

## Short Communication

# *Diplacodes lefebvrei* (Rambur 1842) in Sicily with first evidence of reproduction (Odonata: Libellulidae)

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**Abstract** - The recent discovery of *Diplacodes lefebvrei* on the island of Sicily (Italy) is reported, with a description of the habitat of two breeding populations and some morphological remarks on the imagoes.

**Key words:** Black Percher, climate change, reproduction, Sicily, Trapani.

**Riassunto** - *Diplacodes lefebvrei* (Rambur 1842) in Sicilia con prime evidenze di riproduzione (Odonata: Libellulidae).

Viene riportata la recente scoperta di due popolazioni riproduttive di *Diplacodes lefebvrei* in Sicilia (Italia), con descrizione degli habitat e alcuni commenti sulla morfologia degli adulti.

**Parole chiave:** cambiamenti climatici, *Diplacodes lefebvrei*, riproduzione, Sicilia, Trapani.

## INTRODUCTION

*Diplacodes lefebvrei* (Rambur 1842) is the only odonate species of its genus found in Europe. The species is common in Africa, although scarce and localized in the north-western coastal region of Morocco (Jacquemin & Boudot, 1999; ACo & M. Viganò, *pers. obs.*), and occurs eastwards up to western India and south-central Asia. In Europe, it is mainly restricted to the south-westernmost quarter of the Iberian Peninsula (Boudot *et al.*, 2009; Boudot & Kalkman, 2015), Sardinia (Italy), where it was first reported in 2013 (Rattu *et al.*, 2014), Cyprus, and the island of Rhodes, Greece (Dow & Clausnitzer, 2016; Cillo & Bazzato, 2018).

Although the species is generally distinguishable from

other Anisoptera, in its range, it can easily be confused with *Selysiothemis nigra* (van der Linden 1825). However, the wing pattern of *D. lefebvrei* is quite distinctive, showing black instead of whitish venation, usually paler appendages (cfr. Discussion section), large grey pterostigmas darkening with age, and a small dark patch at the base of the hindwing.

We here report the first records of *D. lefebvrei* for mainland Sicily, including the first breeding records for the region.

## MATERIALS AND METHODS

Following the first Sicilian observations of some imagoes of *D. lefebvrei* in 2022 and 2023, in the spring-summer of 2023 and 2024, we systematically monitored all suitable habitats (coastal and inland lakes, former salt pans, rivulets, artificial basins, and irrigation ponds) in the provinces of Trapani (western Sicily) and Agrigento (south-western Sicily). During field monitoring activities, we used binoculars (10 $\times$ ), photo cameras (Canon EOS 7D with 150-600 zoom lens), and entomological nets.

## RESULTS

On 25 August 2022, 1♂ was observed near a small pond at Pettineo (ME, Sicily) (locality 1, Fig. 1), where an extensive search in 2023 did not produce any additional observation (Maurizio Sarà, *pers. com.*). On 8 September 2023, during a field survey aimed at the collection of data for the Atlas of Sicilian dragonflies, one of us (ACu) found 2 mature ♂♂ of the species (Fig. 2) at an artificial lake in the Roccolino Soprano area, near the Trinità Dam (locality 4, Fig. 1; Campobello di Mazara, Trapani: 37°42'39.9"N; 12°42'43.1"E). On a subsequent visit to the same locality, on 11 June 2024, two of us (ACu and SS) observed and photographed at least 5 different individuals, including a pair in tandem. On 10 May 2024, ACo observed respectively 1♀ mature and 1♀ teneral and 2♂ mature and 1♀ mature in two very small coastal lakes between Triscina di Selinunte (locality 5, Fig. 1; Campobello di Mazara, Trapani: 37°35'08.1"N; 12°45'43.2"E) and Tre Fontane (locality 6, Fig. 1; Campobello di Mazara, Trapani: 37°35'19.36"N; 12°45'31.88"E). The "main" localities (localities 4, 5 and 6, Fig. 1) lay 14.2 km apart; the first one (locality 4 in Fig. 1)

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is a small dam lake of 55×21 m (0.12 ha) with dense vegetation, mainly *Phragmites* sp. In contrast, localities 5 and 6 (Fig. 1) are part of a small system of freshwater/brackish coastal ponds, semi-permanent or temporary (one of which is almost entirely drained), with dense shoreline vegetation and wide sandy banks with low herbaceous vegetation, in a suburban and rather degraded area.

