SEXUAL DIFFERENCES OF THE FEEDING CLAWS AND MOUTHPARTS
OF THE FIDDLER CRAB, UCA ARCUATA (DE HAAN, 1833)
(BRACHYURA, OCYPODIDAE)

BY

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ABSTRACT

Morphological features of the minor claw and of the first and second maxillipeds of the fiddler crab, Uca arcuata were studied. Males have a claw with a longer dactylus and propodus than females, but differences are very small. No sexual difference was found in the width of claw. Males have a higher and deeper minor claw than females. There are no clear sexual differences in the numbers of hair-like setae that occur on the outer and inner surface of the minor claws. Sexual difference was observed in the length and width of the first and second maxillipeds. The total number of setae that occur on the anterior half of the inner surface of the second maxilliped was counted. No sexual difference was found. The total number and density of the setae that occur on the outer surface of the basal endite of the first maxilliped were examined. No clear sexual differences were found. In the width of the third maxillipeds, we found no sexual difference, either. Our results thus suggest that no sexual differences in the mouthparts exist yet, studies of feeding behaviour show, that females scoop 70% more frequently than males with two chelipeds, and that males collect 46% more substratum in one scoop than do females.

RÉSUMÉ

Les caractéristiques morphologiques de la petite pince et des premier et second maxillipèdes du crabe violoniste Uca arcuata ont été étudiées. Les mâles ont une pince dont le dactyle et le propode sont plus longs que chez les femelles, bien que la différence soit très faible. Aucune différence entre les sexes n’a été trouvée sur la largeur de la pince. Les mâles ont une petite pince plus haute et plus profonde que celle des femelles. Il n’y a aucune différence claire entre les sexes dans le nombre des soies fines présentes sur les surfaces interne et externe des petites pinces. Des différences ont été observées entre les sexes sur la longueur des soies de l’extrémité, mais pas dans leur nombre. Aucune telle différence n’a été observée dans la longueur et la largeur des premier et second maxillipèdes. Le nombre total de soies situées sur la moitié antérieure de la surface interne du second maxillipède a été compté. Aucune différence n’a été trouvée entre mâle et femelle. Le nombre total et la densité
des soies de la surface externe de l’endite basal du premier maxillipède ont été examinés. Là encore, aucune différence n’a été trouvée. Dans la largeur du troisième maxillipède, nous n’avons trouvé aucune différence entre les sexes. Nos résultats suggèrent qu’il n’y a aucune différence entre les sexes au niveau des appendices buccaux. Les études que nous avons menées sur le comportement nutritionnel de ces animaux montrent que les femelles ratissent avec les deux pinces 70% plus fréquemment que les mâles, mais que les mâles transportent 46% de substrat de plus que les femelles en un seul geste.

INTRODUCTION

The most characteristic morphological feature of the fiddler crabs of genus *Uca* is the presence of an extremely large cheliped in males. The cheliped of one side is developed enormously but the one on the opposite side is very small and there thus is a huge asymmetry in the chelipeds. Females have no large cheliped and have equal-sized, symmetrical, small chelipeds. The use of the large male cheliped is varied: in most species, males wave the large cheliped very actively in order to stimulate and entice females into their burrows (Crane, 1975). However, the large cheliped is not used in feeding. The food of fiddler crabs consists of small organisms and various organic substances (Altevogt, 1955a, b, 1957; Miller, 1961; Ono, 1965), bacteria, protozoans (Dye & Lasiak, 1986), and microalgae (Wolfrath, 1992) that are contained in the surface substratum of the habitat. Fiddler crabs scratch, pinch, or scoop the substratum with their minor chelipeds and carry it to their mouthparts.

In her monumental monograph dealing with the fiddler crabs in the world, Crane (1975) presented a collection of illustrations of the minor chelipeds. She explained the characteristics of the minor chelipeds as follows: “In comparison with the corresponding appendages of most other ocypodids, the minor chelipeds are almost as specialized as the majors in general shape and size. Minor chelipeds are notably similar in general characteristics within species groups, particularly in the width of the gape and in the relative size and characters of the armature on the prehensile edges. The narrowest gapes have a series of fine serrations and are characteristic of many mud-livers, such as Indo-Pacific *Deltuca* and American *Minuca*. Some female *Deltuca* and *Australuca* have a single enlarged tooth on both pollex and dactyl in at least one cheliped; no such enlargement is found in the male minor cheliped. Although the small cheliped is used in a number of ways, its primary function is undoubtedly that of carrying food to the mouthparts. Obvious adaptations to this role are the perfectly meeting, spooned tips of the chela and the serrations of the prehensile edges, especially in mud-living crabs that must lift wet and sticky substrate. Pellets composed chiefly of sand, on the other hand, are lifted in the basket of curved setae at the tip of a widely gaping chela”.