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A new locality in northern Algeria for the endangered Maghrebian endemic butterfly *Pseudophilotes fatma* (Lepidoptera: Lycaenidae)

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Abstract
Pseudophilotes fatma is an endemic butterfly species found in northern Algeria and Morocco, listed as Endangered (EN) on the IUCN Red List. Previously, it was known only from a few localities of Algeria in the western part of the country and northern Morocco. In 2019 it has been recorded for the first time in Ghilassa Forest in the Bordj Bou Arréridj region of northern Algeria, about 100 km west of known Algerian distribution. This study also shortly discusses the current distribution of the species and sits endangerment.

Keywords: Papilionoidea, distribution, Fatma's Blue, endangerment, Algeria.

Introduction

Understanding the geographic distribution of an endemic species is critical for assessing their adaptation to specific environments, interactions with other species, and the threats it faces (Burlakova et al. 2011).

Although Algeria is the largest country in Africa and in the Mediterranean region, its butterfly diversity is relatively low, with only 121 species recorded (Tennent 1996). This limited diversity is attributed to the country's orographic features, which lack extremely high mountains, as well as the absence of exhaustive faunistic studies. Existing research is scarce, with studies limited to specific regions such as the Metidja (Remini & Moulaï 2015), Belezma National Park (Berkane et al. 2019), and Bordj Bou Arréridj (Yahiaoui & Ait Mohamed 2022).

This study examines the distribution of *Pseudophilotes fatma* (Oberthür, 1890), a highly localised Maghrebian endemic species. It is considered Endangered (EN) according to the IUCN Mediterranean Red List of Butterflies (Numa et al. 2016). This univoltine butterfly flights from late April to early June, depending on altitude and the availability of its larval host plant (Tarrier 2019). Its habitat consists of dry, shrub-covered areas, flowering meadows, and open spaces in light woodlands, always in proximity to its host plant, primarily the Silver Sage (*Salvia argentea* L.) (Bouam et al. 2024). Recently, a shift to *Salvia phlomoides africana* (Maire) Greuter & Burdet, a plant found in drier, rockier environments, has been observed in Morocco due to overgrazing and trampling of the sites with its original host plant (Tarrier 2019).

In Morocco, *Pseudophilotes fatma* has been recorded in the Middle Atlas and eastern High Atlas Mountains, including locations such as Anosseur, Ifrane, Azrou, and Imouzzèr. In Algeria, the species has been documented in the Aurès region, particularly at Lambèse and the Telmet Pass (Tennent 1996). These finds were recently corroborated by Bouam et al. (2024) who record the species from several new sites outside protected areas. Most records come from elevations of 1500 to 1800 metres above sea level (Tarrier & Delacre 2008; Tshikolovets 2011; Van Swaay et al. 2015; Bouam et al. 2024). The present note reports a new locality of *Pseudophilotes fatma* from the Ghilassa Forest, northern Algeria.

Fig. 1 – A male of *Pseudophilotes fatma* near Bordj Ghedir in Algeria sitting on the leaves of a potential host plant, the Silver Sage (*Salvia argentea* L.). (Photographed by B.A. Boulaouad)

Materials, Methods, and Results

On 9 May 2019, during a faunistic survey in Ghilassa Forest, located approximately 30 kilometres from the provincial capital of Bordj Bou Arréridj in northern Algeria, a single male *Pseudophilotes fatma* was observed and photographed (Fig.1). The survey covered a 10-hectare area of the forest, with the observation occurring on the south-facing slopes at the forest's edge (35°51'12"N, 4°52'46"E). The site is situated at an elevation of 1150 metres, approximately 100 kilometres northwest of the nearest historically recorded location at Telmet Pass (Bouam et al. 2024) (Fig. 2). The observed specimen was identified using taxonomic keys based on the photography in its natural habitat.

Material examined: ALGERIA: Ghilassa Forest, Bordj Bou Arréridj, 35°51'12"N, 4°52'46"E, 1150 m, 09 May 2019, B.A. Boulaouad leg., 1 ♂ observed perched on *Salvia argentea* and photographed (Fig. 1). Despite the presence of its local host plants, the species was not observed at this location during subsequent surveys in May 2021, 2023, and 2024.

Discussion

The results of this study provide important insights into the current distribution of *Pseudophilotes fatma* and highlight significant conservation concerns for the species in Algeria. The extension of its known range gives hope that species might have survived in other remote mountainous regions in northern part of the country. It is welcoming, that the species was rediscovered in the Djebel Refaa area in northeastern Algeria in 2024 at two new localities, at elevations of 1696 m (April 2024) and 1675 m (May 2024) (Bouam et al. 2024).

As noted in previous research, habitat degradation remains a significant threat to *Pseudophilotes fatma*. Overgrazing, particularly in Ghilassa Forest, continues to damage the host plants and other vegetation essential for the species' lifecycle. As overgrazing reduces the availability of host plants *Salvia argentea*, this may ultimately lead to the decline in butterfly populations and local extinctions. Therefore, immediate action is needed to mitigate the effects of overgrazing through sustainable land management practices, including regulated grazing and the establishment of protected areas.

