Washington*, vol. 65, pp. 141-174.

MOUND, L.A. and MARULLO, R., 1996. The thrips of Central and South America: an introduction (Insecta: Thysanoptera). *Memoirs of Entomology International*, vol. 6, pp. 1-487.

MOUND, L.A. and MORRIS, D.C., 2007. The insect order Thysanoptera: classification *versus* systematics. *Zootaxa*, vol. 1668, no. 1, pp. 395-411. http://dx.doi.org/10.11646/zootaxa.1668.1.21.

MOUND, L.A., 2014. Austral Thysanoptera: 100 years of progress. *Austral Entomology*, vol. 53, no. 1, pp. 18-25. http://dx.doi.org/10.1111/aen.12054.

MOUND, L.A., HEMING, B.S. and PALMER, J.M., 1980. Phylogenetic relationships between the families of recent Thysanoptera. *Zoological Journal of the Linnean Society of London*, vol. 69, no. 2, pp. 111-141. http://dx.doi.org/10.1111/j.1096-3642.1980.tb01934.x.

NEL, P., SCHMIDT, A.R., BASSLER, C. and NEL, A., 2013. Fossil thrips of the family Uzelothripidae suggest 53 million years of morphological and ecological stability. *Acta Palaeontologica Polonica*, vol. 58, no. 3, pp. 609-614.

PHILLIPS, S.J., DUDÍK, M. and SCHAPIRE, R.E. 2020 [viewed 4 February 2021]. *Maxent software for modeling species niches and distributions Version 3.4.1* [online]. Available from: http://biodiversityinformatics.amnh.org/open_source/maxent/

THRIPSWIKI, 2021 [viewed 4 February 2021]. *Thripswiki: providing information on the world's thrips* [online]. Available from: http://thrips.info/wiki/Main_Page

TREE, D.J., 2009. Disjunct distribution of Uzelothripidae (Thysanoptera) new to Australia. *Zootaxa*, vol. 2207, no. 1, pp. 67-68. http://dx.doi.org/10.11646/zootaxa.2207.1.3.

WISZ, M.S., HIJMANS, R.J., LI, J., PETERSON, A.T., GRAHAM, C.H. and GUISAN, A., 2008. Effects of sample size on the performance of species distribution models. *Diversity & Distributions*, vol. 14, no. 5, pp. 763-773. http://dx.doi.org/10.1111/j.1472-4642.2008.00482.x.