Brachyuran Herbivory and Burrows in Typhoon Haiyan Affected Mangroves in Bantayan Island, Cebu

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Abstract

Mangrove crabs are considered important ecosystem engineers. Their feeding on propagules strongly influences the structure of mangrove forests; their leaf litter consumption influences the availability of organic matter; and their burrowing influences geochemical processes in the forest ground. This study examines the crab community and its herbivory in natural and planted mangrove stands in Bantayan Island, Cebu. Methods utilized were leaf and propagule tethering, burrow counting, manual crab catching, and measurement of several environmental parameters. The preliminary results showed a significant difference in burrows and number of leaves consumed between natural and planted stands. Leaf consumption shows correlation to organic matter. Propagule consumption, contrary to previous studies, was negligible. The study will provide insights into the contribution of crab activities in Philippine mangroves and the post-typhoon dynamics and recovery process of mangrove forests.

Introduction

Among the most abundant macrofauna taxon in mangrove forests are brachyurans or true crabs (Van Nedervelde et al., 2014). They are called ecosystem engineers because their activities have extensive influence on the functionality ofmangrove forest. Crabs influence nutrient cycling in the forest by feeding on large amounts of leaf litter (Robertson, 1992; Canicci et al., 2008), making the organic matter more readily available to other organisms. Crabs alter topography and properties of soil through burrowing. These activities increases the degree of aeration thereby influencing the concentration of phytotoxins and the productivity of microbial organisms in the substrates (Smith et al., 1991; Kristensen, 2008). They affect seedling recruitment, forest growth and structure through consumption of mangrove propagules (Smith 1987; Mc Guiness, 1997; Lindquist, 2009). In the event of a disturbance (for example typhoons), the vegetation and soil will be extremely altered making it less habitable for crabs. As the vegetation and soil improves, the cab activity will also improve. This study therefore aims to establish baseline data on

mangrove brachyuran activity in mangroves damaged by super typhoons as applied in Bantayan Island, Cebu.

Materials and Methods

Study sites are made up of natural, mixed, and monospecific planted stands. Herbivorous activity was assessed in terms of leaf litter and propagule consumption. Leaf and propagule tethering set-ups were deployed in representative sampling plots (three replicate plots per site in three sites) and left for 24 hours. Burrow openings were counted and size ranges were estimated. Knowing the brachyuran species composition is vital to characterize the activities, therefore, some crabs were caught and were identified. Topography, vegetation characteristics, and pore water conditions were measured. Fieldwork was conducted in May and September 2015.

Summary & Implications

There appears to be a general trend between burrows, leaf consumption, and organic matter. However, ANOVA tests showed a significant difference only in number of leaves predated on between natural and planted stands in May and in the number of burrows between the mixed (natural with a few planted) stand and planted stand in September. Propagule consumption, contrary to results of other studies, was negligible. It is interesting to see whether it is the post-typhoon regeneration that affects the crab's activities or whether it is more of the crab activities that will affect how the mangrove recovers and develops. The appropriate management of natural and restored mangroves relies on the understanding of the impact of crab activity and the factors that affect it.

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