



## **Vegetation Pattern of Commercially Important Trees in Evergreen Forests of Baratang Island, Andamans**

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### **ABSTRACT**

Baratang Island, spread over an area of 238 km<sup>2</sup> and one of the main constituents of the 'Great Andaman' group are characterized by dense tropical forests. The Tropical Evergreen Forests was studied for its regeneration status, composition and species diversity of commercial tree species both in the felled (worked) and un-felled (unworked) areas. It was noticed that the tree layer in evergreen un-worked forest was dominated by *Dipterocarpus spp.* with the highest IVI of 28.76 and the second most dominant species is *Knema andamanica* with IVI 26.21 followed by *Myrstica andamanica* with IVI 18.16 but in worked area *Dipterocarpus spp.* retained its dominance with highest IVI of 55.36 while *Knema andamanica* occupied second position with IVI 27.20 followed by *Pometia pinnata* with IVI 20.90. It was found that felled areas have more number of tree species (84) than the unfelled. The composition of the species need to be maintained to manage these fragile areas so that the biodiversity rich areas are intact in its natural form.

### **Keywords:**

IVI, moist deciduous, phytosociology, regeneration, semievergreen

### **INTRODUCTION**

Tropical Rain Forests are bestowed with a wide variety of species richness and diversity patterns (Alwyn and Calaway, 1987; Jacobs, 1988). The Baratang Island is one of the constituent Islands of the Andaman group situated in the eastern coast of India in junction of Bay of Bengal, and Indian Ocean. It harbours lush green tropical rain forests. They are the diverse and highly productive of all the ecosystems. Its unique geographical set up has resulted in evolution of variety of species with high degree of endemism. During the last few decades Andaman Islands has been experiencing modification and loss in biodiversity due to the indiscriminate exploitation of the rich biodiversity by the immigrant population

and developmental pressure. Sustainability of these forests is critical for the existence of the *Jarawas* (original Tribes of A&N Islands) who depend on these resources since ages and the overall ecosystem of these Islands.

Quantitative inventories help in identification of economically useful species as well as species of special concern and thus to quantify conservation worthiness of the candidate sites (Keel *et al.*, 1993). The diversity of trees is fundamental to total rainforest biodiversity, because trees provide resources and habitat structure for almost all other rainforest species (Cannon *et al.*, 1998). The results of the quantitative inventory have enormous significance for the conservation and management of tropical

forests (Campbell 1994). There have been many attempts in the past to explore the flora of the Andaman Islands (Parkinson 1923; Vasudevarao 1986; Lakshminarasimhan and Rao 1996; Mathew 1998; Hajra et al. 1999; Reddy and Dutt 2003) but many areas still are unexplored. In addition, attempts have been made to study the community structure of different vegetation types based on onscreen visual interpretation (Padalia, et al. 2004); study of some specific areas like the flora of Saddle Peak; Middle Andaman; North Andaman (Tripathi et al. 2004; Reddy and Prasad 2008) or to study the spatial distribution of some specific plant groups like rattans and palms; climbing plants (Nagabhatla et al. 2007; Ghosh 2013). But till date no attempt have been made to study the distributional pattern of commercially important trees by distinguishing the forest areas with regard to areas which are already felled (worked) or unfelled (unworked).

This paper is an attempt to study the regeneration status and vegetation pattern of the commercially important trees of Baratang Island for population structure, density, dominance, frequency and species richness of the felled and unfelled forest areas so as to analyse the deviation in species composition of the managed areas from the natural unfelled forest areas. This paper will act as a guide to bring back the felled and monoculture plantation areas to near natural profile as far as possible through conservation measures.

## **MATERIALS AND METHODS**

### **Study area**

Andaman and Nicobar are two important districts of the Andaman and Nicobar Islands. Andaman is a set of five big island groups viz. North Andaman, Middle Andaman, Baratang, South Andaman and Little Andaman islands besides the several small islands distributed around each of them. The study area, Baratang Island lies between 11° 46' 10" to 12° 18' 35" N latitude and 92° 32' 35" to 92° 10' 40" E Longitude and covers an area of 238 km<sup>2</sup>(Fig. 1). The islands have a typical tropical climate. Soils are acidic in nature with a high amount of clay (40 per cent). There are no rivers, but small streams run in all directions over the islands. The coastline is broken by several deep

indentations of creeks. The topography is undulating, with high elevations and steep slopes. Champion and Seth (1968) classified the forests of these islands into Andaman Tropical Evergreen Forest - IA/C2, Andaman Semi Evergreen Forest - 2A/C1, Andaman Moist Deciduous Forest- 3A/C1/2S1 and Tidal Swamp Forest - 4B/TS2.

### **Methodology**

After reconnaissance survey representative sample plots of 1 ha measuring 250 x 40 m were laid out in different forest types of felled and unfelled area. Length of the plot was aligned along the fertility gradient. In total 12 sample plots of 1 ha each in different forests types (two sample plots in each forest type) namely Evergreen, Semi-evergreen, and Moist deciduous forest area were laid out. Each sample plot was further divided into 20 quadrats of 20 x 25 m (500 m<sup>2</sup>) and overall 240 (80 plots per forest type of which 40 plots each in felled and unfelled) plots were sampled. These were laid based on the experience of earlier studies. All the trees having 10 cm dbh (diameter at breast height) and above were measured and species wise data tabulated for each quadrat of the plot separately. In addition regeneration status survey of the seedlings was carried out over a period of 10 years in both the felled and unfelled areas in forest areas of South Creek, M/Dera, Lorojig, Adajig, Gandhighat and SukhaKhari.

