

FIRST RECORDS OF *DOLICHODERUS QUADRIPUNCTATUS* (LINNAEUS, 1771) (HYMENOPTERA, FORMICIDAE) IN LITHUANIA

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Introduction

Ants (Hymenoptera: Formicidae) have keystone roles in most ecosystems. They are considered as valuable model taxa in monitoring of ecosystem conditions, detecting and evaluating the presence of invasive species and their interactions with threatened or endangered species, land management actions, and long-term ecosystem changes (Underwood & Fisher, 2006; Record *et al.*, 2018; Deák *et al.*, 2021; Zina *et al.*, 2021).

The subfamily Dolichoderinae is a cosmopolitan species-rich clade with approximately 900 described species, which includes some of the world's most successful invasive species, such as the Argentine ant, *Linepithema humile* (Mayr, 1868) and the ghost ant, *Tapinoma melanocephalum* (Fabricius, 1793) (Ward *et al.*, 2010; Wetterer, 2015). The genus *Dolichoderus* Lund, 1831 has a widespread distribution, being absent only from the Afrotropics. It was even more dominant in the past, as fossil species from the *D. quadripunctatus* group have been found in Baltic and Rovno amber (Ward *et al.*, 2010). The genus *Dolichoderus* comprises more than 140 species, of which only two are distributed in the Palaearctic region – European *D. quadripunctatus* (Linnaeus, 1771) and East Asian *D. sibiricus* (Emery, 1889) (Borisova & Dmitrienko, 2016; Park *et al.*, 2019). These species are easily recognised by the presence of yellow to ivory lateral spots on the terga 1 and 2 of their abdomen (Fig. 1).

The Western Palearctic species *D. quadripunctatus* is arboricolous and thermophilous oligotopic ant, inhabiting open forests types, nesting in rotte trunks of old trees up to the height of 5 metres and more (Dolek *et al.*, 2009; Floren *et al.*, 2014; Salata *et al.*, 2018; Stukalyuk, 2018). In addition, it may inhabit old wooden constructions in orchards, urban parks and gardens (Salata & Borowiec, 2016; Sinchuk & Blinov, 2017; Czechowski *et al.*, 2019; Radchenko *et al.*, 2019; Trigoso-Peral *et al.*, 2020; Stukalyuk *et al.*, 2022; Stukalyuk & Maák, 2023) and even old stone walls (Tăusan & Teodorescu, 2017), oak and reed galls (Heneberg *et al.*, 2014; Giannetti *et al.*, 2019).

D. quadripunctatus has not been observed in Lithuania earlier. Among the bordering countries, it occurred in Poland and Belarus. In Poland, it is widely distributed in the west, centre and south, and less common in the east (Zięba & Zięba, 2018). The range of *D. quadripunctatus* in Belarus is restricted to the south and east of the country (Sinchuk & Blinov, 2017).

In this article, we report the first records of the species from three localities of Lithuania.

Material and Methods

The specimens were collected by hand, or their pictures were taken and uploaded to the Macrogamta (www.macrogamta.lt) or iNaturalist (www.inaturalist.org) online databases. In one of the localities, the colony of ants was found in a Hymenoptera trap-nest that was constructed as a bundle of 20 internodes of the reed *Phragmites australis*, wrapped into the Tetrapack carton, and fixed using sticky tape (Budrys *et al.*, 2010).

Collectors: A. Budrienė (A.B.), E. Budrys (E.B.), M. Leliunga (M.L.), S. Orlovskytė (S.O.), V. Tamutis (V.T.). Collected specimens are deposited in the Nature Research Centre, Vilnius.

