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CONSIDERATIONS ON CANNIBALISM IN ZYGOPTERA

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Abstract — Literature on the cannibalism in Zygoptera is reviewed and it is hypothesized that cannibalism may result from a situation in which intraspecific communication has failed. This is supported by the analysis of the evidence hitherto brought on record in the suborder.

Introduction

June 25, 1976 I observed a mature female of *Ischnura elegans* (Vander L.) feeding upon a conspecific mature male, while perching near a pool at Marina di Ugento, near Lecce, Puglia, Italy. This observation has induced the considerations outlined in the present note.

Considerations and Discussion

MOORE (1952) suggested that cannibalism in Odonata may result from a diverted sexual drive after an attempt at mating has failed. This hypothesis implies that (1) only mature males may act as intraspecific predators, and

Table I — Records of intraspecific predation in Zygoptera

Species	Predator	Prey	References
Ceriagrion melanurum	mature ♂	teneral ♀	YAMAMOTO, 1971; pers. comm. 1977
	mature ♂	unknown	AOYANAGI, 1973; pers. comm. 1977
Ischnura elegans	mature ♀	teneral ♂	MÜLLER, 1972
	mature ♀	mature ♂	this note
I. verticalis	mature ♀	teneral ♂	
	mature ♀	teneral ♂	BICK, pers. comm. 1979
	mature ♀	teneral ♀	
Enallagma civile	mature ♂♂, ♀♀	tenerals	BICK & BICK, 1963
Pyrrhosoma nymphula	adults	tenerals	CORBET, 1962
Archilestes grandis	mature ♂	tenerals	BICK, pers. comm. 1979
Indophaea dispar	adults	tenerals	FRASER, 1934
Hetaerina americana	adults	adults	BICK & SULZBACH, 1966

(2) that a sexual drive may quickly turn into a feeding drive.

As apparent from the scarce evidence on the phenomenon in Zygoptera (cf. Tab. I), Moore's hypothesis, the only one so far available on the subject in dragonflies, is not satisfactory in the case of Zygoptera. Firstly, not only male individuals, but also females may act as intraspecific predators and secondly, a quick change of a sexual drive into a feeding drive is highly improbable and of little adaptive value, though a detailed study on this is still lacking.

It is well-known that mature zygopteran females refuse mating by a threat display (cf. e.g. BICK, 1966). A similar threat display is performed by perched males as well, if approached by an individual of the same species (PAJUNEN, 1966), having in this latter case the function of preventing the physical contact between individuals.

I have observed newly emerged coenagrionids, either struck or approached by mature individuals, or disturbed by the observer, lowering the whole body along their perch and moving towards the opposite side of the same. This may indicate that they are unable to perform the adult threat display, possibly due to their immature stage. Tenerals are protected against disturbance from mature individuals by structural and behavioural adaptations (cf. CORBET, 1962). Although these are, on the whole, very effective, it may happen that an hungry adult meets a teneral individual. In this case the latter, if aggressed upon as a prey, would not be able to inhibit the predator from approaching, being incapable of performing the threat display.

As far as cannibalism in mature zygopterans is concerned, it should be emphasized that no case is known of a mature male preying upon a mature female, while the reverse is possible, as evidenced by the observation recorded in the present note. As an explanation I should like to suggest a hypothesis based on a reasoning analogous to that applied when mature individuals prey upon tenerals.

Generally, at the reproductive sites there are more mature males than females, and usually females are seized in tandem as soon as they appear at water. This, however, is not the case in *Ischnura elegans*, where numerous mature and teneral females may be observed near water (PARR, 1973). In this species, female aggressiveness is so low that very little disturbance is caused to the males by the females. It is not unlikely that this may be a general rule in Zygoptera and, therefore, one would be tempted to assume that the correct response to the threat display, i.e. retreating away from a threatening individual, might be lacking in the zygopteran females. As far as I was able to ascertain, no case of dragonfly female retreating from a threatening male has ever been placed on record. Therefore, should a female act as a predator versus an adult individual of the same species, in no way "she" could be inhibited by the threat display of the latter, since "she" lacks the correct response to the threat display.

In this connection, of particular interest are two records of a female *Argia moesta*

(Hag.) preying upon an *A. plana* Calv. male (Dr. G.H. Bick, pers. comm., 1979). The threat postures of the Coenagrionidae are often effective also between individuals of allied species.

If this is true, one should expect that a mature female may act as a conspecific predator versus individuals of any stage (mature and teneral individuals of both sexes), while a mature male would prey only upon tenerals, but not upon mature females. It is obvious that for the confirmation of this hypothesis many more observations will be needed.

In conclusion, cannibalism in the Zygoptera might be considered as an aspect of ordinary predation in which the prey is not recognized as conspecific, since it is either unable to show a proper display (the tenerals) or the predator lacks the adaptation to respond to the display (the mature females).

References — AOYANAGI, M., 1973, *Kontyû* 41: 241-253; — BICK, G.H., 1966, *Proc. ent. Soc. Wash.* 68: 271; — BICK, G.H. & J.C. BICK, 1963, *SWest Nat.* 8: 57-84; — BICK, G.H. & D. SULZBACH, 1966. *Anim. Behav.* 14: 156-158; — CORBET, P.S., 1962, *A biology of dragonflies*, Witherby, London; — FRASER, F.C., 1934, *Fauna of British India, Odonata*, 2. Taylor & Francis, London; — MOORE, N.W., 1952, *Behaviour* 4: 85-100; — MÜLLER, K., 1972, *Odonatologica* 1: 51-52; — PAJUNEN, V.I., 1963, *Ann. ent. fenn.* 29: 236-239; — PARR, M.J., 1973, *Odonatologica* 2: 159-174; — YAMAMOTO, Y., 1971, *Nature & Insects* 6: 11.

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