ZooNotes 246: 1-4 (2024)
www.zoonotes.bio.uni-plovdiv.bg
ISSN 1313-9916
246
DOI: 10.69085/zn20240246

Butozania bulgarica (Kantardzhieva-Minkova, 1953) (Scarabaeidae: Melolonthinae) – little known and possibly endangered species

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Abstract. Balkan endemic species *Butozania bulgarica* (Kantardzhieva-Minkova, 1953) was found in several closely situated localities in the Radomir Valley (SW Bulgaria) after a period of more than 50 years lack of data. The species has not been found in most of the historical localities in Bulgaria during several years of targeted survey, and it seems that its distributional range in the country has significantly decreased after the species description.

Key words: Rhizotrogini, Balkan Peninsula, endemic species

Introduction

The species *Butozania bulgarica* (Kantardzhieva-Minkova, 1953) (Scarabaeidae: Melolonthinae) is described as *Rhisotrogus* [sic!] *bulgaricus* by Kantardzhieva-Minkova (1953) on materials from several localities in Radomir and Sofia Valleys (SW Bulgaria). In 1955, Mikšič described *Rhizotrogus macedonicus* from Skopska Crna Gora Mts and Skopje Valley (North Macedonia), established for it a new subgenus *Butozania* Mikšič, 1955 within the genus *Rhizotrogus* Latreille, 1825 (Mikšič, 1955). Kantardzhieva-Minkova (1958) synonymized *Rh. macedonicus* with previously described *Rh. bulgaricus*, and elevated *Butozania* to genus level. *Butozania bulgarica* is known only from Bulgaria and North Macedonia (Bezděk, 2016), and thus represents a Balkan endemic.

The genus *Butozania* and its only species *B. bulgarica* are poorly known among coleopterologists. In addition to Kantardzhieva-Minkova research, only Popov provides new data on the distribution and biology of the species in Bulgaria, reporting a number of new localities from Radomir, Pernik and Sofia Valleys (Popov, 1968). No new data are available on the distribution of the species in North Macedonia.

In the present work we report new data on the distribution and biology of *B. bulgarica* and discuss its current distribution in Bulgaria.

Materials and Methods

The field studies were carried out by the authors in the period 2018–2023 in Radomir, Pernik and Sofia Valleys, as well as on the foothills of the surrounding mountains (SW Bulgaria). Arable fields and grasslands in the neighbourhoods were examined for the presence of adult beetles in accordance with the known habitat of the species (Kantardzhieva-Minkova, 1953; Popov, 1968). The pictures in Fig. 1 were taken with Olympus SZ61 stereomicroscope, equipped with Canon EOS 2000D digital camera. The pictures in Fig. 2 were taken with Olympus SP-820UZ or Canon PowerShot SX420 IS. The abbreviations used in the text are as follows: YP = Yana Petrova, DG = Denis Gradinarov.

Received: 13.09.2024, Accepted: 18.09.2024, Университетско издателство "Паисий Хилендарски"
Published: 19.09.2024 Plovdiv University Press "Paisii Hilendarski"

The collected specimens are preserved in the Zoological Collection of Sofia University "St. Kliment Ohridski", Faculty of Biology (BFUS).

