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Species-specific advantages of mangroves growing at intertidal zones

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Abstract

Restoration of degraded mangroves is important to maintain sound ecological system.

In a typical mangrove rehabilitation program, only single *Rhizophora* species is planted due to its higher survivability. It often produces a monoclonal forest with low biodiversity.

Field sampling was conducted in the Olango island of the Philippines, where *Rhizophora stylosa*, *Avicennia marina*, and *Sonneratia alba*, majorly grow at intertidal zones, which are inundated once or twice a day. *R.stylosa* was planted in a part of the area, which then covered more than 90% of the area.

Three of each species were selected at each sampling location with different elevation. Tree height, girth length, leaf surface temperature, and solar intensity were recorded, then, chlorophyll fluorescence (Fv/Fm) of leaves were measured to observe the stress condition.

The surface sediment dries up within 1 hr after the exposure to air, however, the sub-surface layer (~0.3m deep) remains wet until next high tide. The tidal front advances quickly on the ground surface, wetting the surface soil completely. Regardless of species and tree height, Fv/Fm values varied following the tidal condition; it gradually decreased after exposed to air in low tide, then, quickly increased in the rising tide.

Among species, Fv/Fm values of *A. marina* declined relatively fast until very low level, but, *R. stylosa* always maintained high values even during low tide period. *A.marina* has low stature, ascending on the ground surface. *R.stylosa* and *S. alba* are, on the other hand, erect upwards. The root depths were, therefore, ~0.5 m for *A.marina* and 1 ~2 m for *R.stylosa* and *S. alba* in the present site. Thanks to the long root, *R.stylosa*, had a high advantage to maintain favorable condition and dominated the intertidal sites. Care must be taken in the selection of species and sites for plantation.

Keywords

mangrove plantation, *Rhizophora stylosa*, chlorophyll fluorescence, intertidal zone