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NOTES ON GEOGRAPHIC DISTRIBUTION

New records of rare horseflies *Chrysops divaricatus* Loew, 1858 and *Tabanus paradoxus* Jaenicke, 1866 (Diptera, Tabanidae) in Slovakia

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Abstract. Slovakia is located on the edge of the distribution ranges of *Chrysops divaricatus* Loew, 1858 and *Tabanus paradoxus* Jaennicke, 1866. The recent occurrence of both species was confirmed after more than five decades, with records in the same geomorphological units previously known. *Chrysops divaricatus* is distributed in the northern regions of Europe and Asia and may represent a post-glacial relict in Slovakia. Conversely, *T. paradoxus* is characteristic of southern Europe, with no evidence of range expansion.

Key words. Distribution, Manitoba trap, peatland, post-glacial relict, range

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Introduction

There are 56 known tabanid species in Slovakia (Chvála 2009). The territory of Slovakia is located at the edge of the ranges of many tabanids with distribution in northern or southern Europe (Chvála et al. 1972; Chvála 1980). *Chrysops divaricatus* Lowe, 1858 is typical for northern parts of Europe and Asia (Chvála 1988). The only record of *C. divaricatus* from Slovakia was published without a collection date and was localised as Malacky (Chvála 1980), which is the seat of the district of the same name and is in the Záhorská nížina lowland (southwestern Slovakia). Subsequently, additional information on this record was published, which refers to five females caught on 5 June 1968 (Ježek 1992). *Tabanus paradoxus* Jaenicke, 1866 is a southern European species (Chvála et al. 1972; Chvála 1980, 1988), and so far, it has only been recorded in Slovakia in the Burda mountain range (Chvála 1980).

As part of research on the recent distribution of the tabanids of Slovakia, emphasis was placed on confirming the occurrence of *C. divaricatus* and *T. paradoxus*. Surveys conducted during 2021–2024 included sampling points in the territory of the Záhorská nížina lowland, in proximity to peatland habitats, as well as sampling within the Burda mountains, where the occurrence of these two species was considered most probable. This report presents a second record of *C. divaricatus* from Slovakia and a new record of *T. paradoxus*, both after an interval of more than five decades (Chvála 1980).

Methods

Horseflies were collected from various sites across Slovakia using a Manitoba trap (or H-trap) with chemical bait that releases CO_2 from a gas cylinder, as part of long-term entomological research. The sampling method was designed based on data on the species' daily and seasonal activity (Chvála et al. 1972).

One of the sites surveyed was located near the village of Lakšárska Nová Ves, in Záhorská nížina lowland. The Manitoba trap was placed in a pine forest clearing 500 m from Zelienka peatland. The trap was used only in 2024, on 15 June and 28 June, always from 11:00 to 17:00.

The study in the Burda mountain range was carried out in 2023 at three sites, each representing different habitats: a meadow (18 August), a garden (19 August) and a cattle farm (23 August)—all within the territory of Chľaba village. In 2024, sampling was conducted only once (Chľaba – Kováčov),

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in an orchard with small trees and bushes (12 August). The Manitoba trap was operated at all four sites from 19:00 to 8:00. Each site was monitored from 19:00 to 0:00 to observe tabanids flying just above the ground. The specimens were euthanised with ethyl acetate and mounted on entomological pins. *Tabanus paradoxus* was photographed using a Pentax K20D camera with an objective Pentax-D FA 50mm Macro, and *Chrysops divaricatus* was photographed using a ZEISS AXIO Zoom V16 microscope with a Canon EOS 5D camera. The image of the latter was focus-stacked using Zerene Stacker v. 1.04. Maps were created with QGIS v. 3.34.3 (QGIS.org 2024) using the base map from the Atlas krajiny Slovenskej Republiky (2013). The nomenclature follows Chvála et al. (1972), whose key was also used for the identification of the specimens. The examined material is deposited in the collection of the Department of Zoology, Faculty of Natural Sciences, Comenius University in Bratislava.

Results

Family Tabanidae Latreille, 1802
Subfamily Chrysopsinae Lutz, 1905
Tribe Chrysopsini Lutz, 1905
Genus *Chrysops* Meigen, 1803

***Chrysops divaricatus* Loew, 1858**
Figure 1

New record. SLOVAKIA — Bratislava region • Záhorská nížina lowland, Lakšárska Nová Ves village env.; 48°35′60″N, 017°10′28″E, alt. 200 m; 15.VI.2024; Attila Balogh leg.; Manitoba trap; 1 ♀, CD01.

