

First records of *Diplacodes lefebvrei* (Rambur, 1842) for Sicily and additional record of *Trithemis kirbyi* Selys, 1891 (Odonata Libellulidae)

Ottavio Janni¹, Michele Viganò² & Andrea Corso^{3*}

¹Via G.G. D'Amore 21, 81016 Piedimonte Matese, Caserta, Italy; e-mail: coeligena@hotmail.com

²Via Ongetta 5, 21010 Germignaga, Italy; e-mail: mikivigano@yahoo.com

³Via Camastra 10, 96100 Siracusa, Italy

*Corresponding author, e-mail: zoologywp@gmail.com

ABSTRACT

We report the first records (three specimens on two dates) of *Diplacodes lefebvrei* (Rambur, 1842) (Odonata Libellulidae) for Sicily, obtained during October 2019 at the island of Linosa, Pelagie Archipelago (Sicily, Italy). Additional record of *Trithemis kirbyi* Selys, 1891 (Odonata Libellulidae), already known for the region, are provided.

KEY WORDS

First records; Sicily; Dragonflies; *Diplacodes lefebvrei*; *Trithemis kirbyi*.

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INTRODUCTION

Diplacodes lefebvrei (Rambur, 1842) (Odonata Libellulidae) is a widespread small Libellulidae that is common throughout Africa and distributed across the Indian Ocean into Eurasia and southern Europe (Dijkstra & Lewington, 2006). In the Mediterranean area, it is fairly common in the countries of North Africa. Its European range is confined to Cyprus, the Greek island of Rhodes and the southern half of the Iberian Peninsula (Boudot et al., 2009; Boudot & Kalkman, 2015). In Italy, it was recorded for the first time in September 2013 at Molentargius Salt-pans, Cagliari (South Sardinia), while in October 2014 a small but flourishing population was found on the island of San Pietro, Cagliari (South Sardinia) (Rattu et al., 2014). Since then, the species has continued to colonize Sardinia, with one new site discovered in central Sardinia, in Oristano province in August 2015 (Cillo & Bazzato, 2018) and an additional 14 new sites discovered as of the end of 2019, in the municipalities of Cagliari, Carbonia-Iglesias, Ges-

turi and Pula, and as far north as Orosei and La Maddalena Island (G. Assandri, pers. com.; P. Leo, pers. com.). Despite these reports, *D. lefebvrei* is not currently known for Sicily or its smaller islands.

Trithemis kirbyi Selys, 1891 is widespread throughout Africa, except in rainforest areas, and in Southern Asia up to India (Dijkstra & Lewington, 2006; Boudot et al., 2009). *Trithemis kirbyi* is not a regular long-distance migrant, its movements being essentially erratic or nomadic; yet it has recently and rapidly expanded its range northwards, spreading into southwestern Europe, including Sicily and Sardinia (Chelmick & Pickess, 2008; Holuša, 2008; Cano-Villegas & Conesa-García, 2009; Herrera-Grao et al., 2012; Corso et al., 2012; Boudot et al., 2009; Obrégon Romero et al., 2013). Global warming is influencing the distribution range of numerous species of Odonata, causing northward expansions, while a tendency towards an increasing range of movements in their migratory patterns has noticed as well (Ott, 2001, 2010; Dijkstra & Lewington, 2006; Bernard et al., 2009).

In this paper, we report the first documented records for Sicily for *D. lefebvrei* and an additional record of *T. kirbyi* to add to those already known for the region (Corso et al., 2012, 2017).

