

A study on the impact of herbivorous crabs on mangrove propagation in Chilaw lagoon, Sri Lanka

Phan Phuong-Nhung¹, Fleur Van Nederveelde¹, Stefano Cannicci², Nico Koedam³ and Farid Dahdouh-Guebas^{1,3}

¹ Laboratory of Systems Ecology and Resource Management, Department of Organism Biology, Faculty of Sciences, Université Libre de Bruxelles - ULB, Avenue F.D. Roosevelt 50, 1050 Brussels, Belgium
E-mail: phuophan@ulb.ac.be

² Department of Evolutionary Biology "Leo Pardi". University of Florence, via Romana 17, 50125 Firenze, Italy

³ Laboratory of Plant Biology and Nature Management, Department of Biology, Faculty of Sciences and Bio-engineering Sciences, Vrije Universiteit Brussel - VUB, Pleinlaan, 2, 1050, Brussels, Belgium

Mangroves are tropical coastal forests growing only in tropical regions, at the interface which is inundated by the ocean and where environmental conditions are highly variable. A unique set of animal species coexist, live and interact in these mangroves, especially crabs. Herbivorous crabs play a big part in the success or failure of mangrove propagation. In this ongoing work we study the interaction between herbivorous crabs, including *Episesarma tetragonum* and some species of mangrove trees, mainly *Bruguiera gymnorrhiza*, *B. sexangula*, *Rhizophora mucronata*, and *Avicennia officinalis* in Chilaw lagoon, on the west coast of Sri Lanka. Various experiments were conducted to confirm if there is a consumption preference of the crabs and which is its impact on the propagule. The first one was based on binary choices between leaves and/or propagules of *B. sexangula*, *R. mucronata* and/or *A. officinalis* while considering propagule size, shape and species. This experiment was repeated in a mixed zone and a zone dominated by *Excoecaria agallocha*. In the mixed zone, preliminary results indicate that crabs seem to prefer leaves over propagules except when *A. officinalis* propagules are involved. They prefer *A. officinalis* leaves rather than leaves of other species, even if the others are cut into the same size as *A. officinalis* leaves. Similar results were observed for the *A. officinalis* propagules. In the *E. agallocha*-dominated zone, different results were observed: *E. tetragonum* seems to prefer leaves and propagules of *R. mucronata*, a species which is not even present in the zone. The only exception is when *A. officinalis* leaves were involved. We believe that all preferences could be related to a combination of ease of removal and nutrition value.

The second experiment aimed at quantifying the impact of the soil depth on germination of *A. officinalis* and *B. sexangula* propagules. Forty propagules of each species were planted at two depths, 5 and 10cm. Preliminary results show that after six days half of the *A. officinalis* propagules were rotten (58% at 5cm depth), 50% at 10cm depth), the rest was unaffected (24% at 5cm depth and 50% at 10cm depth) or unfound (18% at 5cm depth and 0% at 10cm). For *B. sexangula* propagules, none of the propagules was affected and very often, some roots appear. We recorded a mean length of 0,4cm at 5cm depth and 0,35cm at 10cm depth. The causes of such a difference in mean length are still under investigation.

Keywords: Crab herbivory; feeding preference; mangrove propagules; Sri Lanka.