**Zygonyx torridus (Kirby 1889) in Almeria Province**

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**SUMMARY**

In 2016, *Zygonyx torridus* was recorded for the first time in the Province of Almeria. This population, which was thriving, is almost 80 km east of the nearest siting which is in Malaga Province.

**RESUMEN**

La especie *Zygonyx torridus* fue avistada por primera vez en la provincia de Almería en el año 2016. Esta población, muy abundante, se localizó a casi 80 km al Este de la más próxima conocida, ubicada en la provincia de Málaga.

**INTRODUCTION**

**LIFE HISTORY AND ENVIRONMENTAL REQUIREMENTS**

The Ringed cascader, *Zygonyx torridus* (Kirby, 1889), is an Ethiopian species ranging throughout sub-saharan Africa; it is also found in parts of the Middle East, Iran and the Indian sub-continent (Boudot & Kalkman, 2015). The genus *Zygonyx* comprises large dragonflies of the family Libellulidae, which are restricted to fast flowing water, where the males can be found relentlessly patrolling riffles and waterfalls in

**REFERENCES**

their search for females. *Z. torridus* lay their eggs either alone or in tandem (Martens, 2015) and often in quite shallow water. In summary, *Z. torridus* requires warm, base-rich waters.

In addition, it can be noted that *Z. torridus* is a large dragonfly and, when present, the males are amongst the easiest species to spot and identify; their behaviour, hovering over fast flowing stretches allows their dark bodies and yellow markings to be seen very easily. This is an unmistakeable European dragonfly (Fig. 1). Further, the male insects demonstrate enormous stamina in their patrolling. Fons Peels and Bob Buckler (pers comm.) observed individual males on the Rio Guadiaro patrolling for more than 4 hours without a rest. Photographing this insect can be quite a challenge. Flight shots are possible (Fig. 1) as the males hover frequently; however, if you want posed individuals, it is probably best to wait until the end of the day when the males do succumb to fatigue and can be pictured.

*Figure 1:* Two views of an adult male *Z. torridus* showing the dark bodies with conspicuous yellow markings. Photo Anthony Winchester.
DISTRIBUTION OF Z. TORRIDUS IN IBERIA

The current distribution of Z. torridus in Iberia is concentrated in two areas (Outomuro et al., 2011). The first is along the Rio Jucar and its tributaries in the Provinces of Valencia and Cuenca. The second is the river systems of western Andalucia in Malaga and Cadiz Provinces including the Rios Guadiaro, Guadalhorce and Guadalete. Both areas have two factors in common: i) The mean annual temperature is greater than 12.5 degrees C. (Steinhauser 1970); ii) The maximum elevation at the source of these rivers is generally 1,500 m a.s.l. and below.

Figure 2 provides a topographical map of the Provinces of Granada and Almeria and highlights the high elevations of the Sierras which dominate these provinces. The majority of the rivers in the area shown on Figure 2 are either non-permanent of have their sources at high altitude in excess of 2,000 m a.s.l.

This paper deals with the new record from Almeria, which appears to contradict the environmental conditions outlined above.


Figure 3 shows the topography of western Almeria Province. In addition, it shows the man adapted hydrology which so greatly influences the area. This part of Almeria, in particular the coastal areas, is dominated by greenhouses, ancient and modern, which I refer to as “Los Plasticos”. These form part of a 100 billion Euro industry providing vegetables to northern Europe during the winter months; they cover the landscape in a spectacular fashion (Fig. 4). Most of the water for this industry was originally provided by deep wells, now virtually exhausted. Water is now provided by means of reservoirs or embalses as well as desalination plants.

One of the most important reservoirs for the western part of the Province is the Embalse de Beninar, which was completed in 1983 and takes its waters from the Rio Alcolea. This is one of many streams that are sourced in the Sierra Nevada, which is the highest mountain range on mainland Spain with 5 peaks in excess of 3,000m (Wikipedia). The water from this reservoir is transported by means of pipeline to “Los Plasticos”. There is an outfall from the reservoir which only flows during times of flood (Fig. 5A).
Figure 5. Aquatic ecosystems around the locality of *Z. torridus* in the Almeria Province. (Fig. 5A) Embalse de Beninar water storage and outfall. Fuentes de Marbella from roadbridge (Fig. 5B) looking north (Fig. 5C) looking south. (Fig. 5D) Feeder stream above the main river. (Fig 5E) The river pool approximately 500 m south of the Fuentes de Marbella. Photos Christina Chelmick.
ZYGONYX OBSERVATIONS AT THE FUENTES DE MARBELLA IN 2016

The town of Berja (Fig. 3) is well known for its Fuentes (springs), indeed, one of its attractions is a walking tour visiting the best examples. One such Fuente, a few kilometres west of the town emerges along the outfall channel from the Embalse de Beninar. It rises just north of the roadbridge and is known as the Fuentes de Marbella (Fig. 3) (hereinafter referred to as the Fuentes). This becomes the Rio Adra which flows south to the coastal town of Adra and, from my own observations, is permanent for only about 9 km south of the Fuentes.

