ABS ACTA BIOLOGICA SIBIRICA
A journal on the biodiversity of Siberia and the adjacent lands

Acta Biologica Sibirica 12: 1421–1446 (2026)
doi: 10.5281/zenodo.23816679
http://journal.asu.ru

RESEARCH ARTICLE

New contributions to the fauna of horseflies (Diptera, Tabanidae) in Azerbaijan, Nakhchivan

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Academic editor: R. Yakovlev | Received 3 August 2026 | Accepted 15 September 2026 | Published 1 November 2026

http://zoobank.org/35C85648-2ADA-4D8D-B2E9-E0FC99839A2E

Citation: Mammadova G, Ayaz B, Mammadov I (2026) New contributions to the fauna of horseflies (Diptera, Tabanidae) in Azerbaijan, Nakhchivan. Acta Biologica Sibirica 12: 1421–1446. https://doi.org/10.5281/zenodo.23816679

Abstract

This study presents the first comprehensive investigation of the horsefly (Diptera: Tabanidae) fauna of the Nakhchivan Autonomous Republic, Azerbaijan, based on field surveys conducted between 2021 and 2025. A total of 451 specimens were collected and identified, comprising 37 species belonging to the subfamilies Tabaninae, Chrysopsinae and Pangoninae. Four species *Tabanus nemoralis*, *T. obsolescens*, *Haematopota pallidula* and *H. pandazisi* are recorded for the first time from Azerbaijan, while ten species are new records for Nakhchivan, raising the known Tabanidae fauna of the country to 90 species. *Tabanus bifarius* (20.39%) and *T. bromius* (17.52%) were the most frequently captured species, whereas *Haematopota pandazisi*, was rarely sampled, represented by only a single specimen. Ecological diversity analysis revealed the highest species richness in Julfa and Babek, while Ordubad (Goygol) and Ordubad (Pazmari) exhibited markedly reduced diversity, reflecting a clear altitudinal zonation of the fauna across the region. These findings substantially expand the known distribution and diversity of Tabanidae in Azerbaijan and provide baseline data for future ecological and veterinary research in Nakhchivan.

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Keywords
Azerbaijan, fauna, horseflies, Tabanidae, Nakhchivan Province

Introduction

A recent study (Bababayli et al. 2024) confirmed that transitional zones encompassing diverse topographic variations and complex microclimatic conditions are of critical importance for biodiversity. Accordingly, the mountainous region of Nakhchivan, characterized by steep elevation changes and heterogeneous rock formations, provides a unique ecological setting that exhibits distinct altitudinal zonation within a narrow geographic area. Furthermore, Babayeva (2024) found out that the unique geographical structure of the region has made it a dynamic center of biodiversity, encompassing Mediterranean, Near Eastern, and Irano-Turanian floristic elements. Indeed, Nakhchivan, with its high rate of endemism and rich biological heritage, is positioned as an ecological junction point within the globally recognized "Irano-Anatolian Biodiversity Hotspot".

Nakhchivan exhibits a sharply continental climate, distinguishing it from other regions of Azerbaijan. The primary factors shaping the local climate are the abundance of solar radiation, complex atmospheric circulation, and diverse relief features. Maximum solar radiation is observed in both the plains and mountainous zones, and the intensity of radiation during the warm season is approximately twice that of the cold season. According to Babayev (1999), the radiation levels recorded in the study area are comparable only to those reported from the high-altitude regions of the Greater Caucasus.

The exceptional taxonomic richness of the region has necessitated the protection of fragile ecosystems and relict populations during the evolutionary process, leading to the establishment of a network of strategic state nature reserves and national parks. For example, the Shahbuz State Nature Reserve, where 85% of the vegetation consists of oak forests and which hosts 1,575 plant species, serves as a vital refugium for the floating islands around Lake Batabat and rare orchid taxa. While the Ordubad (Zengezur) National Park provides habitat for endangered apex mammals and 115 rare plant species endemic to the region, the Arpaçay and Arazboyu Conservation Areas similarly safeguard globally threatened species (Talibov 2001; Talibov and İbrahimov 2008; Talibov et al. 2021).

However, this delicate ecological balance is currently under serious pressure due to anthropogenic impacts such as overgrazing, deforestation, unplanned rural development, and aggressive infrastructure projects. These pressures are rapidly fragmenting micro-habitats in the region and dramatically accelerating soil erosion. This habitat fragmentation weakens the carrying capacity of ecosystems and puts many taxa belonging to the biodiversity in the region at risk of extinction (silent extinction / Linnean shortfall) even before they can be scientifically identified. This situation makes the conduct of urgent and systematic fauna and flora inventory

studies an unavoidable scientific necessity for the development of regional conservation strategies.

The family Tabanidae, commonly known as horse flies and deer flies, is a widely distributed group encompassing approximately 4,300 to 4,455 described species worldwide. They exhibit a distinct sexual dimorphism in their feeding habits: while males feed exclusively on plant nectar and pollen, females require regular blood meals to complete egg development (Anderson 1971). Because of their painful bites and interrupted feeding behavior, female tabanids are significant mechanical and biological vectors for various pathogens. They are known to transmit diseases of severe veterinary and public health concern, including trypanosomiasis (such as *Trypanosoma evansi*, causing surra), anaplasmosis, anthrax, tularemia, equine infectious anemia, and *Loa loa* filariasis (Krinsky 1976; Foil 1989; Kettle 1995; Marques et al. 2025). Furthermore, in the realm of animal husbandry, persistent tabanid infestations pose a direct threat to agricultural productivity; intensive attacks on pastured livestock are well-documented to cause marked declines in milk yield and overall weight gain (Desquesnes and Dia 2004). Tabanidae species have successfully adapted to diverse ecological niches, with about 550 species identified in the Palaearctic region and 220 in Europe (Chvala 1988; Andreeva 2004). While Azerbaijan's horsefly populations were extensively studied in the mid-to-late 20th century, particularly through seminal regional works, focused entomological studies have been notably absent lately. This has resulted in a significant lack of data on the current diversity and distribution of Tabanidae, specifically in remote and protected habitats (Mammadova 2021, 2025). In an effort to close this gap, the present study was conducted to provide an updated and comprehensive inventory of horseflies in various districts of the Nakhchivan Autonomous Republic based on extensive contemporary field surveys.

Given the ecological specialization of their preimaginal phases to aquatic habitats and the significant mobility of the adults, members of the Tabanidae family (Diptera) represent an optimal biological indicator for tracking altitudinal gradients and ecosystem degradation. A comprehensive evaluation of this family's current status within Nakhchivan, a region where they pose significant medical and veterinary risks as vectors, will contribute essential information concerning the area's faunal composition and overall ecological stability. The ecological dominance of these dip-terans frequently results in substantial socio-economic disruptions, particularly affecting outdoor recreational activities and the tourism sector. Consequently, understanding the population dynamics and pathological risks associated with this family remains a critical focus for global entomological research. This study presents the first dedicated species inventory of horseflies (Diptera: Tabanidae) in various districts of the Nakhchivan Autonomous Republic, based on original field collections with reference to historical regional literature for taxonomic verification.

Materials and methods

This study was conducted using material collected from the Ordubad, Shahbuz, and Culfa districts and villages of the Nakhchivan Autonomous Republic (Fig. 1). Specimen collection began in the third decade of April and continued until the second decade of September between 2021–2025. The trapping activities were carried out from the hours of 8 am to 7 pm. The traps were controlled three times per day. Sampling was conducted using a targeted faunistic approach. Traps were deployed in high-activity microhabitats, particularly near natural water sources, riparian vegetation, and active livestock grazing areas. To maximize the recovery of species diversity across heterogeneous landscapes, trap positions were dynamically adjusted within each locality based on weekly catch yields and animal movements.

