SHORT COMMUNICATION

A descriptive analysis on the (in)fidelity of mangrove-climbing sesarmid crabs to the mangrove trees in Cancabato Bay, Philippines

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Abstract Five years after Super Typhoon Haiyan, mangroves regrow and mangrove-climbing sesarmid crabs were found in the Cancabato Bay. In a three- month surveillance, four species of mangrove-climbing sesarmid crabs: *Aratus pisonii*, *Episesarma versicolor*, *Perisesarma bidens*, and *Selatium brockii* were observed in mangrove trees: *Avicennia marina*, *Aegiceras corniculatum*, *Rhizophora mucronata*, and *Rhizophora apiculata*. They were observed moving into the different parts of the mangrove tree and from one mangrove species to another. Only *Selatium brockii* was observed clinging to *Avicennia marina*. This interspecies fidelity was perceived due to food availability and habitat success, which could be an indicator of mangrove status and persistence after a large-scale disturbance. This behavior was manifested in both morning and evening in reference to the rise and fall of the tide.

Keywords: fidelity climbing patterns, foraging climbing patterns, tide influenced behavior, mangrove status

Introduction

Several animal species perform climbing behavior. The ability to climb on plants and in the canopy of trees conveys significant ecological advantages and is widespread in the animal kingdom (Labonte and Federle 2015). Fidelity, that is the tendency to return to a previously occupied location, has been observed in numerous species amongst chordates, arthropods, and mollusks. In each settlement decision, an animal evaluates all habitats and chooses the habitat with the highest suitability and highest reproductive success (Switzer 1993).

Switzer (1993) emphasized that in predictable habitat, changing territories may be favored after a previous one, this would mean that if the habitat would be favorable such as a bad previous outcome, fidelity exists among organisms. In contrast, in unpredictable habitat, the decision of changing territories should be independent in the previous outcome. An experimental field study conducted by Brousseau et al (2002) to Asian shore crab, *Hemigrapsus sanguineu* a highly mobile grapsid crab; shows limited fidelity to a particular shelter or feeding site. This may due to the two site differences in food and shelter availability.

There is a dearth in the literature about interspecies fidelity in animals, thus; an investigation among sesarmid crabs and mangrove trees could imply occurrence of this symbiotic realtionship. Sesarmid crabs consume organic matter affecting soil nutrient and enriching mangrove forest productivity (Smith 1987). When Super Typhoon Haiyan hit the Philippines, there was massive damage to the mangroves especially those that were hit by the storm surge (Primavera et al 2016). In a recovering circumstance after a large- scale disturbance, the presence of sesarmid crabs in the mangrove forests is considered a reliable indicator of mangrove status (Ellison 2008). Slim et al (1997) stressed that sesarmid crabs to be keystone species in mangrove ecosystems.

There were six species of sesarmid crabs in Anibong Bay, Tacloban City, Philippines: *Aratus pisonii*, *Episesarma singaporense*, *Episesarma versicolor*, *Perisesarma eumolpe*, *Perisesarma indiarum* and *Neosarmatium smithi* (Matillano et al 2018). All the sesarmid crab species were observed climbing up the mangrove trees during high tide and move to the ground during low tide. There was no mention of climbing fidelity, thus this paper seeks to observe this behavior in an adjacent embayment, Cancabato Bay.

Materials and Methods

Field observation was conducted in Cancabato Bay, Tacloban City, Philippines. During Super Typhoon Haiyan this mangrove forest was obliterated by a 5.65 meters storm surge. After five years, mangrove patches regenerated and sesarmid crabs were observed in the area. Field Guide to Philippine Mangroves by Primavera & Dianala (2009) and Revised Checklist of Philippine Crustaceans Decapoda by Estampador (1959) were used for the identification focusing

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on the morphological characteristics. Surveillance was based on the procedure of Masagca (2009) and Matillano et al (2018) and was conducted from May to July 2018 from 6:00-9:00 h and 18:00-21:00 h. Two 25 meters transect lines (11.233890, 125.023161 and 11.234069, 125.023075) with four 5x5 m^2 plots and twenty-five 1x1 m^2 grids in each plot were established as observation sites.

Results and Discussion

There were four identified mangrove climbing sesarmid crabs in the area: *Aratus pisonii*, *Episesarma versicolor*, *Perisesarma bidens*, and *Selatium brockii*. Identified mangrove trees on the other hand were: *Rhizophora mucronata*, *Rhizophora apiculata*, *Avicennia marina*, and *Aegiceras corniculatum.* These identification were confirmed by the Bureau of Fisheries and Aquatic Resources (BFAR) Regional Office VIII.

A. pisonii, *E. versicolor*, *P. bidens* were seen climbing up all the mangrove species. Sesarmid crabs were observed climbing the trunk of the mangroves as the tide rises and descend to the mangrove floor during low tide. Though they didn't indicate climbing patterns, they were observed climbing all the mangrove species depending on their proximities when the high tide starts. They were foraging both daytime and nightime, eating soft trunk tissues and certain algae growing in it. They go down the sublittoral areas during low tide to forage on senescent and dead leaf litters. Sesarmid crabs were observed to be more active on daytime compared to nightime. This behavior was also manifested similar to the observations of Matillano et al (2018) in an adjacent Anibong Bay. However, only *A. pisonii* were observed at the upper canopies to forage distinct food choices like young twig tissues, young leaves, and calyx. This behavior of *A. pisonii* makes it a more powerful climber compared to other species.

Figure 1 *Aratus pisonii* (left and upper right) climbing the upper canopies of *Rhizophora mucronata. Selatium brockii* (lower right) going out from the crevices of *Avicennia marina.*

Remarkably, *S. brockii* were observe clinging only to *A. marina*. At low tide, *S. brockii* goes down to forage senescent, dead leaves and even observed eating mollusks and dead fish. Despite the array of food choices and food availability, *S. brockii* return on the same *A. marina* tree where it initially climbed as the high tide started. As observed, *S. brockii* hides on trunk burrows; feeding on loss and soft tissues throughout the observation period. *S. brockii* keep on foraging in a specific location but may have short movements if they were reached by the tide. Brousseau et al (2002) stressed that interspecies fidelity may be manifested because of food and shelter availability. This eating behavior was observed in both daytime and nighttime. This was in contrast to Sivatoshi's (2000) observations on *S. brockii* to be exclusive nighttime eaters.

Switzer (1993) stated that animals seem to choose the habitat with the highest suitability and habitat yielding. This could be the reason why *S. brockii* keeps on returning to the

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same *A. marina* tree to seek shelter from predators. Crevices and burrows of *A. marina* became hiding places of *S. brockii* during high tide. Different birds and monitor lizards were seen feeding on sesarmid crabs especially during daytime.

Conclusions

There were four species of mangrove-climbing sesarmid crabs: *Aratus pisonii*, *Episesarma versicolor*, *Perisesarma. bidens*, and *Selatium brockii*. Four mangroves trees were identified in the area: *Aegeceras corniculatum*, *Rhizophora apiculata*, *Rhizophora mucronata*, and *Avecennia marina*. *A. pisonii*, *E. versicolor*, and *P. bidens* were observe climbing all the mangrove species. Only *S. brockii* was observed clinging to *A. marina*. This interspecies fidelity is observed due to food availability and habitat success.

Conflict of Interest

The authors declare no conflict of interest.

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