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**Diversity and distribution of climbing plants in
Mangrove forest of North Andaman Islands, India**

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Abstract

The present study examined the floristic diversity, dominance, abundance and IVI of climbers and lianas species in the tropical mangrove vegetation of North Andaman forest. A total of 188 climbing plants belonging to 27 species, 18 genera, and 15 families were identified. The most dominant family is *Papilionaceae* (25%). The forest is consisted of 18 liana and 9 herbaceous climber species. Hook climbing was the most predominant (40.74%) climbing mechanism. The dominant species recorded from this forest was *Calamus palustris* (IVI-29.78). *Dalbergia junghuhnii* shows the highest frequency (81.81%).

Key-Words: Climbing plants, mangrove, North Andaman

Introduction

Climbing plants are one of the most common and important plant life forms in tropical forest ecosystems, an important constituent of the total biodiversity. Their size, situation and relative abundance contribute to the total character of several types of forests (Champion & Seth, 1968). Climbers are the most threatened group of plants because they are first to be decimated in a silviculturally managed forest (Jacobs, 1988). 'The ecology of lianas is virtually blank' (Jacobs, 1976). 'Lianas have been no less neglected by plant collectors, quite probably lianas are the most undercollected of any major habit group of plants' (Gentry, 1991).

Interest in liana inventory has recently gained currency (DeWalt *et al.*, 2000; Muthuramkumar and Parthasarathy, 2001; Perez-Salicrup *et al.*, 2001; Phillips *et al.*, 2002; Parren, 2003; Reddy and Parthasarathy, 2003; Kouame *et al.*, 2004; Mascaro *et al.*, 2004; Parthasarathy *et al.*, 2004; Rice *et al.*, 2004; Phillips *et al.*, 2005; DeWalt *et al.*, 2006; Prasad *et al.*, 2009; Ghosh and Mukherjee, 2006; Ghosh, 2013a, b).

No comprehensive work is available for climbers in the study area. Therefore, the specific objectives of the present study was to determine the diversity and distribution of climbing plants in the mangrove forest of North Andaman as a way of contributing to the understanding of the general floristic composition, abundance and diversity.

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Material and Methods

The North Andaman is the northernmost island of the Andaman region and includes about 70 other smaller islands. It is located between 13°41' N to 12°50' N latitudes and 92°11' E to 93°07' E longitudes, covering an area of 1458 km². The phytosociological study in this region was carried out during the years 2001-2004, through quadrat sampling method. Eleven quadrat plots (32 x 32 m) were studied for recording ground covers (Mishra 1966; Malhotra 1973; Das & Lahiri 1997; Rai *et al.*, 2011). In each quadrat the climbing plants were enumerated and measured for girth (GBH >0.5 cm) at breast height. The collected voucher specimens were identified by using regional floras (Perkinson, 1923; Hooker, 1872-1885; Gamble & Fisher, 1921-1935; Mathew, 1991). The specimens were processed into mounted herbarium sheets following the conventional methodology (Jain & Rao, 1977) and deposited at CUH herbarium.

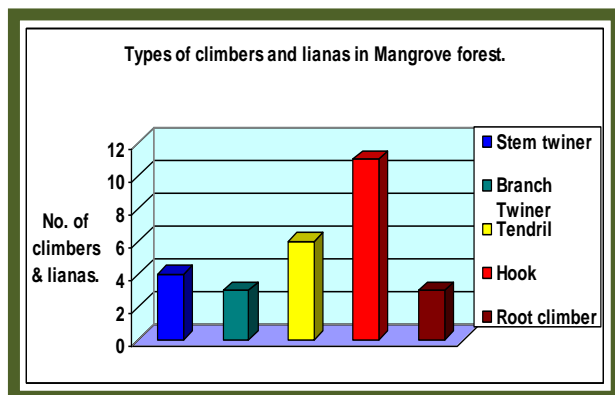
Climbing mechanisms were also studied for each species and classified them based on observations in the field and reliable references (Putz, 1984). The collected field-data were analyzed for Species structure (frequency, density, abundance, basal area, importance value index (IVI), using the formula as suggested by Mishra (1966),

Phillips (1959), Das & Lahiri (1997) and Ghosh (2012). The species diversity was determined using Shannon-Weiner's Index (1963).

Results and Discussion

Diversity of climbing plants: A total of 188 individuals of climbing plants were identified in the study. 27 species of climbers and lianas were found, of which 26 species are angiosperms, and one species is a fern (*Davallia solida*). Within the angiosperms, 16 species are from the dicotyledons (represented by 11 genera of 9 families) and 10 species are from the monocotyledons (7 genera of 6 families). The details of the determined phytosociological values are recorded in Table 1.

In the study area, 4 species (14.81%) are stem twiners, 3 (11.11%) branch twiners, 6 (22.22%) tendril climbers, 3 (11.11%) root climbers and the rest 11 species (40.74%) are hook climbers (Fig. 36). In such



forest, 9 species (33.33%) are climbers and 18 species (66.66%) are lianas (Fig.1).