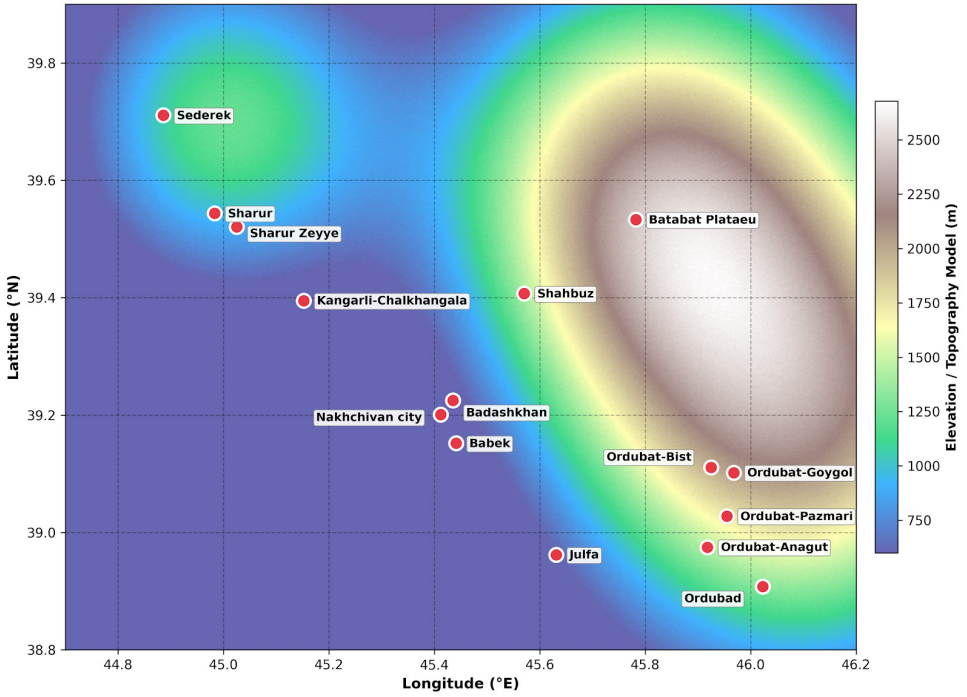


Figure 1. Sampling area of horseflies

Data analysis and ecological diversity indices

Quantitative ecological analyses were performed to evaluate and compare Tabanidae community structures in different sampling localities in Nakhchivan. Species diversity was calculated for each station using the Shannon-Wiener index (H'). Population regularity and ecosystem balance were determined using both the Pielou

regularity index (*e^H/S*) and the Shannon equation (*J'*). All biodiversity indices and community structure measurements were calculated using PAST (Paleontological Statistics, version 5.3) software.

Results

A total of 451 specimens were collected during the field studies, and 37 species of the belonging to the subfamilies Tabaninae, Chrysopsinae and Pangoninae were identified. The list of 37 species, date of collection, and distribution throughout the world is shown below. Four species are new records to the Tabanidae fauna of Azerbaijan and 10 species are new records for Nakhchivan Province.

Tabanus nemoralis, *Tabanus obsolescens*, *Haematopota pallidula*, and *Haematopota pandazisi* are the new records for Azerbaijan. *Pangonius pyritosus*, *Chrysops divaricatus*, *Tabanus nemoralis*, *Tabanus obsolescens*, *Tabanus canipalpis*, *Tabanus rupinae*, *Haematopota pallidula*, *Haematopota pandazisi*, *Haematopota turkestanica* and *Dasyrhamphis umbrinus* are new records for Nakhchivan horsefly fauna.

According to the PAST analysis, the distribution rates, number of individuals, number of taxa, and index values of the species in the research areas are given in Table 1.

Table 1. Ecological diversity and evenness indices of Tabanidae communities across different sampling localities

Sampling localities	Taxa (S)	Individuals (N)	Shannon Index (H′)	Evenness Index (eH/S)	Equitability (J′)
Babek	15	40	2.432	0.7588	0.8981
Sharur	9	18	2.139	0.9435	0.9735
Batabat Plateau	9	52	1.728	0.6253	0.7863
Shahbuz	12	101	1.261	0.2940	0.5074
Nakhchivan	6	35	1.6420	0.8606	0.9162
Ordubad Goygol	2	7	0.5983	0,9095	0,8631
Ordubad Anagut	3	13	0.9251	0.8407	0.8421
Ordubad Pazmari	1	10	0.000	1.0000	*NaN*
Ordubad	8	27	1.8680	0.8093	0.8982
Julfa	16	41	2.6400	0.8761	0.9523
Shahbuz Batabat	5	48	0.6980	0.4020	0.4337
Ordubad Bist	4	8	1.3210	0.9367	0.9528
Sharur Zeyye	2	34	0.4176	0.7591	0.6024
Kangarli Chalkhangala	4	8	1.3210	0.9367	0.9528
Badashkhan	1	4	0	1	*NaN*
Sederek	2	5	0.6730	0.9801	*0.9710*

Subfamily: PANGONINAE

Tribus: Pangoniini

***Pangonius pyritosus* (Loew, 1859)**

Material examined: Babek, 39°17'24.59"N, 45°20'19.58"E, 1,054 m, 2♀♀; Sharur, 39°35'13.25"N, 45°02'56.02"E, 870 m, 3♀♀.

Distribution worldwide: Bulgaria, Greek Mainland, Hungary, Macedonia, Poland, Romania, Serbia, South European Russia, Ukraine, West Russia, Turkey, Bosnia and Herzegovina, Croatia, Kazakhstan (GBIF 2026).

Family: TABANIDAE

Subfamily: CHRYSOPSINAE

Tribus: Chrysopsini

***Chrysops caecutiens* (Linnaeus, 1758).**

Material examined: Babek, 39°17'24.59" N, 45°20'19.58" E, 1,054 m, 2♀♀; Shahbuz, 39°26'40.12" N, 45°36'03.46" E, 1,587 m, 28.06.2023, 1♀; Batabat Plateau, 39°32'21.67" N, 45°47'02.08" E, 2,118 m, 03.07.2024, 1♀; Shahbuz, 39°26'40.12" N, 45°36'03.46" E, 1,587 m, 12.07.2024; Shahbuz, 39°26'40.12" N, 45°36'03.46" E, 1,587 m, 25.07.2025, 2♀♀.

Distribution worldwide: Albania, Austria, Balearic Is., Belarus, Belgium, Bosnia and Herzegovina, Britain I., Bulgaria, Central European Russia, Croatia, Czech Republic, Danish mainland, Dodekánisos (Dodecanese Is.), East Palearctic, Estonia, European Turkey, Finland, French mainland, Germany, Greek mainland, Hungary, Ireland, Italian mainland, Kikládes (Cyclades Is.), Kriti (Crete), Latvia, Liechtenstein, Lithuania, Luxembourg, North Macedonia, Near East, North European Russia, Northwest European Russia, Norwegian mainland, Poland, Portuguese mainland, Romania, Sardinia, Serbia, Sicily, Slovakia, Slovenia, South European Russia, Spanish mainland, Sweden, Switzerland, the Netherlands, Ukraine, Vóreion Aiyáion (North Aegean Is.), Yugoslavia (former) (Mikuska et al. 2008; Krčmar 2011; Altunsoy and Ayaz 2021; Ganeva 2021; GBIF 2026).

***Chrysops divaricatus* (Loew, 1858)**

Material examined: Babek, 39°17'24.59" N, 45°20'19.58" E, 1,054 m, 2♀♀; Shahbuz, 39°26'40.12" N, 45°36'03.46" E, 1,587 m, 2♀♀.

Distribution worldwide: Czech Republic, Danish mainland, East Palearctic, Estonia, Finland, Germany, Hungary, Kazakhstan, Lithuania, Mongolia, Norwegian mainland, Poland, Romania, Russia (Siberia), Slovakia, Sweden, Switzerland,

Ukraine, Turkey (Chvala et al. 1972; Olsufjev 1977; Altunsoy and Ayaz 2024, GBIF 2026).

***Chrysops flavipes* (Meigen, 1804)**

Material examined: Babek, 39°17'24.59" N, 45°20'19.58" E, 1,054 m, 2♀♀; Shahbuz, 39°26'40.12"N, 45°36'03.46"E, 1.587 m, 2♀♀.

Distribution worldwide: This species is Mediterranean in its distribution, extending from Southern Europe through Turkey and Iran to Central Asia, India, Iraq, Jordan, Lebanon, Palestine, and Syria (Chvala et al. 1972; Müller et al. 2012; Al-Talafha et al. 2004; Krčmar 2011; Altunsoy and Ayaz 2021; GBIF 2026).