MATERIAL AND METHODS

The Pelagic Archipelago is located in the southern Mediterranean, in the middle of the Sicilian Channel, and comprises the islands of Lampedusa, Lampione and Linosa. The first two are limestone islands and are part of the African tectonic plate. Linosa (35°52'N, 12°52'E) is a small volcanic island of 5.4 km², with its highest elevation at 195 m a.s.l. It lies halfway between Sicily and Tunisia, about 160 km from each, and the nearest land is Lampedusa about 42 km to the southwest. Since 2005, Linosa has been visited annually by a group of bird-watchers (MISC) in autumn, and somewhat less regularly in spring as well. In addition to ornithological research (Corso et al. 2009a, b, c, 2013), numerous entomological studies have also been conducted by members of the group in the Pelagic Islands (Corso 2011a, b; Corso et al., 2012; Colonnelli et al., 2016). Odonata were studied in detail by Corso et al. (2012) who reported 20 species from the islands. Our observations of Odonata on Linosa in October and November 2019 were made opportunistically, as part of our daily surveys of migratory birds on the island. Field observations were made by Raimondo Finati, Ottavio Janni, Michele Viganò, Andrea Corso, Luca Giussani, Luca Nigro, Matteo Toller and many other observers. During these surveys, the authors paid careful attention to dragonflies as well, and AC was always equipped with a hand-net and pole, tubes, envelopes and all relevant entomological equipment. All observers were equipped with binoculars and digital cameras. The captured dragonflies were photographed and released shortly thereafter; only one leg was preserved in ethanol 95% for genetic studies.

RESULTS

In October 2019 we photographed 1 female in the field then in the hand at Linosa Island, in a small

grassy field in the middle of town (35°51'27.62"N, 12°51'49.99"E), on 26.X.2019 (Fig. 1); 2 females in the northern part of the island, again in a small grassy field, on 28.X.2019 (35°52'15.47"N, 12°51'53.75"E). On 4.XI.2019, 1 male *Trithemis kirbyi* was found on the northern part of the island (35°52'24.48"N, 12°51'52.31"E) (Fig. 2).

DISCUSSION AND CONCLUSIONS

The records of *D. lefebvrei* here reported, along with the continuing range expansion in Sardinia, clearly confirm the predictions made by Dijkstra & Lewington (2006) and Rattu et al. (2014) with an active northward range expansion from Africa. A similarly rapid range expansion was recently noted for the similar *Selysiothemis nigra* (Van der Linden, 1825), which in Italy has been recorded as far north as Lombardy (Odonata.it).

The Pelagic islands are a particularly good area for monitoring the migration and seasonal movements of dragonflies. We have recorded several new species for Italy or even Europe and the Western Palearctic: *Pantala flavescens* (Fabricius, 1798), *Trithemis kirbyi*, *Sympetrum sinaiticum* Dumont, 1977 and *Tramea basilaris* (Palisot de Beauvois, 1807). *Pantala flavescens* it is now regularly recorded while the other three species are rare vagrants recorded only once or a handful times (Corso et al., 2012, 2017; Viganò et al., 2017). Specifically, *T. kirbyi* were reported already three times before with 8 specimens in total; therefore the record here reported is the 4th for Sicily, all at Pelagic Archipelago (9 specimens in tot.).

It is interesting to note that all the specimens of *D. lefebvrei* observed at Linosa were females. Such a sex-ratio in favour of females were noticed, and with a much larger sample, also in Sardinia (Rattu et al., 2014; P. Leo, pers. com.). This is unlike the other vagrant species recorded in Sicily, for which the sex-ratio strongly favoured males (Corso et al., 2012, 2016; Viganò et al., 2017; MISC, unpubl., AC, pers.obs.). Interestingly, a similar sex-ratio in favour of females was noticed for *Selysiothemis nigra* and *Brachythemis impartita* (Karsch, 1890) in Sicily at various sites in the provinces of Siracusa, Ragusa, Catania and Caltanissetta (AC, unpubl.). Farkas et al. (2013) suggest that correlation between water temperature, voltinism and cohort-



Figure 1. *Diplacodes lefebvrei* mature female, Linosa Island (Sicilian Channel, Italy), 26.X.2019 (photo A. Corso).



Figure 2. *Trithemis kirbyi* mature male, Linosa Island (Sicilian Channel, Italy), 4.XI.2019 (photo A. Corso).

splitting are potential causes of the variability in dragonfly sex ratios. It should therefore be checked whether the increase in temperatures due to climate change could change the sexual relations of the populations of these Libellulidae (all rather similar to each other) towards a predominance of females.

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