

A TAXONOMIC CENSUS OF MAGNOLIOPHYTES ASSOCIATED WITH THE FOREST ABODES OF TRIBALS IN DURGAPUR FOREST RANGE OF BURDWAN DISTRICT, WEST BENGAL

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ABSTRACT

The inventory of the Magnoliophyta (angiosperms) in the forest abodes of the Santhals in Burdwan Forest Division shows the community to be composed of 187 species, of which 166 species are dicotyledonous and 21 species monocotyledonous. At specific, generic, family and class levels, dicots show higher percentages over monocots regarding the contribution to the flora. The ratios of trees, shrubs, herbs and vines associated with the forest abodes of tribals were found to be 76, 35, 56 and 20 respectively. Value of Generic Coefficient of the forest flora was 88.77 which speaks of an appreciable taxonomic potential to render stability to the ecosystem. This value is expected in course of time to be progressively escalated to 1. Since the difference between the observed and expected values of generic coefficients is low (11.23), there is a possibility of successful revegetation and restoration of the forests studied.

KEYWORDS : Census, Magnoliophyta, Santhal tribes, Generic Coefficient, revegetation

Deforestation has been a usual event associated with development of our civilization ever since Paleolithic age with progressively accelerating trend from Neolithic age onwards (Lanly, 1983) and has been a great menace in wiping off many diversities in nature (Mukherjee, 1997). The annual loss of Indian forests is about 1.5 million hectares (Ahmed, 2004). According to the India State of Forest Report 2011 released by the Forest survey of India (FSI), of the total geographical area of 88,752 sq Km, the state of West Bengal has 11,879 sq. Km under recorded forests which constitutes 13.38 % of the total geographical area of State. The forests in Burdwan district of this Indian State have also been sharing the same experience and at present the total recorded forest area is 277sq Km which constitutes 3.94 % of the total geographical area (7024 sq. km) of the state (State of Forest Report, 2011). Forests, being the abode of progressively attenuating biodiversity, have been necessitating the attention of scientists especially the conservation biologists for evaluation of resource potential, biodiversity (species, genetic and ecological diversities) restoration and sustenance. Under the objectives, the present work was undertaken to prepare a taxonomic census of plant species composing the forested ambience of ethnic communities of Santhals settled in different parts of Durgapur Forest Range in Burdwan district of West Bengal state.

STUDY SITE

Burdwan is one of the western districts of West Bengal lying between 22°56'N and 23°53'N latitudes and between 86°48'E and 88°25'E longitudes covering an area of 7024 sq km forested areas are located between the rivers Ajoy in the north and Kunur in the south, under Durgapur Forest Range, Burdwan District. These villages being in the proximity of and in conformity with forests are rich in biodiversity (Bhattacharya & Mukherjee 2006). In these areas, the tribal people (Santhals) depend mainly upon the forest for their livelihood. The soil is lateritic in nature and the temperature ranges from 20.1°C to 44°C during summer and from 6°C to 26.2°C during winter. Annual rainfall is more or less 1500mm.

MATERIALS AND METHODS

Field work was performed from 2009-2011 in different seasons, viz. pre-monsoon, monsoon and post-monsoon in different forest areas of Durgapur Forest Range in Burdwan district of West Bengal State. Specimens of the constituent species were collected some of which were processed for herbarium preservation (Jain and Rao, 1977) and the rest were dissected, described and identified with the help of pertinent taxonomic literature (Prain, 1903; Guha Bakshi, 1984; Bennet, 1987; Panigrahi and Murti, 1989; Murti and Panigrahi, 1999) and authentic specimens. After identification, the plant species were

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enumerated under respective families arranged according to Cronquist's system of classification (1988). Generic Coefficient (Jacard, 1901) which gives an indication of trend of the microclimatic status of a floristic organization was determined by the following formula:

Generic Coefficient= No. of genera/No. of species x 100.

RESULTS

As many as 187 species of Magnoliophyta (Angiosperms) could be identified of which 166 are Magnoliopsids (dicot) and 21 Liliopsids (monocots). The number of species of trees, shrubs, herbs and vines are 76, 35, 56 and 20 respectively. These species have been incorporated in to their respective systematic positions in Cronquist's system of classification (1988) (Table,1).