Subfamily: TABANINAE

Tribus: Tabanini

***Atylotus quadrifarius* (Loew, 1874)**

Material examined: Sahbuz, 39°26'40.12" N, 45°36'03.46" E, 1,587 m, 2♀♀; Babek, 39°17'24.59" N, 45°20'19.58" E, 1,054 m, 2♀♀.

Distribution worldwide: Palearctic and Oriental affinity. It is distributed from Morocco through the Northern Mediterranean countries to southern Russia, the Near and Middle East to Central Asia, Iraq, Jordan, and Palestine (Chvala et al. 1972; Müller et al. 2012; Müller et al. 2023; Altunsoy and Ayaz 2024; GBIF 2026).

***Therioplectes tricolor* (Zeller, 1842)**

Material examined: Nakhchivan center, 39°11'59.35" N, 45°24'13.49" E, 840 m, 4♀♀; Babek, 39°17'24.59" N, 45°20'19.58" E, 1,054 m, 2♀♀.

Distribution worldwide: Bulgaria, France, Georgia, Germany, Greek mainland, Italian mainland, Near East, Romania, Sicily, South European Russia, Turkey, Ukraine, and Voreion Aigaion (North Aegean Is.) (Chvala et al. 1972; Olsufjev 1977; Gurgenidze et al. 2002; Altunsoy and Ayaz 2024; GBIF 2026).

***Hybomitra caucasi* (Szilady, 1923).**

Material examined: Ordubad, Goygol, 39°12'35.20" N, 45°58'38.86" E, 3,076 m, 24.07.2025, 5♀♀, 26.05.2021; Shahbuz, Batabat, 39°26'40.12" N, 45°36'03.46" E, 1,587 m, 28♀♀, 03.06.2021; Shahbuz, Batabat, 39°26'40.12" N, 45°36'03.46" E, 1,587 m, 11♀♀, 09.06.2021; Ordubad, Anagut, 38°58'49.42" N, 45°57'48.88" E, 1,339 m, 8♀♀.

Distribution worldwide: Bulgaria, Near East, Romania, Russia, and Turkey (Chvala et al. 1972; Olsufjev 1977; Al-Talafha et al. 2004; Ganeva 2020; Altunsoy and Ayaz 2024; GBIF 2026).

***Tabanus autumnalis* (Linne, 1761)**

Material examined: Babek, 39°17'24.59" N, 45°20'19.58" E, 1,054 m, 2♀♀; Batabat Plateau, 39°32'21.67" N, 45°47'02.08" E, 2,118 m, 03.07.2023, 3♀♀, 3♂♂; Nakhchivan city, 39°11'59.35" N, 45°24'13.49" E, 840 m, 24.07.2023, 1♀, 2♂♂; Nakhchivan city, 39°11'59.35" N, 45°24'13.49" E, 840 m, 30.07.2023, 2♂♂; Ordubad, Pazmari, 39°04'34.62" N, 45°57'09.03" E, 2,116 m, 16.07.2023, 6♀♀, 4♂♂; Julfa, 39°08'56.75" N, 45°42'27.42" E, 1,420 m, 21.06.2023, 3♀♀, 1♂; Nakhchivan city, 39°11'59.35" N, 45°24'13.49" E, 840 m, 15.06.2025, 3♀♀; Ordubad, 39°08'44.03" N, 45°52'38.52" E, 1,557 m, 11.08.2023, 1♀.

Distribution worldwide: Albania, Austria, Balearic Is., Belgium, Bosnia and Herzegovina, Britain I., Bulgaria, Central European Russia, Corsica, Croatia, Cyprus, Czech Republic, Danish mainland, East European Russia, East Palearctic, Estonia, European Turkey, French mainland, Germany, Greek mainland, Hungary, Italian mainland, Lithuania, Luxembourg, Malta, Near East, North Africa, North Macedonia, Northwest European Russia, Norwegian mainland, Poland, Portuguese mainland, Romania, Sardinia, Serbia, Sicily, Slovakia, Slovenia, South European Russia, Spanish mainland, Sweden, Switzerland, the Netherlands, Ukraine, Yugoslavia (former) (Chvala et al. 1972; Olsufjev 1977; Al-Talafha et al. 2004; Mikuska et al. 2008; Krčmar 2011; Müller et al. 2012; Ganeva 2020; Altunsoy and Ayaz 2021; GBIF 2026)

***Tabanus bifarius* (Loew, 1858)**

Material examined: Shahbuz, 39°26'40.12" N, 45°36'03.46" E, 1,587 m, 26.05.2021, 1♀, 1♂; Batabat Plateau, 03.07.2024, 39°32'21.67" N, 45°47'02.08" E, 2,118 m, 18♀♀, 2♂♂, 28.06.2023; Shahbuz district, 39°26'40.12" N, 45°36'03.46" E, 1,587 m, 65♀♀, 5♂♂.

Distribution worldwide: Albania, Austria, Bulgaria, Croatia, European Turkey, French mainland, Georgia, Germany, Greek mainland, Hungary, Italian mainland, Moldova, Near East, North Africa, North Macedonia, Romania, Slovakia, Slovenia, South European Russia, Spanish mainland, Ukraine, and Yugoslavia (former) (Olsufjev 1977; Gurgenidze et al. 2002; Al-Talafha et al. 2004; Mikuska et al. 2008; Kilich and Altunsoy 2011; Ganeva 2020; GBIF 2026)

***Tabanus bromius* (Linne, 1758)**

Material examined: Nakhchivan center, 39°11'59.35" N, 45°24'13.49" E, 840 m, 8♀♀; Babek, 39°17'24.59" N, 45°20'19.58" E, 1,054 m, 12♀♀; Ordubad, Anagut, 38°58'49.42" N, 45°57'48.88" E, 1,339 m, 09.06.2021, 3♀♀; Ordubad, Bist, 39°08'44.03" N, 45°52'38.52" E, 1,557 m, 16.06.2021, 2♀♀; Ordubad, 38°54'19.32" N, 46°01'17.06" E, 848 m, 21.06.2023, 7♀♀; Julfa, 39°08'56.75" N, 45°42'27.42" E, 1,420 m, 28.06.2023, 1♀; Batabat Plateau, 39°32'21.67" N, 45°47'02.08" E, 2,118 m,

03.07.2024, 5♀♀, 4♂♂; Nakhchivan city, 39°11'59.35" N, 45°24'13.49" E, 840 m, 20.05.2024, 2♀♀, 2♂♂; Batabat Plateau, 39°32'21.67" N, 45°47'02.08" E, 2,118 m, 28.06.2024, 2♀♀, 2♂♂; Sharur, Zeyva, 39°34'59.96" N, 45°00'12.47" E, 843 m, 21.07.2025, 14♀♀, 15♂♂.

Distribution worldwide: Albania, Austria, Belgium, Bosnia and Herzegovina, Britain I., Bulgaria, Central European Russia, Croatia, Czech Republic, Danish mainland, East European Russia, East Palearctic, Estonia, European Turkey, Finland, French mainland, Germany, Greek mainland, Hungary, Ireland, Italian mainland, Latvia, Liechtenstein, Lithuania, Luxembourg, Moldova, Near East, North Africa, North European Russia, North Macedonia, Northwest European Russia, Norwegian mainland, Poland, Portuguese mainland, Romania, Sardinia, Serbia, Sicily, Slovakia, Slovenia, South European Russia, Spanish mainland, Sweden, Switzerland, the Netherlands, Ukraine, and Yugoslavia (former) (Chvala et al. 1972; Olsufjev 1977; Mikuska et al. 2008; Kilich and Altunsoy 2011; Krčmar 2011; Ganeva 2020; Müller et al. 2023; GBIF 2026).

***Tabanus bovinus* (Linnaeus, 1758)**

Material examined: Nakhchivan center, 39°11'59.35" N, 45°24'13.49" E, 840 m, 2♀♀; Babek 39°17'24.59" N, 45°20'19.58" E, 1,054 m, 2♀♀.

