

Potamonautid river crabs (Decapoda, Brachyura, Potamonautidae) of KwaZulu-Natal, South Africa

G Gouws* and BA Stewart

Department of Zoology, University of Stellenbosch, Private Bag X1, Matieland 7602, South Africa

Abstract

The recent descriptions of *Potamonautes dentatus*, *P. clarus* and *P. lividus* have brought the number of species recorded from KwaZulu-Natal (South Africa) to five, with *P. depressus depressus* and *P. sidneyi* having long been known from the province. To determine and quantify levels of genetic differentiation between these species, 14 populations were analysed using allozyme electrophoresis of 14 presumptive loci. Interspecific genetic identity-values ranged between 0.224 and 0.793 ($D = 0.233$ to 1.495), with between one and ten fixed allele differences present among species. Morphometric differentiation between species was examined using discriminant function analyses of seven carapace and eight pereiopod variables. Species were found to be well defined along the first two canonical variables, in terms of carapace and pereiopod morphometrics. Results are discussed in light of genetic and morphometric differentiation documented for the genus. The distribution of each species was determined, using data from 220 collection localities, plotted, and discussed. A key for the identification of the species occurring in the province is provided.

Introduction

River crabs are the largest invertebrates and constitute the largest biomass in many of South Africa's rivers (Hill and O'Keeffe, 1992). They are important prey items, forming the dominant component of the diet of the otter and water mongoose (Purves et al., 1991), many bird species (Arnell, 1979), and fish species. The crabs are, themselves, important detritivores; reducing the particle size of leaf litter and organic debris, presenting a source of nutrition to collector and filter-feeding river fauna, and enabling microbial activity (Hill and O'Keeffe, 1992). These crabs utilise energy from diverse trophic levels and contribute to energy and resource recycling within the river ecosystem (Hill and O'Keeffe, 1992).

Elsewhere in Africa, they are valued as a food source (Sachs and Cumberlidge, 1991; Cumberlidge and Clark, 1992). Freshwater crabs are also known to be vectors of parasitic disease, as the intermediate hosts of the fluke-worms, *Paragonimus uterobilateralis* and *P. africanus*, which cause paragonimiasis in humans (Cumberlidge, 1989; Sachs and Cumberlidge, 1991). Recently, work has been done investigating the use of crabs as indicators of aquatic pollution, particularly through heavy metals (Steenkamp et al., 1993; 1994).

Despite their importance in the river ecosystem, the group has not been researched thoroughly. Since the cataloguing work of Barnard (1935; 1950), Bott (1955) and, more recently, the revision by Kensley (1981), the freshwater crab fauna of South Africa has received little attention. These authors had documented five species of freshwater river crab from South Africa, all belonging to the family Potamonautidae.

In particular, the taxonomy and systematics of the group have remained obscure, largely due to the fact that classifications have been based on sparse and poor sampling, without an adequate understanding of the variation which is evident within the group. Furthermore, taxa have been defined, often arbitrarily, with the

apparent presence of intergrading, transitional forms being problematic (Rathbun, 1921; Barnard, 1935; 1950). Often distinctions were made based on the possession of extreme features, which could have been revealed as a series, with sufficient sampling localities and individuals (Barnard, 1935). A project was thus launched in 1992 to resolve the taxonomy of the group, by means of intensive collecting, and genetic and morphological analyses. Since its inception, four new species have been described from regions outside of KwaZulu-Natal (Stewart, 1997a; b; Stewart and Cook, 1998; Daniels et al., 1998a).

From the existing literature it is apparent that *Potamonautes sidneyi*, and *Potamonautes depressus depressus* have long been known to occur within KwaZulu-Natal (Krauss, 1843; Stebbing, 1910; Lenz-Lübeck, 1912; Barnard, 1935; 1950; Dandy and Ewer, 1961; Kensley, 1981). However, a number of other species have also been recorded from the province. Rathbun (1906) catalogued collections made at Port Natal (Durban), which included the type specimen of *Potamonautes inflatus*. This species was later synonymised with *P. depressus depressus* by Bott (1955), and subsequently confirmed by examination of the type specimen. A single specimen of *P. bayonianus dubius* var. *jallae* was collected at Howick Falls, near Pietermaritzburg and documented by Balss (1922). Barnard (1935), however, believed the specimen to be an outlier of *P. warreni* (a species believed to be restricted to the Orange River system), as the specimen showed reduced teeth on the anterolateral margin and resembled specimens of *P. warreni* collected from the former Transvaal. Balss (1936), however, defended his identification.

Dandy and Ewer (1961) listed *P. warreni* as occurring in KwaZulu-Natal, stating that, as the species had never been recorded from the region before, it was probably an invader from the Orange River. Colosi (1924) had earlier documented collections of *P. warreni* made at Port Natal. Barnard (1950) suggests that, as the collector (Wahlberg) had travelled to the Transvaal, there is reason to believe that the specimens were collected much further north. It is, however, probable that the *P. bayonianus dubius* specimen and the *P. warreni* specimens are specimens of *P. dentatus*, a species (also characterised by the possession of dentate anterolateral

*To whom all correspondence should be addressed.

☎(021) 808-3229; fax (021) 808-2405; e-mail: ggouws@akad.sun.ac.za
Received 25 July 1999; accepted in revised form 18 August 2000