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BIOLOGICAL SPECTRUM OF BANKATI FOREST AREAS IN BURDWAN DISTRICT, WEST BENGAL

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ABSTRACT

Analysis of the biological spectrum of the patch of tropical deciduous Sal forest in Bankati Gram Panchayat area under Durgapur Forest Range, Burdwan District, West Bengal, based on 71 Plant species of angiosperms, reveals that per hundred species of its flora, 63.38 are phanerophytes, 1.41 chamaephytes, 8.45 cryptophytes, 7.04 hemicryptophytes and 19.71 therophytes. The phytoclimate appears to be of phanero-therophytic type.

KEY WORDS: Biological spectrum, bankati, phytoclimate, phanero-therophytic type

Biological spectrum of vegetation is the index of the phytoclimate of the site, deduction of which is based on different life-forms composing the flora of the site. The life-form in its turn is the ultimate manifestation of the sum of all the adaptations undergone by a plant to the climate in which it resides. Raunkiaer (1934) proposed the term "Biological Spectrum" to express both the life-form distribution in a flora and the phytoclimate under which the prevailing life-forms evolved. Life-form study is thus an important part of vegetation description, ranking next to floristic composition.

The biological spectrum is thus useful as an index of the health status of a forest. When worked out at periodic intervals, biological spectrum may set the guidelines for eco-restoration and optimization of a community. In view of this, the present work was under taken in the forested areas of Bankati Gram Panchayat of Burdwan District, West Bengal.

MATERIALS AND METHODS

This work, which is a part of the Project concerning study of Non-Timber Forest Produce (NTFP) of Durgapur Forest Range, Burdwan, was carried out in the forested areas of Bankati Gram Panchayat since 2009. During field studies the species were tentatively identified and their life-forms were recorded for determination of biological spectrum adopting Raunkiaer (1934). Some of the plant specimens collected during field study were processed for herbarium preservation and the rest were taxonomically worked out for confirming identification with the help of pertinent literature (Prain, 1903; Guha Bakshi, 1984; Bennet, 1987, Bentham and Hooker1862-83) and authentic specimens preserved in the herbarium of Burdwan University.

Study Site

Bankati Gram Panchayat lies between $22^0$56`N and $23^0$53`N latitudes and between $86^0$48`E and $88^0$25`E longitudes. It includes 24 villages dispersed in 16 Mouzas of Burdwan District which are located between the rivers Ajoy in the North and Kunur in the South. These villages being in the proximity of and in conformity with forests are rich in biodiversity (Bhattacharya and Mukherjee 2006). The soil is lateritic in nature and the temperature ranges from 20.1^0C to 44^0C during summer and from 6^0C to 26.2^0C during winter. Annual rainfall is more or less 1500mm.

RESULTS

This work records 71 plant species of angiosperms in table 1. The graphical representation of Raunkiaer's normal spectrum are shown in fig 1. The diversity thus documented reveals that of the species composing the flora 63.38% are Phanerophytes, 1.41% Chamaephytes, 7.04% Hemicryptophytes, 8.45% Cryptophytes and 19.71% Therophytes (Fig.2).

DISCUSSION

Analysis of the present work reveals the phytoclimate to be of Phanero-therophytic type. The climate is ideal for sustaining the forest trees. This can be evidenced from much higher (63.38%) proportion of