Table 1: An enumeration of the angiospermic plants (Magnoliophyta) composing forests in Burdwan district
Class MAGNOLIOPSIDA

Subclass I. Magnoliidae

Order Magnoliales

Family Annonaceae

1. *Annona squamosa* L.(Tree)

Order Laurales

Family Lauraceae (Laurel family)

2. *Cinnamomum tamala* (Ham.) Th.G.Fr.Nees (Tree)

Order Piperales

Family Piperaceae (Peperomiaceae, pepper family)

3. *Piper longum* L.(Creeping herb)

Order Aristolochiales

Family Aristolochiaceae

4. *Aristolochia indica* L.(Climber)

Order Nymphaeales

Family Nelumbonaceae

5. *Nelumbo nucifera* Gaertn.(Aquatic herb)

Family Nymphaeaceae (Euryalaceae)

6. *Nymphaea pubescens* Willd (Aquatic herb)

Order Ranunculales

Family Menispermaceae

7. *Stephania japonica* (Thunb.) Miers (Climber)

8. *Tinospora cordifolia* (Willd.) Miers (Climber)

Subclass II Hamamelidae

Order Urticales

Family Ulmaceae (Celtidaceae)

9. *Holoptelia integrifolia* Planch.(Tree)

10. *Trema orientalis* (L.) Blume. (Tree)

Family Moraceae

11. *Artocarpus heterophylla* Lamk. (Tree)

12. *A. lakoocha* Roxb. (Tree)

13. *Ficus benghalensis* L. (Tree)

14. *F. hispida* L.f. (Tree)

15. *F. racemosa* L. (Tree)

16. *Streblus asper* Lour. (Tree)

Subclass III. Caryophyllidae

Order Caryophyllales (Centrospermae)

Family Amaranthaceae

17. *Achyranthes aspera* L. (Herb)

18. *Aerva lanata* (L.)Juss. Ex Schult. (Herb)

19. *Alternanthera philoxeroides* (Mart.) Griseb. (Herb)

20. *Amaranthus spinosus* L. (Herb)

Family Portulacaceae

21. *Portulaca oleracea* L. (Herb)

Family Molluginaceae

22. *Glinus oppositifolius* (L.) DC. (Herb)

Order Polygonales

Family Polygonaceae

23. *Polygonum barbatum* L. (Herb)

Order Plumbaginaceae

Family Plumbaginaceae

24. *Plumbago zeylanica* L. (Shrub)

Subclass IV. Dilleniidae

Order Dilleniales

Family Dilleniaceae

25. *Dillenia pentagyna* Roxb. (Tree)

Order Theales

Family Ochnaceae

26. *Ochna obtusata* De (Shrub)

Family Dipterocarpaceae

27. *Shorea robusta* C.f.Gaertn. (Tree)

