Studies on Iberian Dragonflies. *Adv. Odonatol.*, Suppl. 1: 9-12

Dragonfly records from the Sierra de la Demanda and the Sierra de Urbión, Spain, with notes on habitat and altitudinal range

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At 15 mountainous habitats a total of 31 spp. was recorded. Several spp. occurred at unusually high altitudes: *Lestes virens* (Charp.), *Aeshna cyanea* (Müll.) and *Crocothemis erythraea* (Brullé). *Coenagrion pulchellum* (Vander L.) is newly introduced to the fauna of the Iberian Peninsula.

Introduction

On several short journeys through central Spain we explored a number of dragonfly habitats in the Sierra de la Demanda and the Sierra de Urbión. From a review on the current knowledge of Odonata distribution in Spain (OCHARÁN LARONDO, 1987), it became clear that the northern part of the Iberian mountains, covering parts of the Burgos, Logroño and Soria provinces, was - and is - still poorly known. Special attention was paid to high altitude habitats (above 1500 m) which have not been well studied in Spain (ANSELIN, 1985). This article gives a review of our observations, together with some data from J.-P. Boudot (Vandoeuvre-les-Nancy, France), with notes on the habitats and altitudinal range.

Material and methods

Study area. The study area is situated between the Spanish towns of Burgos, Logroño and Soria, covering parts of the three provinces with the same name. The Sierra de la Demanda and the Sierra de Urbión form the northern part of the *Sistema Ibérico*, one of the two most important Iberian old-fold ranges formed during Hercynian folding and composed of rocks of the ancient crystalline core. They are known to be of great botanical interest as they act as refuges for montane and alpine plants, and as centres of diversification of recent species (POLUNIN, 1973).

Both ranges possess several mountains above 2000 m, with San Lorenzo (2265 m) and Pico de Urbión (2229 m) the highest peaks. The Sierras, and in particular the Sierra de Urbión, are well wooded with extensive forests of *Pinus sylvestris* and, at higher altitudes, mixed forest with *Fagus sylvatica*. The numerous small and often boggy lakes or 'lagunas' are an important geological feature, witnesses of the glacial activity in the past. They represent interesting dragonfly habitats.

The region has a semi-humid climate, with cold winters and warm summers. Precipitation is relatively high (800-1200 mm/year) compared to the much drier surrounding Meseta (300-600 mm/year), but lower than, for instance, the Pyrenees (> 1600 mm/year). The Río Duero has its source on the western slopes of the Pico de

Urbión and flows, as do most of the rivers of the range, towards the Atlantic Ocean. Several rivers from the northern and eastern slopes are part of the Ebro watershed and flow to the Mediterranean.

List of localities. 15 different localities were studied, 8 of them with flowing water, 7 with standing water. For each site the name and location are given together with the province, altitude, area (if known) and a short description of the habitat. Localities 1 and 9 were visited by J.-P. Boudot, localities 2-15 by the authors.

