

**LIFE HISTORY OF THE SPECIES THAT MAKE UP  
THE ODONATE ASSOCIATION CHARACTERISTIC  
OF A PERMANENT STREAM  
IN THE WESTERN MEDITERRANEAN BASIN :  
PRELIMINARY RESULTS**

M. FERRERAS-ROMERO

Departamento de Biología Animal (Zoología),  
Facultad de Ciencias, Universidad de Córdoba,  
Avenida San Alberto Magno s/n,  
ES-14004 Córdoba, España

Larvae and exuviae of three semivoltine Anisoptera were collected during three years (1988-1990) from a permanent stream in the Sierra Morena (southern Spain). It seems that each species exhibits a different life-history pattern. *Cordulegaster boltoni* is a typical spring species and *Boyeria irene* is a typical summer species in the sense defined by Corbet. The life-history pattern of *Onychogomphus uncatus* is less clear.

Since May 1988, odonate larvae have been collected monthly from a permanent stream in the Sierra Morena (southern Spain) situated at 400 m a.s.l. During the flight season, exuviae were also collected. The coordinates of the stream where this study has been carried out are 37° 56' N, 4° 52' W. *Onychogomphus uncatus* (Charpentier), *Boyeria irene* (Fonscolombe) and *Cordulegaster boltoni* (Donovan) are the most abundant species. This association is typical of permanent streams in mid sized mountains in the western Mediterranean Basin (JARRY & VIDAL, 1960 ; FERRERAS-ROMERO, 1984).

The results obtained show that the three are semivoltine species, but each exhibit a different life-history pattern. The smallest larvae (head with < 0.6 mm) of *O. uncatus* and *C. boltoni* have been collected in autumn-winter, thus neither species spends the first winter as egg. On the contrary, the smallest larvae (head width < 1.7 mm) of *B. irene* appear in May-June, and are of the right size to have hatched in March, thus must be a species with overwintering egg.

F-0 larvae of *C. boltoni* have been collected every months (Fig. 1), except some June and July's samples (adult emergence season), which indicates that *C. boltoni* is a typical spring species (*sensu* CORBET, 1954, 1962). The sudden appearance in numbers of F-0 larvae in March and April of *B. irene*, and the abundance of larvae in instars between F-1 and F-3 in autumn-winter (Fig. 2), indicates that *B. irene* is a typical summer species (*sensu* Corbet 1954, 1962). Exuviae of *C. boltoni* are being found from mid April to September ; exuviae of *B. irene* are being found from second half May to September. Both species have maximum emergence in June (Tab. 1).

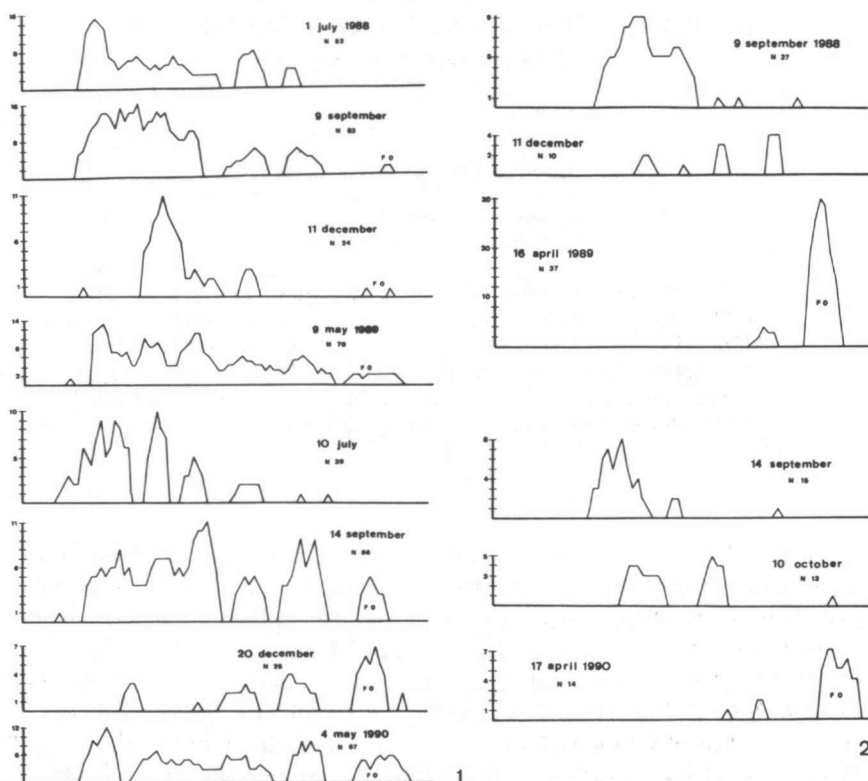


Fig. 1. *Cordulegaster boltoni* : Head-width frequency distributions of larval samples from stream Bejarano, smoothed by a moving average of five. F-0 = final-instar larvae.

