ALLOMETRIC GROWTH, HANDEDNESS, AND MORPHOLOGICAL VARIATION IN *POTAMONAUTES WARRENI* (CALMAN, 1918) (DECAPODA, BRACHYURA, POTAMONAUTIDAE) WITH A REDESCRIPTION OF THE SPECIES

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ABSTRACT

Some morphological relationships are investigated amongst three populations of *Potamonautes warreni* (Calman, 1918) and the species is redescribed. Differences between sexes as well as the growth of the carapace, chelipeds, and handedness are quantified. Sex ratios did not differ significantly from 1:1 among sites, and no differences in the carapace variables were evident between sexes. Both sexes were heterochelous, with the right chela usually being larger in males than in females. Sexual dimorphism is evident for the width of the abdominal somites. The functional significance of an enlarged right chela, and that of patterns of allometric growth are discussed. In addition, the structure of pleopod 1, mandibular palp, chelipeds, and the third maxilliped are described and illustrated. The distribution of *P. warreni* is re-examined and the species appears to be restricted to the Orange River System and its major tributaries such as the Vaal River in South Africa and Namibia.

RÉSUMÉ

Quelques relations morphologiques ont été étudiées chez trois populations de *Potamonautes warreni* (Calman, 1918) et l’espèce est redécrite. Des différences entre les sexes ainsi que la croissance de la carapace et des chélpèdes, la proportion de droitiers et gauchers, ont été quantifiées. Les sex ratios n’ont pas différé significativement de 1 : 1 sur les différents sites et aucune différence dans les variables de la carapace n’est évidente entre les sexes. Les deux sexes sont hétérochèles, avec la pince droite habituellement beaucoup plus grande chez les mâles que chez les femelles. Le dimorphisme sexuel est évident sur la largeur des somites abdominaux. La signification fonctionnelle d’une pince droite agrandie et celle des modèles de croissance allométrique sont discutées. De plus, la structure du péréiopode 1, du palpe mandibulaire, des chélpèdes et les troisièmes maxillipèdes sont décrits et illustrés. La distribution de *P. warreni* est réexaminée et l’espèce apparaît comme limitée au système de la rivière Orange et de ses principaux tributaires comme la rivière Vaal en Afrique du Sud et Namibie.
INTRODUCTION

Freshwater crabs of the family Potamonautidae are common in freshwater systems throughout South Africa (Barnard, 1935, 1950; Bott, 1955). All the freshwater crabs described from this region belong to the genus Potamonautes, which is the most speciose of the genera in this family (Cumberlidge, 1999). Calman’s (1918) original description of P. warreni was based on a female collected from Potchefstroom in Transvaal (now, North West Province), South Africa. The original description consisted of only a brief note on the carapace morphology, without any reference to the taxonomically-important gonopods, mandibular palp, maxillipeds, or chelipeds. As a result, the morphological features that distinguish P. warreni from other potamonautid river crabs remained unknown, warranting a more comprehensive description. More recently Daniels et al. (in prep.) noted that the dentition pattern commonly used to distinguish P. warreni from other freshwater crabs is highly variable among certain populations. These authors noted that the dentition pattern in this species may range from the presence of a single tooth to 5-10 well-defined teeth on the epibranchial corner of the carapace. Intraspecific patterns of morphological variation in this species have, however, not been investigated, and the degree of morphological variation among populations of P. warreni is consequently unknown. Few detailed morphometric studies of freshwater crabs exist. As in other heterochelous crabs, one claw is often enlarged, and generally thought to play a role in food acquisition and crushing. Yet, the functional significance of an enlarged cheliped in freshwater crabs has not been explored. In addition, the changes in overall body morphology have been poorly documented in this group. In the present study, morphological variation among populations of P. warreni is quantified and the diagnostic morphological features of this species are described and illustrated.

MATERIALS AND METHODS

A total of 249 Potamonautes warreni specimens of (118 males and 131 females) were collected from three geographical areas of the Orange River system. Group 1 is from the lower section near Upington, group 2 from Bothaville (Vaal River system), and group 3 from Bloemfontein (Vaal River system). The carapace and limbs were measured to the nearest 0.1 mm using digital calipers attached to a portable computer. The following measurements were taken: carapace length along the medial line (CL); carapace width at the widest part (CWW); distance between postfrontal crest and anterior margins of the carapace (PFCD); distance between medial margin of the orbits (ED); distance between the exorbital teeth (CWA); carapace height (depth) (CH); width of the fifth (AW5) and sixth (AW6)