

**SOME OBSERVATIONS OF *MACROMIA SPLENDENS* (PICTET) IN ANDALUCIA, SPAIN
(ANISOPTERA: MACROMIIDAE)**

D. CHELMICK

31 High Beech Lane, Haywards Heath, West Sussex, RH16 1SQ, United Kingdom;
dgc@davidchelmick.com

Abstract. – The occurrence of *M. splendens* in southern Spain is discussed; it appears to be well established on the Guadiaro river system in Andalucia. Adult, exuviae and larval observations are included. Its status on other southern Spanish river systems remains uncertain and more research work is required.

Introduction

Macromia splendens is the only European representative of a family of dragonflies, Macromiidae, which occur in Asia, Africa and North America. It is extremely local with rather specialised habitat requirements. Historically its known stronghold was southeastern France but in recent years it has been found at a number of sites in Portugal (CHELMICK & MITCHELL, 1996; MALKMUS, 2002). It has recently been discovered in northwestern Spain (CORDERO RIVERA, 2000). Its status in southern Spain was uncertain. There is a record of two larvae collected on the Guadalquivir river system in the 1980s, albeit with no details of dates or specific locality (FERRERAS ROMERO,

1988). There is an additional record also of two larvae from Rio Tavizna North of Ubrique in Andalucia (FERRERAS ROMERO, 1983). The third and most recent record is from a survey of the Rio Hozgarganta within the Parque Natural los Alcornocales also in Andalucia (AGUERO PELEGRIN et al., 1998). This latter paper gives little information other than that *M. splendens* occurs in two localities in Andalucia. The Guadalquivir river system is one of the largest in southern Spain traversing northern Andalucia and reaching the sea SW of Seville. The Rio Tavizna is a tributary of the Guadalete which runs West, reaching the sea at Cadiz. The Rio Hozgarganta is a tributary of the Rio Guadiaro which runs South, meeting the sea between Estepona and Gibraltar. These three river systems are not connected.

Between 2 October and 5 June I made four visits to the Guadiaro river system; in 2004 and 2005 the visits concentrated upon the Rio Hozgarganta. The Guadiaro is a large river which is in flow for most of the year; it has a number of dammed stretches which are used for the small

scale provision of Hydro Electric Power (HEP). In other areas it is a typical rocky river with deep sluggish stretches bordered by alders (*Alnus glutinosa*), tamarisk (*Tamarix sp.*), willows (*Salix sp.*) and large unidentified trees. The Rio Hozgarganta is a tributary of the Guadiaro. Above the town of Jimenez de la Frontera the river is wide with deep stretches bordered by oleander (*Nerium oleander*), alders and other scrub. In the 18th century the river was dammed approximately 500 m upriver of the town in order to provide water via a canal to the bomb making factory immediately adjacent the river; this industry provided the canon balls for the shelling of Gibraltar. The enterprise failed, due mainly to the irregularity of the water supply, in or around 1780. The remains of the dam can still be seen and continue to hold back water to provide some of the deepest stretches of the river. These and other deep stagnant pools are all that remain of the river during the summer months. The Genal is also a tributary of the Guadiaro. At the road bridge below the town of Gaucin the river is wide and shallow, bordered by low scrub and with extensive stretches of gravel islands. There is a dammed area near the road bridge which is used as a swimming pool.

Observations of larvae

Larval sampling has not featured prominently in the survey work. Three larvae have been found on the Rio Hozgarganta. The first was a final instar (F-0) larva taken at the base of a large sedge in shallow water on 30 April 2003; this insect was clearly ready for emergence. Apart from this last record, larval sampling has been carried out whilst floating in the river using a lifebelt. On 8 July 2004, I spent the morning searching for larvae around tree roots and along the banks of the river where exuviae had previously been found. This search was carried out using a 300 mm diameter sieve and produced no larvae other than two *Oxygastra curtisii* (Dale). On 4 June 2005, I spent two hours searching for larvae, this time using a 300 mm diameter handled net and concentrating on the river bottom. Two larvae were taken in a combination of sand and leaf detritus at a depth of approximately 1.5 m and approximately 3.0 m from the bank.

Observations of exuviae

Exuviae of *M. splendens* were only found on the Rio Hozgarganta at 6 separate sites over a distance of approximately 2.0 km. the preferred emergence sites were overhanging boughs of trees or branches where the insect could hang horizontally. As an alternative, the larvae used the surrounding scrub. Exuviae were found between 0.45 and 0.60 m above the water surface. Emergence sites were all in shady areas where the sun only penetrated for a short period during the day. Exuviae were found using the life-belt flotation technique. Access from the bank was impossible due to the impenetrable nature of the vegetation and the fact that the banks dropped steeply into the water. The minimum depth of an emergence site was approximately 1.0 m (one site), the remaining sites were all between 1.5 m and 2.5 m deep. At all emergence sites I collected the anisopteran exuviae and in order to show the associated fauna I show the results below together with similar collections made in Portugal in 1995 (CHELMICK & MITCHELL, 1996).

- Site A – Hozgarganta 4 sites collected between 4 & 6 July 2004: *Gomphus graslini* (21), *Gomphus pulchellus* (13), *Macromia splendens* (8), *Boyeria irene* (8), *Onychogomphus forcipatus* (7), *Gomphus simillimus* (4), *Oxygastra curtisii* (3), *Trithemis annulata* (2), *Sympetrum striolatum* (1), *Paragomphus genei* (1).
- Site B – Hozgarganta 5 sites (3 from previous year + 2 new sites) collected between 31 May & 6 June 2005: *Gomphus pulchellus* (43), *Gomphus graslini* (31), *M. splendens* (22), *Oxygastra curtisii* (21), *Gomphus simillimus* (4), *Trithemis annulata* (2).
- Site C – River Ceira near Coimbra in Portugal. Two sites on the river were examined on 10 & 11 July 1995: *Gomphus graslini* (26), *Oxygastra curtisii* (8), *Boyeria irene* (8), *Gomphus pulchellus* (7), *M. splendens* (4), *Gomphus simillimus* (4), *Onychogomphus uncaus* (4), *Orthetrum coerulescens* (1).