Identification. *Chrysops divaricatus* is a member of the *sepulcralis* group, which consists of four species found in Europe. Among these, females of *Chrysops caecutiens* (Linnaeus, 1758) and *C. divaricatus* are distinguished by the presence of a black pattern in the shape of an inverted "V" on the yellow second abdominal tergite (Figure 1). In *C. divaricatus*, the extremities of the widely open "V" do not reach

Figure 1. *Chrysops divaricatus* Loew, 1858, female. Scale bar = 5 mm.

the third tergite, and the following tergites are black with a yellow border on the hind margins. This species also differs from *C. caecutiens* by its completely black legs and by the shape of the apical spot on the wings, which is very narrow and reaches only as far as vein R_4 (Chvála et al. 1972).

Subfamily Tabaninae Latereille, 1802
Tribe Tabanini Latreille, 1802
Genus *Tabanus* Linnaeus, 1758

***Tabanus paradoxus* Jaennicke, 1866**
Figure 2

New record. SLOVAKIA — Nitra region • Burda mountain range, Chľaba village; 47°49′36″N, 018°47′42″E, alt. 140 m; 19.VIII.2023; Attila Balogh leg.; Manitoba trap; 1 ♀, TP01.

Identification. *Tabanus paradoxus* and *T. autumnalis* Linnaeus, 1761 are the only two Central European species in the *bovinus* group whose females are blackish grey. The females of these species can be distinguished, for example, by the colouration of legs, palpi, and abdomen (Chvála et al. 1972). In *T. autumnalis* females, the tibiae are brownish, and the palpi are whitish. Triangular spots extend to the anterior margins of the abdominal tergites, and lateral patches on the abdomen are large and oval. *Tabanus paradoxus* females have black legs and dark-brown palpi. In this species, the triangular spots extend approximately to the middle of each tergite, not reaching the anterior margin of the tergite (Figure 2). Narrow whitish lateral patches are present on posterior margins of each tergite.

Discussion

Chrysops divaricatus is widely distributed in northern Eurasia (Chvála et al. 1972). To date, the southernmost record of this species comes from Eastern Anatolia (Altunsoy and Ayaz 2024). Occurrences have been documented in 17 countries: Czech Republic, Denmark, Estonia, Finland, France, Germany, Kazakhstan, Lithuania, Mongolia, Norway, Poland, Romania, Russia (including northern and central

Figure 2. *Tabanus paradoxus* Jaennicke, 1866, female. Scale bar = 5 mm.