Results and Discussion

***Butozania bulgarica* (Kantardzhieva-Minkova, 1953)**

New records: Bulgaria: Radomir Valley, N Chervena Mogila Vill., 42°31.354'N 23°00.219'E, 700 m, 05.v.2018, field margins, arable fields (cereals and sunflower), 4 ♂♂, 2 ♀♀, at flight and on the ground (5:50–6:50 p.m.), YP & DG leg. (Fig. 1); idem, 04.v.2019, 7 ♀♀, on the ground, feeding obs. (4:00–5:00 p.m.), YP & DG leg.; idem, 17.v.2020, 3 ♂♂, 12 ♀♀, on the ground (7:45–8:10 p.m.), YP & DG leg.; idem, 16.iv.2022, 5 ♂♂, 11 ♀♀, on the ground, feeding obs. (6:10–6:20 p.m.), YP & DG leg. [numerous specimens obs.]; idem, 24.v.2022, 5 ♀♀, on the ground, feeding obs. (6:30–7:00 p.m.), YP & DG leg.; idem, 19.iii.2023, 9 ♂♂, 1 ♀ (3:10–3:50 p.m.), YP & DG leg.; idem, 26.iii.2023, 4 ♂♂, 5 ♀♀, on the ground (6:10–6:30 p.m.), YP & DG leg.; idem, 23.iv.2023, 5 ♂♂, 3 ♀♀, on the ground, feeding obs. (6:30–6:50 p.m.), YP & DG leg. [numerous specimens obs.]; Radomir Valley, N Chervena Mogila Vill., 42°31.136'N 23°00.053'E, 685 m, grasslands, 04.v.2019, 3 ♀♀, on the ground, feeding obs. (4:00–5:00 p.m.), DG leg.; idem, 23.iv.2023, about ten specimens, flight, feeding and mating, DG obs. (6:00–6:10 p.m.); Radomir Valley, N Chervena Mogila Vill., 42°31.160'N 23°00.135'E, 685 m, field margins, arable fields (cereals and sunflower), 23.iv.2023, 13 ♂♂, 6 ♀♀, at flight and on the ground, feeding and mating obs. (5:40–6:30 p.m.), YP & DG leg. [hundreds of specimens obs.]; idem, 11.vi.2023, 2 ♀♀, in soil (1:50 p.m.), YP & DG leg.; Radomir Valley, N Vladimir Vill., 42°27.930'N 23°05.084'E, 680 m a. s. l., grasslands, 05.v.2018, 2 ♂♂, on the ground (8:00 p.m.), YP & DG leg.; Radomir Valley, N Vladimir Vill., 42°27.890'N 23°05.017'E, 675 m, field margins, arable fields, 20.v.2018, 1 ♀, on the ground (8:00 p.m.), DG leg.; idem, 23.iv.2023, 2 ♂♂, at flight (5:15 p.m.), DG leg.; Radomir Valley, NE Stefanovo Vill., 42°29.673'N 23°02.288'E, 670 m, 05.v.2018, field margins, arable fields, 1 ♀, on the ground (7:15 p.m.), YP & DG leg.; idem, 24.v.2022, 1 ♂, 4 ♀♀, DG leg.; Radomir Valley, N Stefanovo Vill., 42°30.251'N 23°01.419'E, 675 m, 23.iv.2023, field margins, 1 ♂, at flight (5:35 p.m.), DG leg.; Radomir Valley, SE Chervena Mogila Vill., 42°30.679'N 23°00.738'E, 670 m, 24.v.2022, field margins, arable fields (sunflower), 1 ♀, on the ground (6:30 p.m.), YP & DG leg.; Radomir Valley, Drugan Vill., 42°29.125'N 23°03.135'E, 670 m, 23.iv.2023, roadside verges, field margins, 1 ♂, on the road (5:30 p.m.), YP & DG leg.

During the present study *B. bulgarica* has been found in wheat (*Triticum aestivum*), barley (*Hordeum vulgare*) and sunflower (*Helianthus annuus*) fields, as well as in the adjacent field margins (Fig. 2A, B). At Chervena mogila and north of Vladimir village the species has been found also in seminatural dry grasslands at a distance of 60–80 m from the field (Fig. 2C). Within the fields, the beetles are much more abundant at the field edge where the cultures are mixed with wild herbaceous species.

In the studied habitats the adults fed preferably on leaves of wild herbs, most frequently bindweed (*Convolvulus arvensis*), yarrow (*Achillea* sp.) and mullein (*Verbascum* sp.), which were close to the ground and easily accessible (Fig. 2E–G). Feeding on leaves of wheat and barley (Fig. 2D), speedwell (*Veronica* sp.), poppy (*Papaver* sp.), wild strawberry (*Fragaria vesca*) has also been recorded. On one occasion we observed feeding on leaves of freshly fallen branch of cherry plum (*Prunus cerasifera*) (Fig. 2H). Evidently the adults are polyphagous, but clearly prefer young and tender leaves of their food plants.

