



Species Combination In Mangroves: Increase Survival Rate in Open/Degraded Areas

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Background of the Study:

Study Site:

Sitio Cuabo, Barangay Manikling, Municipality of San Isidro, Davao Oriental

- Established in April 2015;
- The study site lies on the Southwestern portion of the Province of Davao Oriental between latitude 126°05'125°10' North and longitude 6°45'-6°50' east. The Municipality of Lupon bound it on the North; the Davao Gulf on the West; the Municipality of Mati on the East; and Governor Generoso on the South.

Introduction:

Mangroves play an important role in the production of fishery resources in the marine environment. It provides environmental protection and sustainable economic benefits to coastal communities. However, despite the many importance of our mangrove forest, mangrove denudations are still apparent either natural or anthropogenic induced destruction. Mangrove rehabilitation and development are continuously undertaken to sustain fishery resources production in coastal and marine environment.

Mangrove plantation development in the past used mono cropping system by using single species like Bakauan species in open and degraded mangrove areas. Monocropping is prone to pest infestation.

Pagatpat, Bungalon and Bakauan bangkau can be intercropped as a result of the study on "Rehabilitation of degraded mangrove areas using 3 mangrove species in exposed mangroves areas in Davao Oriental... though these species belong to different families but they thrive well in the same zonation pattern. These are true mangrove species that thrive in the intertidal zones.

Materials and Methods:

A total of 21 sample plots measured at 10 m x10 m in three, replications. Treatments were Treatment 1(Pagatpat monocropping), treatment 2 (Bungalon monocropping), treatment 3 (Bakauan bangkau), treatment 4 (Pagatpat + bungalon), treatment 5 (Pagatpat + Bakauan bangkau), treatment 6 (Bungalon + Bakauan bangkau) and treatment 7 (Pagatpat + Bungalon + Bakauan bangkau)



(Left) *Sonneratia alba* commonly named as Pagatpat belong to Sonneratiaceae family. A small to medium sized bushy tree which reaches a height of 26 m and 175 cm in diameter. Its branches spread horizontally to form a broad crown. It has stocky pneumatophores bluntly pointed which serve as their breathing organs of the tree. (Right) *Avicennia marina* which is commonly named as Bungalon belongs to Avicenniaceae family, it grows well in open bays, inland edges and higher.

Results and Discussion:

Results showed that among the three mangrove species Pagatpat showed good performance in terms of percentage survival and growth rate for treatment 1(Pagatpat monocropping). While for treatment 4 (Pagatpat + Bungalon cropping combination had showed highly significant result compared with other cropping combinations. (Table 1 & 2).

Table 1 : Survival Percentage (%) of planted Mangrove one month and six months after planting

Treatments	Block I		Block II		Block III		means
	One month after	Six months after	One month after	Six months after	One month after	Six months after	
T1 (Pagatpat Mono)	91	65	100	60	99	78	67.67 ^a
T2 (Bungalon Mono)	100	44	83	25	98	25	31.33 ^b
T3 (Bakauan bangkau Mono)	100	25	100	28	52	25	26.00 ^b
T4 (Pagatpat + Bungalon)	89	44	99	34	100	70	49.33 ^{bc}
T5 (Pagatpat + B. Bangkau)	100	24	100	25	99	54	34.33 ^b
T6 (Bungalon + B. Bangkau)	83	25	27	50	25	25	25.67 ^b
T7 (Pagatpat+Bungalon+ B. Bangkau)	65	56	43	25	36	25	35.33 ^b
Means	89.71	40.43	78.86	35.29	72.71	39.86	

Combination cropping like Pagatpat + bungalon species cropping system will enhance plant diversity and lessen infestation as observed in Monocropping in mangrove ecosystem. Both species are true mangroves that thrived within the intertidal zones. These species are called "front liner" that can withstand strong wave current and barnacle infestations.

Table 2: Total mean height (cm) and mean increment (cm) of planted Mangrove one month and six months after planting

Treatments	Block I			Block II			Block III			Mean Increment
	One month After	Six months After	Increment	One month After	Six months After	Increment	One month After	Six months After	Increment	
T1 (Pagatpat Mono)	24.28	52.02	27.74	24.1	46.48	22.38	28.81	60.54	31.73	27.28 ^a
T2 (Bungalon Mono)	24.87	50.41	25.54	19.26	28.04	8.78	28.71 ^m	24.09 ^m	-4.62	9.90 ^{ab}
T3 (Bakauan bangkau Mono)	66.90	48.00	-18.90	49.56	70.85	21.29	53.03	30.25 ^m	-17.01	-4.87 ^b
T4 (Pagatpat + Bungalon)	17.80	47.07	29.27	14.48	28.88	14.40	24.88	55.21	30.33	24.67 ^a
T5 (Pagatpat + B. Bangkau)	33.52	44.1	10.58	48.00	49.91	1.91	28.71	43.8	15.09	9.19 ^{ab}
T6 (Bungalon + B. Bangkau)	34.93	66.84	31.91	48.73	66.14	17.41	32.98	37.00	4.02	17.78 ^{ab}
T7 (Pagatpat+Bungalon+ B. Bangkau)	30.33	50.89	20.56	31.14	28.32	-2.82	30.25	^m	-5.88	3.95 ^{ab}
Means	30.10	51.33	21.23	30.77	45.52	14.74	33.11	49.14	10.94	15.64

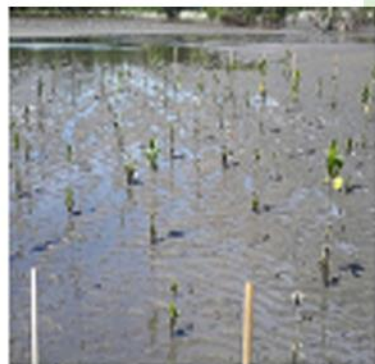
Recommendations:

1. Based on the result of the study it is recommended to use Pagatpat monocropping and combination of Pagatpat + Bungalon in plantation establishment considering that both species are resistant to barnacles' infestation and can withstand strong wave current.

2. Other environmental factors should be considered;

1. Plant during the onslaught of the north-east monsoon (amihan) to avoid strong waves brought about by the south-west monsoon (Habagat) to protect the plantation from strong waves; and

2. Carefully assess the area and observe cases of shifting sand. Do not plant in these areas.



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