## DISCUSSION AND CONCLUSIONS

The first regional records of *D. lefebvrii* for Sicily were reported for Linosa Island (Pelagie Islands, Agrigento) by Janni *et al.* (2020) when three mature females were recorded between 26 October 2019 and 28 October 2019. However, these individuals were most likely nomadic adults, given that the small volcanic island lacks permanent or temporary wetlands suitable for reproduction. This considered, the records here reported represent the first documented observations of the species for mainland Sicily and the first reproduction evidence ever recorded for the island. As early as 2023, the species was suspected

to have settled and reproduced near Campobello di Mazara (localities 4 in Fig. 1), and the observation of 2024 confirmed that a small population reproduces in the area. In fact, the observation of teneral cannot be related to nomadic imagoes, but most likely confirms a local reproduction (locality 5, Fig. 1). Although no larvae or exuviae were found, mating pairs, oviposition, and the occurrence of teneral are considered by most authors as genuine confirmation of local reproduction (Patten *et al.*, 2019; Assandri *et al.*, 2023). Subsequently to our observations, 1♂ (immature) was photographed on 13 September 2024 near Misiliscemi (Trapani, Sicily: 37°53'38.5"N; 12°36'01.7"E) (Nicola Larroux, *pers. comm.*) and 1♀ was photographed by Mathia Coco (*pers. comm.*) on 13 September 2024 near Fiume Torto (Termini Imerese, Palermo, Sicily: 37°56'07.5"N; 13°46'55.2"E) likely suggesting that a northward expansion is underway in Sicily, similar to what has been observed in Sardinia, where the species has expanded as far north as the island of La Maddalena in just a few years (Cillo & Bazzato, 2018; iNaturalist, 2024) and, recently, also over mainland Italy, with 1♂ and