Identification was facilitated by the inclusion of local people and field staff of the forest department having reasonably good knowledge of forests and plant species. Most of the specimens collected were identified in the field station with the help of Parkinson Flora (1923) and collected material available at Botanical Survey of India (BSI), Andaman and Nicobar Circle. However, some of them could be identified only to genus level or local names. The unidentified specimens were preserved and later identified in herbaria at BSI, Port Blair, India.

### **Data analysis**

Quantitative data collected were analysed to compute the frequency, abundance, density (Curtis and McIntosh 1950), basal area and importance value index – IVI (sum of relative density, relative

frequency and relative dominance of the species)(Curtis 1959). Further, ecological indices like Co-efficient of similarity proposed by Sorensen (1948) was used for comparing the surveys from floristic point of view and similarity index (common species shared between the two forest types) for the area under study was done. Species richness was calculated as number of species encountered in all the quadrats. All these analyses were performed using MS-excel (Kindt and Coe 2005).

**RESULTS AND DISCUSSION**

**Regeneration status**

The results of the regeneration status survey of commercial as well as miscellaneous species in the felled (old natural regeneration areas) and unfelled forests of Baratang are presented in Table 1. From the data it has been observed that

**Table 1:** Regeneration status of felled and unfelled forests in Baratang forest division (number per ha)

| Forest Area | Commercial Species (number/ha) |     |    |     |    | Miscellaneous Species (number/ha) |     |    |     |     |
|-------------|--------------------------------|-----|----|-----|----|-----------------------------------|-----|----|-----|-----|
|             | R & UE                         | E   | PL | U G | OG | R & UE                            | E   | PL | U G | O G |
| Felled area | 613                            | 145 | 71 | 40  | 77 | 205                               | 38  | 23 | 12  | 14  |
| Unfelled    | 206                            | 66  | 41 | 19  | 44 | 187                               | 157 | 60 | 16  | 18  |

**Note:** R – Recruit, UE – Un-established, E – Established, PL – Pole crop from 60 cm to 89 cm in girth, UG – Under Girth from 90 cm to 119 cm OG – Over girth 120 cm and above.

recruits and unestablished seedlings of commercial species in felled area are more than the unfelled areas. Even the established, pole crop, under girth and over girth crop for commercial species are higher than unfelled area. This is indicative of preferential treatment given to the commercial species, which were on demand in the past. Thus, modification in the present silvicultural practices is absolutely necessary to achieve the objectives of regeneration management so as to bring back the vegetation to the near natural state.

**Phyto-sociological analysis**

The number of species recorded from felled and un-felled area of each forest type is mentioned in Table 2. The species which are not present in felled and unfelled areas of each forest type are also

presented in Table 2. The results clearly indicate that the number of species established was more in worked area in all the major forest types. Analysis further indicated that among the major forest vegetation classes, Evergreen Forest was the most diverse supporting more plant species per hectare. Tree species diversity in tropical forests varied greatly from place to place. The tree layer in Evergreen un-worked forests is dominated by *Dipterocarpus spp.* with the highest IVI of 28.76 followed by *Knema andamanica* with IVI 26.21 and *Myrstica andamanica* with IVI 18.16 but in worked area *Dipterocarpus spp.* retained its dominance with highest IVI of 55.36 while *Knema andamanica* occupied second position with IVI 27.20 followed by *Pometia pinnata* with IVI 20.90 (Table 3 and 4).

In Moist Deciduous un-worked forests dominant species was *Cinnamomum bejolghota* with highest IVI 24.90 followed by *Pterocarpus dalbergioides* with IVI 23.25 and *Diospyros marmorata* with IVI 16.60. In worked area the species dominating this forest is found to be *Diospyros marmorata* with IVI 18.39 followed by *Pterocarpus dalbergioides* with IVI 17.66 and *Aglaia andamanica* with IVI 13.64.

In Semi-evergreen un-worked forests tree layer is found to be dominated by *Knema andamanica* with highest IVI of 39.69 followed by *Dipterocarpus spp.* with IVI 26.69 and *Lagerstroemia hypoleuca* with IVI 15.81. On the other hand in worked forests area dominant species was *Pterocarpus dalbergioides* with highest IVI of 17.73 followed by *Diospyros pyrrocarpa* with IVI 17.10 and *Diospyros montana* with IVI 16.94.

**Co-efficient of similarity**

The species richness in all the forest types, both for felled and unfelled category is quiet high and has been fairly constant. The richness of floristic composition is well within the range of species recorded for the same type of forests elsewhere in the world. Floristically, identical stands gave a  $K_s$  of 100, those which differ completely with one another will have a  $K_s$  of 0. For all the three types of forests the co-efficient of similarity between worked and un-worked areas of each forest type is