Fig. 1: Types of climbers and lianas in Mangrove forest

Frequency and density of species: It has been observed that *Dalbergia junghuhnii* shows the highest frequency (81.81%) with density of 14.5454/hec. in the forest; followed by *Dinochloa andamanica* and *Entada rheedii* (frequency: 63.63%, with densities of 16.3636/hec. and 9.0909/hec. respectively). *Dinochloa andamanica* shows the highest density (16.3636/hec.) with lower frequency (63.63%); followed by *Dalbergia junghuhnii* (density: 14.5454/hec., frequency: 81.81%). Except *Dinochloa andamanica* which shows highest density, all other species show linear progression of density and frequency with regression value (R^2) =0.8124. (Fig: 2)

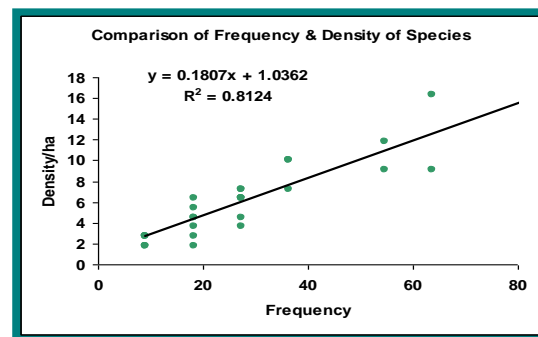
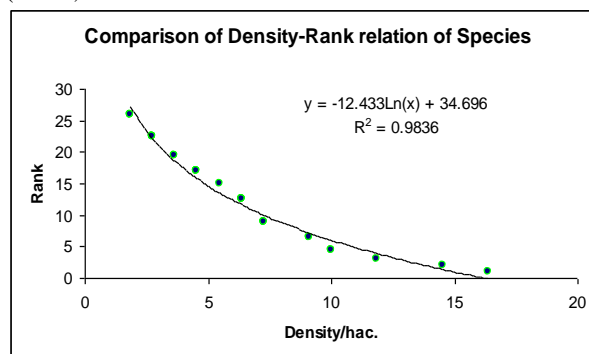


Fig. 2: Comparison of frequency and density of Mangrove forest species

Density-rank relation of species: Density-Rank relationship of species shows that *Dinochloa andamanica* gets first rank with maximum density 16.3636/ha, followed by *Dalbergia junghuhnii* (14.5454/ha, rank-2), *Calamus palustris*(11.8181/ha, rank-3), *Cissus discolor* and *Momordica charantia* (10/ha,



rank-4)

Fig. 3: Comparison of density-rank relation of Mangrove forest species

Except *Dinochloa andamanica*, other species show logarithmic pattern of curve with regression value (R^2) =0.9836. (Fig: 3)

Importance Value Index of species: *Calamus palustris* shows the highest IVI (29.78), followed by *Dalbergia junghuhnii* (27.4), *Dinochloa andamanica* (25.99), *Calamus pseudorivialis* (18.92), *Flagellaria indica* (18.05), *Calamus longisetus* (14.11). It is found that mangrove forest species show logarithmic pattern with regression value (R^2) =0.9755 (Fig. 4).

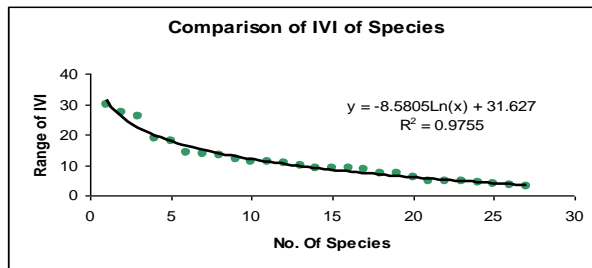


Fig. 4: Comparison of IVI of mangrove forest species

Species richness (S) and diversity of plots: A total of 27 species were found within the 11 plots through out the mangrove forest. Considering the overall values of floral species richness (S), species diversity (NI) of different plots, the plot numbers 1 and 2 show high species richness ($S > 20$), the diversity of these plots are relatively high ($NI = 9.49$) in comparison to plot numbers 4, 5 and 11 where species richness is high ($S \leq 18$) but the diversity is relatively low ($NI \leq 6.18$). It is also found that the plot numbers 3, 6, and 7 show high diversity ($NI \leq 7.1$), but their species richness is low ($S \leq 13$). Plots like 8, 9 and 10 show more or less proportionate S and NI values. (Fig: 5).

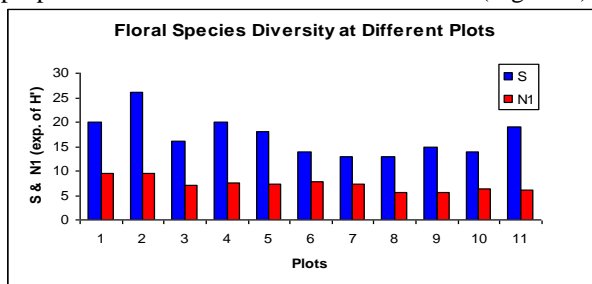


Fig. 5: Comparison of species richness (S) and diversity (NI) of mangrove forest plots

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