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Floristic diversity of Pathra and its adjoining areas, Paschim Medinipur District, West Bengal

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ABSTRACT

Pathra is a village in Paschim Medinipur district. Recently this village has come to limelight due to its archaeological recognition having many temples and related structures of historical importance. Many people come to this for sightseeing and as such biodiversity of this area might be affected due to anthropogenic activities. In this background, with a view to understand the floristic diversity in this region the present study has been undertaken.Present botanical exploration at Pathraand its adjoining areas reportsthe 97 species (angiosperms 94 & pteridophytes 3). 94 angiosperms (dicots 81& monocots 13) belong to89 genera (dicots77& monocots 12) and 45 families (dicots 38 & monocots 7). The ratio of monocots and dicots is 1: 6.23. Only 3 species of petidophytes i.e. *Adiantum lunatum* Burm.f., *Dryopteris filix-mas* (L.) Schottand *Pteris longifolia* L. under 2 familieshave been recorded from this area.In present study 18 alien species have been recorded, of whichfour are fast growing invasive (e.g. *Argemone mexicana*L., *Lantana camara* L., *Mikania micrantha* Kunth and *Parthenium hysterophorus* L.).In most of the cases they create hazards over the normal growth of the vegetation.Biodiversity of a particular vegetation pocket acts as the sources of medicine, ethno-medicine, keystone species as well as controlling nutrient cycle, check pollution etc, so from the conservation and as well as floristic point of view such pocketsshould be maintained scientifically from their gradual disappearance through anthropogenic activities, natural calamities etc.giving topmost priority.Botanical name of the plants, families, habit, flowering-fruiting times and mode of propagations has also been discussed in this paper.

INTRODUCTION

Formulation of data bank in the form of flora, monograph of a particular area or a region through survey of vegetation, sacred grove etc are the ultimate measurement of bio-diversity index. The biodiversity of particular vegetation pocket is the treasure trove of the raw material resources for the preparation of ethno-medicines, modern medicines, wooden materials, building materials, etc.In a broad sense these materials can be utilised initially for strengthening socio-economic status of local areas and subsequently the sustainable development of a country. Rapid urbanisation, industrialisation, clear felling of trees, ecological fragmentation, climate change, etc

are the prime causes for gradual lossof bio-resources (genetic resources) day by day from our mother earth. So through pocket to pocket vegetation survey one can assess the quantum of diversified flora as well as fauna of a particular area. Ultimately from such works, data bank / information bank, etc in near future will be the prerequisite for evolving the state, regional as well as national level flora.

Earlier to understand the status of vegetation a galaxy of investigators, researchers have explored the flora from different parts of undivided Midnapore district (1-5). Later floristic works were also done by (6-9) mainly from Paschim Medinipur district. Besides them, a group of investigators (10-21) also reported their works on medicinal plants from this region. Until now no comprehensive floristic works have been done from this area. So in the present paper attempthas been made to investigate thoroughly the different floristic compositions at Pathra and its adjoining areas.

MATERIALS AND METHODS

The study area:

For the survey of floristic diversity, the study area Pathra and its adjoiningareas was selected. Pathra is a village of temples under Gram Panchayat and has a latitude 22.4116^0N and longitude 87.4183^0E and covering total geographical area is 341.15 hectares. From 8^{th} Century to 12^{th} Century, it was an important hub for Hindus, Jains and Buddhists. It is situated about 15 km from the district town head quarters, 10 km from Birendra Sasmal Setu (Locally at Amtala / National Highway, No.60) and 13 km from National Highway (No.6). The River Kansabati flows besides the Pathra. At rainy season this river remains in the spate, resulting inundation of the low-lying areas. The soil of Pathra is basically of alluvial type and to some extend mixed mural type. The floristic assemblage / vegetationare of tropical mixed types. The temperature varies from 34^0C-44^0C (during summer) and goes down to around 9^0C (during winter). Though the climatic set up of Pathra is not varied enough, there grows different type of habit groups.

Collection data/ specimens:

Field surveys were done in different seasons (at least three times in a year) at Pathra and its adjoining areas. The specimens were collected in flowering and fruiting stage. The collected specimens were identified with the help of literatures (22-24). Field and herbarium methods were followed according to (25). Finally the voucher specimens were deposited at Ramnagar College Herbarium. For updating species names the websites (26) were consulted.The list of accepted plant nameswere arranged alphabetically (Table-1) along with their families, local name (s), habit, flowering and fruiting periods, mode of propagation and their major uses were presented in tabulated form.

The present communication is concerned with the enumeration of floristic diversity (floral compositions)at Pathra and its adjoining areasalong with their conservations.

Table-1: Showing the floristic compositions collected from Pathra and its adjoining areasof Paschim Medinipur district.*Symbols used:* Fl.=Flowering & Frt.=Fruiting; "NR'=Not Recorded; Months: 1=January to 12=December.