List of localities

Locality	Administrative district	Coordinates (LAT, LONG)
Aukštkalniai env.	Kaunas distr.	55.0499, 23.5179
Juodžių Miškas f. (1)	Panevėžys distr.	55.4444, 24.3323
Juodžių Miškas f. (2)	Panevėžys distr.	55.4450, 24.3328
Užulėnio Miškas f.	Ukmergė distr.	55.4075, 24.6299

List of species

Dolichoderus quadripunctatus (Linnaeus, 1771)

Aukštkalniai env., deciduous mature forest on the southern slope of the Nemunas riverbank, 18 06 2022, 1♀ (V.T.); Juodžių Miškas f. (1), clear cut area in a mixed forest, 16 07 2023, 1♀ (M.L.); Juodžių Miškas f. (2), clear cut area in a mixed forest, 20 06 2023, 1♀ (M.L.); Užulėnio Miškas f., colony in a Hymenoptera trap-nest on alive Norway spruce (*Picea abies*) tree trunk, clear cut area in a deciduous forest, 06 06–20 09 2023, 12♀ (A.B., E.B., S.O.)

Discussion

The *Dolichoderus quadripunctatus* is distributed in the central and southern Europe, up to southern Sweden and Norway in the north and up to the southwestern Siberia in the east, being absent from the Great Britain and Iceland (Borisova & Dmitrienko, 2016; Sinchuk & Blinov, 2017; Stukalyuk, 2018; Zięba & Zięba, 2018; Park *et al.*, 2019; Popkova *et al.*, 2021; Stukalyuk *et al.*, 2022). The species is widespread in Romania and Ukraine (Tăusan & Teodorescu, 2017; Stukalyuk, 2018). However, it was considered declining and was included in the Red Data book in Germany (Dolek *et al.*, 2009). The species is rare in Norway and Belarus (Ødegaard *et al.*, 2015; Sinchuk & Blinov, 2017) and regionally redlisted in Russia (Borisova & Dmitrienko, 2016; Popkova *et al.*, 2021). Harsh winters limit nesting possibilities of ants stronger in the canopy than in the soil (Jaffe *et al.*, 2007). However, due to the global warming, the thermal environments suitable for arboricolous species may induce their expansion to the north. Previously recognised as rare (Czechowski *et al.*, 2012; Mazur, 2013), *D. quadripunctatus* currently has spread across Poland (Salata *et al.*, 2018; Borowiec & Waleński, 2020). The ways of spreading of this species are poorly known, though the DNA-barcoding demonstrated

that the CO1 mitotypes of the Norwegian population are close to the mitotypes from Central Europe, implying an interchange across the sea (Ødegaard *et al.*, 2015).



Fig. 1. *Dolichoderus quadripunctatus* workers in natural environments of Juodžių Miškas forest (photo M. Leliunga)

D. quadripunctatus avoids visiting the soil surface and prefers foraging in the canopy and grass (Stukalyuk, 2018). Therefore, the species can be easily overlooked in the pitfall trap studies.

D. quadripunctatus is promoted by intermediate or high levels of diverse decomposing deadwood resources (Le Souchu *et al.*, 2023). In Catalonia, it was assessed as the potential bioindicator of riparian forest ecological health (Zina *et al.*, 2021). This species can be considered as an indicator of the naturalness of woodland habitats.

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Pirmieji keturdėmės skruzdėlės *Dolichoderus quadripunctatus* (Hymenoptera: Formicidae) stebėjimai Lietuvoje

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Santrauka

Straipsnyje pateikiami pirmieji keturdėmės skruzdėlės *Dolichoderus quadripunctatus* (Linnaeus, 1771) (Hymenoptera: Formicidae) stebėjimo duomenys Lietuvoje. Ši archaiška medžiuose gyvenanti rūšis, kurios giminaičiai rasti Baltijos bei Rovno gintare, paplitusi Vakarų, Vidurio ir Pietų Europos bei Vakarų Sibire. Ji susijusi su buveinėmis, kuriose gausu yrančios medienos. Dėl priklausomybės nuo negyvos medienos šią skruzdėlę galima naudoti kaip vieną iš miško buveinių natūralumo indikatorių.

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