

SHORT COMMUNICATIONS

NEW EXTERNAL MORPHOLOGICAL CHARACTERS FOR
DISTINGUISHING LARVAE OF *ENALLAGMA CYATHIGERUM*
(CHARPENTIER) AND *ISCHNURA ELEGANS* (VANDER LINDEN)
(ZYGOPTERA: COENAGRIONIDAE)

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External morphological characters are described which permit larvae of the 2 spp. to be distinguished reliably in most, and perhaps all, instars without injuring or killing specimens. The characters occur on the head, thorax, abdomen and caudal lamellae.

INTRODUCTION

The small coenagrionids *Enallagma cyathigerum* (Charpentier) and *Ischnura elegans* (Vander Linden) are common throughout most of Europe where they frequently occur together in a wide variety of standing waters. Unlike *I. elegans*, which is confined to the Palaearctic Region and extends from western Europe to Japan, *E. cyathigerum* is circumboreal and in the Nearctic Region may coexist with other species of *Ischnura* (e.g. PILON, 1980).

In the many habitats, principally in northern Britain (see HAMMOND, 1983), in which the only other Zygoptera are *Lestes sponsa* (Hansemann) and *Pyrrhosoma nymphula* (Sulzer) (both of which are easily recognised as larvae) it can be especially useful to be able to distinguish larvae of *E. cyathigerum* and *I. elegans*. Hitherto the external characters proposed for this purpose have been on the caudal lamella (LUCAS, 1925, 1930) and the labial palpus (GARDNER, 1954).

The characters on the caudal lamella are the relative extent of spiniform setae on upper and lower margins (GARDNER, 1954, p. 161, couplet 2) and the shape

and pattern of the whole lamella (GARDNER, 1954, p. 169, figs 23, 26): the ratio of length to width; the relative obtuseness of the tip; and the presence or absence of 1-3 narrow, transverse, pigmented bands. These characters are, however, too variable in expression to be useful (see also WALKER, 1953, pp. 119-120, for discussion of corresponding difficulties encountered in distinguishing northern Nearctic species of *Enallagma* and *Ischnura*), partly because lamellae frequently become detached and because replacements, while regenerating, can look atypical.

The character on the labial palpus is the presence in *E. cyathigerum*, but not in *I. elegans*, of a small spine on the outer margin, slightly proximal to the base of the movable hook (GARDNER, 1954, p. 170, figs 28, 29). This character is reliable for diagnosis of *E. cyathigerum* in larvae as small as 5 mm long (excluding antennae and caudal lamellae), these being the smallest larvae we have been able to examine for this character; but to detect this spine requires the use of high magnification and almost always entails irreparable physical injury to the larva being examined.

Here we describe four external morphological characters which serve reliably to distinguish larvae of *E. cyathigerum* and *I. elegans*, down to a length of 7.6 mm, these being the smallest larvae examined by us for these characters, without having to use high magnification and without injuring the specimen. The larvae we examined came from Angus and Perthshire (in Scotland) and Shropshire (in England) and included fresh as well as preserved material.

After completing this study we learnt that the second of these characters (as listed below) had recently been used by YOUNG (1986) to distinguish larvae of these two species in intermediate and late instars (headwidth 1.8 and 3.4 mm respectively; equivalent length approximately 9.5 and 13.5 mm).

THE CHARACTERS

The new characters, and the magnification required to discern them in the penultimate or final larval instars, are listed below in descending order of ease of use.

ABDOMEN (X20)

At the anterolateral corners of the dorsum of each segment, except I, 9 and 10, a small, but clearly discernible, dark-brown spot is present in *I. elegans* but not in *E. cyathigerum* (Fig. 1, A). When, as often happens in preserved specimens, the segments are slightly telescoped, the anterior part of each segment lying slightly within the posterior part of its neighbour (as illustrated in Fig. 1, A), the spots are nevertheless clearly discernible through the overlying cuticle. Though always unequivocal, this character is more conspicuous in younger, paler larvae.