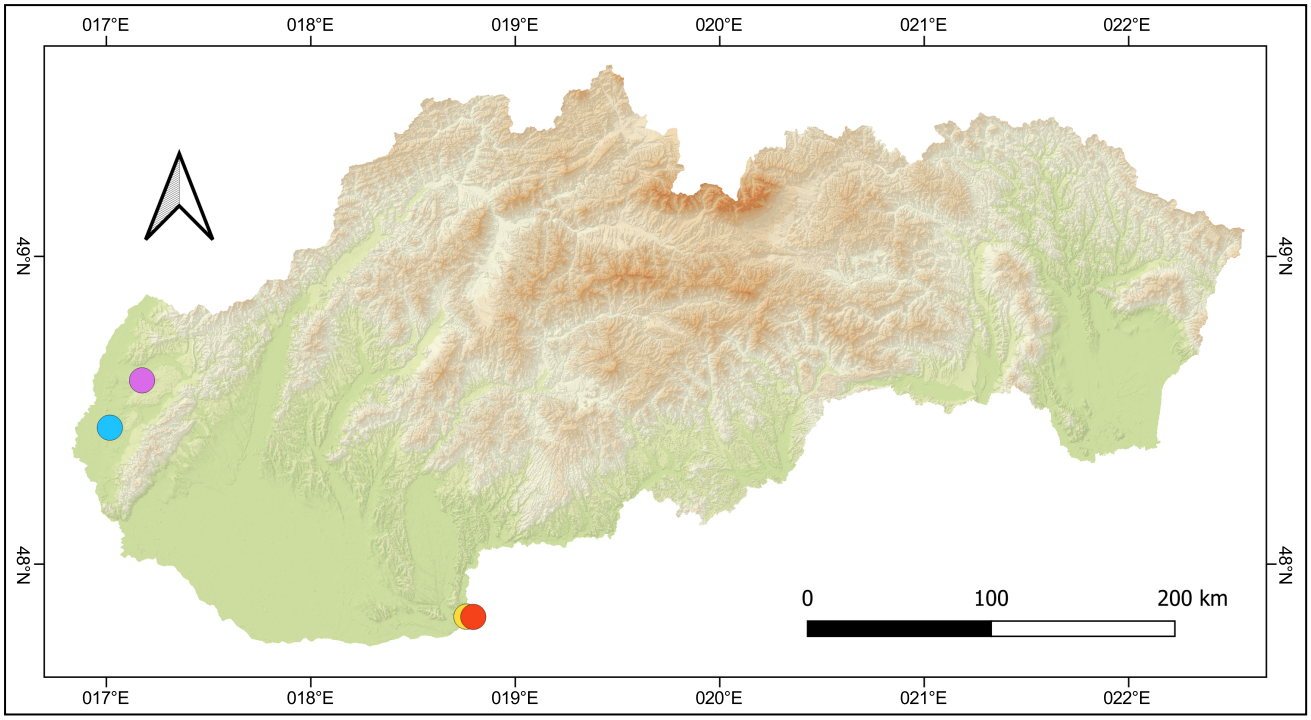

Figure 3. Records of *Chrysops divaricatus* Loew, 1858 and *Tabanus paradoxus* Jaennicke, 1866 in Slovakia. The blue circle represents a historical record of *C. divaricatus*, and the yellow one of *T. paradoxus*. The violet circle represents the new record of *C. divaricatus* obtained in the present study, while the red circle corresponds to that of *T. paradoxus*.

European part of Russia, West Siberia, East Siberia, and Far East), Slovakia, Sweden, Switzerland and Ukraine (Chvála et al. 1972; Chvála 1988; Leclercq 1995; Altunsoy and Ayaz 2024). This species is particularly common in Finland and Sweden and is considered typical of the taiga (Chvála et al. 1972).

The first record of *C. divaricatus* in Slovakia was within the territory of the Záhorská nížina lowland (localised as Malacky; Figure 3). This occurrence, first published in 1980, was reported without any additional data, including the collection date (Chvála 1980). Further information concerning this record was subsequently provided in a revision of Tabanidae in the collections of the Natural History Museum in Prague (Ježek 1992). A similar situation is observed regarding the faunistic data for *Hybomitra acuminata* (Loew, 1858): the first record of this species in Slovakia was published without the collection date (Gunárová 1984), whereas only the second record, published recently, provides this information (Dvořák 2010). *Chrysops divaricatus* remained unrecorded in Slovakia for more than five decades. The recent find of this species represents the second record in the country. Thus, only six of the 56 tabanid species in Slovakia are known from a single record (Gunárová 1984; Chvála 2009). According to published data, *C. divaricatus* can be considered one of the rarest horsefly species in Slovakia. In the second half of the 20th century, there was considerable interest among professional entomologists in studying the Tabanidae family (Chvála et al. 1972). Therefore, the small number of records cannot be attributed to a lack of research or field effort. Moreover, the probability that this species was overlooked due to misidentification is low, as *C. divaricatus* can be unambiguously identified from other tabanids by the characteristic black pattern on its abdomen (Chvála et al. 1972).

Chrysops divaricatus only occurs in a few sites at the southern limit of its distribution, such as in South Bohemia (Chvála 1980). The species, often recorded in areas adjacent to peat bogs, ponds and large lakes, is considered a Nordic species typical of the taiga (Chvála et al. 1972, Chvála 1980). Its distribution resembles that of two other tabanid species, *Hybomitra borealis* (Fabricius, 1781) and *Hybomitra tarandina* (Linnaeus, 1758), which are also found in the taiga (Chvála et al. 1972). Both species are associated with peatlands and are regarded as post-glacial relicts in Poland (Trojan 1958; Chvála et al. 1972). These similar characteristics indirectly indicate that *C. divaricatus* may also be considered a post-glacial relict at its southern limit, including Slovakia. This assumption is supported by the location of the present record, where the specimen was collected only 500 m from Zelienka, a young-Holocene peat bog, situated in interdunal depressions (Krippel 1988). The examined specimen was collected in a clearing within a pine forest. *Chrysops divaricatus* showed a preference for pine forests in the Voronezh Province in southwest Russia (Prisniy 2020).

