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ISCHNURA PERPARVA MCLACHLAN (ZYGOPTERA: COENAGRIONIDAE) HAS AN ANDROMORPHIC FEMALE, AND ANOTHER SUGGESTION TO MODIFY THE TERMINOLOGY OF FEMALE COLOR POLYMORPHISM IN ODONATA

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This paper is dedicated to Philip S. Corbet on the occasion of his 70th birthday.

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Polymorphism in *Ischnura perparva*

There is considerable theoretical interest in the polymorphism shown by females of some species of Odonata (Johnson, 1975 Robertson, 1985 Hinnekint, 1987 Cordero, 1992; Fincke 1994). This polymorphism is especially conspicuous in many species of *Ischnura*, in which it is correlated with other traits (Robinson & Allgeyer 1996). Robinson & Allgeyer (1996) and Westfall & May (1996) listed all 12 North American *Ischnura* species as polymorphic, with the exception of *I. demorsa*, *I. hastata*, *I. perparva*, and *I. posita*, which were considered monomorphic.

However, I recently examined all 235 female *I. perparva* in my collection and found two andromorphic individuals, along with 16 immature (orange) gynomorphic, 216 mature (pruinose), and one clearly intermediate between the last two. The andromorphic females were collected in Washington state, from a pond 0.5 mi E Beverly, Grant Co., 5 August 1972, and a lake west of Lower Hampton Lake, Grant Co., 27 July 1973.

The andromorphic females, both quite young, differ from my sample of gynomorphic immatures and the detailed description of the female by Kennedy (1915) in three ways, involving both color and pattern. First, although the markings are similar, the pale color of the head, thorax, and legs is light tan, paler and duller than the rather bright orange characteristic of gynomorphic females. In that, it is similar to the coloration of very young males.

Second, the pale color on abdominal segments 8-10 is light blue rather than the orange characteristic of gynomorphs, although it is patterned much the same, with a black U-shaped marking on the dorsum of segment 8, black basal dorsolateral spots on segment 9, and no black markings on segment 10.

Third, the basal abdominal segments are extensively black above. The dorsum of segment 1 is black in its basal one-third in one specimen, mostly black in the other. The dorsum of segment 2 is black from base to tip, but the black narrows almost to the midline at about mid segment and again narrows just before the posterior black ring. The dorsum of segment 3 is entirely black, the black narrowing almost to the midline at two-thirds length in one specimen. This is strikingly different from the gynomorph

females, in which segments 1-2 are entirely orange, and segment 3 is orange except for the black distal one-fourth.

These differences are similar to those of other species of *Ischnura*, which typically exhibit an orange vs. a blue or green morph (Westfall & May 1996).

It is possible that andromorphs of this species, as they mature, look identical to gynomorph females, as is the case in the rather similar *I. demorsa* (Johnson 1966). If this were the case, they would be detectable only when immature. Females undergoing the transition from the orange immature to the pruinose mature stage are virtually never seen in this species, and immature females are seldom seen, indicating either that the change is very rapid or that they are especially secretive. Thus determining the frequency of andromorphs may depend on large-scale rearing, as was done for *I. demorsa* by Johnson (1966).

The finding of andromorphic females in this species does not in any way contradict the conclusions of Robinson & Allgeyer (1996), as the species in their Group 1 are both monomorphic and polymorphic.

Terminology for polymorphic females

As there has been much discussion about the terminology of "typical" and "male-like" females in polymorphic odonates, with no satisfactory resolution, I take the risk of complicating the issue even more by suggesting still another pair of words, one of them newly coined, with the hope of arriving at terms that are both accurately descriptive and relatively brief. Although the term *polymorphism* has been used to describe the condition of discrete color variation, *polychromatism* is a more accurate description of this condition. In addition, females of two species of *Ischnura* are actually polymorphic in pronotum shape (Schmidt, 1967; Schneider, 1986); thus there is temptation to restrict the term "polymorphic" to such females.

However, I prefer to use "polymorphism" to describe color variation as well, as it is so used for other taxa throughout the scientific literature; thus the logical change to "polychromatism" in Odonata would put this literature at odds with that concerning other taxa. There is also some rationale in using "polymorphism," as the differences between females are caused by structural differences in pigment cells and granules, and these differences have been called "morphological" to contrast them with physiological color changes (O'Farrell, 1964). Finally, the familiar term morph is unlikely to be replaced by the coinage of a new term such as chrome.

Therefore, I suggest retaining the frequently used term *andromorphic* for "male-like" females, as is now well established in the odonate literature. The commonly used "heteromorphic" seems a particularly bad choice, as "hetero" merely means different, and the reader may ask "different from what?" I suggest as a substitute the term *gynomorphic* for "female-like" (defined by their duller, less blue coloration, typical of female odonates) females, and the meaning of the prefix in both words is thus quite clear. The corresponding nouns would be *andromorph* and *gynomorph*. These terms stem from the "androchromatypic" and "gynochromatypic" suggested by Hilton (1987), who discussed the problems with all previously used terms. Although Hilton's terms are logical and descriptive, they

are also lengthy and very different from previously used terms, which I think has precluded their usage.

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