

# ***Aeshna isoceles* and *Libellula fulva* rediscovered in the Algarve, southern Portugal (Odonata: Aeshnidae, Libellulidae)**

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## **Abstract**

*Aeshna isoceles* and *Libellula fulva* are rare and local species in the Iberian Peninsula and their presence in the Algarve was summed up to isolated records from the mid-1990. Since 2013 both species were rediscovered and the first evidence of their reproduction was found in Vilamoura.

## **Zusammenfassung**

Wiederfunde von *Aeshna isoceles* und *Libellula fulva* in der Algarve, Südportugal (Odonata: Aeshnidae, Libellulidae) – *Aeshna isoceles* und *Libellula fulva* sind auf der Iberischen Halbinsel selten und nur lokal verbreitet. Ihr Vorkommen in der Algarve wurde aus isolierten Datensätzen aus der Mitte der 1990er Jahre zusammengefasst. Seit 2013 wurden beide Arten wiederentdeckt und die ersten Fortpflanzungsnachweise in Vilamoura erbracht.

## **Introduction**

*Aeshna isoceles* (Müller 1767) is widespread across Europe and Middle East but rather local in most of its range and it becomes rare in the Iberian Peninsula and North-Western Africa (DIJKSTRA & LEWINGTON 2006; BOUDOT et al 2009; KALKMAN et al. 2015). In the western Iberian Peninsula it is a localized species (BOUDOT et al. 2009; BROTONS PADILLA et al. 2009; MARAVALHAS & SOARES 2013) being recorded only twice in Andalucía (BELLE 1979; JÖDICKE 1996) and less than ten

times in Portugal (GIRARD 1891; SEABRA 1939; AGUIAR & AGUIAR 1983; GARDINER & WALLIS 1996; JAHN 1996; JONES 1996; FERREIRA & GROSSO-SILVA 2006; MOREIRA et al. 2008).

In the Algarve the only known records date from May and June 1995 (GARDINER & WALLIS 1996; JONES 1996), both in Quinta da Rocha (Portimão).

*Libellula fulva* Müller, 1764 is relatively widespread across Central, Southern and Eastern Europe from the Pyrenees to the Caspian Sea and Southern Turkey (DIJKSTRA & LEWINGTON 2006; BOUDOT et al 2009; KALKMAN & CHELMICK 2015). In the Iberian Peninsula it is rare and mainly restricted to the foothills of the Pyrenees in Catalonia. From Portugal hitherto only three records were available (SEABRA 1937; DIJKSTRA 1997). In Andalucía it was only recorded once, in 1977 (DUFOUR 1978). The only record in the Algarve dates back to March 1995, when a female was captured in Loulé municipality (Dijkstra 1997).

## Methods

In the Algarve large reed bed areas are very local and restricted to alluvial soils near the coast. In 2013 the two largest reed bed areas in the region were selected for Odonata inventory:

- Parque Ambiental de Vilamoura (37°05'49.18"N, 08°08'52.21"W). This study area consists of two manmade lakes and a network of drainage ditches coming from the existing golf course and wastewater treatment plant to the reed beds on the lowland of Ribeira de Quarteira. Both the lakes and the ditches are densely vegetated, mainly dominated by *Phragmites australis* and *Typha domingensis*;
- Quinta do Rosário (37°10'6.12"N, 08°29'2.48"W). In this place the ditches are formed by a natural spring emerging from the Querença-Silves aquifer and the water is partially used to irrigate a rice field. Like the Vilamoura study site, here the ditches are densely vegetated with *Phragmites australis* and *Typha domingensis*.

Both areas are located below 10 meters high and have active agricultural soil use nearby.

Parque Ambiental de Vilamoura was visited regularly between 2013 and 2016 with three to seven site visits per year. Quinta do Rosário was only visited 3 times (Table 1).

## Results

*Aeshna isocles* was recorded 5 times in Parque Ambiental de Vilamoura but it was not found at Quinta do Rosário.

Table 1. Visits of the study sites. – Tabelle 1: Begehungsdaten der Untersuchungsgebiete.

|      | Parque Ambiental de Vilamoura                  | Quinta do Rosário |
|------|------------------------------------------------|-------------------|
| 2013 | 10-iii; 25-v; 14-vii; 8-ix                     |                   |
| 2014 | 22-iii; 26-iv; 28-vi; 3-viii; 23-viii; 28-ix   | 19-iv             |
| 2015 | 21-ii; 8-iii; 29-iii; 19-iv; 10-v; 6-ix; 12-ix | 3-iv; 17-v        |
| 2016 | 12-iii; 2-iv; 9-iv                             |                   |

On May 2015 two exuviae were collected on *Phragmites australis* streams nearly 1.5 m above the water level and 1 m from the lakeshore.

*Libellula fulva* was recorded eight times in Vilamoura and three times in Quinta do Rosário. All exuviae were found on dry *Typha dominguensis* leaves, no more than 20 cm high and 50 cm from the lakeshore. The males were very territorial and never seen near water unless they were copulating. The territories were defended mainly next to hedgerows and therefore quite linear and on average only 5 m long.