Females of *C. divaricatus* attack a wide range of hosts, including humans, horses, cattle, and dogs (Chvála et al. 1972). It is assumed that the recent decrease in cattle grazing poses a lower potential

threat to the populations of this tabanid in comparison to the disappearance of suitable larval habitats, particularly peatlands.

Tabanus paradoxus is a southern European species (Chvála 1980). This tabanid has been recorded in 15 countries to date: Albania, Austria, Bosnia and Herzegovina, Bulgaria, Croatia, France, Germany, Greece, Hungary, Italy, Poland, Serbia, Slovakia, Spain and Switzerland (Chvála et al. 1972; Chvála 1988; Krčmar et al. 2004; Ganeva 2009; Krčmar et al. 2011; Aibulatov et al. 2012). The northern limit of the species' distribution is in Germany, Austria, Slovakia and Poland (only one individual from Polish Silesia). Reports from Central Europe are sporadic (Chvála et al. 1972; Chvála 1980), and there is no evidence of its range expansion. Populations and species of horseflies have been thoroughly studied in the Carpathian Basin (Herczeg et al. 2015). Similar to *C. divaricatus*, there is a minor probability of *T. paradoxus* being overlooked due to misidentifications. *Tabanus paradoxus* and *T. autumnalis* are the only two black Central European horsefly species classified within the *bovinus* group. These two species can be distinguished by the colouration of their legs and abdomen (Chvála et al. 1972).

Tabanus paradoxus has recently been collected using a Manitoba trap for sampling without chemical bait, in France (Ferjani et al. 2020) and Hungary (Otártics 2021). A black sphere, a component of the Manitoba trap, serves as a visual attractant (Ferjani et al. 2020). This information is noteworthy because adults of *T. paradoxus* are active during the late evening, at dusk and shortly after nightfall (Chvála et el. 1972). Recent records from Hungary (2018–2019) include 50 specimens from four sites: two horse farms, a family house garden and a forest clearing (Otártics 2021). Similar biotopes were investigated within the Burda mountains; however, we collected only a single female in the garden of a family house, located in Chľaba (Figure 3). This occurrence represents the first Slovakian record of this species in over five decades (Chvála 1980). Furthermore, a report from Bosnia and Herzegovina documents the occurrence of *T. paradoxus* collected from the windows of two buildings, one of which was a restaurant (Krčmar et al. 2004). Despite records of *T. paradoxus* from anthropogenic habitats, females are not known to attack humans, choosing primarily to attack cattle (Chvála 1980). Observations of Chvála in the Burda mountain range (10.VIII.1964) reported that individuals did not attack humans; several females were observed flying close to the ground in small circles around the observer's legs (Chvála et al. 1972). To the best current knowledge, this was the last documented record of *T. paradoxus* in Slovakia.

The Burda mountain range constitutes the smallest geomorphological unit in Slovakia (Šimon et al. 2023); nonetheless, *T. paradoxus* has been recorded exclusively within this unit and confirmed with repeated collections (Chvála 1980). No presence of the species was recorded during fieldwork conducted in 2010 and 2011 in the Burda mountains (Straka and Majzlan 2016), likely due to the use of the Malaise traps, as the sampling efforts were not exclusively directed towards collecting tabanids.

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Additional information

Conflict of interest

The authors declare that no competing interests exist.

Ethical statement

No ethical statement is reported.

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Author contributions

Conceptualization: AB, MK. Data curation: AB. Funding acquisition: MH, MK. Investigation: AB. Methodology: AB. Resources: AB, MK. Supervision: MH, MK. Visualization: AB, SK. Validation: MH, MK. Writing – original draft: AB. Writing – review and editing: AB, MH, MK, SK.

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Data availability
All data that support the findings of this study are available in the main text.

References

Aibulatov S, Chetverikova T, Chetverikov P (2012) List of horseflies (Diptera: Tabanidae) from Belgrade neighbourhoods (Serbia). Acta Entomologica Serbica 17: 167–169.

Altunsoy F, Ayaz B (2024) Distribution and seasonality of horseflies (Diptera: Tabanidae) in Van province of Türkiye with new records. Journal of Insect Biodiversity and Systematics 10: 605–615. https://doi.org/10.61186/jibs.10.3.605

Atlas krajiny Slovenskej Republiky (2013) Slovenská agentúra životného prostredia. Centrum environmentálnej informatiky. http://geo.enviroportal.sk/atlassr/http://geo.enviroportal.sk/atlassr/. Accessed on: 2024-07-16

Chvála M (1980) Tabanidae. In: Chvála M (Ed.) Krevsající mouchy a střečci – Diptera. Academia, Praha, Czechoslovakia, 282–390.