**Table 2:** Number of species and their similarity recorded in each forest type

| Description                 | Evergreen (64*)  |  | Semievergreen (63*)   |  | Moist Deciduous (53*)  |  |
|-----------------------------|--|--|---|--|--|--|
|                             | Felled   | Unfelled   | Felled  | Unfelled   | Felled   | Unfelled   |
| No. of species recorded     | 83   | 80   | 77  | 75   | 75   | 65   |
| No. of species not recorded | 16   | 19   | 12  | 14   | 12   | 22   |
|                             | <p><i>Ailanthus kurzii</i>,<br/> <i>Alstonia kurzii</i>,<br/> <i>Champeria mainillana</i>,<br/> <i>Hibiscus tiliaceus</i>,<br/> <i>Hopea odorata</i>,<br/> <i>Leea acuminata</i>,<br/> <i>Milium tectona</i>,<br/> <i>Nauclea gageana</i>,<br/> <i>Oroxylum indicum</i>,<br/> <i>Pterocarpus dalbergioides</i>,<br/> <i>Sideroxylonlonge petiolatum</i>,<br/> <i>Tabernaemontana crispera</i>,<br/> <i>Terminalia bialata</i>,<br/>                     Surmaipatti,<br/>                     Gum phal,<br/>                     Tooth</p> | <p><i>Albizia stipulata</i>,<br/> <i>Atlantia monophylla</i>,<br/> <i>Bischofia javanica</i>,<br/> <i>Dillenia pentagyna</i>,<br/> <i>Dracaena pachyphylla</i>,<br/> <i>Endospermum chinense</i>,<br/> <i>Garcinia cowa</i>,<br/> <i>Gyrocarpus spp.</i>,<br/> <i>Macaranga tanarius</i>,<br/> <i>Orophia hexandra</i>,<br/> <i>Pajenalia rheedii</i>,<br/> <i>Pisoniaum bellifera</i>,<br/> <i>Sterculia alata</i>,<br/> <i>Trema ambionensis</i>,<br/> <i>Walsura hypoleuca</i>,<br/>                     Junglilasoon,<br/>                     Mistriphora,<br/>                     ZerawaChilka<br/> <i>Daubanga</i></p> | <p><i>Aglaia gangoo</i>,<br/> <i>Ailanthus kurzii</i>,<br/> <i>Amoora wallichii</i>,<br/> <i>Antidesma acidum</i>,<br/> <i>Artocarpus gomeziana</i>,<br/> <i>Buchanania platyneura</i>,<br/> <i>Pisoniaum bellifera</i>,<br/> <i>Pometia pinnata</i>,<br/> <i>Sideroxylon longepetiolatum</i>,<br/> <i>Syzygium claviflorum</i>,<br/>                     Junglilasoon,<br/>                     Gum phal</p> | <p><i>Adenan therapavonina</i>,<br/> <i>Albizia stipulata</i>,<br/> <i>Bassia butyracea</i>,<br/> <i>Bischofia javanica</i>,<br/> <i>Gmelina arborea</i>,<br/> <i>Mallotus peltatus</i>,<br/> <i>Mimusop selengi</i>,<br/> <i>Nauclea gageana</i>,<br/> <i>Prunus martabanica</i>,<br/>                     Mistriphora,<br/>                     Pathmauna,<br/>                     JungliAmrooth,<br/>                     Parsa, Khiya</p> | <p><i>Alstonia kurzii</i>,<br/> <i>Canarium euphyllum</i>,<br/> <i>Diospyros variegata</i>,<br/> <i>Endospermum chinense</i>,<br/> <i>Ganophyllum falcatum</i>,<br/> <i>Mangifera sylvatica</i>,<br/> <i>Mimusops elengi</i>,<br/> <i>Parishia insignis</i>,<br/> <i>Spondius mangifera</i>,<br/> <i>Hibiscus tiliaceus</i>,<br/>                     JungliSapota,<br/>                     Mistriphora</p> | <p><i>Ailanthus kurzii</i>,<br/> <i>Amoora wallichii</i>,<br/> <i>Artocarpusgomezian a</i>,<br/> <i>Champeria mainillana</i>,<br/> <i>Dipterocarpus spp.</i>,<br/> <i>Garcinia xanthochymus</i>,<br/> <i>Gmelina arborea</i>,<br/> <i>Knema andamanica</i>,<br/> <i>Leea acuminata</i>,<br/> <i>Pajenalia fheedii</i>,<br/> <i>Planchonia andamanica</i>,<br/> <i>Randi aexaltata</i>,<br/> <i>Semecarpus kurzii</i>,<br/> <i>Xanthophyllum andamanicum</i>,<br/>                     Banya,<br/>                     GoIKhatta,<br/>                     Hara Patti,<br/>                     Kao Phal,<br/>                     KerelaKhatta,<br/>                     Pathwan,<br/>                     Thooth,<br/>                     Surmai Patti</p> |

(\*) No. of species common in both felled and un-felled forest area of the same type.

