International Research Journal of Biological Sciences _____ ISSN 2278-3202
Vol. **7(4),** 1-6, April **(2018)** *Int. Res. J. Biological Sci.*

Short Research Article

Phytodiversity assessment of Sola Reserve Forest, Charaideo district, Assam, India

P. Jiji
Department of Botany, Swahid Peoli Phukan College, Namti, Namtidole, Sivasagar, Assam, India
sanjeevjiji@gmail.com

Available online at: www.isca.in, www.isca.me
Received 14th January 2018, revised 8th April 2018, accepted 9th April 2018

Abstract

Assam is one of the hotspot regions of India. The biodiversity of Assam is decreasing very fast. For the proper assessment of biodiversity and its speed of extinction, it is necessary to have periodic data collection on the number of species and general census of each on some representative sites. Sola reserve forest is an evergreen rain forest, and it lies between 94°8′-94°4′east longitude and 26°7′-27°2′north latitude and an altitude of 110M. Due to ONGCL. Drilling operation forest area is decreasing very fast and the soil is polluted. During survey numbers of species have been come under endemic and endangered species listed in IUCN Red Data Book. From these, Alpinia galanga, Clerodendron coleobrookianum, Smilax macrophyla, Gnetum gnemon, G. latifolium, Calamus floribundus etc. are wild vegetables and some are medicinal. Aquillaria agalocha yield a variety of perfume, Magnolia grifithii and M. gustavii are wood for furniture, were found endangered. So, conservation of the forest is necessary to keep biodiversity and get rid of global warming.

Keywords: Biodiversity, pollution, conservation, endangered.

Introduction

Assam, one of the most sensitive biodiversity zones of the world, having an area of 78,438 km^2. Covering much of the Brahmaputra valley and the hills of the Himalayan ranges to the north and south. Assam is well known for its rich eco-biodiversity nature. Most of the area full of greenery and deep jungles. But the problems of biodiversity conservation as the global phenomenon also faced by the Assam. Like any other parts of India, Assam also has been experiencing unthinkably great loss of its biodiversity resulting from a variety of human and natural factors. Phytodiversity is essential part of biodiversity. For the conservation of the biosphere Phytodiversity must be conserved.

Floristic study in Assam have been carried out from time to time by several workers as Kanjilal et al.[1], Sharma[2], Islam[3], Gogoi[4] and Gogoi and Islam[5].

The study area Sola Reserve Forest comprises the total area of 683.17 Hectors. And it lies between 94^{0}8′-94^{0}4′east longitude and 26^{0}7′-27^{0}2′north latitude (26^{0}56′14$^{//0}$N latitude 64^{0}54′11$^{//0}$) and an attitude of 110M, and is situated in the foot hills of Naga Hills. The terrain is flat on the northern side and gradually rising south wards. Most of the area is of alluvial formation with a great depth of alluvium. Tropical monsoon climate with rainfall ranging from 2,400mm to 4,000mm and temperature ranging from 9^0-38^{0}C likewise. The vegetation of these are comprises of evergreen and semi evergreen rain forest. It is one of the biodiversity hotspot. The forest contains number of endemic, endangered and threatened species of flora and fauna. Number of ethno medicinal plants and food plants were found in the "Sola Reserve Forest". People live around are depend on this forest. Study of this area is very important because the forest is reducing very fast.

Materials and methods

Survey and collection of the plant species were conducted following the methodologies of floristic study Jain and Rao[6]. Repeated field visits were carried out in different time intervals. During the period of survey necessary data like local name(s), habit, habitat, and occurrence of plants were recorded.

Structural analysis of the existing plant species, on the drill sites and protected areas, are carried out in sample plots. The size of the sample plots were 10mx10m for trees, shrubs and climbers, while, the herbaceous species were well studied in sample plot size 1mx1m.

The density, frequency, abundance, A/F Ratio were calculated for each species[7], Sorensen's index of similarity between two communities was determined by using the formula[8].

Results and discussion

Sola Reserve forest, floristically unexplored area, of Charaideo district situated in boarder area of Assam. In between 26°58′14″ North latitude and 94°54′11″ east longitude is located in the Southern bank of river Brahmaputra is endowed with luxuriant

vegetative growth with rich Biodiversity. The total area of the forest is about 683.17hectors, where 223 plant species have been recorded in the present survey of the work, is summarized as follow:

The 223 species are belong to 189 genera and 92 families and out of these 158 are dicotyledones, 55 monocots, 2 gymnosperms and 8pteridophytes (Table-1). Trees were found dominant (40.35%), Herbs (27.35%) shrubs, (20.18%), climbers, (9.41%) and epiphytes, (2.69%) amongst the floristic diversity of the study area family papillionaceae (9 species) recorded as predominant followed by Euphorbiaceae (8 species) while in monocotyledon Poaceae (12 species) recorded as dominant followed by Arecaceae (7 species).