Chvála M (1988) Tabanidae. In: Soós Á, Papp L (Eds.) Catalogue of Palearctic Diptera. Volume 5: Athericidae–Asilidae. Akadémiai kiadó, Budapest, Hungary, 97–171.

Chvála M (2009) Tabanidae Latreille, 1802. In: Jedlička L, Kúdela M, Stloukalová V. (Eds.) Checklist of Diptera of the Czech Republic and Slovakia. Electronic version 2. Comenius University in Bratislava, Faunima, Bratislava, Slovakia. http://www.edvis.sk/diptera2009/families/tabanidae.htm. Accessed on: 2025-11-11.

Chvála M, Lyneborg L, Moucha J (1972) The horse flies of Europe (Diptera, Tabanidae). Entomological Society of Copenhagen, Copenhagen, Denmark, 499 pp.

Dvořák L (2010) *Hybomitra acuminata* (Loew, 1858) (Diptera: Tabanidae)—confirmed occurrence in Slovakia. Acta Rerum Naturalium Musei Nationalis Slovaci 56: 62–63.

Ferjani A, Etienne L, Duvallet G (2020) Seasonal abundance of Tabanidae (Diptera) on a farm in southern France. Agriculture and Natural Resources 54: 158–164. https://doi.org/10.34044/j.anres.2020.54.2.06

Ganeva D (2009) The tabanids (Diptera: Tabanidae) from the Belassitsa Mountain, Bulgaria. Journal of Agricultural Science and Technology 1: 30–32.

Gunárová V (1984) Čeľaď Tabanidae. In Čepelák J (Ed.) Diptera Slovenska I (Nematocera, Brachycera-Orthorrhapha). Veda, Bratislava, Czechoslovakia, 153–165.

Herczeg T, Száz D, Blahó M, Barta A, Gyurkovszky M, Farkas R, Horváth G (2015) The effect of weather variables on the flight activity of horse flies (Diptera: Tabanidae) in the continental climate of Hungary. Parasitology Research 114: 1087–1097. https://doi.org/10.1007/s00436-014-4280-3

Ježek J (1992) Revision of collections of horse flies (Diptera, Tabanidae) – faunistics, additions, grid-mapping, new records (part 1). Časopis Národního muzea, Řada přírodovědná 160: 112–114.

Krčmar S, Mikuska A, Mikuska J (2004) New faunistic records of horse flies (Diptera: Tabanidae) in Bosnia and Herzegovina. Acta Universitatis Carolinae Biologica 48: 197–201.

Krčmar S, Hackenberger DK, Hackenberger BK (2011) Key to the horse flies fauna of Croatia (Diptera, Tabanidae). Periodicum Biologorum 113 (Suppl. 2): 1–61.

Krippel E (1988) The Fen Peat Bog Zelenka in the Záhorská Nížina Lowland. Geografický Časopis 40: 174–186.

Leclercq M (1995) Presence en France de *Chrysops divaricatus* Loew (Diptera: Tabanidae). Bulletin de la Société Française de Parasitologie 13: 229-232.

Otártics MZ (2021) Bögölyközösségek elemzése és zavaró hatásuk vizsgálata lovakon. PhD thesis, Magyar Agrár-és Élettudományi Egyetem Kaposvári Campus, Kaposvár, Hungary, 149 pp.

Prisniy YA (2020) Fauna of Horseflies (Diptera, Tabanidae) of the South of the Middle Russian forest-steppe and adjoining steppe territories. Entomological Review 100: 83–90. https://doi.org/10.1134/S0013873820010078

Straka V, Majzlan O (2016) Dvojkrídlovce (Diptera) pohoria Burda. Ochrana prírody 27: 89–125.

Šimon L, Kollárová V, Kováčiková M (2023) Neogene volcanics of the Burda mountain range nearby Štúrovo, Slovakia. Mineralia Slovaca 55: 117–132. https://doi.org/10.56623/ms.2023.55.2.2

Trojan P (1958) The ecological niches of certain species of horse-flies (Diptera, Tabanidae) in the Kampinos Forest near Warsaw. Ekologia Polska 6: 53–129.