Introduction of *Loxothylacus panopaei* (Cirripedia: Rhizocephala), a marine non-indigenous parasitic castrator in estuarine area of Recife, Pernambuco, Brazil.

In the current age of fast ships and routine transatlantic voyages, introduced species have become an increasing problem in coastal marine ecosystems, the ballast water containing a myriad of larval species that are released into habitats on the other side of the ocean (BOONE et al., 2004). There are two possibilities of the outcomes of introduced species with respect to their parasites, among those signaled by Torchin et al. (2001): (1) If infected individuals are the source of an introduction, they may bring with them all or a subset of their native parasite fauna; (2) Some of the local parasite fauna may colonize invading hosts which may or may not have brought parasites from their region of origin.

One group that shows the most interesting parasitic behavior and biogeography history related with ship transportation, been recognized as invasive, is sacculinid parasites of crabs (VAN ENGEL et al., 1976; GALIL & LÜTZEN, 1995). They are taxonomically placed within the class Cirripedia, as rhizocephalan barnacles, in which female cyprids infect recently molted crabs and proliferate internally, ultimately producing a sack or "externa" protruding from the crab abdomen, and a ramifying nutrient-absorbing root-like body inside the host called the "interna" (HOEG & LÜTZEN, 1995; GLENNER et al., 2000; KRUSE & HARE, 2007).

Parasitization by sacculinids induces serious modifications in morphology, behavior, reproduction, and molt cycle of their hosts (HOEG, 1995). Infections persist through multiple crab molts, preventing the host from reproducing in an example of ''parasitic castration'', because gonads of parasitized crabs do not mature and, in consequence, hosts do not reproduce (ALVAREZ et al., 1995). The end effect could be described either colloquially as transforming the host into a robot, that only serves the needs of the parasite or, more appropriately, as creating an organism possessing the phenotype of the host and the genotype of the parasite (O'BRIEN, 1999).

During a research of benthic invertebrates carried out at the estuary of Capibaribe River, Recife, northeast of Brazil, it was found a male crab *Aratus pisonii* (Milne Edwards, 1837) infected, showing one externa of *Loxothylacus panopaei* (Gissler, 1884), in January 2006. Its host was in the mud, on scattered rocks, submitted to a salinity of 18, at low tide. Reisser & Forward Jr. (1991) noted that adult parasites of this species appears to be a hyperosmotic regulator at salinities below about 15 and becomes an osmoconformer at salinities above this level, while their larvae are euryhaline, being able to develop to cyprids over a l0-30 salinity range. Therefore, the parasite was perfectly adapted to the environment.

The large sack-like protruding from the male abdomen had the dimensions of 5.1 mm height, and 7.2 mm length, with strongly pronounced excrescences each side of the body. Its host showed a wide abdomen, typical of female crabs. This feminized abdominal shape is one of the classical morphological alterations of male abdominal exoskeleton produced by the parasite (RITCHIE & HOEG, 1981). Unlike the observations of Hartnoll (1967) that parasitized crabs have precocious maturity, with adult hosts usually significantly smaller than uninfected hosts, the observed male had not this feature, since its measurements were equivalents of an mature adult (carapace width 16.2 mm, height 15.1 mm), while others uninfected males from the same places had, in average, 18.2 and 18.5 mm, respectively.

The rhizocephalan barnacle *L. panopaei* is native to the Gulf of Mexico and southern Florida (TORCHIN et al., 2002), but now is found in Atlantic Ocean since Maryland, USA (KRUSE & HARE, 2007), to Pará, North of Brazil (YOUNG, 1993), and in Pacific Ocean, in the British Columbia (REINHARD & REISCHMAN, 1958). This finding widen its meridional distribution southward, in the western Atlantic.

The enlarged distribution of this species in the Brazilian littoral is of great concern because the possibility of this species to parasite others hosts. Until now, *L. panopaei* shows a good example of broad host recognition, parasitizing a goneplacid crab *Tetraplax quadridentata* (Rathbun, 1898) (KRUSE & HARE, 2007) and nine xanthid mud crabs within a native range: *Dispanopeus sayi* (Smith, 1869), *Eurypanopeus depressus* (Smith, 1869), *Lophopanopeus bellus* (Stimpson, 1860), *Neopanope packardi* (Kinsley, 1879), *Panopeus herbstii* (H. Milne Edwards, 1834), *Pilumnus sayi* (Rathbun, 1897), *Tetraxanthus rathbunae* (Chace, 1939), and *Rhithropanopeus harrisii* (Christiansen & Costlow, 1975) (BOSCHMA, 1928; REISSER & FORWARD JR, 1991; ALVAREZ et al., 1995; HINES et al., 1997). In Brazil, it was found also in the xanthid crab *Panopeus occidentalis* (Saussure, 1857) (BOSCHMA, 1928; YOUNG, 1993), and now, a grapsid crab, *Aratus pisonii*.

This introduction in the Northeast of Brazil can not be explained by the larvae transportation from vessel ballast water, because the sacculinid larvae are lecithotrophic, with short duration in naupliar phase, which obviously results in a limited capacity of dispersal (HOEG & LÜTZEN, 1995). In Chesapeake Bay USA, Van Engel et al. (1966) hypothesized that *L. panopaei* was accidentally introduced with infected mud crabs associated with oysters transplanted from the Gulf of

Mexico. In Recife, this introduction may be a result of transport of adults in small vessels. In spite of its host species occurs in all Brazilian littoral, living usually on mangrove trees (MELO, 1996), it was also observed among the fouling organisms collected from fishing boats vessels arriving to the Port of Recife, Pernambuco (FARRAPEIRA et al., 2007). This new record deserves monitoring, because if this parasite becomes established, they may impact other native species, recruiting to novel hosts, including the species that it was already recorded.

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