Acta Entomologica Serbica, 2025, 30(1): 77-81

UDC: 595.733.1(497.11)
DOI: 10.5281/zenodo.16967127

Short communication

FIRST RECORD OF *LINDENIA TETRAPHYLLA* (VANDER LINDEN, 1825) (ODONATA: GOMPHIDAE) IN SERBIA

MARKO NIKOLIĆ[1,2]* and ANA SAMARDŽIĆ[1,2]

1 University of Niš, Faculty of Sciences and Mathematics, Višegradska 33, 18000 Niš, Serbia
2 Biological Society "Dr. Sava Petrović", Višegradska 33, 18000 Niš, Serbia
*E-mail: marko@bddsp.org.rs (corresponding author)

Abstract

In this paper, the first records of *Lindenia tetraphylla* (Vander Linden, 1825) in Serbia are presented, based on field surveys conducted in 2024 and 2025 at the Dobrotin locality, southeastern Serbia. This observation expands the known range of *L. tetraphylla* in the Balkans, although its breeding status in the area remains to be confirmed. With this record, the total number of dragonfly species documented in Serbia reaches 70. The discovery underscores the value of ongoing faunistic surveys, particularly in underexplored habitats, and highlights the potential for climate change to drive shifts in species composition.

KEYWORDS: Bladetail, dragonfly, new record, Serbia, Dobrotin, distribution, Anisoptera

The bladetail*, Lindenia tetraphylla* (Vander Linden, 1825), is a large, easily recognizable dragonfly species belonging to the family Gomphidae, and the sole representative of the genus *Lindenia* (Smallshire & Swash, 2020). This species occurs across a broad belt of arid and semi-arid habitats, extending from Central and Western Asia, the Caucasus, the Middle East, and Turkey, to the southern Arabian Peninsula, and western Mediterranean (Borisov & Haritonov 2008; Boudot *et al*., 2009; Schorr *et al*., 1998; Skvortsov & Snegovaya 2014; Kalkman & Bogdanović, 2015).

In Europe, *L. tetraphylla* has been recorded in Italy, France (Corsica), Spain, Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Albania, North Macedonia, Greece, Bulgaria, and the European parts of Turkey and Russia (Boudot *et al*., 2013; Dijkstra & Schröter, 2020). On the Balkan Peninsula, this species displays a fragmented distribution, with numerous records concentrated along the Adriatic coast (Kolev & Boudot, 2018). It is regarded as rare and is typically associated with large lakes. Within this region, strong and stable populations are scarce (Boudot *et al*., 2009; Kalkman, 2006; Kalkman & Bogdanović, 2015). Consequently,

certain freshwater habitats, such as Lake Skadar on the Montenegro-Albania border, Lake Doiran on the North Macedonia-Greece border, and Lake Vólvi in Greece, represent regionally important sites for the conservation of this species (Kalkman & Bogdanović, 2015; Vinko *et al*., 2017).

L. tetraphylla exhibits a pronounced migratory potential, allowing individuals to disperse far from breeding sites and colonize newly formed or isolated water bodies, thereby expanding their distribution while maintaining a relatively stable overall range. This dispersal ability is attributed to the species' well-documented migratory and vagrant behavior, which is unusual for members of the family Gomphidae (Boudot *et al*., 2013; Dijkstra & Schröter, 2020).

The species is included in Annex II and Annex IV of the Habitats Directive (92/43/EEC), designating it as a conservation target within the Natura 2000 network and requiring strict protection measures. It is also included in Annex II of the Bern Convention (Convention on the Conservation of European Wildlife and Natural Habitats) and in the revised Annex I of Resolution 6, which identifies species requiring specific habitat conservation measures. Although globally assessed as Least Concern (LC) (Boudot *et al*., 2013), *L. tetraphylla* is classified as Critically Endangered (CR) on the North African Red List (García *et al*., 2010) and as Near Threatened (NT) on the Mediterranean Red List (Riservato *et al*., 2009).

Figure 1. Mating pair (copula) of *Lindenia tetraphylla* photographed on 19.07.2025 (left) and a female individual photographed on 27.07.2025 (right), at the Dobrotin locality, southeastern Serbia (Photo: M. Nikolić).

