

FIRST RECORD OF *NUBENSIA NUBENS* (EDWARDS, 1929) (DIPTERA: CHIRONOMIDAE) FROM CROATIA

VALENTINA DORIĆ¹, MIRAN KOH² & ZLATKO MIHALJEVIĆ³

¹Eko-monitoring Ltd., Kučanska 15, 42000 Varaždin, Croatia

²Department of Biology, Josip Juraj Strossmayer University of Osijek, Cara Hadrijana 8A,
31000 Osijek, Croatia

³Department of Biology, Faculty of Science, University of Zagreb, Rooseveltov trg 6,
10000 Zagreb, Croatia

Dorić, V., Koh, M. & Mihaljević, Z.: First record of *Nubensia nubens* (Edwards, 1929) (Diptera: Chironomidae) from Croatia. Nat. Croat., Vol. 29, No. 1, 139-142, Zagreb, 2020.

The species *Nubensia nubens* (Edwards, 1929) from the dipteran family Chironomidae has been recorded for the first time in Croatian chironomid fauna. It was found in the littoral of the oligotrophic Lake Vrana on the island of Cres. The species is known from Italy, Albania and the Republic of Northern Macedonia as well as western Europe, the Czech Republic and the Pyrenees. Lake Vrana is currently the only known habitat of this species in Croatia.

Key words: *Nubensia* genus, new species, chironomid larvae, Adriatic island lake

Dorić, V., Koh, M. & Mihaljević, Z.: Prvi nalaz vrste *Nubensia nubens* (Edwards, 1929) (Diptera: Chironomidae) u Hrvatskoj. Nat. Croat., Vol. 29, No. 1, 139-142, Zagreb, 2020.

Vrsta *Nubensia nubens* (Edwards, 1929) koja pripada porodici Chironomidae zabilježena je po prvi put u fauni Hrvatske. Pronađena je u litoralu Vranskog jezera na otoku Cresu. Ova vrsta je poznata u fauni Italije, Albanije te Republike Sjeverne Makedonije, kao i s područja zapadne Europe, Češke i Pirineja. Vransko jezero na otoku Cresu zasad je jedino poznato stanište ove vrste u Hrvatskoj.

Ključne riječi: rod *Nubensia*, nova vrsta, ličinke trzalaca, jezero na jadranskom otoku

INTRODUCTION

There are currently more than 6500 described species belonging to the family Chironomidae, making it one of the most successful Dipteran families to inhabit freshwater habitats (ARMITAGE *et al.*, 1995). Chironomids can be found at elevations of up to 5600 m a.s.l. on Himalayan glaciers, in Lake Baikal at a depth of 1600 m, in Antarctica where they are the only living insects, as well as in caves where they are only known flying troglubi-onts (ARMITAGE *et al.*, 1995; ANDERSEN *et al.*, 2016).

Nubensia nubens (Edwards, 1929) is currently the only species belonging to the genus *Nubensia* Spies, proposed by SPIES & DETTINGER-KLEMM (2015) based on the morphological characteristics of larvae, pupae and both adult male and female. In the latest version of the Fauna Europaea database the species is still listed as *Polypedilum (Pentapedilum) nubens* (Edwards, 1929) (SAETHER & SPIES, 2013). It is also worth mentioning that the species can be identified as *Polypedilum* type A in BROOKS *et al.* (2007). The species is currently known to inhabit western Europe, the Czech Republic, Spain, Portugal, Italy, the Republic of North Macedonia and Albania (SAETHER & SPIES, 2013; BITUŠIĆ & TRNKOVÁ, 2019).

MATERIALS AND METHODS

This study was conducted in the littoral zone of Lake Vrana on Cres Island. This is an ultra-oligotrophic karstic lake with an area of 5.75 km² and an approximate depth of 50 m (TOMEČ *et al.*, 2002).

The samples were taken on one occasion in July 2018 following the standard lake littoral sampling protocol (URBANIČ *et al.*, 2012). Three locations (Fig. 1) were sampled and at each location ten replicates were collected up to one m depth, using a benthic hand net (25 x 25 cm area, 500 µm mesh-size). Samples were taken in microhabitats covering at least 10% of the area, proportionately to their coverage at the sampling sites.

Chironomidae larvae were collected together with all other benthic taxa, separated in the lab and identified to the species level using VALLENDUUK (2017) and SPIES & DETTINGER-KLEMM (2015). Seven larvae are deposited as semi-permanent microscopic slides and the rest are deposited in 80% ethanol at the Department of Biology, Faculty of Science in Zagreb. Photographs of the head capsule parts were taken using a Canon EOS 550D camera and a Carl Zeiss Microscope Axio Vert.A1, magnification 400x. Habitus photograph was taken using the same camera and Carl Zeiss Stemi 2000-C Stereo Microscope, magnification 40x.



Fig. 1. Position of Lake Vrana and three sampling locations of *Nubensia nubens* (Edwards, 1929).

RESULTS AND DISCUSSION

A total of 176 Chironomidae individuals belonging to 11 taxa were collected in Lake Vrana. In total 57 larvae belonging to the species *Nubensia nubens* (Fig. 2) were found at locations 1 and 2 but none were found at location 3. At location 1 larvae of *N. nubens* comprised 46 % of the chironomid community and 69 % at location 2.



Fig. 2. *Nubensia nubens* (Edwards, 1929) larva. A) Habitus. B) Antenna. C) Mentum and ventromental plates. D) Mandible. E) Premandible.