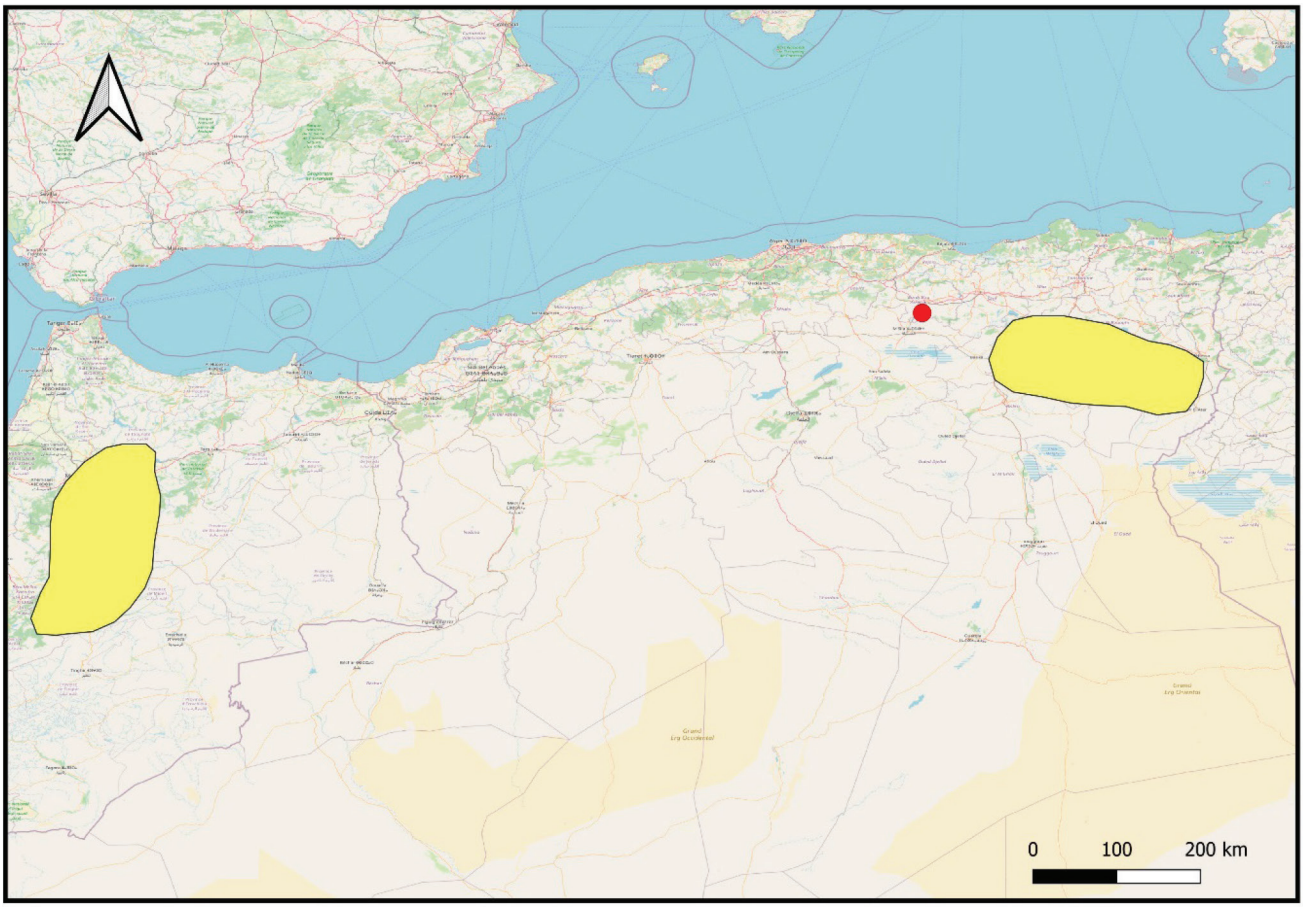

Fig. 2 – Map of the study region (north-west Africa), showing *Pseudophilotes fatma* distribution according to IUCN (van Swaay et al. 2015) and Bouam et al. 2024 (yellow) and the newly discovered population (red dot).

Another key threat to *Pseudophilotes fatma* is the increasing frequency of wildfires, which are exacerbated by climate change and human activity. These fires can destroy habitats, including nectar sources and larval host plants, leading to significant ecological consequences. The need for fire prevention and habitat restoration is evident, as these measures would help secure the species' habitat and reduce the impact of wildfires on its survival. Studies by Keeley & Syphard (2016) and Mann et al. (2016) emphasise the importance of proactive fire management strategies, such as firebreaks and reforestation, to protect fragile ecosystems.

The absence of *Pseudophilotes fatma* in recent surveys at key locations, despite the presence of host plants, suggests that factors beyond habitat loss – such as climate change, habitat fragmentation, and possibly genetic bottlenecks – may also be influencing the species' decline. The small, fragmented populations of *Pseudophilotes fatma* in Algeria and Morocco face additional challenges related to its genetic diversity, which may further compromises their ability to adapt to environmental pressures. Continuing surveys of other potentially suitable mountain systems in northern Algeria is therefore urgently needed to provide further insights in the species distribution and designate suitable conservation for its long term survivor.

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