Fig. 2. *Boyeria irene* : Head-width frequency distributions of larval samples from stream Bejarano, smoothed by a moving average of five. F-0 = final-instar larvae.

Table I  
Relative abundance of odonate exuviae by month in stream Bejarano (southern Spain). 1991\* until August 8, 98% estimated.

Species		N	Late- April	Early- May	Late- May	Early- June	Late- June	Early- July	Late- July	Early- August	Early- Septemb.
<i>Calopteryx haemorrhoidalis</i>	1989	(0)									
	1990	(6)									
	1991	(3)			0.33	0.17 0.33	0.50	0.33	0.33		
<i>Onychogomphus uncatus</i>	1989	(2)									
	1990	(0)									
	1991	(2)						0.50		0.50	
<i>Aeshna cyanea</i>	1989	(1)									
	1990	(1)									
	1991	( )							1.00		1.00 1.00
<i>Boyeria irene</i>	1989	(345)			0.05	0.19	0.45	0.24	-	0.04	0.03
	1990	(192)			0.04	0.27	0.43	-	0.16	0.10	
	1991*	(675)		0.003	0.12	0.33	0.26	0.16	0.08	0.01	
<i>Cordulegaster boltoni</i>	1989	(148)	0.01	0.16	0.18	0.24	0.22	0.14	-	0.07	0.02
	1990	(226)	0.01	0.03	0.04	0.31	0.28	-	0.23	0.02	0.03
	1991*	(471)	0.004	0.07	0.24	0.16	0.24	0.13	0.11	0.02	

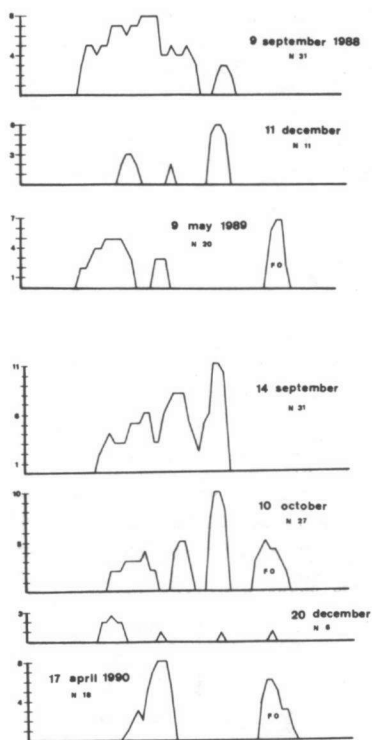


Fig. 3. *Onychogomphus uncatus*: Head-width frequency distributions of larval samples from stream Bejarano, smoothed by a moving average of five. F-0 = final-instar larvae.

The life-history pattern of *O. uncatus* is less clear. During autumn and winter, in many samples, some F-0 larvae (few, generally) have been collected. Sudden appearance of F-0 larvae from March-April to May has been recorded (Fig. 3). Only two exuviae (July 10 and August 1, 1989) have been collected. This life-history may exemplify a event of species transition bridge between spring and summer species (Paulson & Jenner 1971).

#### ACKNOWLEDGEMENTS

I am very grateful to Professor Philip S. Corbet for his interesting and helpful comments about these preliminary results.

#### REFERENCES

- CORBET, P. S., 1954. Seasonal regulation in British dragonflies. *Nature, Lond.* 174 : 655.
- CORBET, P. S., 1962. *A biology of dragonflies*. Witherby, London.
- FERRERAS-ROMERO, M., 1984. The odonate communities associated with distinct aquatic environments of the Sierra Morena (Andalusia), Spain. *Notul. Odonatol.* 2 (4) : 57-61.
- JARRY, D. & D. VIDAL, 1960. Introduction à l'étude écologique des odonates de la région Montpelliéraine. *Vie et Milieu* 11 : 261-283.
- PAULSON, D. R. & C. E. JENNER, 1971. Population structure in overwintering larval Odonata in North Carolina in relation to adult flight season. *Ecology* 52 (1) : 96-107.