



Additional records of lycaenid butterflies (Lepidoptera: Lycaenidae) to the butterfly fauna of Iraq

FARHAD A. KHUDHUR^{1,2}, ZDENEK F. FRIC³, VLADIMÍR HULA¹ & FAISAL N. JABER⁴

¹Department of Forest Ecology, Faculty of Forestry and Wood Technology, University of Mendel, Brno, Czechia.

✉ farhad.khudhur@univsul.edu.iq <https://orcid.org/0000-0001-5267-6334>

✉ vladimir.hula@mendelu.cz <https://orcid.org/0000-0001-7023-7087>

²Department of Biology, College of Science, University of Sulaimani, Sulaymaniyah, Kurdistan Region, Iraq.

³Biology Centre CAS, Institute of Entomology, Ceske Budejovice, Czechia.

✉ fric@entu.cas.cz <https://orcid.org/0000-0002-3611-8022>

⁴Department of Plant Protection, Faculty of Agriculture, University of Basara, Iraq.

✉ fnasser642@gmail.com <https://orcid.org/0009-0000-7933-6866>

The Iraqi butterfly fauna includes more than 50 species of Lycaenidae, however, it is still largely undersampled and the country deserves wide-ranging surveys. Especially the family Lycaenidae is the most likely candidate group for new discoveries. This article adds two species of Lycaenidae to the Iraqi butterfly fauna. The first species is a native Western Palearctic, *Tomares romanovi* (Christoph, 1882) from mountains of the Kurdistan region, and the second species is an exotic invasive species with Nearctic origin, *Brephidium exilis* (Boisduval, 1852) from deserts of the south of Iraq.

Globally, Lycaenidae is the second most diverse butterfly family, after Nymphalidae. It contains about 6,000 species, which forms about one third of all Papilionoidea (Pierce *et al.*, 2002; van Nieukerken *et al.*, 2011). In Iraq, Lycaenidae is represented by 51 species, 38 species were listed by Wiltshire (1957), later Higgins (1958) adding eight species, and Othman *et al.* (2018) and Said *et al.* (2018) recording two species decades later. Khudhur recently reported three new species (2021 and 2022). The vast majority of species in Iraq are distributed in the Kurdistan Region in the North and North East of the country (Othman *et al.* 2018; Said *et al.* 2018; Khudhur 2022).

The genus *Tomares* Rambur 1840 is a Palearctic member of a subfamily Theclinae, with about ten species (Nazari and ten Hagen, 2020). The genus in Iraq was so far only known by one species, *T. callimachus* (Eversmann, 1848), which occurs on the dry slopes of middle-altitude mountains (Wiltshire, 1957; Othman *et al.* 2018). The butterfly fauna of the neighboring countries confirms the occurrence of 6 additional species of *Tomares* in Turkey (Çalırkan and Yıldız, 2023) and 4 species in Iran (Rajaei *et al.* 2023). *Tomares romanovi* (Christoph, 1882) is among those *Tomares* species found in Iran and Turkey. Furthermore, *T. romanovi* is distributed in the highlands of Transcaucasia, Kopet-Dagh and Armenia (Korb and Bolshakov, 2011).

The genus *Brephidium* Scudder, 1876 contains few species in subfamily Polyommatainae with a disjunct distribution in the Nearctic region and Africa. The genus has three species, two of which are distributed in the southern parts of the United States and Mexico, and one in South and South Eastern Africa (Pohl and Nanz, 2023). *Brephidium exilis* (Boisduval, 1852) (Western Pygmy Blue) is a species of Nearctic origin, first described in the United States. The species was found during the mid-nineties on the Arabian Peninsula as an exotic invasive species, probably imported as immature stages by plant cultivars from the United States. First record of its existence on the Eastern Arabian Peninsula dates back to 1995 from Sharjah in UAE. Later it was recorded also in Oman and Saudi Arabia (Pittaway, 2006), Kuwait (Pope and Nithyanandan, 2014), Iran (Markhasiov, 2023), Qatar, Egypt and Israel (Verovnik, 2023).

This article adds two lycaenid butterflies *Tomares romanovi* (Christoph, 1882) and *Brephidium exilis* (Boisduval, 1852) to the Iraqi fauna.