Order Malvales

Family Tiliaceae

28. *Corchorus aestuans* L. (Herb)
 29. *Grewia asiatica* L. (Tree)
 30. *Triumfetta rhomboidea* Jacq. (Herb)
Family Sterculiaceae
 31. *Helicteres isora* L. (Shrub)
 32. *Melochia corchorifolia* L. (Herb)
Family Bombacaceae
 33. *Bombax ceiba* L. (Tree)
Family Malvaceae
 34. *Abutilon indicum* (L.) Sweet. (Herb)
 35. *Hibiscus cannabinus* L. (Herb)
 36. *Sida cordata* (Burm.f.) Borssum (Herb)
 37. *Sida rhombifolia* L. (Shrub)
Order Lecythidales
Family Lecythidaceae
 38. *Barringtonia acutangula* (L.) Gaertn. (Tree)
 39. *Careya arborea* Roxb. (Tree)
Order Nepenthales
Family Droseraceae
 40. *Drosera burmanii* Vahl (Herb)
Order Violales
Family Flacourtiaceae
 41. *Flacourtia indica* (Burm.f.) Merr (Shrub)
Family Bixaceae
 42. *Bixa orellana* L. (Shrub)
Family Violaceae
 43. *Hybanthus enneaspermus* (L.) F. Muell (Herb)
Family Cucurbitaceae
 44. *Coccinia grandis* (L.) Voigt. (Scandent shrub)
Order Capparales
Family Capparaceae
 45. *Capparis zeylanica* L. (Shrub)
Order Ebenales
Family Sapotaceae
 46. *Madhuca indica* J.F.Gmel. (Tree)
Family Ebenaceae
 47. *Diospyros melanoxylon* Willd (Tree)
Family Symplocaceae
 48. *Symplocos racemosa* Roxb. (Tree)
Subclass V. Rosidae
Order Fabales
Family Mimosaceae
 49. *Acacia auriculiformis* Benth. (Tree)
 50. *A. catechu* (L.f.) Willd. (Tree)
 51. *A. holoserica* A. Cunn. Ex G.Don. (Shrub)
 52. *A. nilotica* (L.) Willd. ex.Del. (Tree)
 53. *A. sinuate* (Lour.) Merrill (Scandent shrub)
 54. *Albizia lebbbeck* (L.) Benth. (Tree)
 55. *Mimosa pudica* L. (Herb)
 56. *M. rubicaulis* Lam. (Shrub)
 57. *Samanea saman* (Jacq.) Merrill (Tree)
Family Caesalpiniaceae
 58. *Bauhinia purpurea* L. (Tree)
 59. *B. vahlii* Wight. & Arn. (Climber)
 60. *Cassia fistula* L. (Tree)
 61. *C. occidentalis* L. (Shrub)
 62. *C. sophera* L. (Shrub)
 63. *Saraca asoca* L. (Tree)
 64. *Tamarindus indica* L. (Tree)
Family Fabaceae
 65. *Abrus precatorius* L. (Climber)
 66. *Aeschynomene indica* L. (Herb)
 67. *Atylosia scarabaeoides* (L.) Benth. (Climber)
 68. *Butea monosperma* (Lam.) Taub. (Tree)
 69. *B. superba* Roxb. (Climber)
 70. *Cajanus cajan* (L.) Huth. (Shrub)
 71. *Dalbergia sissoo* Roxb. (Tree)
 72. *Desmodium triflorum* DC. (Herb)
 73. *Gliricidia sepium* (Jacq.) Kunth ex Walp. (Tree)
 74. *Indigofera tinctoria* L. (Shrub)
 75. *Mucuna pruriens* (L.) DC. (Climber)
 76. *Pongamia pinnata* (L.) Pierre (Tree)
 77. *Pterocarpus marsupium* Roxb. (Tree)
 78. *Tephrosia purpurea* Pers. (Herb)
Order Proteales
Family Proteaceae
 79. *Grevillea robusta* A. Cunn. ex.R.Br. (Tree)
Order Myrtales
Family Lythraceae
 80. *Lagerstoemia speciosa* (L.) Pers. (Tree)
 81. *Lawsonia inermis* L. (Shrub)
 82. *Woodfordia fruticosa* Kurz (Shrub)
Family Myrtaceae

83. *Psidium guajava* L. (Tree)
84. *Syzygium cumini* (L.) Skeels (Tree)

Family Onagraceae

85. *Ludwigia octovalvis* (Jacq.) Raven (Herb)

Family Combretaceae

86. *Combretum roxburghii* Spreng (Scandent shrub)

87. *Terminalia arjuna* (Roxb. ex.DC.) W. & A. (Tree)

88. *T. bellerica* Roxb. (Tree)

89. *T. chebula* Retz. (Tree)

Order Cornales**Family Alangiaceae**

90. *Alangium salvifolium* (L.f.) Wangerin (Tree)

Order Santalales**Family Olacaceae**

91. *Olax scandens* Roxb. (Scandent shrub)

Order Euphorbiales**Family Euphorbiaceae**

92. *Bridelia retusa* Spreng. (Tree)

93. *Croton bonplandianum* Baill (Herb)

94. *C. roxburghii* Wall. (Tree)

95. *Emblia officinalis* Gaertn. (Tree)

96. *Jatropha gossypifolia* L. (Shrub)

97. *Mallotus philippensis* Muell.Arg. (Tree)

98. *Ricinus communis* L. (Shrub)

99. *Trewia nudiflora* L. (Tree)

Order Rhamnales**Family Rhamnaceae**

100. *Ventilago denticulata* Willd.(Climber)

101. *Zizyphus mauritiana* Lam. (Tree)

102. *Z. oenoplia* (L.) Mill. (Shrub)

Family Vitaceae

103. *Cayratia pedata* Gagnep (Climber)

104. *Vitis reticulata* Gagnep (Climber)

Order Sapindales**Family Sapindaceae**

105. *Schleichera oleosa* (Lour.) Oken. (Tree)

Family Burseraceae

106. *Garuga pinnata* Roxb. (Tree)

Family Anacardiaceae

107. *Anacardium occidentale* L. (Tree)

108. *Buchanania lanzan* Spreng. (Tree)

109. *Lannea coromandelica* (Houtt.) Merrill (Tree)

110. *Mangifera indica* L. (Tree)