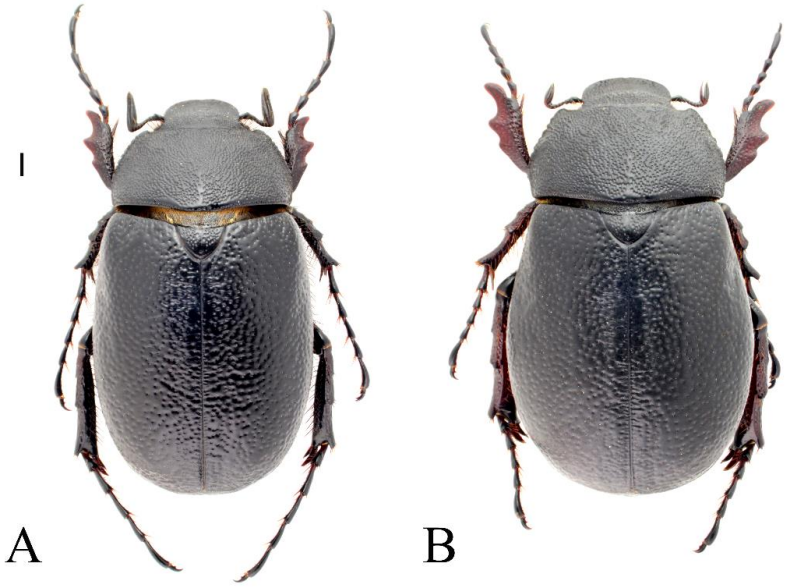

Fig. 1. Habitus of *Butozania bulgarica* from Chervena Mogila Village, 05.v.2018. A – male, dorsal view; B – female, dorsal view. Scale bar = 1 mm.

The adults have been observed from the second half of March to the first half of June. The beetles are diurnal and appear in the afternoon, remain active until sunset, then burrow into the soil. Swarming of the males was observed in April and May, between 5:00 to 6:30 p.m. The males fly in search of a mate and in short distances, up to two meters from the ground. Mating was observed in April, with the females feeding during the copulation (Fig. 2I). After the mating, some of the beetles burrow into the soil, others continue to feed or crawl on the ground for some more time. This pattern of seasonal and circadian activity in general corresponds to what was described by Popov (1968). According to Popov, however, both male and female fly which was not confirmed in our study and does not exactly correspond to *Butozania* characteristics. Although macropterous, the female of *Butozania*, as described by Miksic, 1955, has a significantly shortened metasternum. The reduction in the metathorax most certainly affects the ability to fly and thus the female of *Butozania* should be flightless. However, this unusual case of metathoracic reduction with retained macroptery needs further investigation.

In the 20th century the known range of *B. bulgarica* in Bulgaria covered three adjacent valleys – Radomir, Pernik and Sofia. In Radomir Valley the species has been reported from the villages Varba (type locality, currently a district of Radomir town), Drugan, Dolni Rakovets, Chervena Mogila, Dren and Izvor (Kantardzhieva-Minkova, 1953; Popov, 1968). In Pernik Valley the species has been found only at Moshino and Byala Voda villages (both are currently districts of Pernik town) (Popov, 1968). In Sofia Valley known localities are Sofia (Kantardzhieva-Minkova, 1953) and the villages Kazichane and Lozen (Popov, 1968). During this survey we have visited all these historical localities (in the cases of subsequent urbanisation the suitable neighbouring areas). We have found the species only in the vicinity of the villages Chervena Mogila and Drugan, as well as in several new neighbouring localities. We did not find the species in its type locality, regardless of the repeated attempts over the years of study. It seems that the agricultural practices, including pesticide use, and the increasing urbanisation have significantly constricted the range of *B. bulgarica* in Bulgaria, turning this poorly studied endemic beetle into an endangered species. At present, the field margins and the uncultivated land adjoining arable fields appear to be the last refugia of this interesting and little-known species.

Acknowledgements. This work has been carried out in the framework of the National Science Program "Environmental Protection and Reduction of Risks of Adverse Events and Natural Disasters", approved by the Resolution of the Council of Ministers № 577/17.08.2018 and supported by the Ministry of Education and Science (MES) of Bulgaria (Agreement № D01-27/06.02.2024).