**Table 3:** Phytosociological analysis of the vegetation in Evergreen Unworked Forest of Baratang

| Sl. No. | Botanical Name                  | Common Name         | Species profile |        |       |        |
|---------|---------------------------------|---------------------|-----------------|--------|-------|--------|
|         |                                 |                     | Rd              | RD     | RF    | IVI    |
| 1       | <i>Ailanthus kurzii</i>         | Ailanthus           | 0.361           | 0.112  | 0.706 | 1.177  |
| 2       | <i>Agla andamanica</i>          | Letauk              | 2.600           | 3.091  | 3.415 | 9.106  |
| 3       | <i>Alstonia kurzii</i>          | Chattiyan           | 0.498           | 0.265  | 0.870 | 1.632  |
| 4       | <i>Amoora wallichii</i>         | Lal Chinni          | 0.367           | 2.646  | 0.679 | 3.691  |
| 5       | <i>Anthocephalus chinensis</i>  | Kadam               | 0.236           | 0.125  | 0.488 | 0.849  |
| 6       | <i>Antidesma acidum</i>         | Khatta Phal         | 0.859           | 0.561  | 1.358 | 2.776  |
| 7       | <i>Artocarpus chaplasi</i>      | Toungpinne          | 1.350           | 2.773  | 2.253 | 6.376  |
| 8       | <i>Artocarpus gomeziana</i>     | Lakuch              | 0.491           | 0.396  | 0.679 | 1.566  |
| 9       | <i>Bassia butyracea</i>         | Mohwa               | 1.418           | 1.570  | 1.463 | 4.451  |
| 10      | <i>Bombax insigne</i>           | Didu                | 0.367           | 1.058  | 0.679 | 2.104  |
| 11      | <i>Buchanania platyneura</i>    | Char                | 0.249           | 0.040  | 0.435 | 0.724  |
| 12      | <i>Callophyllum inophyllum</i>  | Poon                | 0.236           | 0.296  | 0.488 | 1.021  |
| 13      | <i>Canarium euphyllum</i>       | White Dhup          | 1.673           | 5.156  | 2.386 | 9.216  |
| 14      | <i>Celtis phillippensis</i>     | Bada Tej Pathi      | 3.888           | 3.378  | 4.831 | 12.096 |
| 15      | <i>Champeriana inillana</i>     | Mitta Bajii         | 1.244           | 0.316  | 2.174 | 3.734  |
| 16      | <i>Cinnamomum bejolghota</i>    | ChotaTej Pathi      | 3.123           | 1.823  | 2.551 | 7.496  |
| 17      | <i>Cleidion nitidum</i>         | Khattal Balli       | 0.859           | 0.387  | 1.140 | 2.385  |
| 18      | <i>Dillenia andamanica</i>      | Korkot              | 0.473           | 0.053  | 0.488 | 1.014  |
| 19      | <i>Diospyros marmarata</i>      | Kala Lakri          | 0.236           | 0.167  | 0.488 | 0.891  |
| 20      | <i>Diospyros montana</i>        | Yellow Agia         | 0.598           | 0.139  | 1.193 | 1.929  |
| 21      | <i>Diospyros kurzii</i>         | Chota Pathi Tendu   | 0.498           | 0.728  | 0.870 | 2.095  |
| 22      | <i>Diospyros pyrrocarpa</i>     | Bada Pathi Tendu    | 1.841           | 0.961  | 2.227 | 5.028  |
| 23      | <i>Diospyros variegata</i>      | Fanda Balli         | 4.019           | 1.553  | 5.366 | 10.938 |
| 24      | <i>Dipterocarpus spp.</i>       | Gurjan              | 6.636           | 17.890 | 4.237 | 28.763 |
| 25      | <i>Dysoxylum arboreescens</i>   | Jungli Jamun        | 2.974           | 1.052  | 3.579 | 7.605  |
| 26      | <i>Evodia glabra</i>            | Lal Balli           | 1.238           | 0.540  | 1.983 | 3.760  |
| 27      | <i>Ficus spp</i>                | Bargat              | 0.498           | 0.898  | 0.870 | 2.265  |
| 28      | <i>Ficus hispida</i>            | Gular               | 0.709           | 0.461  | 1.463 | 2.633  |
| 29      | <i>Ganophyllum falcatum</i>     | Jungli Neem         | 0.709           | 4.270  | 0.976 | 5.955  |
| 30      | <i>Garcenia xanthochymus</i>    | Rakath Phal         | 0.498           | 0.074  | 0.870 | 1.441  |
| 31      | <i>Gmelina arborea</i>          | Yemnae              | 0.249           | 0.024  | 0.435 | 0.708  |
| 32      | <i>Goniothalamus macranthus</i> | Button Balli        | 1.418           | 0.716  | 1.463 | 3.597  |
| 33      | <i>Grewia callophylla</i>       | Mariyum Khatta      | 0.971           | 1.085  | 1.384 | 3.439  |
| 34      | <i>Grewia microcos</i>          | Metha               | 1.655           | 0.890  | 2.439 | 4.984  |
| 35      | <i>Hibiscus tilliaceus</i>      | Safed Chilka        | 0.740           | 0.326  | 1.331 | 2.397  |
| 36      | <i>Homonio cariparis</i>        | Surmai patti        | 0.746           | 0.085  | 1.304 | 2.136  |
| 37      | <i>Hopea dorata</i>             | White Thingan       | 0.498           | 0.574  | 0.870 | 1.942  |
| 38      | <i>Knema andamanica</i>         | ChottaPathiJaiphall | 15.786          | 4.475  | 5.944 | 26.205 |
| 39      | <i>Lannea coromandelica</i>     | Nabbe               | 0.952           | 3.198  | 1.437 | 5.587  |