111. *Semecarpus anacardium* L.f. (Tree)

Family Simarubeceae

112. *Ailanthus excelsa* Roxb. (Tree)

Family Meliaceae

113. *Azadirachta indica* A.Juss. (Tree)

114. *Melia azadiracht* L. (Tree)

Family Rutaceae

115. *Aegle marmelos* (L.) Corr. (Tree)

116. *Glycosmis pentaphylla* (Retz.) DC. (Shrub)

117. *Limonia acidissima* L. (Tree)

118. *Murraya koenigii* (L.) Spreng. (Tree)

Order Geraniales**Family Oxalidaceae**

119. *Biophytum sensitivum* (L.)DC. (Herb)

120. *Oxalis corniculata* L. (Herb)

Order Apiales**Family Apiaceae**

121. *Centella asiatica* (L.) Urb. (Creeping herb)

Subclass VI. Asteridae**Order Gentianales****Family Loganiaceae**

122. *Strychnos potatorum* L. (Tree)

Family Apocynaceae

123. *Alstonia scholaris* (L.) R.Br. (Tree)

124. *Carissa caranda* L. (Shrub)

125. *Catharanthus roseus* (L.) G. Don (Shrub)

126. *Holarrhena pubescens* (Buch-Ham) Wall ex.G.Don (Tree)

127. *Ichnocarpus frutescens* (L.) R. Br. (Climbing shrub)

128. *Rauvolfia serpentina* (L.) Benth.ex.Kurz (Herb)

Family Asclepiadaceae

129. *Calotropis gigantea* (L.) R. Brown (Shrub)

130. *Gymnema sylvestre* R. Br. (Climber)

131. *Hemidesmus indicus* (L.) R. Br. (Climber)

132. *Tylophora indica* (Burm.f.) Merrill (Twining herb)

Order Solanales**Family Solanaceae**

133. *Physalis minima* L. (Herb)
134. *Solanum surattense* Burm.f. (Herb)

Family Convolvulaceae

135. *Argyreia nervosa* (Burm.f.) Bojer (Climber)
136. *Evolvulus alsinoides* (L.) L. (Herb)
137. *Ipomoea aquatica* Forsk. (Herb)
138. *I. fistulosa* Martius ex. Choisy (Shrub)

Family Cuscutaceae

139. *Cuscuta reflexa* Roxb. (Climber)

Order Lamiales**Family Boraginaceae**

140. *Cordia dichotoma* Forst. (Tree)
141. *Ehretia laevis* Roxb. (Tree)
142. *Heliotropium indicum* L. (Herb)

Family Verbenaceae

143. *Clerodendrum viscosum* Vent (Shrub)
144. *Gmelina arborea* Roxb. (Tree)
145. *Lantana camara* L. (Shrub)
146. *Lippia javanica* (Burm.f.) Spreng. (Shrub)
147. *Tectona grandis* L.f. (Tree)
148. *Vitex negundo* L. (Shrub)

Family Lamiaceae

149. *Hyptis suaveolens* (L.) Poit. (Herb)
150. *Ocimum gratissimum* L. (Herb)

Order Scrophulariales**Family Oleaceae**

151. *Nyctanthes arbortristis* L. (Tree)

Family Scrophulariaceae

152. *Scoparia dulcis* L. (Herb)

Family Acanthaceae

153. *Andrographis paniculata* (Burm.f.) Wallich ex. Nees (Herb)
154. *Hygrophila schulli* M. R. Almeida & S. M. Almeida (Herb)
155. *Justicia adhatoda* L. (Shrub)
156. *Rhinacanthus communis* Nees (Shrub)

Order Rubiales**Family Rubiaceae**

157. *Anthocephalus chinensis* (Lam.) A. Rich. ex. Walp. (Tree)

158. *Gardenia gummifera* L.f. (Tree)
159. *Haldina cordifolia* (Roxb.) Ridsdale (Tree)
160. *Meyna spinosa* Roxb. ex. Link (Shrub)
161. *Mitragyna parviflora* (Roxb.) Korth. (Tree)
162. *Morinda citrifolia* L. (Tree)

Order Asterales**Family Asteraceae**

163. *Eclipta prostrata* L. (Herb)
164. *Elephantopus scaber* L. (Herb)
165. *Enydra fluctuans* Lour. (Herb)
166. *Spilanthes acmella* Murray (Herb)