Distribution worldwide: Austria, Belgium, Bulgaria, Czechoslovakia (former), Denmark, Finland, France, Germany, Great Britain, Greece, Hungary, Italy, North Africa (Morocco and Algeria), Norway, Poland, Romania, Russia, Spain, Sweden, Switzerland, Turkey, and Yugoslavia (former) (Moucha 1976; Mikuska et al. 2008; Krčmar 2011; Zeegers and Müller 2014; Ganeva 2020; Müller et al. 2023; Altunsoy and Ayaz 2024; GBIF 2026).

***Tabanus canipalpis* (Bigot, 1892)**

Material examined: Batabat Plateau, 39°32'21.67"N, 45°47'02.08"E, 2,118 m, 03.07.2024, 3♀♀.

Distribution worldwide: Armenia, Baluchistan, Iran, and Turkey (Andreeva and Zeynalova 2002; Kilich 1999; GBIF 2026)

***Tabanus cordiger* (Meigen, 1820)**

Material examined: Ordubad, Bist, 39°08'44.03" N, 45°52'38.52" E, 1,557 m, 16.06.2021, 1♀; Kangarli, Chalkhangala, 39°25'53.37" N, 45°08'35.96" E, 990 m, 30.06.2021, 1♀; Julfa, 39°08'56.75" N, 45°42'27.42" E, 1,420 m, 21.06.2024, 3♀♀.

Distribution worldwide: Albania, Austria, Belgium, Bosnia and Herzegovina, Britain I., Bulgaria, Canary Is., Central European Russia, Croatia, Czech Republic, East European Russia, European Turkey, Finland, French mainland, Germany, Greek mainland, Hungary, Italian mainland, Lithuania, Near East, North Africa,

North Macedonia, Northwest European Russia, Poland, Portuguese mainland, Romania, Serbia, Slovakia, Slovenia, South European Russia, Spanish mainland, Sweden, Switzerland, the Netherlands, Ukraine, and Yugoslavia (former) (Chvala et al. 1972; Olsufjev 1977; Mikuska et al. 2008; Krčmar 2011; Ganeva 2020; Altunsoy and Ayaz 2021; Müller et al. 2023; GBIF 2026).

***Tabanus eggeri* (Schiner, 1868)**

Material examined: Julfa, 39°08'56.75" N, 45°42'27.42" E, 1,420 m, 2♀♀; Ordubad, 39°08'44.03" N, 45°52'38.52" E, 1,557 m, 1♀.

Distribution worldwide: Albania, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Croatia, Czechia, French mainland, Italian mainland, Lebanon, Near East, North Africa, Portuguese mainland, Russia, Spanish mainland, Türkiye, Ukraine, and Yugoslavia (former) (Chvala et al. 1972; Mikuska et al. 2008; Altunsoy and Ayaz 2021; GBIF 2026).

***Tabanus fumidus* (Austen, 1923)**

Material examined: Babek, 39°17'24.59" N, 45°20'19.58" E, 1,054 m, 2♀♀; Culfa, 39°08'56.75" N, 45°42'27.42" E, 1,420 m, 1♀.

Distribution worldwide: Afghanistan, Armenia, Azerbaijan, Iran, Iraq, Turkmenistan, and Uzbekistan (Leclercq 1963; Chvala et al. 1972; Al-Talafha and Amr 2024; GBIF 2026).

***Tabanus glaucopis* (Meigen, 1820)**

Material examined: Julfa, 39°08'56.75" N, 45°42'27.42" E, 1,420 m, 2♀♀; Babek, 39°17'24.59" N, 45°20'19.58" E, 1,054 m, 1♀; Shahbuz, 39°26'40.12" N, 45°36'03.46" E, 1,587 m, 3♀♀; Batabat Plateau, 39°32'21.67" N, 45°47'02.08" E, 2,118 m, 2♀♀.

Distribution worldwide: Albania, Austria, Belgium, Bosnia and Herzegovina, Britain I., Bulgaria, Central European Russia, Croatia, Czech Republic, East Palearctic, European Turkey, French mainland, Germany, Greek mainland, Hungary, Italian mainland, Lithuania, Near East, North Macedonia, Northwest European Russia, Norwegian mainland, Poland, Portuguese mainland, Romania, Sardinia, Serbia, Sicily, Slovakia, Slovenia, South European Russia, Spanish mainland, Sweden, Switzerland, Ukraine, and Yugoslavia (former) (Leclercq 1959; Chvala et al. 1972; Mikuska et al. 20008; Krčmar 2011; Ganeva 2020; Altunsoy and Ayaz 2021; GBIF 2026).

***Tabanus laetetinctus* (Becker, 1913)**

Material examined: Sharur, 39°35'13.25" N, 45°02'56.02" E, 870 m, 2♀♀; Babek, 39°17'24.59" N, 45°20'19.58" E, 1,054 m, 3♀♀.

Distribution worldwide: Afghanistan, Armenia, Azerbaijan, Caucasus, Central Asia, Georgia, Iran, Iraq, Pakistan, Russia, Tajikistan, and Turkey (Chvala et al. 1972; Al-Talafha and Amr 2004; Al-Talafha et al. 2004; GBIF 2026).

***Tabanus leleani* (Austen, 1920)**

Material examined: Julfa, 39°08'56.75" N, 45°42'27.42" E, 1,420 m, 2♀♀; Sharur, 39°35'13.25" N, 45°02'56.02" E, 870 m, 3♀♀.

Distribution worldwide: Algeria, Azerbaijan, Europe, Iraq, Jordan, Kyrgyzstan, Mongolia, Morocco, Palestine, Pakistan, Russia (Siberia), Syria, and Tunisia (Leclercq 1963; Chvala et al. 1972; Al-Talafha et al. 2004; Müller et al. 2012; Ganeva 2021; Müller et al. 2023; Altunsoy and Ayaz 2024; Al-Talafha and Amr 2024; GBIF 2026).

***Tabanus miki* (Brauer, 1880)**

Material examined: Ordubad Bist, 39°08'48.24" N, 45°53'07.70" E, 1,702 m, 16.06.2021, 3♀♀; Kangarli-Chalkhangala, 39°26'39.75" N, 45°16'29.33" E, 1,421 m, 30.06.2021, 2♀♀, 1♀; Julfa, 38°57'32.70" N, 45°38'01.31" E, 725 m, 28.07.2024, 3♀♀; Batabat Plateau, 39°32'21.67" N, 45°47'02.08" E, 2,118 m, 03.07.2024, 4♀♀; Sharur, 39°35'13.25" N, 45°02'56.02" E, 870 m, 2♀♀.

Distribution worldwide: Albania, Austria, Belgium, Bosnia and Herzegovina, Britain I., Bulgaria, Central European Russia, Croatia, Czech Republic, Danish mainland, East European Russia, East Palearctic, European Turkey, French mainland, Germany, Greek mainland, Hungary, Italian mainland, Lithuania, Near East, North Macedonia, North European Russia, Northwest European Russia, Poland, Portuguese mainland, Romania, Serbia, Slovakia, Slovenia, South European Russia, Spanish mainland, Sweden, and Ukraine (Mikuska et al. 2008; Altunsoy and Ayaz 2021; Ganeva 2021; Krčmar 2011; Al-Talafha and Amr 2024; GBIF 2026)

