

TERRESTRIAL SCAVENGING BEHAVIOUR OF THE SINGAPORE FRESHWATER CRAB, *JOHORA SINGAPORENSIS* (CRUSTACEA: BRACHYURA: POTAMIDAE)

Daniel J. J. Ng and Darren C. J. Yeo*

Department of Biological Sciences, National University of Singapore

14 Science Drive 4, Singapore 117543, Republic of Singapore

(*Corresponding author: darrenyeo@nus.edu.sg)

ABSTRACT. — An individual of the Singapore freshwater crab, *Johora singaporensis*, was observed feeding on a dead mole cricket in a stream at the Bukit Timah Nature Reserve, Singapore. This observation illustrates the role of *Johora singaporensis* as a macrodecomposer. It shows the potential importance of terrestrial, i.e., allochthonous, sources of nutrients to the crab and to the stream ecosystem it inhabits.

KEY WORDS. — Bukit Timah Nature Reserve, freshwater decapod crustacean, Potamidae, Singapore

INTRODUCTION

The Singapore freshwater crab, *Johora singaporensis* Ng, 1986, is endemic to a few hill streams in Singapore (Ng, 1986, 1990; Yeo et al., 2008). Listed by International Union for Conservation of Nature as critically endangered (Esser et al., 2008), it was recently listed among the top 100 most threatened species in the world (Baillie & Butcher, 2012). The species is primarily aquatic and may be externally distinguished from other freshwater crabs in Singapore by its numerous short interspersed hairs throughout its body (Ng, 1988; Fig. 1). Despite the significance of this species, both globally and locally—as an icon of Singapore’s national and natural heritage (Yeo et al., 2008; Tan et al., 2010), little is known about its ecology. In contrast, there is more information regarding its zoogeography (Yeo et al., 2007) and taxonomy (Ng, 1988). Here, we present an account of scavenging behaviour by an individual of the Singapore freshwater crab feeding on a mole cricket.



Fig. 1. Frontal view of the Singapore freshwater crab, *Johora singaporensis*. (Photograph by: Daniel Jia Jun Ng).

OBSERVATIONS

On the night of 30 Jun.2012 (ca. 2140 hours) at the Bukit Timah Nature Reserve, an adult individual of *Johora singaporensis* (estimated carapace length ca. 20 mm) was observed out of water, and hiding in a crevice between two boulders. It was slowly feeding on a mole cricket (*Gryllotalpa* species; estimated body length ca. 30 mm; Figs. 2, 3). The mole cricket appeared to have been dead for some time as ants (probably *Pheidole* species) were also observed swarming around it, and even carrying one severed limb away. After five minutes of observation, the crab retreated back to the water while still holding onto the mole cricket (Fig. 4).



Fig. 2. A Singapore freshwater crab tearing off flesh from a mole cricket carcass, while ants are moving one limb of the mole cricket away (circled). (Photograph by: Daniel Jia Jun Ng).



Fig. 3. Close-up of a Singapore freshwater crab with mole cricket's flesh in its mouthparts (circled). (Photograph by: Daniel Jia Jun Ng).



Fig. 4. A Singapore freshwater crab in the water while still holding on to its food. (Photograph by: Daniel Jia Jun Ng).

DISCUSSION

Freshwater crabs are generally regarded as scavengers and omnivores (Dominey & Snyder, 1988; Hill & O’Keeffe, 1992; Harrison, 1995). Direct observations of their diet in the wild are uncommon but they have been noted to feed predominantly on plant materials, which are most readily available in the natural environment (Dominey & Snyder, 1988; Ng, 1988; J. J. D. Ng, pers. obs). As they can shred leaf matter efficiently, and detritus comprises the bulk of their diet (Hill & O’Keeffe, 1992; Abdallah et al., 2004), freshwater crabs are probably important in energy transfer between different trophic levels and play an essential role as shredders and macrodecomposers in certain freshwater ecosystems (Dobson, 2004).

In captivity, *Johora singaporensis* has been noted to prefer animal matter to plant matter, possibly a result of the higher nutritional value of the former (Ng, 1988). Based on anecdotal observations, this crab has been recorded to feed mainly on plant detritus as well as on oligochaetes found in the soft mud, while in the water (Ng, 1987, 1988; J. J. D. Ng, pers. obs.). Larger individuals are also known to cannibalise their smaller counterparts (Ng, 1987; J. J. D. Ng, pers. obs.). As *Johora singaporensis* is primarily aquatic (Ng, 1987, 1988, 2008), this observation of an individual feeding on a dead terrestrial insect carcass out of water is unusual and has not been previously reported. Mole crickets are subterranean insects that are highly specialised for burrowing, and their sizes range from 30–50 mm (Chopard, 1968; Townsend, 1983). They feed largely on the roots of plant, with some species being important plant pests (Ulagaraj, 1975). To the best of our knowledge, the diets of freshwater decapods have not been known to include mole crickets.

Although there is a small possibility that the mole cricket was opportunistically subdued and predated upon by the *Johora singaporensis*, we believe that this is unlikely as the orthopteran is larger and more mobile than the crab, and it can escape by digging, jumping or moving through its network of burrows if such a threat occurs. Hence, it is more likely that the crab chanced upon the dead mole cricket while foraging out of the water, and opportunistically fed on the carcass. This observation highlights the potential importance of terrestrial allochthonous nutrient inputs to freshwater crabs and to the stream ecosystem. It shows the need to protect the surrounding riparian/terrestrial zone in addition to the immediate aquatic environment for the conservation of this critically endangered species.

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