For structural analysis the sites were divided in to undisturbed site (A) and neighboring area of disturbed site (B) on the basis of influence of ONGCL drilling operations and human activities. The nature of distribution like frequency, density, abundance, A/F ratio and similarity dissimilarity index were calculated from both selected plot shown in Table-2.

Table-1: Statistical synopsis and percentage of floral diversity of Sola Reserve Forest.

Groups	Species		Genus		Family	
Angiosperms	No.s	%	No.s	%	No.s	%
Dicots	158	70.85	137	72.58	66	71.7
Monocots	55	24.66	44	23.28	18	19.5
Gymnosperms	2	0.89	1	0.53	1	1.11
Pteridophytes	8	3.58	7	3.7	7	7.6
Total	223	100	189	100	92	100

Table-2: Ecological nature of vegetation in undisturbed and disturbed sites of Sola Reserve Forest.

Name of plants	Frequency		Density		Abundance		A/F Ratio	
	A	B	A	B	A	B	A	B
Achrostichum aureum	60	20	1.2	0.2	2	1	0.03	0.05
Achyranthes aspera	40	40	1	0.6	2.5	1.5	0.06	0.04
Alocasia indica	20	-	0.2	-	1	-	0.05	-
Alpinia galanga L	20	-	0.4	-	2	-	0.1	-
Albizzia lebbek	20	-	0.2	-	1	-	0.05	-
Alstonia Scholaris	20	20	0.4	0.2	2	1	0.1	0.05
Angiopteris evecta	20	-	0.4	-	2	-	0.1	-
Aquillria agallocha	40	-	0.4	-	1	-	0.03	-
Arundo donox L	40	20	0.8	0.2	2	1	0.05	0.05
Axonopus compressus	40	80	1.4	2	3.5	2.5	0.09	0.03
Blastus cochinchinensis	60	-	0.2	-	0.33	-	0.01	-
Boerhavia diffusa	20	20	0.6	0.2	3	1	0.15	0.05
Borreria articularis	40	40	1.4	0.6	3.5	1.5	0.09	0.04
Calamus flagellum	40	-	0.4	-	1	-	0.03	-
C. floribundus	40	-	0.6	-	1.5	-	0.04	-

Name of plants	Frequency		Density		Abundance		A/F Ratio	
	A	B	A	B	A	B	A	B
Cardiospermum helicacabum	20	-	0.4	-	2	-	0.1	-
Cassia alata	20	-	0.2	-	1	-	0.05	-
Cassia fistula	40	-	0.2	-	0.5	-	0.01	-
C. tora	20	60	1.2	0.8	6	1.33	0.3	0.02
Celastrus hindsii. Benth	20	-	0.4	-	2	-	0.1	-
Centella asiatica	60	20	0.6	0.2	1	1	0.02	0.05
Cinnamomum tamala	40	-	0.4	0	1	-	0.03	-
Cissampelos parieta	40	-	0.4	0	1	-	0.03	-
Clerodendron coleobrookianum	40	-	1	0	2.5	-	0.06	-
Costus speciosus	40	-	0.4	0	1	-	0.03	-
Croton caudatus	40	-	0.4	0	1	-	0.03	-
Crotolaria striata	40	40	0.8	0.8	2	2	0.05	0.05
C. pallida	40	20	0.2	0.2	0.5	1	0.01	0.05
Cuscuta reflexa	40	40	0.4	0.4	1	1	0.03	0.03
Cyathia gigantia Wall	20	-	0.4	0	2	-	0.1	-
Cyperus brevifolia	40	20	1.2	0.2	3	1	0.08	0.05
C.rotundus	40	40	1.4	0.8	3.5	2	0.09	0.05
Dendrobium fulcatum	40	-	0.2	0	0.5	-	0.01	-
D. fibriatum Hook	40	-	0.2	0	0.5	-	0.01	-
Dillenia indica	20	-	1	-	5	-	0.25	-
Dio spyros variegeta	20	-	0.2	0	1	-	0.05	-
Dipterocarpus retuses BL	60	-	0.4	0	0.67	-	0.01	-
Dioscorea alata L	20	-	0.2	0	1	-	0.05	-
Elephantopus scaber L	20	20	0.6	0.2	3	1	0.15	0.05
Entada pursaetha DC	20	-	0.4	0	2	-	0.1	-
Euphorbia hirta	40	40	0.4	0.6	1	1.5	0.03	0.04
Eupatorium odoratum	40	40	1.2	1.8	3	4.5	0.08	0.11