|    |                                    |                    |       |       |       |        |
|----|------------------------------------|--------------------|-------|-------|-------|--------|
| 40 | <i>Lagerstroemia hypoleuca</i>     | Pyinma             | 2.488 | 2.161 | 1.739 | 6.388  |
| 41 | <i>Leea acuminata</i>              | Hara buti          | 0.746 | 0.113 | 0.435 | 1.294  |
| 42 | <i>Mallotus peltatus</i>           | Banga              | 0.361 | 0.049 | 0.462 | 0.872  |
| 43 | <i>Mangifera andamanica</i>        | Aam Chotta pathi   | 0.746 | 0.334 | 1.304 | 2.384  |
| 44 | <i>Mangifera sylvatica</i>         | Aam Bada Pathi     | 0.249 | 0.018 | 0.435 | 0.701  |
| 45 | <i>Memexylon ovatum</i>            | Lohra Lakri        | 0.473 | 0.154 | 0.976 | 1.602  |
| 46 | <i>Milium tectona</i>              | Jungli Sagwan      | 0.236 | 0.167 | 0.488 | 0.891  |
| 47 | <i>Morus laevigata</i>             | Posa               | 0.236 | 0.359 | 0.488 | 1.083  |
| 48 | <i>Murraya exotica</i>             | Malai Lakri        | 0.249 | 0.018 | 0.435 | 0.701  |
| 49 | <i>Myristica andamanica</i>        | Bada Pathi Jaiphal | 9.698 | 4.796 | 3.664 | 18.157 |
| 50 | <i>Nauclea gageana</i>             | Theinkala          | 0.734 | 0.596 | 0.679 | 2.009  |
| 51 | <i>Oroxylum indicum</i>            | Burma Phali        | 0.361 | 0.181 | 0.462 | 1.003  |
| 52 | <i>Parishia insignis</i>           | Lal Dhup           | 2.514 | 6.370 | 3.309 | 12.192 |
| 53 | <i>Planchonia andamanica</i>       | Lal Bombwe         | 3.191 | 4.249 | 4.046 | 11.485 |
| 54 | <i>Polyalthia parkinsonii</i>      | Neva               | 3.533 | 0.914 | 3.690 | 8.137  |
| 55 | <i>Pometia pinnata</i>             | Thitkandu          | 2.830 | 6.372 | 2.063 | 11.265 |
| 56 | <i>Prunus martabanica</i>          | Lal Thingan        | 0.498 | 1.775 | 0.870 | 3.142  |
| 57 | <i>Pterocarpus dalbergioides</i>   | Padauk             | 0.486 | 0.454 | 0.679 | 1.618  |
| 58 | <i>Pterospermum aceroides</i>      | Makchund           | 1.220 | 0.870 | 1.384 | 3.473  |
| 59 | <i>Pubistylus andamanensis</i>     | Haddi Balli        | 0.491 | 0.097 | 0.896 | 1.484  |
| 60 | <i>Rathmonnia pulcherimma</i>      | Papra              | 0.473 | 0.154 | 0.976 | 1.602  |
| 61 | <i>Sagerea elliptica</i>           | Chooi              | 0.479 | 0.420 | 0.949 | 1.847  |
| 62 | <i>Semecarpus kurzii</i>           | Jungli Kaju        | 2.084 | 0.665 | 2.741 | 5.490  |
| 63 | <i>Sideroxylon longepetiolatum</i> | Lamba Patti        | 1.493 | 1.983 | 1.739 | 5.215  |
| 64 | <i>Spondius mangifera</i>          | Ambra              | 1.344 | 1.606 | 2.036 | 4.986  |
| 65 | <i>Sterculia companulata</i>       | Papita             | 1.319 | 0.807 | 1.655 | 3.780  |
| 66 | <i>Sterculia villosa</i>           | Lal Chilka         | 7.565 | 5.574 | 4.390 | 17.529 |
| 67 | <i>Strebulus taxoides</i>          | Kaksi              | 0.746 | 0.340 | 0.435 | 1.521  |
| 68 | <i>Tabernaemontana crispa</i>      | Corriya            | 0.598 | 0.094 | 0.949 | 1.640  |
| 69 | <i>Terminalia bialata</i>          | White Chuglum      | 1.182 | 2.236 | 0.976 | 4.393  |
| 70 | <i>Terminalia manii</i>            | Black Chuglum      | 0.622 | 0.330 | 1.087 | 2.039  |
| 71 | <i>Terminalia procera</i>          | Badam              | 0.491 | 1.119 | 0.896 | 2.506  |
| 72 | <i>Tetrameles nudiflora</i>        | Thitpok            | 0.361 | 1.246 | 0.706 | 2.312  |
| 73 | <i>Vitex diversifolia</i>          | Charai Gudwa       | 0.249 | 0.590 | 0.435 | 1.274  |
| 74 | <i>Xanthophyllum andamanica</i>    | Laphew             | 3.980 | 2.934 | 4.783 | 11.697 |
| 75 | -                                  | Gum Phal           | 0.722 | 1.210 | 1.193 | 3.124  |
| 76 | -                                  | Tooth              | 0.746 | 0.529 | 0.870 | 2.144  |
| 77 | -                                  | Jungli Kusum       | 0.249 | 0.162 | 0.435 | 0.845  |
| 78 | -                                  | Jungli Sapota      | 1.244 | 0.343 | 1.304 | 2.891  |
| 79 | -                                  | Khadi Balli        | 0.249 | 0.067 | 0.435 | 0.751  |
| 80 | -                                  | Gandauk            | 0.236 | 1.434 | 0.488 | 2.158  |

Note: Rd- Relative Density RD- Relative Dominance RF- Relative Frequency IVI- Importance Value Index

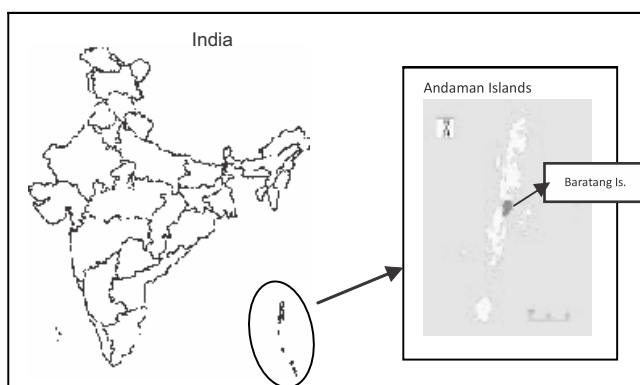
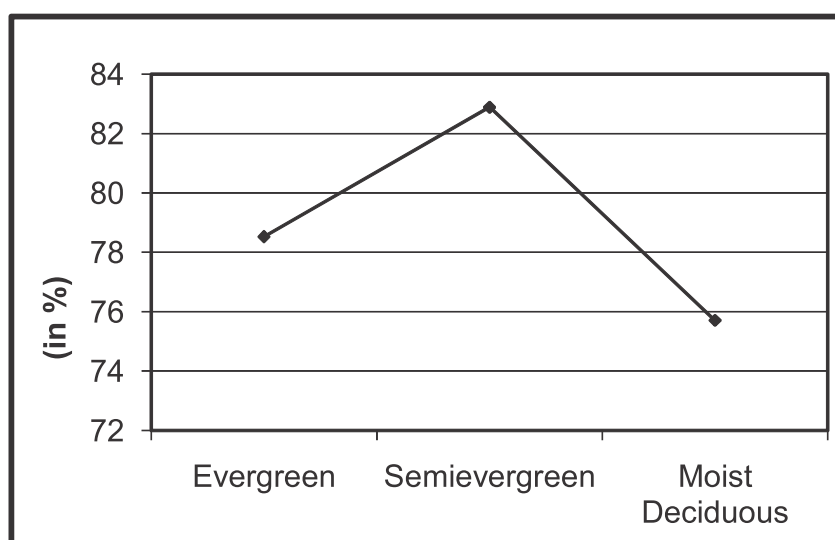
**Table 4:** Phytosociological analysis of the vegetation in Evergreen worked Forest of Baratang