The locations differed in the substrate composition in the littoral of the lake. The substrate at locations 1 and 2 was composed solely of meso- and macrolithal (stones sized 2–40 cm), and at location 3 it was composed of different sized stones (0,2–40 cm) and macrophyte vegetation. They also differed in the inclination of the littoral, the third location being gently inclined whereas locations 1 and 2 were steep.

According to MOLLER PILOT (2009) this species was found in waters with very low conductivity (less than 200 $\mu\text{S}/\text{cm}$), but here it was found at a conductivity of 401 $\mu\text{S}/\text{cm}$, which is a result of karstic geology.

In the Czech Republic the species was found in the mesotrophic Vranov reservoir and the eutrophic reservoir Nove Mlyny (SYROVÁTKA & LANGTON, 2015; SYROVÁTKA, personal communication) and in Albania it is known from Lake Ohrid (BITUŠÍK & TR-

NKOVÁ, 2019). In the Rhine River, it was collected from an artificial oxbow lake (SPIES & DETTINGER-KLEMM, 2015). During extensive research efforts, which included the sampling of seven natural and 36 man-made lakes from Croatia (VILENICA *et al.*, 2019) the species *N. nubens* was found only in the oligotrophic Lake Vrana. Since the species was found in European lakes and reservoirs of different trophic one can conclude that it is a generalist species whose spread to other, similar, habitats in Croatia was stopped solely by the geographic positioning of the Lake Vrana.

The new record of *N. nubens* represents a valuable addition to Croatian Chironomidae fauna, which at the time, consisted of 235 species (ČERBA *et al.*, 2020), but many more are expected. Lake Vrana on the island of Cres is the only known habitat of this species in Croatia so far.

ACKNOWLEDGEMENTS

We would like to thank Dr Marko Miliša, Natalija Vučković, Ivana Grgić and Mirjana Dimnjaković for their great help during fieldwork and separation of samples. We would also like to thank two anonymous reviewers for their helpful comments that improved this paper.

Received November 28, 2019

REFERENCES

- ANDERSEN, T., BARANOV, V., HAGENLUND, L. K., IVKOVIĆ, M., KVIFTE, G. M., & PAVLEK, M., 2016: Blind Flight? A New Troglolobitic Orthoclad (Diptera, Chironomidae) from the Lukina Jama – Trojama Cave in Croatia. *PLoS ONE* **11**(4), e0152884. doi:10.1371/journal.pone.0152884
- ARMITAGE, P. D., PINDER, L. C. & CRANSTON P. (Eds.), 1995: The Chironomidae, Biology and ecology of non-biting midges. Chapman & Hall, London, UK.
- BITUŠIĆ, P. & TRNKOVÁ, K., 2019: A preliminary checklist of Chironomidae (Diptera) from Albania with first records for the Balkan Peninsula. *Zootaxa* **4563** (2), 361–371.
- BROOKS, S. J., LANGDON, P. G. & HEIRI, O. 2007: The identification and use of Palearctic Chironomidae larvae in paleontology. QRA Technical Guide No. 10, Quaternary Research Association, London. 276 pp.
- ČERBA, D., KOH, M., ERGOVIĆ, V., MIHALJEVIĆ, Z., MILOŠEVIĆ, DJ., & HAMERLIĆ, L., 2020: Chironomidae (Diptera) of Croatia with notes on the diversity and distribution in various habitat types. *Zootaxa* **4780** (2), 259-274. doi: 10.11646/zootaxa.4780.2.2.
- MOLLER PILLOT, H. K. M., 2009: Chironomidae Larvae of the Netherlands and Adjacent Lowlands. Biology and Ecology of the Chironomina. KNNV Publishing, Zeist, The Netherlands, 270 pp.
- SAETHER, O. A. & SPIES, M., 2013: Fauna Europaea: Chironomidae. In: PAPE, T. & BEUK, P. 2013: Fauna Europaea: Diptera. Fauna Europaea version 2017.06, <https://fauna-eu.org>
- SPIES, M. & DETTINGER-KLEMM, A., 2015: Diagnoses for *Nubensia*, n. gen. (Diptera, Chironomidae, Chironomini), with the first full descriptions of the adult female and larva of *N. nubens* (Edwards, 1929). *Zootaxa* **3994** (1), 109-121.
- SYROVÁTKA, V. & LANGTON, P. H., 2015: First records of *Lasiodiamesa gracilis* (Kieffer, 1924), *Parochlus kiefferi* (Garrett, 1925) and several other Chironomidae from the Czech Republic and Slovakia. *CHIRONOMUS Journal of Chironomidae Research* **28**, 45-56.
- TOMEČ, M., TERNJEJ, I., KEROVEC, M., TESKEREDŽIĆ, E. & MEŠTROV, M., 2002: Plankton in the oligotrophic Lake Vrana (Croatia). *Biologia, Bratislava* **57/5**, 579-588.
- URBANIĆ, G., PETKOVSKA, V. & PAVLIN URBANIĆ, M., 2012: The relationship between littoral benthic invertebrates and lakeshore modification pressure in two alpine lakes. *Fundamental and Applied Limnology* **180/2**, 157-173.
- VALLENDUUK, H. J., 2017: Chironomini larvae of western European lowlands (Diptera: Chironomidae). Keys with notes to the species. *Lauterbornia* **82**, 1-216.
- VILENICA, M., VUČKOVIĆ, N. & MIHALJEVIĆ, Z., 2019: Littoral mayfly assemblages in South-East European man-made lakes. *Journal of Limnology* **78**, 47-59. doi: 10.4081/jlimnol.2019.1853