***Tabanus quatuornatatus* (Meigen, 1820)**

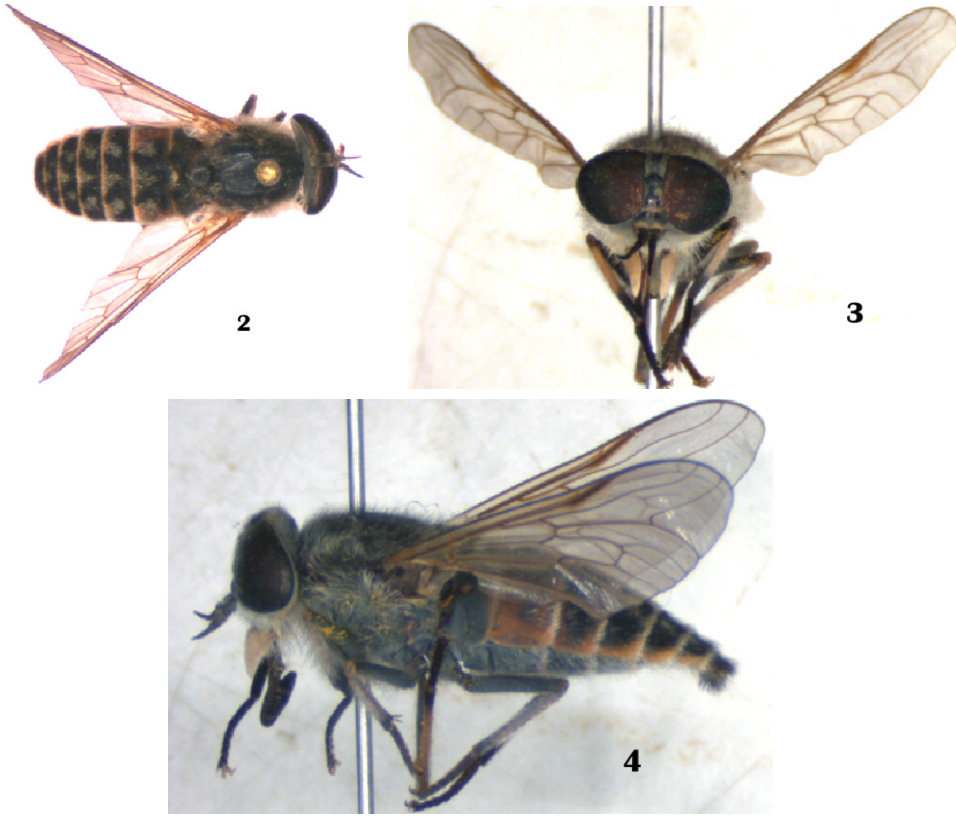
Material examined: Shahbuz, Batabat, 39°32'21.67" N, 45°47'02.08" E, 2,118 m, 26.05.2021, 1♀; Julfa, 39°08'56.75" N, 45°42'27.42" E, 1,420 m, 21.06.2023, 1♀; Ordubad, 38°54'19.32" N, 46°01'17.06" E, 848 m, 27.07.2023, 3♀♀; Sharur, 39°35'13.25" N, 45°02'56.02" E, 870 m, 2♀♀.

Distribution worldwide: Albania, Austria, Belgium, Bosnia and Herzegovina, Britain I., Bulgaria, Croatia, Czech Republic, Danish mainland, East Palearctic, European Turkey, French mainland, Germany, Greek mainland, Hungary, Italian mainland, Moldova, Near East, North Africa, North Macedonia, Poland, Portuguese mainland, Romania, Serbia, Slovakia, Slovenia, South European Russia, Spanish mainland, Switzerland, Ukraine, and Yugoslavia (former) (Chvala et al. 1972; Olsufjev 1977; Altunsoy and Ayaz 2021; Krčmar 2011; GBIF 2026).

***Tabanus nemoralis* (Meigen, 1820)**
Figs 2–4

Material examined: Shahbuz district, 39°26'40.12" N, 45°36'03.46" E, 1,587 m, 28.06.2023, 2 ♀♀.

Diagnosis: Medium-sized species (12–14 mm); short, densely pale-haired eyes marked with three bands, a broad, greyish-dusted frons, a large, shining black, nearly square lower callus, and a broad, dull black median callus. The antennae are entirely black or have a reddish-brown third segment with a slightly developed dorsal tooth near the base. The thorax is mostly blackish, showcasing a mesonotum with distinct, paler longitudinal stripes and scattered pale hairs, alongside clear wings with blackish-brown veins and a distinct brown stigma. The abdomen is rather shining black, covered in dense, short, adpressed black hairs, and decorated with a distinct greyish pattern consisting of slender median triangles, large, oval, and oblique sublateral patches, and narrow pale borders on the posterior margins, while the underside is uniformly light grey.



Figures 2–4. *Tabanus nemoralis*.

Differential remarks: A few more smaller, mostly shining black species with three rows of greyish patches on abdomen; resembling *T. quatuornotatus* Meig. but subcallus is dulled by greyish dust. Eyes haired with three bands in female, frontal calli separated, and lower callus very large, black. Palpi slender in both sexes. Male with two eye-bands and very slightly differentiated facets, vertex with a row of very long black hairs (Chvala et al. 1972)

Distributional note: First record for the fauna of Azerbaijan.

Distribution worldwide: Southwest Europe, North Africa, Iraq, Jordan, and Palestine (Chvala et al. 1972; Krčmar et. al. 2002; Mikuska et al. 2008; Al-Talafha and Amr 2024; GBIF 2026).

***Tabanus obsolescens* (Pandelle, 1883)**
Figs 5–7

Material examined: Shahbuz district, 39°26'40.12" N, 45°36'03.46" E, 1,587 m, 28.06.2023, 3♀♀.

Diagnosis: Small to medium-sized species (12–14 mm); eyes bare, with three distinct bands in specimens; frons narrow (index 1: 5–6); lower frontal callus shiny dark brown, higher than wide, tapering dorsally; abdomen dark brownish-grey with a characteristic median stripe of pale, elongated triangles flanked by faint lateral spots; costal cell slightly yellowish.

Differential remarks: Medium- sized, rather brownish species of the *glaucopis* group with naked eyes with three bands in female. Antenna light brown, abdomen mostly brownish with three rows of paler patches. Subcallus entirely polished dark brown in both sexes. Eyes in male with sharply differentiated facets and only small, fine pale hairs on vertex (Chvala et al. 1972).

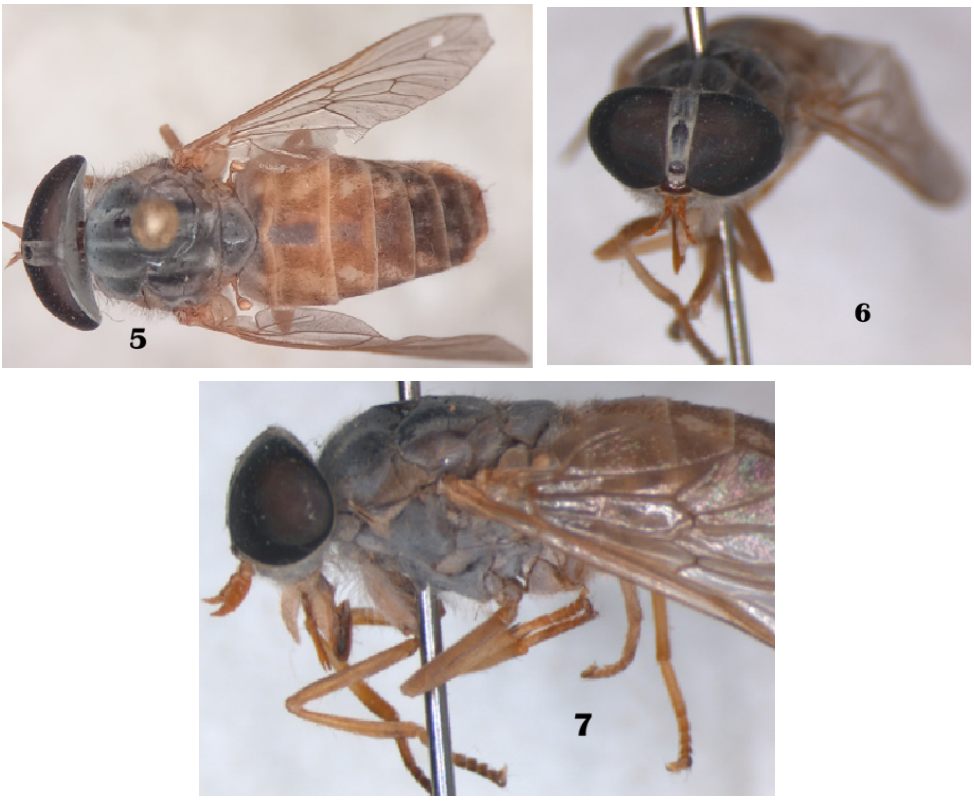
Distributional note: First record for the fauna of Azerbaijan.

Distribution worldwide: Croatia, Iran, and Turkey (Chvala et al. 1972; Krčmar and Durbešić 2001; Altunsoy and Kilich 2016).