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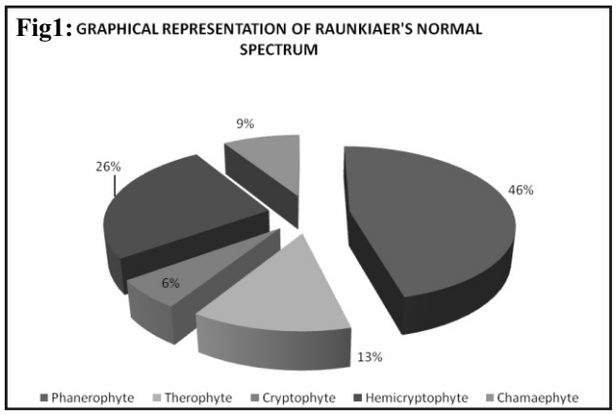
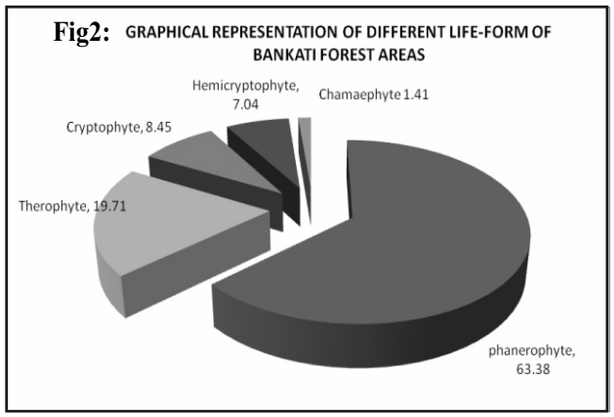
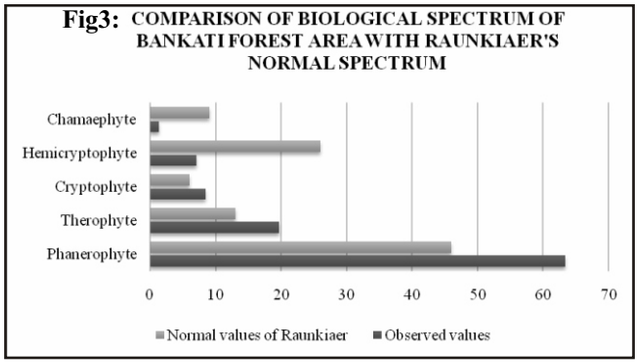
Table 1: An inventory of the angiosperms composing the Bankati Forest Area

Serial No.	Scientific Name	Family	Life-form category
1.	*Melochia corchorifolia* L.	Sterculiaceae	Therophyte
2.	*Strychnos potatorum* L.f.	Loganiaceae	Phanerophyte
3.	*Caesalpinia pulcherrima* (L.) Sw.	Caesalpiniaceae	Phanerophyte
4.	*Madhuca longifolia* Koeing	Sapotaceae	Phanerophyte
5.	*Holoptelea integrifolia* Planch.	Ulmaceae	Phanerophyte
6.	*Alangium salvifolium* (L.f.) Wang.	Alangiaceae	Phanerophyte
7.	*Ficus hispida* L.f.	Moraceae	Phanerophyte
8.	*Combretum decandrum* Roxb.	Combretaceae	Phanerophyte
9.	*Vitis reticulatus* L.	Vitaceae	Phanerophyte
10.	*Tinospora cordifolia* (Willd.) Miers	Menispermaceae	Phanerophyte
11.	*Morinda citrifolia* L.	Rubiaceae	Phanerophyte
12.	*Dioscorea tomentosa* Koenig	Dioscoreaceae	Phanerophyte
13.	*Cryptolepis buchanani* Roem. & Schult.	Asclepiadaceae	Phanerophyte
14.	*Barringtonia acutangula (L.) Gaertn*	Lecythidaceae	Phanerophyte
15.	*Ficus religiosa* L.	Moraceae	Phanerophyte
16.	*Bambusa arundinaceae* (Retz.) Willd.	Poaceae	Phanerophyte
17.	*Abrus precatorius* L.	Fabaceae	Phanerophyte
18.	*Gymnema sylvestre* R. Br.	Asclepiadaceae	Phanerophyte
19.	*Hemidesmus indicus* (L.) Ait	Asclepiadaceae	Phanerophyte
20.	*Syzygium cumini* (L.) DC	Myrtaceae	Phanerophyte
21.	*Physalis minima* L.	Solanaceae	Therophyte
22.	*Glycosmis pentaphylla* Corr.	Rutaceae	Phanerophyte
23.	*Cordia myxa* Roxb.	Boraginaceae	Phanerophyte
24.	*Achyranthes aspera* L.	Amaranthaceae	Therophyte
25.	*Acacia catechu* (L.f.) Wild.	Mimosaceae	Phanerophyte
26.	*Semecarpus anacardium* L.f.	Anacardiaceae	Phanerophyte
27.	*Curculigo orchioides* Gaertn	Hypoxidaceae	Cryptophyte
27.	*Grewia asiatica* L.	Tiliaceae	Phanerophyte
28.	*Ziziphus sylvatica*	Rhamnaceae	Phanerophyte
29.	*Gloriosa superba* L.	Liliaceae	Cryptophyte
30.	*Butea superba* Roxb.	Fabaceae	Phanerophyte
31.	*Tylophora indica* (Burm.f.) Merrill.	Asclepiadaceae	Phanerophyte
32.	*Vangueria spinosa* Roxb.	Rubiaceae	Phanerophyte
33.	*Mitragyna purviflora* (Roxb.) Korth	Rubiaceae	Phanerophyte
34.	*Cassia tora* L.	Caesalpiniaceae	Therophyte