| Sl. No. | Botanical Name                  | Common name          | Species profile |        |       | IVI    |
|---------|---------------------------------|----------------------|-----------------|--------|-------|--------|
|         |                                 |                      | Rd              | RD     | RF    |        |
| 1       | <i>Aglaia andamanica</i>        | Letauk               | 0.770           | 0.337  | 1.515 | 2.621  |
| 2       | <i>Albizia stipulata</i>        | Bombeza              | 0.198           | 0.302  | 0.377 | 0.878  |
| 3       | <i>Amoora wallichii</i>         | Lal Chinni           | 0.747           | 0.799  | 1.341 | 2.887  |
| 4       | <i>Anthocephalus chinensis</i>  | Kadam                | 0.299           | 0.343  | 0.775 | 1.418  |
| 5       | <i>Antidesma acidum</i>         | Khatta Phal          | 1.720           | 0.468  | 2.504 | 4.692  |
| 6       | <i>Artocarpus chaplasi</i>      | Toungpienne          | 1.741           | 2.803  | 2.678 | 7.221  |
| 7       | <i>Artocarpus gomeziana</i>     | Lakuch               | 0.150           | 0.249  | 0.388 | 0.787  |
| 8       | <i>Atalantia monophylla</i>     | Jungli Nimbhu        | 0.198           | 0.017  | 0.377 | 0.593  |
| 9       | <i>Bassia butyracea</i>         | Mohwa                | 0.299           | 1.163  | 0.775 | 2.238  |
| 10      | <i>Bischofia javanica</i>       | Pani Padauk          | 0.198           | 0.017  | 0.377 | 0.593  |
| 11      | <i>Bombax insigne</i>           | Didu                 | 0.595           | 1.754  | 1.132 | 3.481  |
| 12      | <i>Buchanania platyneura</i>    | Char                 | 0.324           | 0.362  | 0.770 | 1.455  |
| 13      | <i>Calophyllum inophyllum</i>   | poon                 | 0.599           | 0.350  | 1.550 | 2.500  |
| 14      | <i>Canarium euphyllum</i>       | White Dhup           | 0.994           | 3.722  | 1.719 | 6.434  |
| 15      | <i>Celtis philippensis</i>      | Bada Tej Pathi       | 0.397           | 0.061  | 0.755 | 1.212  |
| 16      | <i>Cinnamomum bejolghota</i>    | Chota Tej Pathi      | 1.664           | 1.431  | 1.515 | 4.610  |
| 17      | <i>Cleidion nitidum</i>         | Khattal Balli        | 0.150           | 0.047  | 0.388 | 0.585  |
| 18      | Daubanga                        | Duabanga             | 0.150           | 0.297  | 0.388 | 0.834  |
| 19      | <i>Dillenia andamanica</i>      | Korkot               | 0.174           | 0.059  | 0.383 | 0.616  |
| 20      | <i>Dillenia pentagyna</i>       | Korkot               | 0.150           | 0.101  | 0.388 | 0.638  |
| 21      | <i>Diospyros montana</i>        | Yellow Agia          | 1.861           | 0.486  | 1.326 | 3.672  |
| 22      | <i>Diospyros kurzii</i>         | Chota Pathi Tendu    | 0.174           | 0.133  | 0.383 | 0.690  |
| 23      | <i>Diospyros marmorata</i>      | Kala Lakri           | 0.595           | 0.186  | 0.755 | 1.536  |
| 24      | <i>Diospyros pyrrocarpa</i>     | Bada Pathi Tendu     | 1.067           | 0.379  | 1.515 | 2.960  |
| 25      | <i>Diospyros variegata</i>      | Fanda Balli          | 7.387           | 2.540  | 5.936 | 15.863 |
| 26      | <i>Dipterocarpus spp.</i>       | Gurjan               | 22.167          | 26.673 | 6.518 | 55.358 |
| 27      | <i>Dracaena pachyphylla</i>     | Surmai Patti         | 0.150           | 0.025  | 0.388 | 0.563  |
| 28      | <i>Dysoxylum arborecens</i>     | Jungli Jamun         | 2.265           | 1.443  | 2.678 | 6.385  |
| 29      | <i>Endospermum chinense</i>     | Bakota               | 0.599           | 0.447  | 0.775 | 1.821  |
| 30      | <i>Evodia glabra</i>            | Lal Balli            | 2.564           | 1.451  | 3.264 | 7.279  |
| 31      | <i>Ficus spp.</i>               | Bargat               | 0.198           | 0.827  | 0.377 | 1.403  |
| 32      | <i>Ficus hispida</i>            | Gular                | 0.871           | 1.026  | 1.913 | 3.809  |
| 33      | <i>Ganophyllum falcatum</i>     | Jungli Neem          | 0.449           | 0.335  | 0.775 | 1.559  |
| 34      | <i>Garcenia cowa</i>            | Kao Phal             | 0.324           | 0.434  | 0.770 | 1.528  |
| 35      | <i>Garcenia xanthochymus</i>    | Rakath Phal          | 0.397           | 0.034  | 0.755 | 1.185  |
| 36      | <i>Gmelina arborea</i>          | Yemnae               | 0.150           | 0.042  | 0.388 | 0.579  |
| 37      | <i>Goniothalamus macranthus</i> | Button Balli         | 0.150           | 0.087  | 0.388 | 0.624  |
| 38      | <i>Grewia callophylla</i>       | Mariyum Khatta       | 1.190           | 1.544  | 1.887 | 4.622  |
| 39      | <i>Grewia microcos</i>          | Metha                | 0.994           | 0.588  | 1.525 | 3.107  |
| 40      | Gyrocarpus                      | Gyrocarpus           | 0.198           | 0.270  | 0.377 | 0.846  |
| 41      | <i>Knema andamanica</i>         | Chotta Pathi Jaiphal | 14.076          | 7.377  | 5.748 | 27.201 |
| 42      | <i>Lannea coromandelica</i>     | Nabbe                | 0.249           | 1.136  | 0.576 | 1.961  |