1. Río Urria, between Huerta de Abajo and Huerta de Arriba (Burgos): 1181 m, small river.
2. Río Zumel, near Regumiel de la Sierra (Burgos): 1100 m, rivulet in a meadow, about 4 m wide and 50 cm deep, shallow, sandy and gravel parts with *Callitriche*.
3. Laguna Negra de Urbión (Soria): 1600 m, rivulet (2 m wide), flowing out of the lake. Very shallow (30 cm) with boggy parts (*Sphagnum*).
4. Río Revinuesa, north of Vinuesa (Soria): 1200 m, river, 8 m wide, fast flowing but shallow in parts with floating *Ranunculus* sp. present, open banks with scattered *Salix* shrubs.
5. Río Duero, at Molinos de Duero (Soria), 1095 m, river, 10 m wide, slow flowing with well developed floating *Ranunculus* vegetation, and low shrubs and herbage on the banks.
6. Río Duero, at Covaleda (Soria), 1200 m, river, 15 m wide, slow flowing in a meadow, banks with little vegetation, some *Typha* stands and small areas of floating *Ranunculus*.
7. Río Lobos, north of Ucero (Soria), 1000 m, river, 15 m, slow flowing, with well developed vegetation on the banks and in the water: *Scirpus lacustris*, *Typha*, *Nuphar lutea*, floating *Ranunculus*.
8. Arroyo de Lavater, near Pajares (Logroño), 1200 m, small rivulet with sparse vegetation on banks.
9. Lagunas Altas de Neila: Laguna Larga and Laguna Negra (Burgos), 1950 m, shallow to deep glacial lakes, 10.8 ha and 12.5 ha resp., with floating *Sphagnum* patches.
10. Laguna Brava (Burgos), 1900 m, glacial lake, deep, 1.5 ha, with some *Typha* and floating vegetation, rocky shores.
11. Las Pardillas, near the Mirador de Neila (Burgos), 1900 m, three glacial lakes, very shallow with peatbogs (*Sphagnum*), *Juncus* and *Erica* vegetation.
12. Forest pond, between Quintanar de la Sierra and Laguna Negra de Neila (Burgos), 1200 m, small lake in open forest, boggy with *Juncus*, *Spaghnum* and *Erica* vegetation.
13. Laguna Helada, above the Laguna Negra de Urbion (Soria), 2000 m, shallow glacial lake,with *Spaghnum* bog.
14. Laguna Negra de Urbión (Soria), 1700 m, large glacial lake, probably very deep, with rocky shores and little vegetation (some sedges).
15. Playa Pita, Embalse de la Cuerda del Pozo, near Molinos de Duero (Soria), 1000 m, sandy shore of large artificial lake (dam of Río Duero), some sedges.

Observation period: Our data were collected during three periods: 29-31 July 1986, 17-18 July 1989 and 13-15 September 1989. Each site was well searched for at least one hour. The data of J.-P. Boudot were collected on 21 July 1990. The weather on all observation days was warm and sunny.

Results

A total of 31 species was recorded. In the following list, the numbers between brackets refer to the locality. Details on date, abundance and activity (cop=in copula; ovi=oviposition) are provided.

Calopteryx splendens xanthostoma: (1): 21.07.; (5): 17.07. 10+, cop, ovi; (6): 18.07. 10+, cop, ovi; (7): 29.07. 10+.
C. virgo meridionalis: (1): 21.07.; (2): 18.07. 50+, cop; (4): 17.07. 10+, ovi; (8): 31.07. 1-5.
Lestes dryas: (1) 21.07.; (12): 18.07. 100+, cop, ovi.
L. sponsa: (5): 17.07. 10+; (9): 21.07., 18.07. 10+; (11): 18.07. 10+.
L. virens: (11): 18.07. 2 males.
Platycnemis latipes: (2): 18.07. 5+; (7): 29.07 1-5.
Pyrrhosoma nymphula: (1): 21.07.; (2): 18.07. 10+; (3): 17.07. 1-10; (6): 18.07. 10+; (9): 21.07.; (12): 18.07. 10+; (13): 17.07. 10+.
Cercion lindenii: (7): 29.07. 10+, ovi.
Coenagrion puella: (5): 17.07. 50+.
C. pulchellum: (8): 31.07. 1 male.
C. scitulum: (9): 21.07.

