ADDITIONAL REPORT ON ARMSTRONGS' SPIDER CRAB, *ENCEPHALOIDES ARMSTRONGI* WOOD-MASON & ALCOCK, 1891 (CRUSTACEA, DECAPODA, BRACHYURA, MAJIDAE) FROM PAKISTANIS WATERS

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Introduction

Encephaloides is a monotypic genus with only one species, E. *armstrongi*, now known to be widely distributed in both the Arabian Sea and Bay of Bengal (Wood-Mason & Alcock, 1891; Creasy *et al*, 1997). Its placement into subfamily Pisinae (Family Majidae) has been discussed by Griffin and Tranter (1986). It is one of the distinctive Indo-Pacific majids (Griffin, 1974), known to inhabit low oxygen waters. The genus and its species will be an addition to the crab list of Pakistan (Kazmi, 2003;). The paper includes a brief description, necessary illustrations with a note on its distribution and habitat.

Materials examined

A large number (not counted) of specimens of *Encephaloides armstrongi* were collected during commercial trawling operations on board two vessels FV "Hu Yu-823" and "Hu Yu-824" on 1 August, 2004 from a depth of 120m depth off Shumal Bundar (24°58'N; 63°10'E). Two specimens (males, cl+r = 28-35mm), are now donated to and housed in Marine Reference Collection and Resource Centre, University of Karachi (MRCC. cat.no. BRAC.753), the rest of the material is kept at the Marine Fisheries Department, Karachi.

Description: Carapace (Figs. 1-2) heart-shaped, greatest breath equals to length with the rostrum; carapace surfaces in larger specimens nodular or pustular, but coarsely spiny in younger specimens. Gastric, hepatic regions well-defined, cardiac, intestinal regions entirely concealed by greatly inflated, arched branchial regions, without any fusion of walls, down the median region. Rostrum beaked-shaped, about 1/4 carapace length with a finely serrated edge (Figs. 3A ,3B). Male abdomen distinctly seven-jointed (Fig. 3C), but female's fourth to sixth segments are immovably sutured together. Eyes small, slender, unpigmented, retracted against side of carapace. A very narrow supra-orbital eave ending anteriorly in a minute tooth with a small post-ocular spinule.

Fig. 1. Dorsal view of *Encephaloides armstrongi* Wood-Mason & Alcock ,1891.

Fig. 2. Ventral view of *Encephaloides armstrongi* Wood-Mason & Alcock ,1891.

Antennae, base of second joint of peduncle visible on either side of rostrum dorsally; hair-like flagellum hardly surpasses tip of rostrum (Fig. 3D). Efferent branchial canal is prolonged; frontal edge of buccal frame V-shaped. Merus of 3rd maxilliped ear-shaped (Fig. 3E).

Ambulatory legs all long, slender, cylindrical, quite devoid of hairs or spines. Chelipeds (Fig. 3F) short, stouter than ambulatory legs. First male gonopod (Fig. 3G) straight, with an elongated lobe on medial edge just before apex; aperture on anterior margin of lobe. Second male gonopod as illustrated (Fig. 3H).

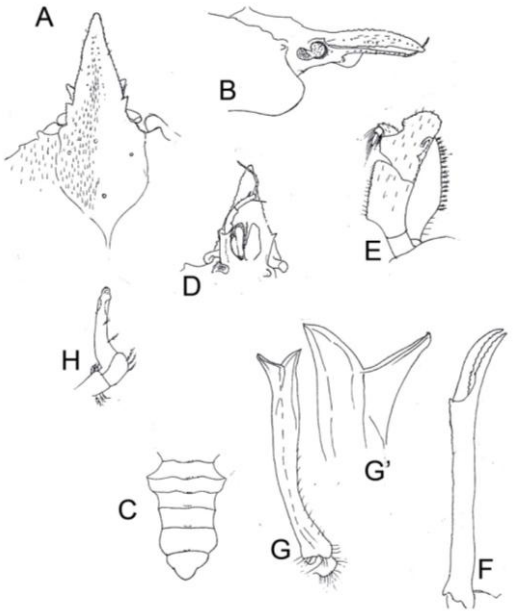

Fig. 3. ***Encephaloides armstrongi*** **Wood-Mason & Alcock ,1891. A) Rostrum and eyes, dorsal view; B) same lateral view; C) Abdomen; D) Antennae, in situ; E) Left third maxilliped; F) Chela; G) First male gonopod; G') First male gonopod tip, enlarged, sternal view; H) Second male gonopod.**

Remarks: The specimens from Pakistan agree well with the original (Wood-Mason & Alcock, 1891) and latter descriptions (Griffin, 1974). According to Griffin (1974), the very small specimens, measuring 10mm carapace length have the branchial region meeting anteriorly only, and a small medial spine is visible on the cardiac and intestinal regions. owever, in larger specimens (20mm (Griffins' material); 28mm, present material) the cardiac spine is still visible.

Habitat and Distribution: The specimens are all collected from North-east Indian Ocean, almost all specimens were male (Wood-Mason & Alcock ,1891). The species was described as having greatly swollen and enlarged gill chambers which Alcock (1902) has attributed to an adaptation to low oxygen concentrations in deep oceanic depths. Griffin (1974) collected International Indian Ocean Expedition specimens (88 in numbers) from depths between 170 and 311m from the Gulf of Oman. The occurrence of these spider crabs and other mega fauna in a special environment has attracted several workers. Bett (1995) who has discussed on the vertical distribution and density relationship of the species in the Arabian Sea (off Oman), noted their vast numbers in the oxygen minimum zone (37 individuals/m^2) at a depth of 985m. Smallwood *et al.* (1999) observed 47 individual/m^2 on the Oman margin, while Murty *et al.* (2009) reported 24–119 individual/m^2 along Oman margin at 1,000m depth.

Creasy *et al.*, (1997), in an elaborated account on population biology and genetics, indicated that *E. armstrongi* specimens were recorded from a depth of 150 to 650m but the major concentration was between the depths of 109 to 182m. Based on their detailed investigation, they suggested that population of *E. armstrongi* found at 150m represents a genetically distinct cohort whereas female of this species form a single pan mictic population between 300 and 650m. Male crabs, on the other hand, from two or more genetically distinct populations at depths of 300-650m. They further noted that this low oxygen tolerant species have male gender-bias dispersal, with the 300-650m populations representing spawning aggregations. The highly skewed sex ratio observed by Creasy *et al.,* (1997) in the oxygen minimum layer in Arabian Sea suggests of reproductive migration; this could be reason why Wood-Mason and Alcocks' material comprises of males only. It was also observed that juvenile population of *E. armstrongi* develops above the oxygen minimum zone in the Arabian Sea, while the adults are found within the area of oxygen minimum (Creasy *et al.*, 1997; Ramirez-Llodra and Olabarria, 2005). The present study materials were collected at a depth of 120m, with no mention of oxygen data. This spider crabs is an example in the Arabian Sea of extensive diversity of morphological and behavioral characteristics subject to selective processes of adaptation to low oxygen concentrations that inhabits dwelling structures to help regulate the environmental conditions in which it lives (Rogers, 2000)

Creasy *et al.,* (1997) further concluded that this species occurs in a continuous, band-like distribution, in the oxygen minimum zone, from the coast of Oman to the western coast of Myanmar in the northern Indian Ocean including Sri Lanka.

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