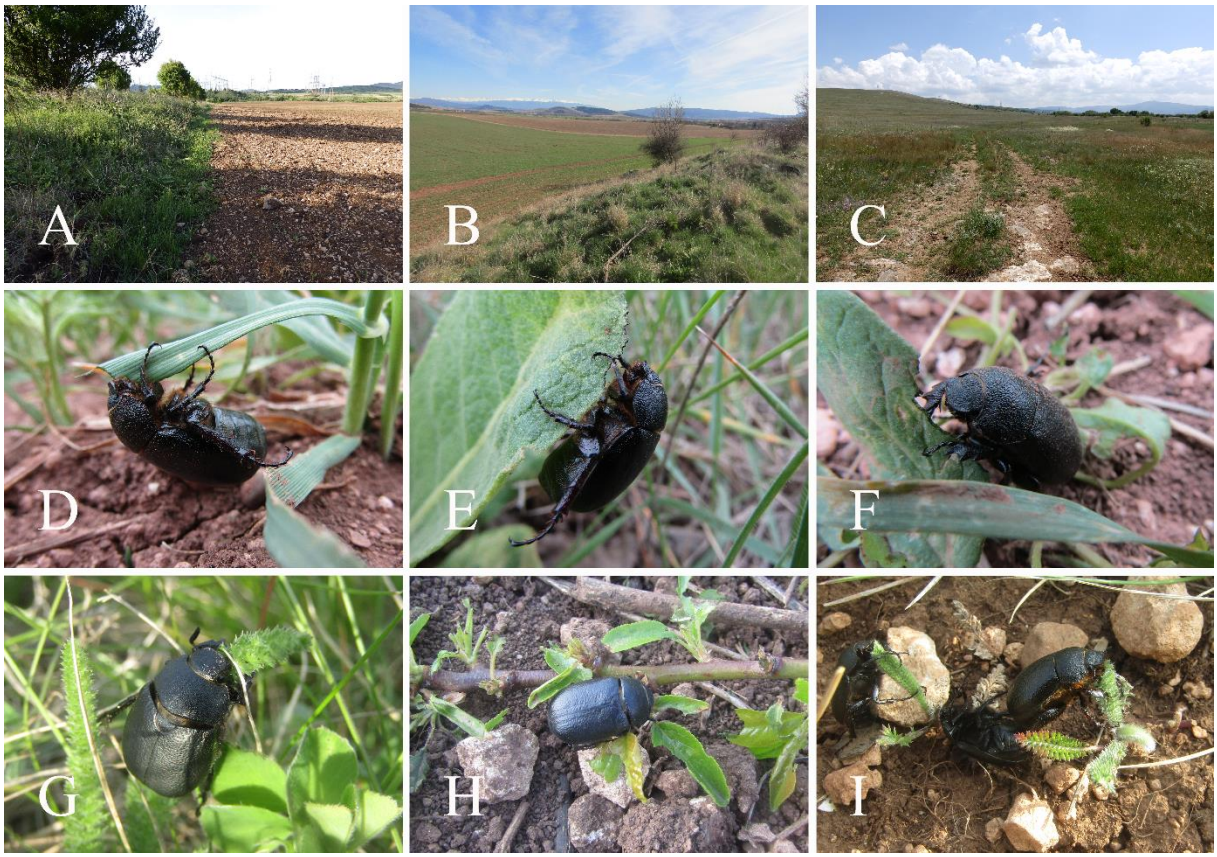

Fig. 2. Habitats of *Butozania bulgarica* in Radomir Valley and adults in their natural environment in the vicinity of Chervena Mogila Village. A – arable field N of Chervena Mogila, 05.v.2018; B – the same, 19.iii.2023; C – grasslands N of Vladimir Village, 20.v.2018; D – female feeding on *Hordeum vulgare*, 04.v.2019; E – female feeding on *Verbascum* sp., 04.v.2019; F – female feeding on *Convolvulus arvensis*, 04.v.2019; G – male feeding on *Achillea* sp., 23.iv.2023; H – male feeding on *Prunus cerasifera*, 23.iv.2023; I – mating, 23.iv.2023.

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