The gravel pits along the lower course of the Južna Morava River constitute an ecologically significant yet poorly studied habitat for dragonflies. They consist of a complex of ponds and small lakes formed in sand and gravel extraction sites of varying age and spatial distribution, located at different distances from the main river channel. In 2023, *Selysiothemis nigra* (Vander Linden, 1825) and *Trithemis annulata* (Palisot de Beauvois, 1807) were recorded for the first time in Serbia in this type of habitat (Đurđević *et al*., 2024). Since then, a continuous monitoring program of the odonates in this area has been established. During a field survey at the

Dobrotin locality (42.9309°N, 22.0265°E), a single adult male *Lindenia tetraphylla* was observed on 08.07.2024. The individual was neither captured nor photographed at the time. However, during regular field visits in 2025, a copula was documented at the same site on 19.07.2025, and one female individual was photographed on 27.07.2025 (Fig. 1). All individuals were identified in the field based on their distinctive morphological characteristics (Dijkstra & Schröter, 2020).

These records represent the first documented occurrence of *L. tetraphylla* in Serbia. The nearest known populations are in North Macedonia and Bulgaria, suggesting that the species may have previously been overlooked in southeastern Serbia due to limited field surveys, or that it is expanding its range into new areas in response to ongoing climate change.

In the European part of its range, *L. tetraphylla* flies from May to August (Dijkstra & Schröter, 2020) and is primarily found at standing water bodies, such as lakes with well-developed reed beds and other riparian vegetation, and less frequently at larger slow-flowing rivers (Schorr *et al*., 1998; Boudot *et al*., 2013). Utzeri *et al*. (2006) also reported the species from abandoned gravel pits and sparsely vegetated areas. The pond complex at the Dobrotin locality (Fig. 2), with its variety of habitat types and the timing of the records, closely aligns with the species' habitat preferences in Europe.

Figure 2. Dobrotin locality in southeastern Serbia, a complex of ponds and gravel pits where *Lindenia tetraphylla* was observed in 2024 and 2025 (Photo: A. Samardžić).

L. tetraphylla relies on a limited number of spatially dispersed breeding habitats throughout its European range. It is estimated that there are currently around 30 to 50 large viable populations, but habitat degradation from pollution, excessive water extraction, and climate change has already caused local extinctions. Kalkman & Bogdanović (2015) further suggest that a continued decline in both population numbers and size is likely.

The discovery of *L. tetraphylla* at the Dobrotin locality significantly enhances knowledge of Serbia's dragonfly fauna, now comprising 70 recorded species (Đurđević *et al*., 2024). Given its confirmed presence in Serbia and recognized international conservation status, formal inclusion of the species in national legislation is

essential. Its presence should be taken into account in the development of strategic planning documents, nature protection regulations, and the preparation of national red lists.

Given the species' limited suitable habitats and fragmented distribution across Europe, its occurrence in southeastern Serbia represents a notable finding that may indicate the presence of a stable breeding population. This assumption is supported by the species' presence at the same locality for two consecutive years and by the 2025 photograph of the copula. Continued systematic research and long-term monitoring in this region are recommended in order to determine the population status, assess habitat dynamics, and implement appropriate conservation measures. Monitoring should encompass not only the chemical and structural characteristics of habitats but also regular assessments of population size, reproductive success, and potential threats such as pollution, water abstraction, invasive species, and habitat degradation. Additionally, evaluating landscape connectivity and modelling the potential impacts of climate change would provide valuable insights for ensuring the long-term viability of the species in this region.

Acknowledgments

The monitoring of Odonata was financially supported by the Biological Society "Dr. Sava Petrović". This research was also supported by the Ministry of Science, Technological Development, and Innovation of the Republic of Serbia through contracts No. 451-03-136/2025-03/200124.

References

Borisov, S. N., & Haritonov, A. Y. (2008). The dragonflies (Odonata) of Middle Asia. Part 2 (Anisoptera). *Euroasian entomological Journal, 7*, 97-123.

Boudot, J. -P., Kalkman V. J., Azpilicueta Amorín, M., Bogdanović, T., Cordero Rivera, A., Degabriele, G., Dommagnet, J.-L., Ferreira, S., Garrigós, B., Jović, M., Kotarac, M., Lopau, W., Marinov, M., Mihoković, N., Riservato, E., Samraoui, B., & Schneider, W. (2009). Atlas of the Odonata of the Mediterranean and North Africa. *Libellula Supplement*, *9*,1-256.

Boudot, J. -P., Schneider, W., & Samraoui, B. (2013). *Lindenia tetraphylla*. The IUCN Red List of Threatened Species 2013: e.T165460A13372703.