Materials and Methods

Adults of *Tomares romanovi* were collected by F. A. Khudhur in Qopy Qara Dagh Mountains in Sulaymaniyah Province in Iraqi Kurdistan, in April, 2023. *Brephidium exilis* specimens were collected by F. N. Jaber in Garmat Ali, Basrah Province, in June, 2023. Sweeping nets were used for collecting the specimens. Specimens were killed with ethyl acetate vapor, and were then put into a paper envelope and brought to the laboratory to be preserved, and deposited at the Biology Centre

CAS, Institute of Entomology (IECA), České Budějovice, Czechia. The butterflies were photographed and identified according to Tshikolovets *et al.* (2014), and Markhasiov (2023).

Results

Tomares romanovi (Christoph, 1882). Examined materials: 2 males (Fig. 1), in Qopy Qara Dagh Mountains, 2.8 km South West Asteli Saru Village, Qara Dagh, Sulaymaniyah (35°13'53"N, 45°22'41"E), Altitude: 1200 m. 06 April, 2023 (F.A. Khudhur leg.).



FIGURE 1. *Tomares romanovi* (Christoph, 1882) ♂: Qopy Qara Dagh Mountains, 2.8 km South West Asteli Saru Village, Qara Dagh, Sulaymaniyah.

Diagnosis: Male wing length (from base to tip) is 14 mm. The upper side of both fore- and hind-wings have dark gray color, with a large, central orange spot on forewings, and smaller orange spot at the anal region of the hind-wings. The underside of both fore- and hind-wings have a greenish-blue background, though the forewing has an orange-colored center with two rows of black spots.

Brephidium exilis (Boisduval, 1852). Examined materials: 2 females (Fig. 2), in the University campus, College of Agriculture, University of Basrah, Garmat Ali, Basrah (30°33'46"N, 47°44'39"E), Altitude: 3.3 m. 02 June, 2023 (F. N. Jaber leg.).

Diagnosis: Female wing length (from base to tip) is 6 mm, the upper sides of both fore- and hind-wings have gold-brown color with iridescent blue basal region of both wings, and the hindwing has a row of submarginal black spots, occasionally supplemented with a white patch or two. The forewing underside has beige-gold color with white dots and whitish basal area. The hindwing underside has a smaller central area of beige-gold color and is mostly occupied by whitish areas and there are four marginal large black spots.



FIGURE 2. *Brephidium exilis* (Boisduval, 1852) ♀: Garmat Ali, Basrah.

Discussion

Both species are known from countries adjacent to Iraq and therefore the records were to some extent expected. *Tomares romanovi* is known from Iran and Turkey (Çalırkan and Yıldız, 2023, Rajaei et al. 2023). *Brephidium exilis* has been recorded as an invasive species from the Gulf countries, including Iran (Pittaway, 2006, Pope and Nithyanandan, 2014, Markhasiov, 2023).

Iraq's varied topography extends from its lowlands and desert oasis to the semi-deserts, plains, foothills and mountainous regions. The country hosts a rich and diverse butterfly fauna, however, due to its long-standing political history, the butterfly fauna of the country has never been thoroughly surveyed. Lycaenidae is the most likely candidate group for many new discoveries (Khudhur, 2021), such as the natural extension of some butterfly species' geographical ranges or the introduction of exotics. Qara Dagh Mountain represents the southwesternmost edge of the western Zagros eco-region and it serves as a natural barrier between the semi-desert and mountainous habitats of Iraq. These mountains have rich vegetation and biodiversity in an almost undisturbed area (Ararat, 2018; Ahmed et al., 2018) and offer good conditions for the occurrence of species like *Tomares romanovi*. It is clear that the Iraqi fauna is underestimated, and we predict many new taxonomical discoveries in the future. Furthermore, Iraqi Kurdistan, especially with its high, unexplored mountain ridges, hosts a unique fauna that is only partly known (e.g., Tshikolovets et al. (2014), who show only a few distributional records from Iraq). We expect these records to increase dramatically in the future.

The population of *Brephidium exilis*, the newest invasive species in Iraq, was expected to be found in southern Iraq, as the territory is geographically adjacent to the Arabian Peninsula and Iranian south-western ecoregion. New distributional areas for this invasive species are expected to be discovered even further north of its current range, reaching the middle of Iraq.