|    |                                 |                        |       |        |       |        |
|----|---------------------------------|------------------------|-------|--------|-------|--------|
| 43 | <i>Lagestroemia hypoleuca</i>   | Pyinma                 | 1.071 | 1.835  | 0.959 | 3.864  |
| 44 | <i>Macaranga tanarius</i>       | Gol Pathi              | 1.198 | 0.809  | 2.326 | 4.332  |
| 45 | <i>Mallotus peltatus</i>        | Banga                  | 1.389 | 0.369  | 1.887 | 3.644  |
| 46 | <i>Mangifera andamanica</i>     | Jungli Aam ChottaPathi | 0.447 | 0.486  | 0.954 | 1.887  |
| 47 | <i>Mangifera sylvatica</i>      | Jungli Aam BadaPathi   | 0.198 | 0.041  | 0.377 | 0.617  |
| 48 | <i>Memexylon ovatum</i>         | LohraLakri             | 0.198 | 0.152  | 0.377 | 0.728  |
| 49 | <i>Morus laevigata</i>          | Posa                   | 0.150 | 1.187  | 0.388 | 1.725  |
| 50 | <i>Murraya exotica</i>          | Malai Lakri            | 0.198 | 0.041  | 0.377 | 0.617  |
| 51 | <i>Myrstica andamanica</i>      | Bada Pathi Jaiphal     | 2.763 | 4.185  | 1.336 | 8.283  |
| 52 | <i>Orophia hexandra</i>         | -                      | 0.150 | 0.668  | 0.388 | 1.205  |
| 53 | <i>Pajenaliar hedii</i>         | Jhingam                | 0.299 | 0.254  | 0.388 | 0.941  |
| 54 | <i>Parishia insignis</i>        | Lal Dhup               | 1.842 | 3.516  | 2.111 | 7.469  |
| 55 | <i>Pisonia umbellifera</i>      | Banya                  | 0.150 | 0.561  | 0.388 | 1.098  |
| 56 | <i>Planchonia valida</i>        | Lal Bombwe             | 4.308 | 3.840  | 5.365 | 13.513 |
| 57 | <i>Polyalthia parkinsonii</i>   | Neva                   | 1.168 | 0.345  | 1.714 | 3.226  |
| 58 | <i>Pometia pinnata</i>          | Thitkandu              | 3.777 | 12.924 | 4.202 | 20.903 |
| 59 | <i>Prunus martabanica</i>       | Lal Thingan            | 0.150 | 0.249  | 0.388 | 0.787  |
| 60 | <i>Pterospermum aceroides</i>   | Makchund               | 0.770 | 0.955  | 1.138 | 2.861  |
| 61 | <i>Pubistylus andamanensis</i>  | HaddiBalli             | 0.571 | 0.126  | 0.760 | 1.457  |
| 62 | <i>Rathmonnia pulcherimma</i>   | Papra                  | 0.348 | 0.224  | 0.765 | 1.337  |
| 63 | <i>Sagerea elliptica</i>        | Chooi                  | 0.794 | 0.104  | 1.509 | 2.407  |
| 64 | <i>Schleichera oleosa</i>       | Jungli Kusum           | 0.796 | 0.431  | 1.331 | 2.557  |
| 65 | <i>Semecarpus kurzii</i>        | Jungli Kaju            | 1.292 | 0.164  | 1.714 | 3.169  |
| 66 | <i>Spondius mangifera</i>       | Amdra                  | 1.990 | 3.456  | 3.448 | 8.892  |
| 67 | <i>Sterculia alata</i>          | Letkok                 | 0.397 | 0.060  | 0.755 | 1.212  |
| 68 | <i>Sterculia companulata</i>    | Papita                 | 2.433 | 0.833  | 2.856 | 6.122  |
| 69 | <i>Sterculia villosa</i>        | Lal Chilka             | 1.022 | 1.242  | 1.734 | 3.998  |
| 70 | <i>Strebulus taxoides</i>       | Kaksi                  | 0.770 | 0.301  | 1.326 | 2.396  |
| 71 | <i>Terminalia manii</i>         | Black Chuglum          | 1.389 | 2.840  | 2.264 | 6.493  |
| 72 | <i>Terminaliaprocera</i>        | Badam                  | 0.397 | 0.034  | 0.377 | 0.808  |
| 73 | <i>Tetrameles nudiflora</i>     | Thitpok                | 0.547 | 0.132  | 0.576 | 1.255  |
| 74 | <i>Trema ambionensis</i>        | Bakri Patti            | 0.150 | 0.042  | 0.388 | 0.579  |
| 75 | <i>Vitex diversifolia</i>       | Charai Gudwa           | 0.249 | 0.093  | 0.576 | 0.918  |
| 76 | <i>Walsura hypoluca</i>         | -                      | 0.599 | 2.033  | 1.163 | 3.795  |
| 77 | <i>Xanthophyllum andamanica</i> | Letphew                | 0.597 | 0.220  | 1.148 | 1.964  |
| 78 | -                               | Jungli Lasoon          | 1.497 | 1.854  | 3.876 | 7.227  |
| 79 | -                               | Gundak                 | 0.150 | 0.178  | 0.388 | 0.716  |
| 80 | -                               | Jungli Sapota          | 1.044 | 0.610  | 1.913 | 3.567  |
| 81 | -                               | Khadi Balli            | 0.623 | 0.309  | 1.352 | 2.284  |
| 82 | -                               | Mistri Phora           | 1.587 | 0.148  | 3.019 | 4.754  |
| 83 | -                               | Zera wachilka          | 0.198 | 0.017  | 0.377 | 0.593  |