De Knijf, G., Billqvist, M., van Grunsven, R. H. A., Prunier, F., Vinko, D., Trottet, A., Bellotto, V., Clay, J., & Allen, D. J. (2024). *Measuring the pulse of European biodiversity. European Red List of Dragonflies & Damselflies (Odonata)*. Brussels, Belgium: European Commission, 46 pp.

Dijkstra, K. -D. B., Schröter, A., & Lewington, R. (2020). *Field guide to the Dragonflies of Britain and Europe* (2nd ed.). Bloomsbury Publishing, London, 336 pp.

Đurđević, A., Medenica, I., Samardžić, A., & Nikolić, M. (2024). *Trithemis annulata* (Palisot de Beauvois, 1807) and *Selysiothemis nigra* (Vander Linden, 1825) (Odonata: Libellulidae): new members of the dragonfly fauna of Serbia. *Acta Entomologica Serbica*, *29*(2), 1-10.

García, N., Cuttelod, A., & Malak, D. A. (2010). *The status and distribution of freshwater biodiversity in Northern Africa*. Gland, Switzerland, Cambridge, UK, and Malaga, Spain: IUCN, 141 pp.

Kalkman, V. J. (2006). Key to the dragonflies of Turkey, including species known from Greece, Bulgaria, Lebanon, Syria, the Trans-Caucasus and Iran. *Brachytron*, *10*, 3-82.

Kalkman, V. J., & Bogdanović, T. (2015). *Lindenia tetraphylla* (Vander Linden, 1825). In Boudot, J. -P. & Kalkman, V. J. (Eds.), Atlas of the European dragonflies and damselflies. KNNV Publishing, Netherlands. 384 pp.

Kolev, N., & Boudot, J. -P. (2018). Evidence of reproduction of *Lindenia tetraphylla* in Bulgaria (Odonata: Gomphidae). *Notulae Odonatologicae*, *9*(1), 11-17.

Riservato, E., Boudot, J. -P., Ferreira, S., Jović, M., Kalkman, V. J., Schneider, W., Samraoui, B., & Cuttelod, A. (2009). *The status and distribution of Dragonflies of the Mediterranean basin*. Gland, Switzerland and Malaga, Spain: IUCN, 33 pp.

Skvortsov, V. E., & Snegovaya, N. Yu., (2014). Additions to the knowledge of the Odonata fauna of Azerbaijan, with six new records. *Notulae odonatologicae*, *8*(3), 67-76.

Schorr, M., Schneider, W., & Dumont, H. (1998). Ecology and distribution of *Lindenia tetraphylla* (Insecta, Odonata, Gomphidae): a review. *International Journal of Odonatology*, *1*, 65-88.

Smallshire, D., & Swash, A. (2020). *Europe's Dragonflies: A Field Guide to the Damselflies and Dragonflies* (Vol. 38). Princeton University Press, 360 pp.

Utzeri, C., Belfiore, C., & Peels, F., (2006). Some new records of *Lindenia tetraphylla* (Vander Linden) in Italy (Anisoptera Gomphidae). *Notulae odonatologicae*, *6*(8), 90-92.

Vinko, D., Kulijer, D., Dinova, D., Rimčeska, B., Brauner, O., & Olias, M. (2017). Faunistic results from the 5th Balkan Odonatological Meeting – BOOM 2015, Republic of Macedonia. *Acta Entomologica Slovenica*, *25*(1), 89-114.

ПРВИ НАЛАЗ *LINDENIA TETRAPHYLLA* (VANDER LINDEN, 1825) (ODONATA: GOMPHIDAE) У СРБИЈИ

МАРКО НИКОЛИЋ и АНА САМАРЏИЋ

Извод

Lindenia tetraphylla (Vander Linden, 1825) је још једна нова врста вилинских коњица за фауну Србије, која је нађена на локалитету Добротин (југоисточна Србија) за време теренских истраживања током 2024. и 2025. године. Овај налаз представља проширење познатог ареала врсте на Балканском полуострву, иако њено размножавање још увек није потврђено на локалитету. Са налазом ове врсте, број забележених врста вилиних коњица у Србији расте на 70. Откриће указује на значај континуираних фаунистичких истраживања, нарочито у слабо проученим подручјима и наглашава могућност промена у саставу фауне услед утицаја климатских промена.

Received: July 30th, 2025
Accepted: August 22nd, 2025