Ischnura graellsii: (1): 21.07.; (7): 29.07. 1 male.
I. pumilio: (15): 17.07. 1 male.
Enallagma cyathigerum: (5): 17.07. 10+; (6): 18.07. 10+; (9): 21.07., 18.07. 10+; (10): 18.07. 1-5; (11): 18.07. 50+; (14): 17.07. 5-10, cop; (15): 17.07. 10+.
Onychogomphus forcipatus: (7): 29.07. 1-5
O. uncatus: (1): 21.07.; (4): 17.07. 1; (8): 31.07. 1-5.
Boyeria irene: (4): 17.07. 2.
Aeshna cyanea: (13): 17.07. 1-5.
A. juncea: (9): 21.07.; 18.07. 5-10; (11): 18.07. 1-5; (12): 18.07. 2; (13): 30.07. 1 teneral.
Anax imperator: (4): 14.09. 1; (7): 29.07. 1.
Cordulegaster boltonii: (1): 21.07.; (2): 18.07. 1-5, ovi; (3): 17.07. 2; (4): 17.07. 3; (8): 31.07. 1; (12): 18.07. 1.
Libellula depressa: (1): 21.07; (2): 18.07. 1; (11): 18.07. 1; (13): 17.07. 2.
L. quadrimaculata: (3): 17.07. 5; (8): 31.07.; (9): 21.07.; (10): 18.07. 2; (11): 18.07. 5-10; (12): 18.07. 10+, teneral; (13): 17.07. 5+.
Orthetrum brunneum: (1): 21.07.
O. coerulescens: (1): 21.07.; (7): 29.07. 1; (8): 31.07. 1; (15): 17.07. 1 male, 1 teneral.
Crocothemis erythraea: (13): 30.07., 2 male.
Sympetrum flaveolum: (2): 18.07. 5-10; (3): 17.07. 5-10; (9): 21.07.; (11): 18.07. 5-10; (12): 18.07. 1-5.
S. fonscolombii: (13): 17.07. 5-10.
S. meridionale: (9): 13.09. 1 male.
S. sanguineum: (3): 13.09. 5-10; (9): 21.07., 18.07. 10+.
S. striolatum: (7): 29.07. 1 teneral.

Discussion

We explored a total of 15 sites finding 31 dragonfly species. The short observation period (only nine days, almost all in July) was insufficient to give a complete idea of the fauna present, although July is certainly one of the best months to collect data in these mountains. The higher parts are snowclad until well into June, and from mid-September onwards, the weather can again become unsuitable for dragonflies.

The presence of *Coenagrion pulchellum* is most surprising, because OCHARAN (1989) excluded it from the Iberian checklist. There are several records in older publications, but his critical examination revealed errors of identification in all cases. Thus our record has to be regarded as the first in the Iberian Peninsula.

Calopteryx splendens xanthostoma, Calopteryx virgo meridionalis and *Cordulegaster boltonii* were all well represented in the running water habitats, but another fairly common species, *Boyeria irene,* was only observed at one such locality. Some widespread and common species, such as *Ischnura graellsii, Platycnemis latipes, Cercion lindenii* and *Anax imperator* were confined to just a few localities, all with running water and none above 1200 m. They were absent from the higher and colder standing water sites. The altitudinal range of some species is remarkable. *Crocothemis erythreae* and *Lestes virens* are considered as 'lowland' species in Europe, generally not occurring above 1200 m (DOMMANGET, 1987; ASKEW, 1988). However, *C. erythraea* has been observed breeding above 2000 m in north Africa (ASKEW, 1988). LOPEZ GONZALES (1983) who has worked in the mountains of the Madrid region, found *C. erythraea* at an altitude of 1300 m and *L. virens* at 1730 m. We found them at altitudes of 2000 m and 1900 m respectively. *Aeshna cyanea* was also observed at 2000 m, which is high for this species.

The dragonfly fauna of the different glacial lakes with their peatbogs and fringing vegetation is without doubt interesting, especially in 'isolated' ranges as the Sierra de la Demanda and the Sierra de Urbión, and certainly needs further study. It is not unlikely that some more 'northern' species, as *Somatochlora metallica* or *Leucorrhinia dubia,* may occur in this region.

Acknowledgements

We wish to thank Dr. Jean-Pierre Boudot who provided his data from this region, and Drs. Jan van Tol who identified a very damaged teneral of *Aeshna juncea*..

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Received: 30.08.95
Revised and Accepted: 15.09.95