Figure 1. *Aeshna isoceles* (male), 26-iv-2014, Vilamoura. – Abbildung 1: *Aeshna isoceles* (Männchen), 26.04.2014, Vilamoura. Photo: NF

## Discussion

*Aeshna isoceles* was recorded mainly between mid-April to end of May with an apparent peak by the end of April and early May. This seems to be a much earlier flight period than recorded for the rest of the Iberian Peninsula, where the records span from late March to early August with an apparent peak in June and July (BROTÓNS PADILLA et al. 2009).

A single adult was recorded on September. Autumn records in the Iberian Peninsula are rare (BROTÓNS PADILLA et al. 2009). This species is considered univoltine but a mass emergence detected in central Portugal during the autumn may suggest a second generation at least in favourable years (R.M. Félix pers. comm.). Only two exuviae were collected so it is not possible to analyse the emergence period.

BROTÓNS PADILLA et al. (2009) suggests that this species can be associated with densely vegetated reed beds with stagnant or slow flowing waters. Both Algarvian study sites support this claim.

*Libellula fulva* was recorded from late March to the end of May with an evident peak between mid-April and mid-May. Given that there is little information on the Iberian populations, the data analysis from Italy shows that this species flies from mid-April to August, peaking between mid-May and mid-June (HARDERSEN 2004) and from France between the end of May and late July (DOMMANGET 1987),



Figure 2. *Aeshna isoceles* (exuvia), 10-v-2015, Vilamoura. – Abbildung 2: *Aeshna isoceles* (exuvia), 10.05.2015, Vilamoura. Photo: NF

Table 2. Records of *Aeshna isoceles*. – Tabelle 2: Funde von *Aeshna isosceles*.

| Site                                 | Date       | Imago | Exuviae | Observations |
|--------------------------------------|------------|-------|---------|--------------|
| Parque Ambiental de Vilamoura, Loulé | 25-v-2013  | 4     |         |              |
| Parque Ambiental de Vilamoura, Loulé | 26-iv-2014 | 9     |         |              |
| Parque Ambiental de Vilamoura, Loulé | 19-iv-2015 | 5     |         |              |
| Parque Ambiental de Vilamoura, Loulé | 10-v-2015  | 11    | 2       |              |
| Parque Ambiental de Vilamoura, Loulé | 6-ix-2015  | 1     |         |              |

Table 3. Records of *Libellula fulva*. – Tabelle 3: Funde von *Libellula fulva*.

| Site                                 | Date        | Imago |        | Teneral | Exuviae | Observations        |
|--------------------------------------|-------------|-------|--------|---------|---------|---------------------|
|                                      |             | Male  | Female |         |         |                     |
| Parque Ambiental de Vilamoura, Loulé | 25-v-2013   | 5     | 3      |         |         |                     |
| Parque Ambiental de Vilamoura, Loulé | 22-iii-2014 | 1     | 1      | 4       |         |                     |
| Quinta do Rosário, Lagoa             | 19-iv-2014  | 8     | 1      |         |         | Male with sex brand |
| Parque Ambiental de Vilamoura, Loulé | 26-iv-2014  | 7     | 4      |         |         |                     |
| Parque Ambiental de Vilamoura, Loulé | 29-iii-2015 |       |        | 6       |         |                     |
| Quinta do Rosário, Lagoa             | 3-iv-2015   | 1     |        | 5       |         |                     |
| Parque Ambiental de Vilamoura, Loulé | 19-iv-2015  | 10    | 6      | 2       | 2       | Oviposition         |
| Parque Ambiental de Vilamoura, Loulé | 10-v-2015   | 5     | 2      |         |         |                     |
| Quinta do Rosário, Lagoa             | 17-v-2015   | 9     |        |         |         |                     |
| Parque Ambiental de Vilamoura, Loulé | 2-iv-2016   |       |        | 3       | 3       |                     |
| Parque Ambiental de Vilamoura, Loulé | 9-iv-2017   | 2     |        | 2       | 1       |                     |

suggesting that Algarvian populations fly rather early when compared with other European populations.

The *Libellula fulva* exuviae collected and the tenerals seen only until mid-April suggest that this species emerges in a short period of time and all the tenerals mature at the same time. After mid-April only similar *Trithemis annulata* exuviae were collected in the same places. This observation suggests a synchronized emergence as reported by STERNBERG & BUCHWALD (2000).



Figure 3. *Libellula fulva* (male), 22-iii-2014, Vilamoura. – Abbildung 3: *Libellula fulva* (Männchen), 22.03.2014, Vilamoura. Photo: NF



Figure 4. *Libellula fulva* (exuvia), 2-iv-2016, Vilamoura. – Abbildung 4: *Libellula fulva* (exuvia), 02.04.2016, Vilamoura. Photo: NF



The habitat preferences of *Libellula fulva* in the Iberian Peninsula are little known, but in France data suggest it favours stagnant and slow flowing waters with muddy substrates (DOMMANGET 1987; SCHRIDDE & SUHLING 1994) as observed in the Algarve study sites.

Although reed habitats are rare in the Algarve it is possible that in the future new populations of *Aeshna isoeles* and *Libellula fulva* can be found, but they are unlikely to be numerous. Due to the small size of the populations of both species it is urgent to develop inventory and monitoring plans to assess the real size and the ecology of both species in the Algarve, in order to achieve a management plan that ensures the conservation of these dragonflies in the region.

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