Name of plants	Frequency		Density		Abundance		A/F Ratio	
	A	B	A	B	A	B	A	B
Ficus benjamina	20	-	0.2	-	1	-	0.05	-
F. religiosa	20	-	0.2	-	1	-	0.05	-
Gntum gnemon	40	-	0.8	0	2	-	0.05	-
G. latifolium	40	-	0.4	0	1	-	0.03	-
Garcinia cowa	40	-	0.4	0	1	-	0.03	-
G. pedunculata	20	-	0.2	0	1	-	0.05	-
Hedyotis scandens	20	-	0.2	0	1	-	0.05	-
Helminthostachys zeylanica L	20	20	0.2	0.2	1	1	0.05	0.05
Hydroctyl rotundifolia	40	40	0.8	0.4	2	1	0.05	0.03
Hygro rhyza aristata	40	-	0.4	0	1	-	0.03	-
Imperata cylendrica	60	-	1.2	0	2	-	0.03	-
Justicia adhatoda	20	-	0.2	0	1	-	0.05	-
Lagerstromia speciosa	40	20	0.6	0.2	1.5	1	0.04	0.05
Leucus aspera Link	60	40	1	0.6	1.67	1.5	0.03	0.04
Lygodium flexuosum	60	-	1	0	1.67	-	0.03	-
L. scandens LSW	40	-	0.6	0	1.5	-	0.04	-
L. japonicum	40	-	0.4	0	1	-	0.03	-
Litseae cubeba (Lour.) Pers.	20	-	0.4	0	2	-	0.1	-
Mangifera sylvatica Roxb.	20	-	0.2	0	1	-	0.05	-
Magnolia caveana	20	-	0.2	0	1	-	0.05	-
M. gustavii King	20	-	0.2	0	1	-	0.05	-
Melastoma malabathricum	20	20	0.4	0.2	2	1	0.1	0.05
Mezoneurum cucullatum	40	-	0.4	0	1	-	0.03	-
Michelia champaca	20	-	0.2	0	1	-	0.05	-
Mimosa pudica	60	40	1.2	0.6	2	1.5	0.03	0.04
Mimusops elengi	20	-	0.2	0	1	-	0.05	-
Mesuea ferrea L	20	-	0.2	0	1	-	0.05	-

Name of plants	Frequency		Density		Abundance		A/F Ratio	
	A	B	A	B	A	B	A	B
Pedearia scandens	40	-	0.4	0	1	-	0.03	-
Pogostemon benghalensis	20	-	0.2	0	1	-	0.05	-
Pongamia pinnata	20	-	0.2	0	1	-	0.05	-
Sapium baccatum	20	-	0.2	0	1	-	0.05	-
Sauruia roxburghii	20	-	0.2	0	1	-	0.05	-
Schima wallichii	20	-	0.2	0	1	-	0.05	-
Shorea robusta	40	-	1	0	2.5	-	0.06	-
Smilax macrophylla	40	-	0.6	0	1.5	-	0.04	-
Smithia grandis	20	-	0.4	0	2	-	0.1	-
Solanum nigram	20	20	0.2	0.2	1	1	0.05	0.05
S. torvum	40	40	0.4	0.4	1	1	0.03	0.03
Stephenia hermandifolia	20	-	0.2	0	1	-	0.05	-
Syzygium kurzii	20	-	0.2	0	1	-	0.05	-
Terminalia chebula	20	-	0.2	0	1	-	0.05	-
T. maryocarpa	20	-	0.2	0	1	-	0.05	-
Tetracera sermentosa	40	-	0.2	0	0.5	-	0.01	-
Vanda roxburghii	20	-	0.6	0	3	-	0.15	-
Viburnum coleobrookianum	20	-	0.2	0	1	-	0.05	-
Walsura robusta.	20	20	0.2	0.2	1	1	0.05	0.05
Xanthium strumarium	60	40	1.4	0.8	2.33	2	0.04	0.05

