POPULATION DYNAMICS OF THE RIVER PRAWN, *MACROBRACHIUM AMAZONICUM* (HELLER, 1862) (DECAPODA, PALAEMONIDAE) ON COMBU ISLAND (AMAZON ESTUARY)

BY

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ABSTRACT

This study estimates reproductive parameters (length at first maturity, reproduction period, and fecundity), mortality, and maximum sustainable yield for *Macrobrachium amazonicum* on Combu Island (Amazon estuary). Samples were taken monthly between March 2003 and February 2004. Ovigerous females were recorded throughout the year, with reproductive peaks in the middle of the flood period (March), in the low water period (September), and the peak dry period (December) of the Guamá River. The size at which 50% of the females were mature was 60.8 mm TL. Absolute fecundity varied between 40 and 3375 eggs per female. The exploitation rate for maximum sustainable yield (EMSY) for males was lower than that for females. For both sexes, EMSY was below the exploitation rates (E). The present study demonstrates the need for management of the prawn fishery on the islands in the Amazon estuary, such as establishing a minimum commercial size.

RESUMO

Este estudo tem o objetivo de estimar os parâmetros reprodutivos (tamanho de primeira maturidade, período reprodutivo e fecundidade), mortalidade e rendimento máximo sustentável do *Macrobrachium amazonicum* da Ilha do Combu (Estuário Amazônico). As amostras foram coletadas mensalmente, entre março de 2003 e fevereiro de 2004. Fêmeas ovígeras foram registradas ao longo de todo ano, com picos reprodutivos no meio da enchente (março), vazante (setembro) e pico de mínima vazão (dezembro) no Rio Guamá. O tamanho na qual 50% das fêmeas estão maduras é de 60,8 mm de comprimento total. Fecundidade absoluta variou entre 40 e 3375 ovos por fêmea. A taxa de exploração para a obtenção do rendimento máximo sustentável (ERMY) para machos foi inferior ao obtido para as fêmeas. Para ambos sexos ERMY foi abaixo das taxas de explotação atuais (E). O presente estudo demonstra a necessidade do manejo da pesca de camarão nas ilhas do estuário Amazônico, como por exemplo o estabelecimento de tamanho mínimo de comercialização.

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INTRODUCTION

The river prawn, *Macrobrachium amazonicum* (Heller, 1862) (Decapoda, Palae-monidae) is an endemic species in South America and occurs throughout the basins of the rivers Orinoco, Amazon, and Paraguay (Holthuis, 1952). This species is also found in the northeastern and eastern states of Brazil (Coelho & Ramos Porto, 1985; Barros & Braun, 1997). In the Amazon basin, the species inhabits estuaries, lakes, and rivers of Central Amazon (Odinetz-Collart, 1987). This species has free-swimming larvae, which, under natural conditions, may develop in both fresh and estuarine waters (Alekhnovich & Kulesh, 2001).

*M. amazonicum* is the main species of freshwater shrimp exploited by the commercial artisanal fleet in the Amazon (Odinetz-Collart, 1987; Odinetz-Collart & Moreira, 1993). In the rivers and estuaries of the Amazon, this prawn is mainly caught with traps, locally known as ‘matapi’, made from palms (*Astrocaryum* spp. and *Atrix* spp.) or ‘jupaty’ (*Raphia* spp.). This species also has a great potential for aquaculture (Kutty et al., 2000).

Dynamic pool models are widely used in population dynamics and have become a major technique for shrimp management. A large variety of models have been applied to species from the genera *Penaeus* (cf. Cha et al., 2002; Niamaimandi et al., 2007), *Pandalus* (cf. Hvingel & Kingsleu, 2006), *Aristeus* (cf. Maynou et al., 2006), and *Melicertus* (cf. Conides et al., 2006). Amazon stocks of *M. amazonicum* have never been assessed, despite its enormous socio-economic importance in the region, and the many studies on aspects of reproduction, abundance, distribution, diet, aquaculture, and growth of the species (Guest & Durocher, 1979; Odinetz-Collart, 1991; Alekhnovich & Kulesh, 2001; Morales-Riodades & Valenti, 2004; Silva et al., 2007).

Both coastal and inland fisheries in the Amazon differ from those of other regions in the richness of the exploited species, the quantity of the catch, and the dependence of traditional communities on this activity (Barthem & Fabré, 2004). Despite its importance as a source of income and food for river communities, the functioning of the biological communities and fishery activities in aquatic environments of the Amazon remain poorly known. In many areas, river and estuarine communities have a low quality of life, even through they live within an ecosystem with a high potential for providing goods and services.

In order to provide the knowledge and baseline information required for the management of *M. amazonicum* stocks in the Amazon estuaries, the aim of the present study was to estimate the reproductive parameters (length at first maturity, reproduction period, and fecundity), mortality, and maximum sustainable yield for this species on Combu island (Amazon estuary).