***Tabanus regularis* (Jaennicke, 1866)**

Material examined: Shahbuz, 39°26'40.12" N, 45°36'03.46" E, 1,587 m, 20.06.2023, 2♀♀; Sharur Zeyve, 39°34'59.96" N, 45°00'12.47" E, 843 m, 24.07.2023, 5♀♀; Shahbuz, Batabat, 39°32'21.67" N, 45°47'02.08" E, 2,118 m, 28.06.2023, 2♀♀; Ordubad, 38°54'19.32" N, 46°01'17.06" E, 848 m, 21.06.2023, 4♀♀.

Distribution worldwide: Bosnia and Herzegovina, Bulgaria, Corsica, Croatia, Cyprus, European Turkey, French mainland, Greek mainland, Hungary, Italian mainland, Malta, Near East, North Africa, North Macedonia, Portuguese mainland, Romania, Sicily, Slovakia, South European Russia, and Spain (Leclercq 1959; Al-Talafha et al. 2004; Mikuska et al. 2008; Ganeva 2021; Müller et al. 2023; Altunsoy and Ayaz 2024; GBIF 2026).



Figures 5–7. *Tabanus obsolescens*.

Tabanus rupinae (Austen, 1920)

Material examined: Julfa, 39°05'03.03" N, 45°32'40.57" E, 974 m, 1♀; Julfa, 39°05'03.03" N, 45°32'40.57" E, 974 m, 2♀♀.

Distribution worldwide: Azerbaijan, Egypt, Iran (Fars, Kerman, Khuzestan, Semnan [northern border of the Kavir Desert in the Damghan District], and Sistan and Baluchistan), and Jordan (Al-Talafha et al. 2004; Müller et al. 2012; Al-Talafha and Amr 2024).

Tabanus semiargenteus (Olsufjev, 1937)

Material examined: Babek, 39°17'24.59" N, 45°20'19.58" E, 1,054 m, 3♀♀; Ordubad, 38°54'19.32" N, 46°01'17.06" E, 848 m, 1♀; Julfa, 39°05'03.03" N, 45°32'40.57" E, 974 m, 2♀♀.

Distribution worldwide: Armenia, Azerbaijan, Iran, Iraq, Syria, and Turkey (Kilich 1999; Zeegers and Müller 2014; Al-Talafha and Amr 2024).

***Tabanus spectabilis* (Loew, 1858)**

Material examined: Julfa, 39°05'03.03" N, 45°32'40.57" E, 974 m, 21.06.2023, 2♀♀; Ordubad, 38°54'19.32" N, 46°01'17.06" E, 848 m, 16.07.2023, 2♀♀; Ordubad, 38°54'19.32" N 46°01'17.06" E, 848 m, 25.07.2023, 3♀♀; Nakhchivan city, 39°11'59.35" N, 45°24'13.49" E, 840 m, 17.07.2024, 5♀♀; Badashkan, 39°12'46.03" N, 45°26'33.03" E, 871 m, 25.07.2024, 4♀♀.

Distribution worldwide: Albania, Bulgaria, Croatia, European Turkey, French mainland, Greek mainland, Hungary, Italian mainland, Moldova, Near East, North Africa, North Macedonia, Romania, Sicily, Slovenia, South European Russia, Spanish mainland, Ukraine, and Yugoslavia (former) (Leclercq 1963; Moucha 1976; Ganeva 2020; Altunsoy and Ayaz 2024; Al-Talafha and Amr 2024; GBIF 2026).

***Tabanus tergestinus* (Egger, 1859)**

Material examined: Ordubad, 38°54'19.32" N, 46°01'17.06" E, 848 m, 09.06.2021, 2♀♀; Ordubad, 38°54'19.32" N, 46°01'17.06" E, 848 m, 21.06.2023, 3♀♀; Nakhchivan city, 39°11'59.35" N, 45°24'13.49" E, 840 m, 17.07.2024, 4♀♀; Shahbuz, 39°26'40.12" N, 45°36'03.46" E, 1,587 m, 26.05.2021, 6♀♀; Shahbuz, Batabat, 39°32'21.67" N, 45°47'02.08" E, 2,118 m, 03.06.2021, 5♀♀.

Distribution worldwide: Albania, Austria, Bosnia and Herzegovina, Bulgaria, Central European Russia, Croatia, Czech Republic, European Turkey, French mainland, Germany, Greek mainland, Hungary, Iran, Italian mainland, Moldova, Near East, North Macedonia, Poland, Romania, Serbia, Slovakia, Slovenia, South European Russia, Spanish mainland, Switzerland, Ukraine, and Yugoslavia (former) (Leclercq 1959; Chvala et al. 1972; Mikuska et al. 2008; Krčmar 2011; Ganeva 2021; Altunsoy and Ayaz 2024; Al-Talafha and Amr 2024; GBIF 2026).

***Tabanus unifasciatus* (Loew, 1858)**

Material examined: Shahbuz, 39°26'40.12" N, 45°36'03.46" E, 1,587 m, 03.06.2021, 1♀; Ordubad, Anagut, 38°58'49.42" N, 45°57'48.88" E, 1,339 m, 09.06.2021, 2♀♀; Ordubad, Bist, 39°08'44.03" N, 45°52'38.52" E, 1,557 m, 16.06.2021, 2♀♀; Kangarli, Chalkhangala, 39°26'44.59" N, 45°16'30.70" E, 1,424 m, 30.06.2021, 2♀♀; Batabat Plateau, 39°32'21.67" N, 45°47'02.08" E, 2,118 m, 03.07.2024, 2♀♀; Julfa, 39°05'03.03" N, 45°32'40.57" E, 974 m, 21.06.2023, 4♀♀.

Distribution worldwide: Albania, Austria, Bosnia and Herzegovina, Bulgaria, Croatia, European Turkey, French mainland, Greek mainland, Hungary, Italian mainland, Moldova, Near East, North Africa, North Macedonia, Portuguese mainland, Romania, Serbia, Slovakia, Slovenia, South European Russia, Spanish mainland, Switzerland, and Ukraine (Mikuska et al. 2008; Krčmar 2011; Müller et al. 2012; Ganeva 2021; Altunsoy and Ayaz 2024; Al-Talafha and Amr 2024; GBIF 2026).

***Tabanus zimini* (Olsufjev, 1937)**

Material examined: Sharur, 39°35'13.25" N, 45°02'56.02" E, 870 m, 1♀; Babek, 39°17'24.59" N, 45°20'19.58" E, 1,054 m, 2♀♀.

Distribution worldwide: Central Asia, China, Iran, Iraq, South European Russia, Southwest Asia, and Türkiye (Leclercq 1963, 1966; Al-Talafha and Amr 2024).

***Philipomyia aprica* (Meigen, 1820)**

Material examined: Shahbuz, Batabat, 39°32'21.67" N, 45°47'02.08" E, 2,118 m, 26.05.2021, 1♀; Kangarli, Chalkhangala, 39°26'44.59" N, 45°16'30.70" E, 1,424 m, 30.06.2021, 2♀♀; Ordubad, Goygol, 39°12'35.20" N, 45°58'38.86" E, 3,076 m, 28.07.2024, 2♀♀.

Distribution worldwide: Albania, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Central European Russia, Croatia, Czech Republic, European Turkey, French mainland, Germany, Greek mainland, Hungary, Italian mainland, Liechtenstein, Near East, North Macedonia, Poland, Portuguese mainland, Romania, Slovakia, Slovenia, Spanish mainland, Switzerland, and Yugoslavia (former) (Chvala et al. 1972; Krčmar et al. 2002; Mikuska et al. 2008; Altunsoy and Ayaz 2024; GBIF 2026).

Tribus: Haematopotini

***Haematopota pallens* (Loew, 1871)**

Material examined: Batabat Plataeu, 39°32'21.67" N, 45°47'02.08" E, 2,118 m, 1♀, 03.07.2024.

Distribution worldwide: Afghanistan, China, East Palearctic, Moldova, Near East, Romania, South European Russia, Turkey, and Ukraine (Leclercq 1963; Andreeva 1990; Müller et al. 2012; Altunsoy and Ayaz 2024; GBIF 2026).