At all sites the exuviae had obviously been present for some time; some had started to disintegrate; some were headless; spider's webs were present around many of the specimens; where the exuviae were found covered in mud and detritus this was solid indicating that had taken

place much earlier than the collection time.

Observations of adults

– Hozgarganta – In 2004, the observations took place between 4 & 8 July and no adults of *M. splendens* were seen. During the entire period of the visit strong winds limited adult activity. In 2005, observations were undertaken between 29 May and 9 June. As mentioned above the exuviae appeared to have been present for quite some time. No emergence or evidence of recent emergence of *M. splendens* was seen.

On the Hozgarganta fully adult *M. splendens* were observed, albeit fleetingly, between 1 and 4 June 2005. Two of the sightings were immediately above the derelict dam along the deepest stretches of the river (3.0 m+ deep). The insects were seen along the shady side of the river whilst the author was searching for exuviae. The other observations were along the Arroyo de Canuelo which is a small tributary stream no more than 1 m wide and very choked with vegetation mainly rushes and sedges. The junction with the Hozgarganta is close to the dam. Within 50 m of the junction there is a large deep pool approximately 10 m in diameter. One *M. splendens* exuviae was found here in 2004. On 3 June 2005 one fleeting observation of an adult insect was made along this valley. On the same day a female was disturbed at the deep pool; again but a fleeting observation.

– Genal – On 6 June 2005 at 6:00 pm we visited the Rio Genal at Gaucin. The weather was sunny and warm. The river here is rather open with few surrounding trees and appears unsuitable as habitat for *M. splendens*. Soon after our arrival I had fleeting views of a female *M. splendens* investigating a short deep shady stretch of the river. This insect then moved down river approximately 30 m and oviposited four or five times into an area of vegetation just north of a dammed area used as a swimming pool. The insect then disappeared.

– Guadiaro – The Guadiaro has an impressive bridge at El Colmenar providing access from Gaucin to Estacion Gaucin; the bridge is currently being rebuilt and an alternative route (the desvio) has been provided. This desvio crosses the river just below the village of El Colmenar using large pipe sections acting as culverts over-

lain with a serviceable road. The desvio bridges the river immediately up river of a small HEP station. The river here is about 20 m wide and flanked on both sides with scrub, mainly tamarisk. From the moment I arrived at 11:00 am on 8 June 2005, I observed males holding territory. One insect flew regularly along the down-river bank of the desvio on a fairly regular beat of approximately 20 m length. Flight was fairly constant at about 1.0 m above the water surface. The insect often flew into the culverts presumably in its search for females. On one occasion the paths of *M. splendens* and *Oxygatra curtisi* crossed, *M. splendens* was briefly chased off by its smaller relative. The males remained until approximately 13:30. During this time no females appeared, copulation was not observed.

Discussion

All of the sites where exuviae were found and larvae collected on the Hozgarganta were from deep stretches of river that every year become isolated pools during the summer months. In 2005 this was particularly evident as water levels were substantially lower than in 2004. Local residents state that the river “dries up” in the summer months. In any event little water other than the deep pools remain. Adults were observed only where large and sluggish pools were present either naturally occurring depressions in the rivers or at human created areas such as swimming pools or near HEP dams.

On the Rio Hozgarganta *Gomphus pulchellus* was the commonest exuviae found. This is a species associated with still water usually in lakes and large ponds (ASKEW, 2004). On the Rio Ceira in Portugal, *Gomphus graslini*, an exclusively riverine species (ASKEW, 2004) was dominant. The river Ceira is a typical slow flowing permanent river quite unlike the Rio Hozgarganta.

Exuviae were found (with only one exception) in areas that remained in the shade for the bulk of the day. Larvae were found adjacent shaded banks. The only larvae collected during my survey were taken from the river bottom, my searches amongst tree roots etc proved fruitless. The larva collected on 30 April 2003 was close to the water surface and clearly ready to emerge. In July 2004, no adult observations were

made. Fully adult insects including ovipositing females were only observed from 1 to 8 June 2005.

Conclusion

There can be no doubt that *M. splendens* is more widely distributed in Spain than current records support; its inaccessibility as a species contributes to its 'documented' rare status. In addition, human activities, in creating dammed areas for HEP or other uses, have greatly assisted *M. splendens* in its ability to survive in this region. A great deal more research is needed to establish this insect's true status on other southern Spanish river systems. In addition, a monitoring system is required to measure the effects of environmental and climate change upon its known habitats.

References — AGUERO PELEGRIN, M., A.F. HERRERA GRAO & M. FERRERAS ROMERO, 1998, *Almoraima* 19: 241-248; — ASKEW, R.R., 2004, *The dragonflies of Europe* (2nd edn), Harley Colchester; — CHELMICK, D. & P. MITCHELL, 1996, *Notul. odonatol.* 4: 121; — CORDERO RIVERA, A., 2000, *Int. J. Odonatol.* 3: 73-83; — FERRERAS ROMERO, M., 1983, *Boln Asoc. esp. Ent.* 6: 395; — 1988, *Odonatologica* 17: 121-126; — MALKMUS, R., 2002, *Nachr. naturw. Mus. Aschaffenburg* 106: 144-147; — 2003, *Natur Mus., Frankf.* 133: 207-212.

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