Note: Rd- Relative Density RD- Relative Dominance RF- Relative Frequency IVI- Importance Value Index



**Fig. 1. Location map of the study area****Fig. 2. Coefficient of similarity between felled and unfelled area**

more than 75 % and highest in Semi-evergreen Forest type with 82.89% from the analysis of 12 sample plots. The above analysis shows that difference between worked and unworked area with reference to floristic composition is quite narrow (Fig. 2).

#### REFERENCES

- Alwyn HG, and Calaway D 1987 Contribution non trees to species richness of a tropical rain forest. *Biotropica* 19(2): 149–156.
- Campbell DG 1994 Scale and patterns of community structure in Amazonian forests. In: *Larger-scales Ecology and Conservation Biology* (eds. Edwards, P. J., May, R. M. and Webb N. R.), Blackwell, Oxford.
- Cannon CH, Peart DR and Leighton M 1998 Tree species diversity in commercially logged Bornean rainforest. *Science* 28: 1366–1368.
- Champion HG and Seth SK 1968 *A Revised Survey of the Forest Type of India*. Govt. of India Publications, New Delhi.
- Curtis JT and McIntosh RP 1950 The interrelations of certain analytic and synthetic phytosociological characters. *Ecology* 31: 434–455.
- Curtis JT 1959 *The Vegetation of Wisconsin- An Ordination of Plant Communities*. University Wisconsin Press, Madison, Wisconsin.
- Ghosh A 2013 Diversity and distribution of climbing plants in littoral forest of North Andaman North

- Andaman Islands, India. *Indian Journal of Plant Sciences* 2(3): 35-42.
- Hajra PK, Uniyal BP and Rao PSN 1999 Flora of Andaman and Nicobar Islands. Vol. I . Botanical Survey of India, Kolkata.
- Jacobs M 1988 The tropical rainforests: A first encounter. Berlin: Springer. 295 pp.
- Keel S, Gentry AH and Spinzi L 1993 Using vegetation analysis to facilitate the selection of conservation sites in Eastern Paraguay. *Conserv Biol* 7: 66–75.
- Kindt R and Coe R 2005 Tree diversity analysis. A manual and software for common statistical methods for ecological and biodiversity studies. World Agroforestry Centre (ICRAF), Nairobi. ISBN 92 9 0 5 9 - 1 7 9 - X .  
URL <http://www.worldagroforestry.org/treesandmarkets/treediversityanalysis.asp>
- Lakshminarasimhan P and Rao PSN 1996 A supplementary list of angiosperms recorded (1983-1993) from Andaman and Nicobar Islands. *J. Econ. Tax. Bot.* 20: 175-185.
- Mathew SP 1998 Supplementary report on the flora and vegetation of the Bay Islands, India. *J. Econ. Taxon Bot* 22: 249-272.
- Nagabhatla N, Roy PS and Jagdale R 2007. Monitoring spatial distribution of commercial rattans and palms in the tropical forest of Baratang Islands (Andaman and Nicobar Islands). *Ind. J. Trad.* Know. 6(4): 630-635.
- Padalia H, Chauhan N, Porwal MC and Roy PS 2004 Phytosociological observations on tree species diversity of Andaman Islands, India. *Curr Sci* 87(6): 25.
- Parkinson CE 1923 A Forest Flora of the Andaman Islands. Bishen Singh Mahendra Pal Singh, Dehra Dun.
- Reddy CS and Dutt CBS 2003 Some interesting additions to the Flora of Andaman and Nicobar Islands from North Andaman. *J Bombay Nat Hist Soc* 102: 133-135.
- Reddy CS and Prasad PRC 2008 Tree Flora of Saddle Peak National park, Andaman, India. *J Plant Sci* 3(1): 1-17.
- Sorenson T 1948 A method of establishing groups of equal amplitude in a plant society based on similarity of species content. *K. Dan. Vidensk. Selsk.* 5: 1–34.
- Tripathi KP, Tripathi S, Selvan T, Kumar K, Mehrotra S and Pushpangandan P 2004 Community Structure and species diversity of Saddle Peak forests in Andaman Island. *Tropical Ecology.* 45(2): 241-250.
- Vasudevrao MK 1986 A Preliminary report on the angiosperms of Andaman-Nicobar Islands. *J Econ Tax Bot* 8: 107-184.