***Haematopota pallidula* (Kröber, 1922)**
Figs 8–10

Material examined: Babek, 39°17'24.59" N 45°20'19.58" E, 1,054 m, 1♀; Sharur, 39°35'13.25" N, 45°02'56.02" E, 870 m, 2♀♀.

Diagnosis: Moderate-sized (9–11 mm), eyes short haired; frons broad and yellowish-grey dusted; median spot absent or present as a minute point. Frontal callus polished black; antenna black but basal half segment 3 reddish-brown. Wings light grey with strongly developed pale pattern.

Differential remarks: Larger species of the *pluvialis*-group. The first antennal segment is entirely polished black and lacks a subapical constriction. The third segment is reddish-brown on the basal half. The frons is slightly broader than high and converges above; the median spot is usually absent. The wings are light grey

with a very enlarged whitish pattern and a whitish posterior margin. Grey sublateral patches are present on all tergites, including the first (Chvala et al. 1972).

Distributional note: First record for the fauna of Azerbaijan.

Distribution worldwide: Central European Russia, Near East, South European Russia, Turkey, and Ukraine (Chvala et al. 1972; Olsufjev 1977; Kucherov 2003; Altunsoy and Ayaz 2024; GBIF 2026).



Figures 8–10. *Haematopota pallidula.*

***Haematopota pandazisi* (Kröber, 1936)**
Figs 11–13

Material examined: Julfa district, 2 38°57'20.64" N, 45°37'45.08" E, 1♀, 21.06.2023.

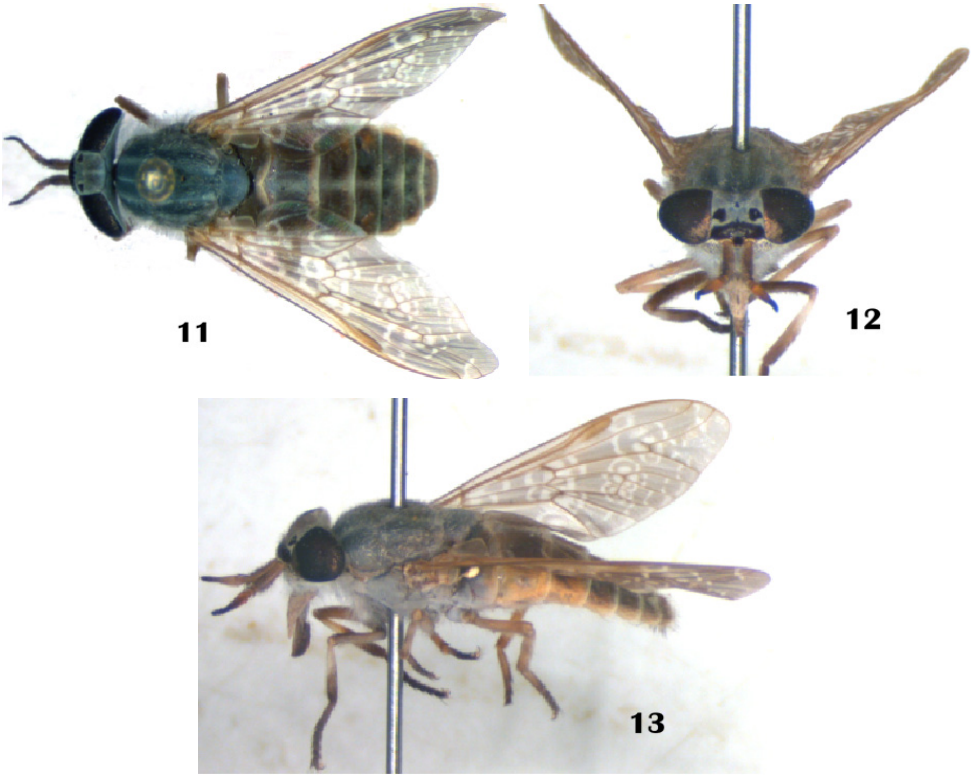
Diagnosis: Body length 8–11 mm; frons yellowish-grey dusted, very narrow. Callus rather narrow, polished black; antenna very long and slender, yellowish brown. Pleura brown in ground colour, greyish dusted and whitish haired. Abdomen blackish-brown in ground colour, sternites with distinct light grey median triangles.

Differential remarks: Smaller, generally more brownish coloured species of the *italica*-group. Antennal segment 1 long and slender, not constricted before apex, entirely yellowish-brown. Frons conspicuously narrow, distinctly higher than broad,

abdomen with sublateral greyish spots usually on posterior three tergites. Male with antennal segment 1 long oval, at most twice as long as deep, brown in ground colour and entirely thinly greyish dusted (Chvala et al. 1972).

Distributional note: First record for the fauna of Azerbaijan.

Distribution worldwide: Bosnia and Herzegovina, Bulgaria, Croatia, France, Greece, Italy, Montenegro, Portugal, and Serbia (Krčmar et al. 2002; Mikuska et al. 2008; Krčmar 2011; Müller et al. 2023; GBIF 2026).



Figures 11–13. *Haematopota pandazisi*.

Haematopota pluvialis (Linnaeus, 1758)

Material examined: Julfa district, 38°57'20.64" N, 45°37'45.08" E, 2♀, 21.06.2023.

Distribution worldwide: Albania, Austria, Belgium, Bosnia and Herzegovina, Britain I., Bulgaria, Central European Russia, Croatia, Czech Republic, Danish mainland, East European Russia, East Palearctic, Estonia, Finland, French mainland, Germany, Greek mainland, Hungary, Ireland, Italian mainland, Latvia, Liechtenstein, Lithuania, Luxembourg, Moldova, Montenegro, Near East, North European Russia, North Macedonia, Northwest European Russia, Norwegian mainland,

Poland, Portuguese mainland, Romania, Sardinia, Serbia, Sicily, Slovakia, Slovenia, South European Russia, Spanish mainland, Sweden, Switzerland, the Netherlands, Turkey, Ukraine, and Yugoslavia (former) (Leclercq 1959; Krčmar et al. 2002; Mikuska et al. 2008; Krčmar 2011; Altunsoy and Ayaz 2021; Ganeva 2021; GBIF 2026).

***Haematopota subcylindrica* (Pandelle,1883)**

Material examined: Julfa district, 38°57'20.64" N, 45°37'45.08" E, 2♀♀, 21.06.2023.

Distribution worldwide: Belgium, Bulgaria, Denmark, France, Germany, Greece, Iran, Iraq, Kazakhstan, Latvia, Poland, Romania, Russia (European part to East Siberia), Serbia, Slovakia, Sweden, the Netherlands, and Turkey (Chvala et al. 1972; Krčmar et al. 2002; Mikuska et al. 2008; Krčmar 2011; Altunsoy and Ayaz 2024; Al-Talafha and Amr 2024; GBIF 2026).

***Haematopota turkestanica* (Kröber, 1922)**

Material examined: Sederek, 39°42'53.41" N, 44°52'04.40" E, 837 m, 2♀♀; Sharur, 39°35'13.25" N, 45°02'56.02" E, 870 m, 1♀.

Distribution worldwide: Bulgaria, East European Russia, East Palearctic, Mongolia, South European Russia, Turkey, and Ukraine (Moucha 1972; Chvala et al. 1972; Olsufjev 1977; Ganeva 1995; Altunsoy and Ayaz 2024; GBIF 2026).

***Dasyrhamphis umbrinus* (Meigen, 1820)**

Material examined: Sharur, 39°35'13.25" N, 45°02'56.02" E, 870 m, 2♀♀; Sederek, 39°42'53.41" N, 44°52'04.40" E, 837 m, 3♀♀.

Distribution worldwide: Albania, Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Greece, Hungary, Iran, Iraq, Israel, Italy, Jordan, Lebanon, Montenegro, North Africa, North Macedonia, Palestine, Serbia, Slovenia, Turkmenistan, Turkey, and USSR (former) (Olsufjev 1977; Krčmar et al. 2002; Al-Talafha et al. 2004; Mikuska et al. 2008; Krčmar 2011; Müller et al. 2012; Müller et al. 2023; Altunsoy and Ayaz 2024; GBIF 2026).

