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New anthropogenic lycaenid arrivals in the Levant

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Abstract: Whilst range expansions out of Africa and Europe into the Middle East are frequently attributed to climate change, some recently recorded occurrences are more likely a result of anthropogenic activities.

Key words: *Brephidium exilis, Cacyreus marshalli*, *Chilades (Luthrodes) pandava.*

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INTRODUCTION

New butterfly arrivals in the Levant are usually attributed to global warming. This is true for *Papilio demoleus* Linnaeus, 1758 that expanded from south Iran to Iraq and then along the Euphrates and Tigris rivers north-westwards into Syria and southeast Turkey finally to appear on the east Mediterranean coasts of Syria, Lebanon, Israel and Cyprus. Several desert whites are likewise expanding northwards from Arabia, southern Israel (Negev Desert) and southern Jordan (Edom and Wadi Rum) to Syria, Lebanon, southeast Turkey and Cyprus, i.e. *Pontia glauconome glauconome* Klug, 1829; *Anaphaeis* (*Belenois*) *aurota* (Fabricius, 1793) and even *Euchloe falloui* (Allard, 1867) in the eastern Syrian Desert. However, the occurrence of three lycaenid species in the Levant appears to be a direct consequence of anthropogenic activities. Their histories illustrate how these butterflies have become established in the Middle East—and perhaps are even expanding toward Africa—serving as examples of the profound biogeographical shifts characterising the contemporary human-dominated world.

RESULTS & DISCUSSION

Brephidium exilis (Boisduval, 1852) (Western Pygmy Blue) (Fig. 1A)

This is among the smallest butterflies globally and holds the title of the smallest in North America. Originally native to the south-western United States and parts of Mexico, this species has demonstrated a notable capacity for dispersal and establishment in new regions.

In Asia, *B. exilis* has been documented along the Persian Gulf, Iran, Pakistan, with established populations in eastern, central and western Saudi Arabia, Bahrain, the United Arab Emirates, Qatar, Kuwait and northern Oman. The initial introduction to the Arabian Peninsula likely occurred via the importation of plant cultivars from the United States, as the butterfly's larvae feed on various host plants, including species in the goosefoot family (Chenopodiaceae).

Figure 1A – *Brephidium exilis* (Western pygmy blue) (upper row), **1B** – *Cacyreus marshalli* (Geranium bronze) (middle row), **1C** –*Chilades (Luthrodes) pandava* (Cycad Blue) (lower row). Photos by Moshe Laudon.

B. exilis was first recorded in the Arabian Peninsula in 1995, with a sighting in Sharjah, United Arab Emirates. Since then, it has established itself throughout the UAE, as well as in northern Oman and eastern Saudi Arabia. Otto (2014) recorded it from Sohar on the Omani coast. More recently, in 2022, *B. exilis* was observed in the south-western mountainous regions of Saudi Arabia, specifically near Al-Baha on 19 September 2022, and in the Wadi Reem area. These sightings are significant as they

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represent the first records of this species in that part of the Arabian Peninsula. Later it crossed the Red Sea to eastern Egypt, penetrating the African continent for the first time with an observation from 16 February 2023, (Verovnik *et al.*, 2023; iNaturalist 2025: Fig. 2; Roobas *et al.*, 2025). The presence of *B. exilis* in these new locations indicates its ecological adaptability, thriving in diverse habitats ranging from deserts and salt marshes to forested areas at higher elevations. The *B. exilis* appears to have crossed the Dead Sea westwards from Jordan to Israel in 2021 and was first reported in Israel on 3 August 2021 by Yuval Evron, a butterfly enthusiast vacationing at a Dead Sea hotel (Evron, 2021; Benyamini, 2021). It was perched on a *Sesuvium* plant in the hotel garden and within a few months, the rapidly spreading species was observed as far south as Eilat in Israel on 2 August 2022 (Kirshenbaum, 2022) and at the Hayarkon River north-west of Tel Aviv on 16 December 2022 (Levi-Khavut, 2023).