Class LILIOPSIDA**Subclass I Arecidae****Order Arecales****Family Arecaceae**

167. *Borassus flabellifer* L. (Tree)
168. *Phoenix acaulis* Buch-Ham ex. Roxb. (Shrub)
169. *P. sylvestris* (L.) Roxb. (Tree)

Subclass II Commelinidae**Order Commelinales****Family Commelinaceae**

170. *Commelina benghalensis* L. (Herb)

Order Cyperales**Family Cyperaceae**

171. *Cyperus rotundus* L. (Herb)

Family Poaceae

172. *Aristida adscensionis* L. (Herb)
173. *Bambusa arundinacea* Willd. (Tree)
174. *Chrysopogon aciculata* (Retz.) Trin. (Herb)
175. *Cynodon dactylon* (L.) Pers. (Herb)
176. *Saccharum munja* Roxb. (Herb)
177. *Saccharum spontaneum* L. (Herb)
178. *Vetiveria zizanioides* (L.) Nash (Herb)

Subclass III Zingiberidae**Order Zingiberales****Family Zingiberaceae** (Ginger family)

179. *Curcuma aromatica* Salisb. (Herb)

Family Costaceae

180. *Costus speciosus* (Koenig) Smith (Herb)

Subclass IV. Liliidae**Order Liliales****Family Liliaceae** (Lily family)

181. *Asparagus racemosus* (Kunth) Baker
(Scandent herb)

182. *Gloriosa superba* L.(Climber)

Family Hypoxidaceae

183. *Curculigo orchiioides* Gaertn. (Herb)

Family Smilacaceae

184. *Smilax zeylanica* L.(Climber)

Family Dioscoreaceae

185. *Dioscorea alata* L. (Climber)

186. *D. bulbifera* L. (Climber)

Order Orchidales

Family Orchidaceae (Orchid family).

187. *Eulophia flava* Hook.f.(Herb)

especially with the trees, shrubs and herbs.

The species quota of each genus is more than one and the Generic Coefficient which serves as an index of floristic diversification is 88.77 and hence appreciable. In the existing condition, where more than one species share single genus, the value is expected in course of time to be reduced to 1. Since the difference between the observed and expected values of generic coefficients is low (11.23), there is a possibility of successful revegetation and restoration of the forests under study, provided the existing environmental conditions.

Fabaceae is the most dominating family in the floristic scenario of the forest which is successively followed by Mimosaceae, Euphorbiaceae, Caesalpiniaceae, Poaceae, Moraceae, Apocynaceae, Rubiaceae, Verbenaceae,, Convolvulaceae and Anacardiaceae (Fig.,2).

As the forest is associated with human settlement, different biotic and anthropogenic stress factors, chances for the impoverishment of the flora are not unlikely. As such, the Forest Department has been planting many indigenous species for promoting ecological welfare of the forest.