THE 2016 SURVEY

On 20th May 2016, I visited the Fuentes. The reason for this visit was that this it is one of only three sites in Almeria for *Orthetrum nitidinerve*, a local dragonfly of the family Libellulidae (Torralba et al., 2011). I did not find this species, indeed the habitat looks quite unsuitable.; however, I did find 5 exuviae of *Z. torridus*. To my amazement this species had never previously been recorded in Almeria. The habitat of the Fuentes is shown in Figs. 5B & 5C. The water flows strongly and is devoid of aquatic vegetation other than some areas of algae in the deeper slower flowing pools. Emergent vegetation is dominated by reeds (*Arundo donax*). Beneath the roadbridge are large boulders. Three of the exuviae were found on the stems of reeds and two on the large boulders.

During 2016 I made four further visits to the Fuentes: 29 & 30 June. The males of *Z. torridus* were conspicuous on both days. All obvious habitats (fast flowing rifles) were occupied by adult males; indeed, they were also holding territories over the pools with no discernible flow. I walked upstream to the feeder channel (Fig. 5D) some 150 m north of the roadbridge. Even on this man made channel *Z. torridus* was holding territory. I also observed pairs at two locations north of the roadbridge. The habitat was at maximum density, indeed I have never before seen such numbers outside of the UAE/

Oman. Approximately 500 m downstream from the roadbridge, a track provides access to the stream which forms a large pool (Fig. 5E). *Trithemis kirbyi* was abundant here but there was no sign of *Z. torridus*.

26th September. No observations of *Zygonyx*; indeed, despite good weather conditions very little was present on the stream. The most conspicuous feature on this visit was the amount of litter including paper and huge numbers of plastic bottles. Clearly this beauty spot is used during the summer months by local people as a swimming and picnic area.

9th November. No observations of *Zygonyx* despite good weather conditions. *Aeshna mixta* was the only notable addition.

EXUVIAE RECOLECTION

Figure 6 shows the *Z. torridus* exuviae collected. They are extremely diverse in colour indicating the wide variation in substrate occupied by the larvae. In UAE/Oman the exuviae are mainly encountered on vertical rocks and boulders; there is very little emergent vegetation in this region. At the Fuentes, the emergence points were equally favoured between the stems of reeds (*Arundo donax*) and the river boulders (Fig. 7).
OTHER ADULT OBSERVATION

Table 2 shows the species observed at the Fuentes other than Zygonyx. The dominant species were Anax parthenope, Orthetrum chrysostigma and Trithemis kirbyi. Calopteryx haemorrhoidalis was very common but only at the Fuentes.

<table>
<thead>
<tr>
<th>Species / Visit</th>
<th>20-May</th>
<th>29-Jun</th>
<th>30-Jun</th>
<th>26-Sep</th>
<th>09-Nov</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zygonyx torridus</td>
<td>5</td>
<td>12</td>
<td>23</td>
<td></td>
<td></td>
<td>40</td>
</tr>
<tr>
<td>Trithemis kirbyi</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Orthetrum chrysostigma</td>
<td>5</td>
<td></td>
<td>1</td>
<td>3</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Calopteryx haemorrhoidalis</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>14</td>
</tr>
</tbody>
</table>

Table 1. Exuviae collected on 2016 visits. As can be seen Z. torridus were by far the most numerous exuviae found.

<table>
<thead>
<tr>
<th>Species / Visits in 2016</th>
<th>20-May</th>
<th>29-Jun</th>
<th>30-Jun</th>
<th>26-Sep</th>
<th>09-Nov</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anax imperator</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Anax parthenope</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>B*</td>
<td></td>
</tr>
<tr>
<td>Aeshna mixta</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F</td>
</tr>
<tr>
<td>Crocothemis erythraea</td>
<td>P</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orthetrum brunneum</td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orthetrum chrysostigma</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trithemis annulata</td>
<td>P</td>
<td></td>
<td></td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>Trithemis kirbyi</td>
<td>F</td>
<td>B*</td>
<td>B</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>Calopteryx haemorrhoidalis</td>
<td>F</td>
<td>F</td>
<td>B</td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td>Ischnura graellsi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>P</td>
</tr>
</tbody>
</table>

Table 3. Adult observations made at the Fuentes and the river pool approximately 500 m downriver (F – only at Fuentes, P – only at Pool, B – on both locations). Exceptionally numerous species highlighted (*).
FURTHER NOTE: RIO ALMANZORA

On 12-Nov-2015 I was on an expedition along the Rio Almanzora in search of an historical wetland called the Laguna de la Albojaira (Fig. 2, "Possible Record"). The search took most of the day; it was quite arduous and produced little result. We walked back along the Rio, which has the appearance of a Middle eastern river with shallow riffles, huge rock outcrops, deep pools and hardly any emergent vegetation (Fig. 8). Late in the afternoon and in typical habitat, I caught a brief glimpse of what I could only conclude was *Z. torridus*. This cannot be taken as a definitive sighting but the area does warrant further research. The question is whether this is a permanent river. It was flowing well in November 2015 but quite dry for large stretches at the same month in 2016. Figure 2 shows that the river has a large embalse (Embalse de Cuevas de Almanzora) and, from the many valves along the river bed, the river is subject to intensive management. Further work is needed to demonstrate whether *Z. torridus* is a resident.
ACKNOWLEDGMENT

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Keywords: Spain, Andalusia, Almeria, Zygonyx torridus.

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Photo Anthony Winchester.