Acknowledgement

Our gratitude to Dr. Karzan G. Khudhur from University of Sulaimani, Sulaymaniyah Iraq and Ing. Dr. Kristína Dziváková, from Mendel University, Brno, Czechia, for their support and facilitation in sending and transporting the specimens from Iraq to the deposit destination. Thanks to Michal Rindoš, from Biology Centre CAS, Institute of Entomology (IECA), České Budějovice, Czechia for taking pictures of the butterflies

References

- Ahmad, S.A., Ahmad, N.S., Salih, S., Raza, H.A. & Ararat, K. (2018) Plant habitat study of QaraDagh-Darbandikhan area. *Journal of Zankoy Sulaimani*, Special Issue, 621–636.
<https://doi.org/10.17656/jzs.10709>
- Ararat, K. (2018) *Birds of Qara Dagh*. American University of Iraq, Sulaimani Press, Sulaymaniyah, 196 pp.
- Çalırkan, S.S. & Yıldız, F. (2023) The relationship between distribution of the genera *Tomares* Rambur, 1840 and the distribution of the larval host plant *Astragalus* L. (Turkey) (Lepidoptera: Lycaenidae). *SHILAP Revista de lepidopterología*, 51 (203), 447–454.
<https://doi.org/10.57065/shilap.530>
- Higgins, L.G. (1958) Butterflies in Kurdistan. *Entomologists*, 91, 38–45.
- Khudhur, F.A. (2021) New records of two butterflies of the genus *Polyommatus* Latreille, 1804 (subgenus *Agrodiaetus* Hübner, 1822) (Lepidoptera: Lycaenidae) from Iraq. *Zootaxa*, 5061 (3), 597–600.
<https://doi.org/10.11646/zootaxa.5061.3.13>
- Khudhur, F.A. (2022) Faunistic study of butterflies (Lepidoptera, Papilionoidea) of Sulaymaniyah Province, Kurdistan-Iraq. *Biodiversity Data Journal*, 10, e82612.
<https://doi.org/10.3897/BDJ.10.e82612>
- Korb, S.K. & Bolshakov, L.V. (2011) A catalogue of butterflies (Lepidoptera: Papilioniformes) of the former USSR. Second edition, reformatted and up-dated. *Eversmannia Supplement*, 2, 1–123.
- Markhasiov, M. (2023). First record of Western Pygmy-Blue *Brephidium exilis* (Boisduval, 1852) in Iran (Lepidoptera, Lycaenidae). *Atalanta*, 54 (1/2), 116–118
- Nazari, V. & ten Hagen, W. (2020) Molecular taxonomy of *Tomares hairstreaks* (Lepidoptera, Lycaenidae, Theclinae). *Deutsche Entomologische Zeitschrift*, 67, 19–33.
<https://doi.org/10.3897/dez.67.50252>
- Othman, H.D., Çifteçi, M.C. & Seven, E. (2018) Studies on the fauna of Papilionoidea and Hesperioidea (Lepidoptera) of Erbil Province (Northern Iraq). *Türkiye Tarımsal Araştırmalar Dergisi*, 5 (2), 120–124.
<https://doi.org/10.19159/tutad.369079>
- Pierce, N.E., Braby, M.F., Heath, A., Lohman, D.J., Mathew, J., Rand, D.B. & Travassos, M.A. (2002) The ecology and evolution