About 90 plants were studied from 10 different undisturbed and disturbed site to find out Frequency, density, Abundunce and A/F ratio. Out of 90 studied only 27 found out in disturbed site. *Achrostichum aureum, Blastus cochinchinensis, Centella asiatica, Dipterocarpus retuses BL, Imperata cylendrica, Leucus aspera Link, Lygodium flexuosum, Mimosa pudica* and *Xanthium strumarium* have maximum frequency of 60% in undisturbed area but *Axonopus compresses* has 80% in disturbed site . *Eupatorium odoratum* has highest density 1.8 in disturbed site and *Axonopus compressus, Borreria articularis* and *C.rotundus* have density of 1.4 in undisturbed site. *Cassia tora* has highest abundance with 6 in undisturbed area and *Axonopus compressus* has abundance 2.5 in disturbed sites. *Boerhavia diffusa* and *Vanda roxburghii* have highest A/F Ratio of 0.15 in undisturbed site and *Eupatorium odoratum* with 0.11 in disturbed site.

Similarity Dissimilarity index was also recorded. Similarity index 0.46 and dissimilarity index 0.54 indicates that, there a remarkable degree of dissimilarity among the species in the both sites due to the soil pollution by ONGCL. The soil health of Sola became damaged by oil pollution. During the course of survey 24 oil wells were recorded, which are located at Sola Reserve forest and one group gathering station (GGS-II). Each site covers 2.5-5 hectors land area. After successful operation oil well sites were converted in to waste land with oil mud's and

waste pit along with other chemical substances, where plants cannot survive and the original structure of forest were destroyed. Moreover, during the survey 14 species have been come under endemic and endangered species listed in IUCN Red Data Book. From these, *Alpinia galanga, Clerodendron coleobrookianum, Smilax macrophyla, Gnetum gnemon, G. latifolium, Calamus floribundus* etc. are wild vegetables and some are medicinal. *Aquillaria agalocha* yield a variety of perfume, *Magnolia caveana, Magnolia grifithii* and *M. gustavii* are wood for furniture. *Dendrobium fulcatum* is one of the orchid plants *Litsea cubeba* is a fiber yielding plant. *Mangifera sylvatica* and *Smithia grandis* also coming under IUCN red list.

During the time of selection of drilling area most of the plants were cut down from the forest parts. The number of plant species started decreasing from last 3 decades. *Flemingia strobilifera* (Makhioti) completely extinct from the forest and *Livistona jenkinsiana* (Toko) also not found now. So conservation of this forest at grass root level is necessary to attain the goal of biodiversity conservation.

Conclusion

Biodiversity of an area related to cultural diversity. Creating deeper relationship with the environment and human is necessary for conservation of biodiversity. Then only the world's diversity can be conserved for the future. Sharing of information on local biodiversity with the public through signboards, instructive displays, leaflet dissemination, botanical gardens, newsletters or local media are the main mechanisms for raising awareness and spreading responsibility. Programmers for 'adopting' a particular nature reserve, habitat, forest section, stream or local species have proven successful in biodiversity conservation. The activities within 'adoption programme' may include keeping the area clean, planting of native species etc. Biodiversity management requires a long scope which reaches out to the next generations. Assessment of biodiversity at an interval is important for conservation of species. Involvement citizen at grass root level is necessary for biodiversity management.

References

1. Kanjilal U.N., Kanjilal P.C. and Das A. (1934). 1940. Flora of Assam. I–IV, Calcutta: Government of Assam.

2. Sharma J.N. (1978). Flora of Sibsagar district Assam. Ph.D. Thesis Guahati University.

3. Islam M. (1996). Weeds of Northeast India. The Assam Paper industry, Tinsukia.

4. Islam M. (1981). On the occurrence and distribution of epiphytes in the tea fields of Assam. *Proc. Nat. Acad, Sci.*, 51(B), 153-156.

5. Gogoi M. and Islam M. (2006). Life-forms and Biological spectrum of the flora of Charaideo sub-division, Assam. *Adv. Plant. Sci*., 19(1), 117-119.

6. Jain S.K. and Rao R.R. (1976). A hand book of field and herbarium methods. Today and Tomorrow publication, New Delhi.

7. Ambasht R.S. and Ambasht N.K. (1988). A Text book of plant ecology. Students friends & Co. Varanasi.

8. Misra K.C. (1989). Manual of plant Ecology. Oxford and IBH publishing Co. Pvt. Ltd.