

THE ABBREVIATED LARVAL DEVELOPMENT
OF THE FRESHWATER PRAWN, *MACROBRACHIUM MALAYANUM*
(ROUX, 1934) (DECAPODA, PALAEMONIDAE),
REARED IN THE LABORATORY

BY

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INTRODUCTION

Of the 13 species of *Macrobrachium* that have so far been reported from Malaysia and Singapore by Johnson (1962, 1966, 1968) complete or partial life histories of only five are known: *M. rosenbergii* (De Man, 1879) (cf. Ling & Merican, 1961; Uno & Kwon, 1969), *M. equidens* (Dana, 1852) (cf. Nguyen, 1976), *M. lanchesteri* (De Man, 1911) (cf. Tay, 1968), *M. sintangense* (De Man, 1898) (cf. Sabar, 1979), and *M. lar* (Fabricius, 1798) (cf. Atkinson, 1977).

The life histories of the remaining 8 species—*M. pilimanus* (De Man, 1879), *M. malayanum* (Roux, 1934), *M. geron* Holthuis, 1950, *M. javanicum* (Heller, 1862), *M. latidactylus* (Thallwitz, 1891), *M. idae* (Heller, 1862), *M. scabriculum* (Heller, 1862), and *M. trompii* (De Man, 1879)—are not known.

The late Prof. D. S. Johnson was the first to record *M. geron* from Singapore and Peninsular Malaysia. The material identified by him as *M. geron* was found to be identical with specimens recently collected by the authors from the same areas. The identity of the authors' specimens was later confirmed by Prof. L. B. Holthuis (Rijksmuseum van Natuurlijke Historie, Leiden) who first described *M. geron* in 1950. However, the authors' recent examination of the type material of *M. malayanum*, originally described as a subspecies of *M. pilimanus* (cf. Roux, 1934), from Basel Museum in Switzerland and the Zoological Reference Collection (formerly the Raffles Museum Collection) in Singapore showed that they are identical with *M. geron*. Therefore *M. geron* is synonymised with *M. malayanum* and the correct name for the species should be *M. malayanum* (Roux, 1934), since Roux's name is senior to Holthuis'. Henceforth, all specimens from Singapore and Peninsular Malaysia previously identified as *M. geron* should now be referred to *M. malayanum*. Details of this synonymy will be discussed in another paper.

Recently, the authors collected large numbers of *M. malayanum* from streams in Bukit Timah Hill and Nee Soon swamp forest (both localities in Singapore),

including numerous berried females. The larvae obtained from these females were reared under laboratory conditions and the complete larval development traced. Their development was found to be of the highly abbreviated type (*sensu* Sollaud, 1923).

This paper describes the morphology of the zoeal, megalopal, and juvenile stages of *M. malayanum* and represents the first confirmed report of a *Macrobrachium* with highly abbreviated development from the South East Asian region. Previously, abbreviated larval development in *Macrobrachium* had been reported from Japan and Taiwan (Shokita, 1973, 1977, 1978), and India (Jalihal & Sankolli, 1975). Comparisons are also made with the *Macrobrachium* species in which abbreviated larval development is known, and their relationships discussed.

MATERIALS AND METHODS

Berried females were collected from streams on the northern face of Bukit Timah hill (ca. 100 m altitude) and Nee Soon swamp forest, both localities in Singapore, and maintained in the laboratory. They were kept individually in plastic tanks (19 × 12 × 13 cm) in 3 cm of water with aeration.

Newly hatched larvae were individually transferred into cylindrical plastic vials of 9 cm diameter with 1 cm of water. Zoeal and megalopal stages were not fed as they had internal yolk reserves. Juveniles were fed with young *Tubifex* worms. Water temperature varies between 28°C and 30°C.

Samples of larval stages were removed daily and preserved in 70% EtOH. Drawings, descriptions and measurements were based on 5 specimens of each stage. All drawings were made with the aid of a Nikon SMZ-10 binocular microscope with a drawing tube, and camera lucida mounted on a Leitz monocular microscope. Measurements were made with an objective micrometer set. Body length was measured from the post orbital margin to the posterior edge of the telson, excluding setae. The naming of the larval and juvenile stages follows that of Shokita (1973).

OBSERVATIONS

The newly spawned eggs of females were almost round and dark green in colour. These gradually became larger and more elongated, measuring on the average 1.75 by 1.35 mm, with the colour changing to orange and then to a translucent light brown just before hatching. The newly hatched larvae are benthic and their pleopods non-functional. The larvae pass through two zoeal and one megalopal stages before moulting to the juvenile.

DESCRIPTION OF STAGES

First zoea (figs. 1A, 2). — Duration: 1 day. Size: body length ca. 4.30 mm, carapace length ca. 1.15 mm. Characteristics: Eyes sessile; antennal flagellum