- of ant association in the Lycaenidae (Lepidoptera). *Annual Review of Entomology*, 47, 733–771.
<https://doi.org/10.1146/annurev.ento.47.091201.145257>
- Pittaway, A.R., Larsen, T.B., Legrain, A., Majer, J. Weidenhoffer, Z. & Gillet, M. (2006) The establishment of an American butterfly in the Arabian Gulf: *Brephidium exilis* (Boisduval, 1852) (Lycaenidae). *Nota Lepidopterologica*, 29 (1/2), 3–14.
- Pohl, P.R. & Nanz, S.R. (2023) *Annotated Taxonomic Checklist of the Lepidoptera of North America, North of Mexico*. Wedge Entomological Research Foundation, Tucson, Arizona, 580 pp.
- Pope, M. & Nithyanandan, M. (2014) Record of the Western Pygmy Blue butterfly *Brephidium exilis* (Boisduval, 1852) (Lepidoptera: Lycaenidae) from Sabah Al Ahmad Sea City, *Kuwait*. *Journal of Threatened Taxa*, 6 (14), 6723–6725.
<https://doi.org/10.11609/JoTT. o4055.6723-5>
- Rajaei, H., Aarvik, L., Arnscheid, W., Baldizzone, G., Bartsch, D., Bengtsson, B.Å., Bidzilya, O., Buchner, P., Buchsbaum, U., Buszko, J., Dubatolov, V.V., Erlacher, S., Esfandiari, M., Freina, J. de, Gaedike, R., Gyulai, P., Hausmann, A., Haxaire, J., Hobern, D., Hofmann, A., Ignatev, N., Kaila, L., Kallies, A., Keil, T., Kiss, Á., Kitching, I.J., Kun, A., László, G.M., Leraut, G., Mally, R., Matov, A., Meineke, J.-U., Melichar, T., Mey, W., Mironov, V., Müller, B., Naderi, A., Nässig, W.A., Naumann, S., Nazari, V., Nieukerken, E.J. van, Nuss, M., Pöll, N., Prozorov, A.M., Rabieh, M.M., Rákósy, L., Rindoš, M., Rota, J., Rougerie, R., Schintlmeister, A., Shirvani, A., Sihvonen, P., Simonsen, T.J., Sinev, S., Yu, Skou, P., Sobczyk, T., Sohn, J.-C., Tabell, J., Tarmann, G., Tokár, Z., Trusch, R., Varga, Z., Volynkin, A.V., Wanke, D., Yakovlev, R.V., Zahiri, R., Zehzad, P., Zeller, H.C., Zolotuhin, V.V. & Karsholt, O. (2023) Catalogue of the Lepidoptera of Iran. *Integrative Systematics*, 6 (Special Issue), 121–459.
<https://doi.org/10.18476/2023.997558.7>
- Said, N.T., Çiftçi, M.C. & Seven, E. (2018) A Preliminary list of Butterflies (Lepidoptera, Rhopalocera) from Duhok (Northern Iraq). *Transactions of the American entomological Society*, 144 (3), 637–644.
<https://doi.org/10.3157/061.144.0313>
- Tshikolovets, V., Naderi, A. & Eckweiler, W. (2014) *The Butterflies of Iran and Iraq*. Tshikolovets Publications, Pardubice, 440 pp.
- van Nieukerken, E.J., Kaila, L., Kitching, I.J., Kristensen, N.P., Lees, D.C., Minet, J., Mitter, C., Mutanen, M., Regier, J.C., Simonsen, T.J., Wahlberg, N., Yen, S.H., Zahiri, R., Adamski, D., Baixeras, J., Bartsch, D., Bengtsson, B.Å., Brown, J.W., Bucheli, S.R., Davis, D.R., de, Prins, J., de, Prins, W., Epstein, M.E., Gentili-Poole, P., Gielis, C., Hättenschwiler, P., Hausmann, A., Holloway, J.D., Kallies, A., Karsholt, O., Kawahara, A.Y., Koster, S., Kozlov, M.V., Lafontaine, J.D., Lamas, G., Landry, J.F., Lee, S., Nuss, M., Park, K.T., Penz, C., Rota, J., Schintlmeister, A., Schmidt, B.C., Sohn, J.C., Solis, M.A., Tarmann, G.M., Warren, A.D., Weller, S., Yakovlev, R.V., Zolotuhin, V.V. & Zwick, A. (2011) Order Lepidoptera Linnaeus, 1758. In: Zhang, Z.-Q. (Ed.) *Animal biodiversity: An outline of higher-level classification and survey of taxonomic richness*. *Zootaxa*, 3148 (1), pp. 1–237.
<https://doi.org/10.11646/zootaxa.3148.1.39>
- Verovnik, R., Kosmač, M., Ishag, A.A.E. & Al Dhafer, H.M. (2023) First records of *Brephidium exilis* (Boisduval) (Lepidoptera: Lycaenidae) from south-western part of the Arabian Peninsula suggests possible further dispersal into North Africa. *African Entomology*, 31, e15990.
<https://doi.org/10.17159/2254-8854/2023/a15990>
- Wiltshire, E.P. (1957) *The Lepidoptera of Iraq*. The Minister of Agriculture Government of Iraq, Baghdad, 160 pp.