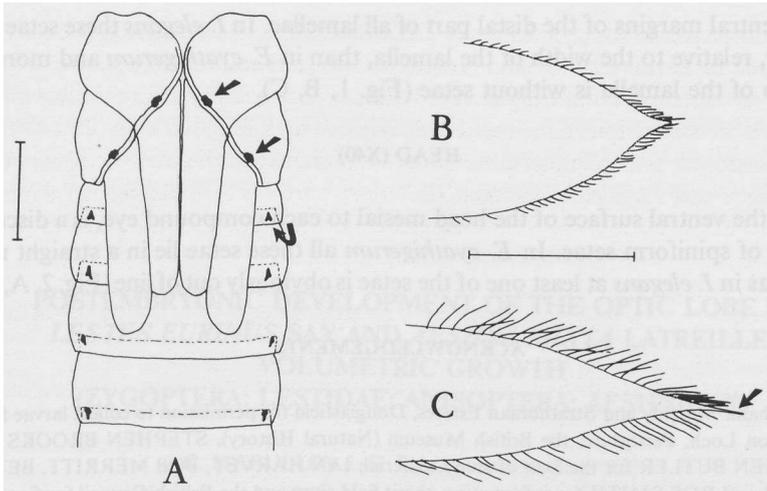
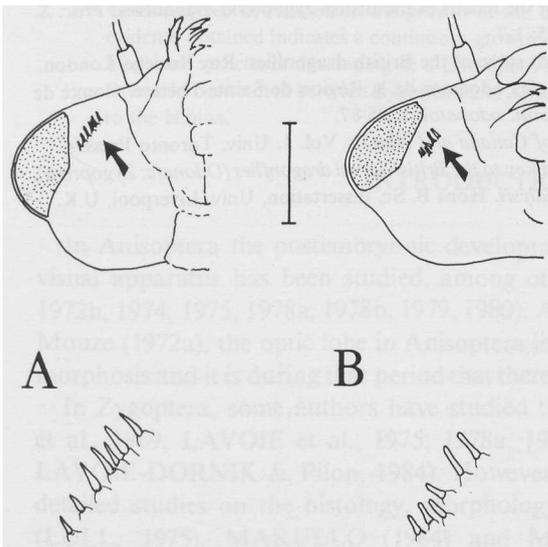


Fig. 1. (A) Dorsal view of part of thorax and abdomen of penultimate-instar larva of *Ischnura elegans* showing segmental dark-brown spots (indicated by arrows) which are absent in *Enallagma cyathigerum*. — (B, C) Distal part (about 1/5 of lamella length) of median caudal lamella of penultimate-instar larva, lateral view, showing length and distribution of setae on the margins; in *E. cyathigerum* (B), unlike *I. elegans* (C), these setae are relatively short and extend almost to the tip of the lamella. Scale line: 1 mm.

THORAX (X20)



On the dorsal (mesial) ridges of the meso- and metathorax, close to the origin of each wing-sheath, a conspicuous dark-brown spot is present in *I. elegans* but not in *E. cyathigerum* (Fig. 1, A).

CAUDAL LAMELLAE (X20)

In both species piliform (hair-like) setae line the dorsal

Fig. 2. Ventral view of right side of head of penultimate-instar larva showing group of spiniform setae which form a straight row in *Enallagma cyathigerum* (A) but not in *Ischnura elegans* (B). Scale line: 1 mm.

and ventral margins of the distal part of all lamellae. In *I. elegans* these setae are longer, relative to the width of the lamella, than in *E. cyathigerum* and more of the tip of the lamella is without setae (Fig. 1, B, C).

HEAD (X40)

On the ventral surface of the head mesial to each compound eye, is a discrete group of spiniform setae. In *E. cyathigerum* all these setae lie in a straight row whereas in *I. elegans* at least one of the setae is obviously out of line (Fig. 2, A, B).

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