Discussion

The field studies conducted across the ecologically heterogeneous landscapes of Nakhchivan yielded a total of 451 horsefly specimens sampled. The most remarkable result of this study is the identification of four species as new records for the fauna of Azerbaijan, along with 10 species reported for the first time in the Nakhchivan region. These new records have been added to the region's biodiversity inventory, thus contributing to future entomological fauna studies. This serves as a model for

studies in regions where biodiversity is complex and sensitive, such as the Iran-Turan hotspot.

Tabanus nemoralis, *Tabanus obsolescens, Haematopota pallidula*, and *Haematopota pandazisi* are the new records for Azerbaijan. *Pangonius pyritosus*, *Chrysops divaricatus*, *Tabanus nemoralis*, *Tabanus obsolescens*, *Tabanus canipalpis*, *Tabanus rupinae*, *Haematopota pallidula*, *Haematopota pandazisi*, *Haematopota turkestanica* and *Dasyrhamphis umbrinus* are new records for the Nakhchivan horsefly fauna.

T. bifarius was identified as the most frequently captured species, accounting for 20.39%. It was collected from high-altitude areas during fieldwork. This species, encountered in May, June, and July, was collected most often in July. *T. bromius* was also one of the most frequently identified species, accounting for 17.52%. Specimens were collected from altitudes ranging from 840 to 2,118 meters. It is a species with a very wide distribution. It was collected throughout the entire study period, but was most densely found in July. The rarely captured species from the study area was *H. pandazisi*, with only one specimen. The specimen collected from Julfa was gathered from an altitude of 718 meters. Bogatchev and Samedov (1949) reported that *T. bromius flavofemoratus* Strobl., *T. laetitinctus* Beck., *T. regularis* Jaenn., and *T. sordes* Bog. and Sam. are predominantly distributed in lowland and foothill zones, actively attacking horses and cattle, while species such as *T. capito* Ots., *T. apricus* Mg., *T. indrae* Haus., *T. proaitor* Bog. and Sam., *T. rappa* Bog. and Sam., and *T. bromius* L. were characteristic of mountainous regions (Quliyeva 2014). In the present study, conducted across the Ordubad, Shahbuz, Julfa, and Sharur districts of the Nakhchivan Autonomous Republic between 2021 and 2025, *T. regularis*, *T. laetetinctus*, and *T. bromius* were also collected from lowland and foothill localities (Sharur-Zeyve, 843 m; Sharur, 870 m; Babek, 1,054 m), whereas *T. bifarius*, *T. unifasciatus*, *T. tergestinus*, and *Hybomitra caucasi* were most frequently captured species in our trap samples from highland areas (Batabat Plateau, 2,118 m; Ordubad Goygol, 3076 m; Ordubad Bist, 1,557 m). Among the collected species, *T. autumnalis*, *T. bromius*, *T. bifarius*, and *T. spectabilis* were mostly observed in localities where livestock husbandry is actively practiced, suggesting their continued role as primary pest species attacking cattle and horses in the region. The diversity and spatial distribution of the Tabanidae family are directly adjusted by a confluence of variables, including water availability, humidity, organic substrates, climatic parameters, seasonal fluctuations, geomorphological features, and the proximity of human or animal hosts (Olsufjev 1969; Miletti et al. 2011).

Quantitative analysis of the Tabanidae family across the sampled localities revealed notable ecological patterns closely linked to elevation gradients, habitat heterogeneity, and varying degrees of environmental stability. According to the calculated biodiversity indices, the highest species richness and diversity were documented in the Julfa (S=16, H'=2.640) and Babek (S=15, H'=2.432) localities. Both localities exhibited high equitability values (J'=0.9523 and 0.8981, respectively), indicating a balanced community structure where individuals are evenly distributed among species. This ecological balance suggests that these localities provide a

highly diverse microhabitat mosaic, stable larval development areas, and sufficient host availability, thus allowing multiple tabanid groups to coexist without competitive exclusion. In Shahbuz, however, a rather interesting ecological contrast was observed. Although Shahbuz had the highest total number of collected individuals (N = 101), the Shannon diversity index was notably low (H' = 1.261), accompanied by a low evenness value (e^{H'}/S = 0.2940, J' = 0.5074). This particular situation points to a strong structural dominance of one or a few highly opportunistic/dominant taxa that successfully monopolize resources in the ecosystem. Such population explosions of specific species usually indicate temporary microclimatic advantages or local seasonal successions that make certain reproductive strategies advantageous over others within the ecosystem. Furthermore, our initial hypothesis regarding the vertical zonation (height filter) pattern of the region was strongly supported by data from high-altitude stations.

Located in an alpine zone above 3,000 meters, Ordubad (Goygol) exhibited a largely simplified community with low species richness (S=2) and diversity (H'=0.5983). High-altitude glacial ecosystems act as harsh environmental filters where extremely low temperatures, strong winds, and limited vegetation cover severely restrict tabanid larval development and adult activity, allowing only highly adapted alpine taxa to survive. Interestingly, despite the low species number, the small number of individuals captured in Goygol were distributed with almost perfect uniformity (e^H/S=0.9095), highlighting an alpine ecotone in tight equilibrium.

Finally, the mid-altitude stream corridors of Ordubad have provided valuable clues. A gradual decrease in species numbers has been observed as one moves from Ordubad Center (S=8, H'=1.8680) towards isolated valley habitats such as Ordubad Anagut (S=3, H'=0.9251) and Ordubad Pazmari (S=1, H'=0.000). The documentation of only a single species in Pazmari highlights an isolated microhabitat structure likely formed around local waterfalls and fast-flowing river banks, restricting the colonization of generalist species and creating a highly specific ecological niche.

Conclusion

This study is a taxonomic and ecological assessment conducted for the first time on such a comprehensive scale in the ecologically heterogeneous habitats of the Nakhchivan Autonomous Republic between 2021 and 2025, examining a total of 451 Tabanidae specimens. The most notable scientific outcome of the research is the creation of a rich biodiversity inventory containing 4 new records for the Azerbaijani and 10 new records for the Nakhchivan region. These findings not only expanded the biodiversity catalog of the region but also provided a strong model for future entomological studies in sensitive and complex ecosystems such as the Irano-Turanian biodiversity hotspot. Ecologically, *Tabanus bifarius* (20.39%) stood out as

the most dominant species in high-altitude areas, while *Tabanus bromius* (17.52%) maintained its dominance in the region with its wide vertical distribution ability.

In contrast, *Haematopota pandazisi*, found in only a single specimen at an altitude of 718 m in Culfa, is recorded as the most rarely captured element of the fauna. Consistent with historical literature (Bogatchev & Samedov 1949), the concentration of species such as *T. regularis*, *T. laetetinctus*, and *T. bromius* in the plains and foothills (Sherur, Babek), and taxa such as *T. bifarius*, *T. unifasciatus*, and *Hybomitra caucasi* in high mountainous areas (Batabat, Goygol), suggests an observable trend of elevational distribution in the region. However, because environmental covariates – such as microhabitat structure, host availability, proximity to water bodies, and seasonal sampling dynamics – were not formally modeled, these patterns should be regarded as preliminary distributional trends rather than a definitive causal vertical zonation. Furthermore, the high abundance of *T. autumnalis*, *T. bromius*, *T. bifarius*, and *T. spectabilis* in areas with intensive livestock farming highlights their high potential veterinary relevance and pest risk to cattle and horses, suggesting they may act as putative mechanical vectors and nuisance pests in the region. Finally, while Ordubad (Goygol), representing the alpine zone above 3,000 meters, presents a highly simplified fauna due to extreme climatic filters, the fact that the stream/waterfall corridor in Ordubad Pazmari hosts only one species reveals that these isolated areas create highly specific and unique ecological niches that prevent the introduction of generalized species. Consequently, this research uncovers the hidden dipterological potential of Nakhchivan, providing a fundamental basis for both vector control strategies and future strategies for the ecological conservation of this sensitive geography.

Acknowledgements

We would like to extend our sincere gratitude to Prof. Dr. Ferhat Altunsoy for his valuable contributions to the identification of the project samples. His expertise and support were instrumental in ensuring the accuracy and quality of this study. Furthermore, we express our appreciation to Eskisehir Technical University for providing the infrastructure and service support that significantly facilitated the progress of our research. Their assistance created a strong foundation for the successful completion of this work.

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