Population structure and biology of the exotic shrimp *Parapenaeopsis sculptilis* (Heller 1862), from Zalala Fishing Centre in Zambézia, Mozambique

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Background

The shrimp *Parapenaeopsis sculptilis* is considered an exotic species in the Mozambique coast, which was first recorded in 2013 in the Púngue estuary in Sofala, and later in other locations of same province as well as in Nampula and Zambézia. The rainbow shrimp *P. sculptilis* is frequently caught in artisanal and semi-industrial fishing fleets and is known to compete for food and space with other native shrimp species by colonizing a wide niche. Nevertheless, some species succeed in colonizing new environments, becoming effectively epidemic that causes ecological disequilibrium. To support any management initiative of the fishery of this penaeid, the present study aimed to study the structure of the population, the reproductive cycle and growth pattern of *P. sculptilis* landed in the major fishing centre of Zambézia Province.

Methods:

The study was carried out at Zalala Fishing Centre, Zambézia Province in Mozambique (17º 49'50.94''S and 37º 30' 07'46.99''E) from November 2016 to October 2017. Sampling took place every each other month, with exception of the fishing closed season months (January and February) as samples were bought from fishermen. Approximately 150 individuals were sampled monthly and weight and carapace length were individually taken. Class sizes were defined for separated sex due the high dimorphism in the species. Also, sex was identified based on observations of secondary characteristics of the species and maturation stages defined according the colour of gonads. The length of first maturity was determined and growth parameters estimated using ELEFAN I on FISAT II (FAO-ICLARM Fish Stock Assessment Tools).

Results:

A total of 1299 individuals of *Parapenaeopsis sculptilis* were analysed , being 382 males and 917 females, which resulted in a sexual proportion of 1:3 (male: female) differing ($p < 0,05$) from the expected 1:1. The most frequent carapace length (Lc) class size was]19-23] mm for males and]28-33] mm for females which were recorded in June and

December, respectively, while the less frequent was composed by individuals measuring]9-13] mm and was recorded in for both males and females in March. The growth of *P. sculptilis* landed at Zalala was allometric negative for both sexes and the maturation of this penaeid was continuous throughout the sampling period. The females attained the sexual maturity at 8.46 mm of Lc. The von Bertalanffy growth function was Lc = 65.1 [1- $e^{-0,11\ (t - 0,412)}$] for females and Lc= 29.40 [1- $e^{-0.53\ (t - 0,140)}$] for males.

Conclusion:

The population of *Parapenaeopsis sculptilis* landed at Zalala fishing centre in Zambezia followed a unimodal distribution of carapace length with majority of shrimps at Lc of]19-23] mm. This study showed that females grow faster than males. This population shows similar pattern observed in other studies where the maturation of females is continuous and the sex ratio differed from the 1:1, with higher occurrence of females. The exotic shrimp *P. sculptilis* is being observed in new areas along the Mozambique coast, thus we recommend that future studies include the trophic relations and stock assessment.