35.	*Elephantopus scaber* L.	Asteraceae	Therophyte
36.	*Scilla indica* Bak.	Liliaceae	Cryptophyte
37.	*Randia uliginosa* DC.	Rubiaceae	Phanerophyte
38.	*Curcuma caesia* Roxb.	Zingiberaceae	Cryptophyte
39.	*Desmodium gangeticum* DC.	Fabaceae	Therophyte
40.	*Mallotus philippinensis* Muell. Arg	Euphorbiaceae	Phanerophyte
41.	*Saccharum munja* L.	Poaceae	Cryptophyte
42.	*Ocimum americanam L.*	Lamiaceae	Therophyte
43.	*Coldenia procumbens L.*	Boraginaceae	Hemicryptophyte
44.	*Merremia emerginata* Hallier f.	Convolvulaceae	Phanerophyte
45.	*M. hederacea* Hallier f.	Convolvulaceae	Phanerophyte
46.	*Hybanthus enneaspermus* (L.) F. V. Muell.	Violaceae	Therophyte
47.	*Aristida adscenscionis* L.	Poaceae	Hemicryptophyte
48.	*Eragrostis tremula* L.	Poaceae	Hemicryptophyte
49.	*E. coarctata* Stapf	Poaceae	Hemicryptophyte
50.	*Fimbristylis ovata* (Burm.f.) Kern	Cyperaceae	Cryptophyte
51.	*Acacia arabica* Willd.	Mimosaceae	Phanerophyte
52.	*Combretum roxburghii* Spreng	Combretaceae	Phanerophyte
53.	*Cassia occidentalis* L.	Caesalpiniaceae	Therophyte
54.	*Melia azadirachta* L.	Melastomaceae	Phanerophyte
55.	*Schleichera trijuga* Willd.	Sapindaceae	Phanerophyte
56.	*Croton oblongifolia* Roxb.	Euphorbiaceae	Phanerophyte
57.	*Triumfetta rhomboidea* Jacq.	Tiliaceae	Therophyte
58.	*Phyllanthus niruri* L.	Euphorbiaceae	Therophyte
59.	*Centratherum anthelminticum* O. Kuntze.	Asteraceae	Therophyte
60.	*Ichnocarpus frutescens* R. Br.	Apocynaceae	Phanerophyte
61.	*Cardiospermum halicacabum* L.	Sapindaceae	Phanerophyte
62.	*Trewia nudiflora* L.	Euphorbiaceae	Phanerophyte
63.	*Lippia javanica* (Burm.f.) Spreng.	Verbenaceae	Therophyte
64.	*Centella asiatica* L.	Apiaceae	Hemicryptophyte
65.	*Smilax zeylanica* L.	Smilacaceae	Phanerophyte
66.	*Jatropha gossypifolia* L.	Euphorbiaceae	Chamaephyte
67.	*Ricinus communis* L.	Euphorbiaceae	Therophyte
68.	*Ipomoea pestigridis* L.	Convolvulaceae	Phanerophyte
69.	*Dalbergia sissoo* Roxb. Ex. DC.	Fabaceae	Phanerophyte
70.	*Alstonia scholaris* (L.) R. Br.	Apocynaceae	Phanerophyte
71.	*Shorea robusta* Gaertn.f.	Dipterocarpaceae	Phanerophyte







phanerophytes than Raunkiaer's normal values (46%) as revealed in fig.3. However, the impoverished state of chamaephytes in the study site (Figs 2 and 3) is likely to have led to severe derangement of the edaphic matrix and severe soil erosion. The value of cryptophytes being higher than the normal confirms the strategy of some of the plants to conceal their perennating organs under the existing stress. The Hemicryptophytes are much more impoverished than the normal condition to keep the forest floor almost bare. The xeric nature of the habitat, which is likely to have emanated from the removal of topsoil by erosion and poor water retention by the substratum even during rainy season, gets reflected in the supra-normal representation of the therophytes in the site. The forest health appears to be much deranged although the area receives adequate rain under monsoonal regime to sustain higher proportion of Phanerophytes. The derangement is mainly from soil erosion and poor water holding capacity of the soil. A periodic monitoring of the existing forest using biological spectrum as the index is certain to prove useful in formulation of strategies for its eco-optimization.

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