DISCUSSION

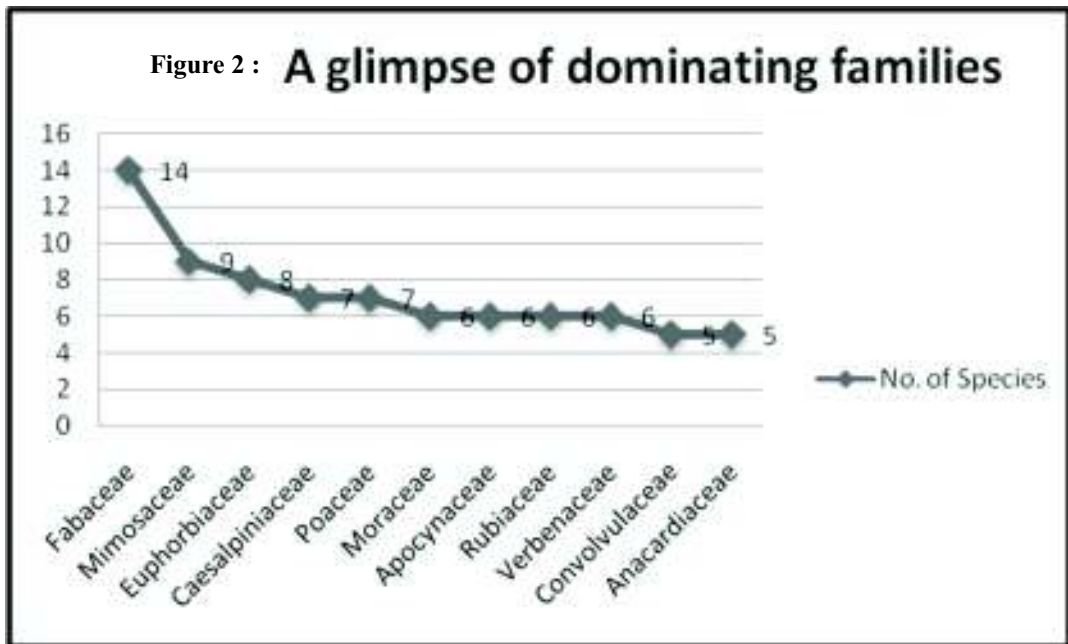
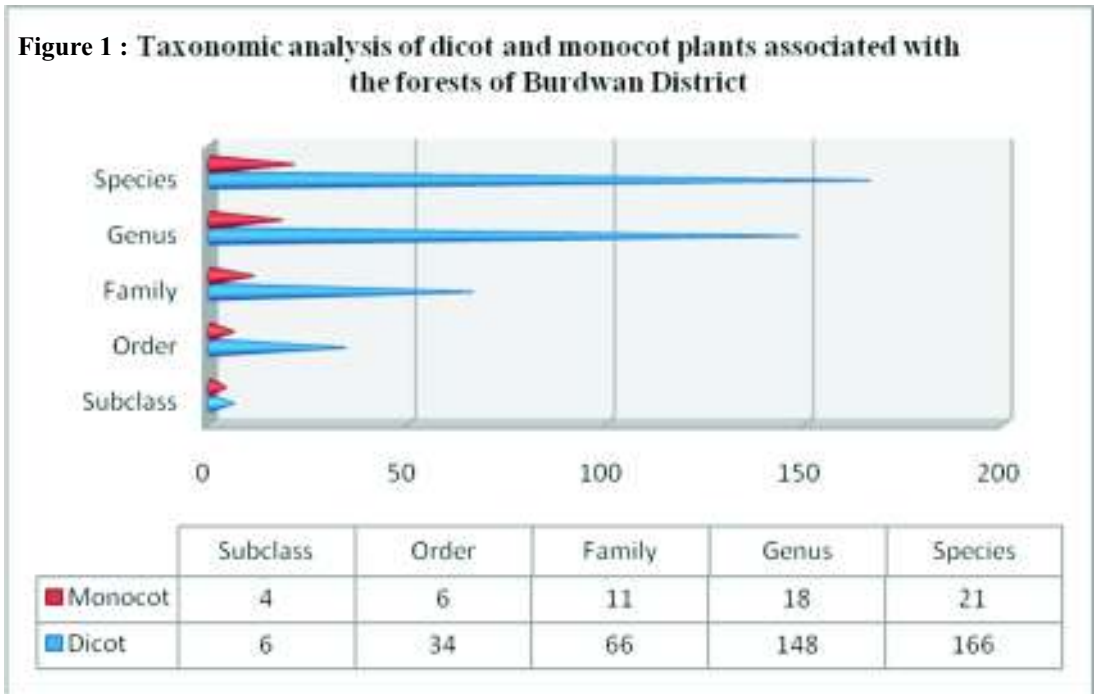
A taxonomic analysis of the floristic diversity thus recorded (Table,2) shows 187 species representing 166 genera of 77 families of Magnoliophyta (angiosperms). The dicots have dominance over monocots when compared at all levels of taxonomic hierarchy as recognized by Cronquist (1988). At the levels of subclass, order, family, genera and species the Magnoliopsida (Dicot): Liliopsida (monocot) ratios appear as 1.5:1; 5.6:1; 6:1; 8.2:1; 7.9:1 respectively (Fig.,1). The trees, shrubs, herbs and vines include 76, 35, 56 and 20 species respectively. These values are indicative of dominance of woody (ligneous species= trees + shrubs + lianas) species over herbaceous plants. The symbiotic relationship between the forest dwelling tribes and plants involves all forms of plant habits in appreciable number,

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Table 2: Taxonomic analysis of plants in forests of Burdwan district

Magnoliophyta (Angiosperms)	Total number	Magnoliopsids (Dicots)		Liliopsids (Monocots)		Magnoliopsids : Liliopsids	Generic coefficient(%)
		Total	percentage	Total	percentage		
Subclass	10	6	60	4	40	1.5:1	88.77
Order	40	34	85	6	15	5.6:1	
Family	77	66	85.71	11	14.28	6:1	
Genus	166	148	89.15	18	10.84	8.2:1	
Species	187	166	88.77	21	11.22	7.9:1	



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