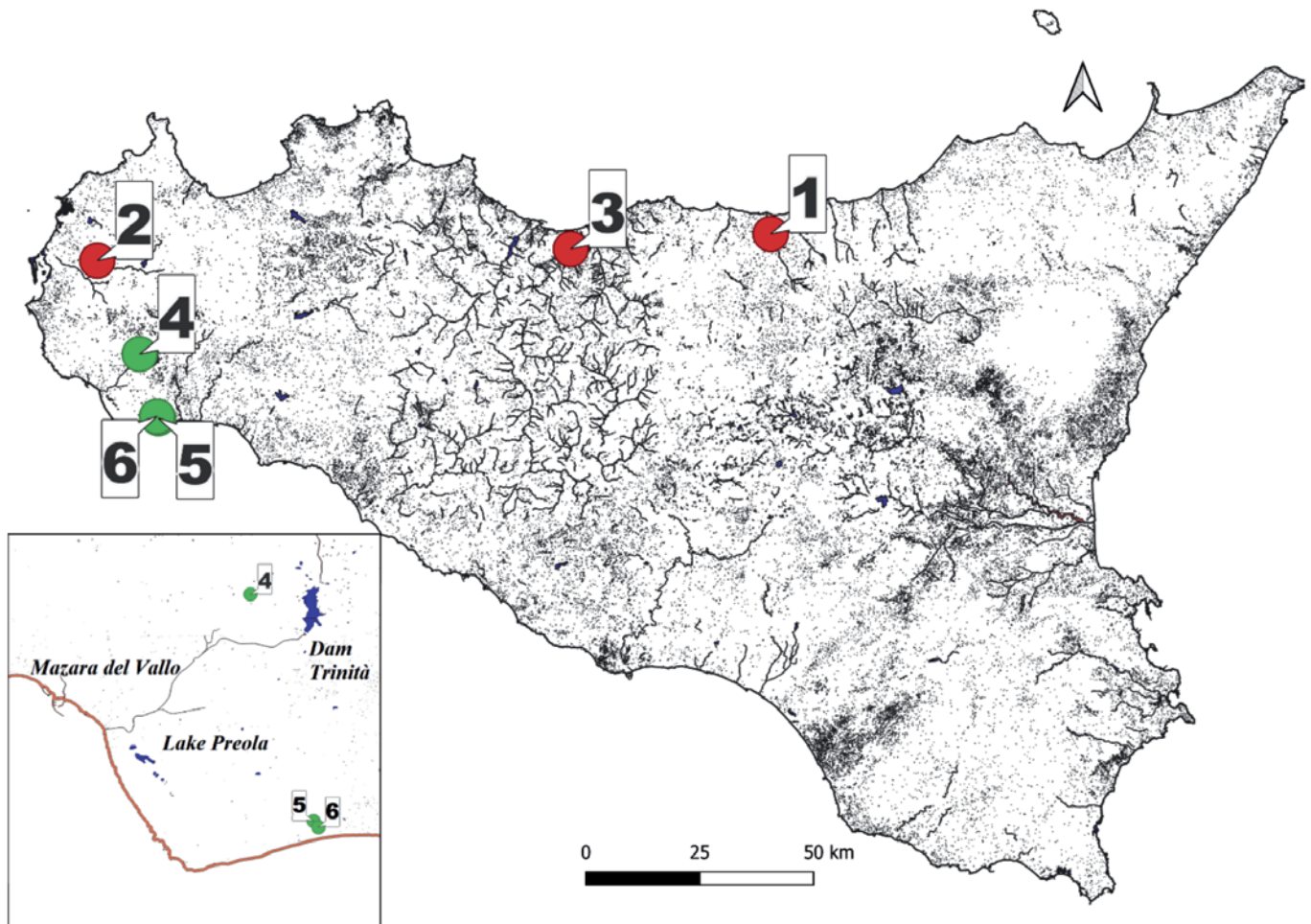


Fig. 1 – Records of *Diplacodes lefebvrii* in Sicily. In red, three second-hand records from 2022 and 2024 reported to the authors (1 – Pettineo, ME; 2 – Misiliscemi, TP; 3 – Termini Imerese, PA). In green, sites investigated by the authors where reproduction is likely confirmed (4 – Trinità dam, TP; 5 – Triscina di Selinunte, TP and 6 – Tre Fontane, TP). / Segnalazioni di *D. lefebvrii* in Sicilia. In rosso, le tre osservazioni del 2022 e 2024 senza evidenza di riproduzione (1 – Pettineo, ME; 2 – Misiliscemi, TP; 3 – Termini Imerese, PA), in verde (4 – Diga Trinità, TP; 5 – Triscina di Selinunte, TP e 6 – Tre Fontane, TP), le località scoperte dagli autori dove la specie si è verosimilmente riprodotta.



Fig. 2 – Top left: mature male of *Diplacodes lefebvrii* from Locality 4, showing an almost completely dark thorax and dark appendages (Photo: A. Cusmano, 8.09.2023). Top right: immature female, netted at Locality 5 (Photo: A. Corso, 10 May 2024). Bottom left: Mature male, Mauritania (Africa). As the old mature males from Sicily, the old male imagoes (and some females too) show dark appendages and very dark, bluish-black or black, thorax (Photo: M. Viganò, February 2024). Bottom right: mature female, netted at Locality 6, showing the typical white appendages and an extremely dark and uniform abdomen and thorax, hardly shown in any field guide (Photo: A. Corso, 10 May 2024). / In alto a sinistra: maschio maturo di *Diplacodes lefebvrii* di Località 4, che mostra un torace quasi completamente scuro e appendici scure (Foto: A. Cusmano, 8 September 2023). In alto a destra: femmina immatura, raccolta in Località 5 (Foto: A. Corso, 10 maggio 2024). In basso a sinistra: maschio maturo, Mauritania (Africa). Come i vecchi maschi maturi della Sicilia, le imago di maschi più vecchi (e anche alcune femmine) mostrano appendici scure e torace molto scuro, nero-bluastro o nero (Foto: M. Viganò, febbraio 2024). In basso a destra: femmina matura, raccolta in Località 6, che mostra le tipiche appendici bianche e un addome e un torace estremamente scuri e uniformi, raramente descritti nelle guide di campo (Foto: A. Corso, 10 maggio 2024).

1♀ photographed near Salerno (Campania) on 30 August 2024 (Enzo Colabella, *pers. com.*).

Previously, in Europe, the species has been known from the southern part of the Iberian Peninsula since the first half of the last century (Anonymous, 1910; Seabra, 1937, 1938), and several observations documented its northward expansion in recent years (Conesa-Garcia, 1985; Sánchez *et al.*, 2009; De Knijf & Demolder, 2010; Boudot & Kalkman, 2015; Rattu *et al.*, 2014). The records here reported confirm this expansion also for Italy, and this is in accordance with other reports of a northward expansion of Odonata in Europe, presumably as a consequence of the effect of climate change (Ott, 2001, 2010; Corso *et al.*, 2012; Riservato, Festi, *et al.*, 2014; Riservato, Fabbri *et al.*, 2014; Soinski, 2015; Surdo, 2015; Corso *et al.*, 2017; Viganò *et al.*, 2017; Corso & Penna, 2020; Janni *et al.*, 2020; Gil-Tapetado *et al.*, 2023; Surdo, 2025).

The study conducted in Sicily allowed us to observe several features relevant to the field identification of the species: some of the older mature males we observed, showed darker appendages than illustrated in all published field guides (e.g., Dijkstra & Schröter, 2021), hardly showing any pale or white color on both upper and lower appen-

dages, making them more similar to *S. nigra* and therefore more difficult to separate from this species at a first glance (Fig. 2). The same was noticed recently (winter-spring 2024) in Morocco, Western Sahara and Mauritania (M. Viganò & ACO, *pers. obs.*) (Fig. 2). Also, they were almost altogether missing visible and striking pale (usually creamy) spots to the side of the abdominal segments, with also the thorax being rather dark. Compared to *S. nigra* of the same sex and age, the thorax was darker, velvet bluish black, rather than brownish tinged as in *S. nigra*. Also, some of the older females appeared darker and more uniformly coloured, with the lateral abdominal pale spotting hardly visible (Fig. 2).

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