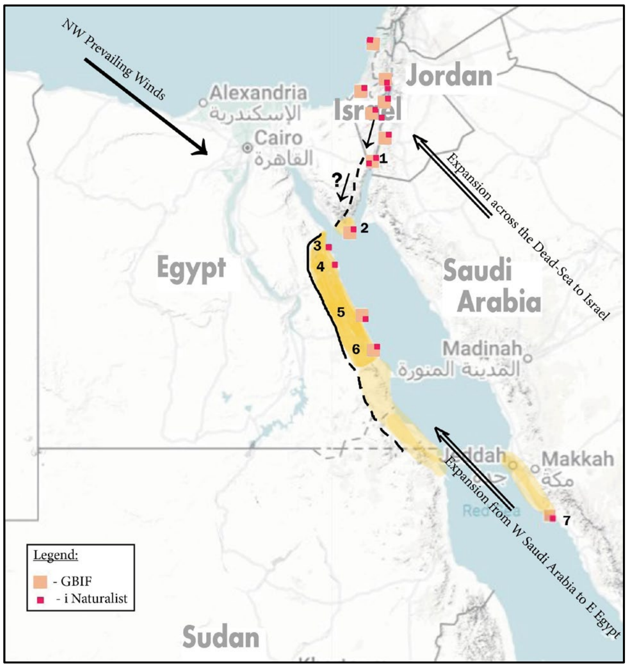

Figure 2 – *Brephidium exilis* records in the eastern Mediterranean and north-eastern Africa. 1 – Eilat (Israel); 2 – Sharm El-Sheikh (Sinai, Egypt); 3 – El Gouna; 4 – Hurgada; 5 – Port Ghalib, Marsa Alam; 6 – Wadi El-Gemal (3-6, Red Sea Coast - E Egypt); 7 – Al Lith (Saudi Arabia); - [Data from iNaturalist 2025 and GBIF 2025; map modified by Leah Benyamini.]

***Cacyreus marshalli* Butler, 1898 (Geranium Bronze) (Fig. 1B)**

This native South African species has host plants *Pelargonium* spp. (commonly known as Geraniums). These plants have become popular garden and ornamental plants across Europe. The species was first detected in Spain in the late 1980s on imported *Pelargonium* plants. Since then, it has expanded eastwards across southern European countries, and after ~ 30 years at an average expansion rate of 130 km/year, it was recorded on Greek Cyclades c. 2010, and in south-western Turkey. Almost simultaneously it had expanded southwards from Spain into North Africa appearing in central-eastern Tunisia between Hammamet Sud and Hammamet and 2000 km to the east appeared near Alexandria airport in Egypt on 6 January 2020 (Benyamini & Kurman, 2020).

Cacyreus marshalli was first observed in Israel on 8 November 2019 when Shalem Kurman, a young butterfly enthusiast and a volunteer of the National Butterfly Monitoring Scheme in Israel, walking his butterfly-monitoring track near Ein-Karem, Jerusalem, noticed that in addition to the usual familiar species, there was a small brown lycaenid (Benyamini & Kurman, 2020). Within the next few years, the species was observed as far southwest as Beer Sheba and northwest to Tel Aviv (Laudon & Benyamini, 2023).

***Chilades (Luthrodes) pandava* (Horsfield, 1829) (Cycad Blue)**
(Fig. 1C)

This unusual metallic-blue lycaenid was observed in a private garden, on 7 September 2012 (Fric *et al.*, 2014) in the Birqash district (Giza governorate, Egypt). It was also recorded on *Cycas* palms in Alexandria governorate and along Egypt's North Coast (Abu-Shall, 2014). Only two years elapsed and in 2014, the butterfly appeared almost simultaneously in Israel and the UAE. From late 2023, it expanded rapidly in Israel and by the end of 2024, it was observed 450 km to the south at Eilat, and was even recorded on the wing in the early winter of December 2024 and January 2025 (Benyamini *et al.*, 2025).

The first record in Israel was in the city of Eilat where it was recorded on 24 May 2015 (Benyamini & Shalmon 2015). This population existed until early 2016, when pesticides were used by the local municipality to spray the ornamental *Cycas* palms in the city, effectively killing the butterfly population. A second record in Israel was noted by Eli and Clara Gur-Arye—volunteers of the National Butterfly Monitoring Scheme in Israel (BMS-IL, the national citizen-science project)—on 21 September 2019 in the coastal city of Ashkelon and nearby areas. This population existed for a few months but apparently did not survive the winter and soon disappeared (Benyamini *et al.*, 2019). In September 2023, a new population was discovered in Upper Galilee—possibly having invaded southwards across the border from Lebanon—and within a few months spread rapidly as far south as the southern Negev desert, the Arava and Eilat 450 km away (Benyamini *et al.*, 2025).

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