Name of the plant	Family	Local name	Habit	Fl. &Frt. periods	Mode of propagation	Major uses of plants, weeds, etc
DICOTYLEDONS [MAGNOLIOPSIDA]						
Abrus precatorius L.	Fabaceae	Lal kunch	Climber	9-12	Seeds	Jewellery system
Acalypha indica L.	Euphorbiaceae	Muktajhuri	Herb	1-12	Seeds	Weed
Achyranthes aspera L.	Amaranthaceae	Apang	Herb	10-2	Seeds	Medicinal
Alstonia scholaris (L.) R.Br.	Apocynaceae	Chattim	Tree	8-3	Seeds	Medicinal
Alternanthera sessilis (L.) R. Br. *ex* DC.	Amaranthaceae	Chaanchi	Herb	1-12	Seeds	Weed
Amaranthus spinosa L.	Amaranthaceae	Kanta-note	Herb	1-12	Seeds	Weed
Amaranthus viridis L.	Amarantahceae	Ban-notey	Herb	1-12	Seeds	Weed
Anisomelis indica (L.) Kuntze	Lamiaceae	Gobura	Shrub	9-12	Seeds	Weed
****Argemone mexicana3***L. [Fig.-4]	Papavaraceae	Sialkanta	Herb	1-8	Seeds	Weed
Aristolochia indica L.	Aristolochiaceae	Iswarmul	Climber	7-2	Seeds and rootstocks	Medicinal
Artabotrys hexapetalous(L.f.) Bhandari.	Annonaceae	Kantali champa	Climber	4-1	Seeds	Timber yielding
Azadirachta indica A. Juss.	Meliaceae	Neem	Tree	3-7	Seeds	Medicinal
Barleria cristata L.	Acanthaceae	Swethjhanti	Herb	9-2	Seeds and stem cuttings	Medicinal
Blumea lacera (Burm.f.) DC.	Asteraceae	Barokuksima	Herb	12-5	Seeds	Medicinal
Boerhavia diffusaL.	Nyctanginaceae	Punarnova	Herb	6-12	Seeds and rootstocks	Weed
Bougainvillea spectaabilis Willd.	Nyctaginaceae	Kagajphul	Climber	NR	NR	Ornamental
Bryophyllum pinnatum (Lam.) Kurz	Crassulaceae	Patharkuchi	Herb	10-3	Stem and leaf cuttings	Medicinal
Canscora diffusa(Vahl) R.Br. *ex* Roem.& Schult.	Gentianaceae	-	Herb	1-12	Seeds	Weed
Capparis zeylanica L.	Capparaceae	Kalokera	Climber	3-10	Seeds	Medicinal
Cardiospermum halicacabumL.	Sapindaceae	Sibjhul	Climber	4-1	Seeds	Ornamental
Cascabela thevetia (L.) Lippold	Apocynaceae	Gulancha	Tree	8-3	Seeds	Ornamental
Cayaponia laciniosa (L.) Jeffery	Cucurbitaceae	Mala	Climber	4-12	Seeds	Medicinal
Cayratia pedata (Lam.) Gagnep.	Vitaceae	Goalilata	Climber	8-12	Seeds	Weed
Cayratia trifolia (L.) Domin	Vitaceae	Amal-lata	Climber	4-12	Seeds	Weed
Cissus quadrangularis L.	Vitaceae	Harbhanga, Harjora	Climber	5-11	Stem cuttings	Medicinal
Cleome 3viscosaL.	Capparidaceae	-	Herb	7-10	Seeds	Weed
Clerodendrum infortunatum L.	Verbanaceae	Ghetu	Shrub	2-7	Seeds	Weed
Clitoria ternatea L.	Fabaceae	Aparajita	Climber	3-12	Seeds	Ornamental
Coccinia grandis (L.) Voigt.	Cucurbitaceae	Telakucha	Climber	5-12	Seeds, stem cuttings	Medicinal
Cocculus hirsutus(L.) Diels	Menispermaceae	Daipata	Climber	11-5	Seeds, stem cuttings	Medicinal
Crataeva nurvala Buch.-Ham.	Capparidaceae	Barun	Tree	2-7	Seeds	Timber yielding
***Croton bonplandianu*s** Baill.	Euphorbiaceae	Churchuri	Herb	1-12	Seeds	Weed
Cuscuta reflexa Roxb.	Cuscutaceae	Swarnalata	Climber	8-4	By stem	Medicinal

Name of the plant	Family	Local name	Habit	Fl. &Frt. periods	Mode of propagation	Major uses of plants, weeds, etc
Cocculus hirsutus(L.) Diels	Menispermaceae	Daipata	Climber	11-5	Seeds, stem cuttings	Medicinal
Crataeva nurvala Buch.-Ham.	Capparidaceae	Barun	Tree	2-7	Seeds	Timber yielding
Croton bonplandianus Baill.	Euphorbiaceae	Churchuri	Herb	1-12	Seeds	Weed
Cuscuta reflexa Roxb.	Cuscutaceae	Swarnalata	Climber	8-4	By stem	Medicinal
Cyclea barbataMiers	Menispermaceae	-	Climber	7-3	Seeds and stem cuttings	Weed
Datura stramoniumL.	Solanaceae	Dhutra	Shrub	8-3	Seeds	Medicinal
Desmodium gangeticum (L.) DC.	Fabaceae	Salpani	Tree	2-6	Seeds	Weed
Dregea volubilis (L.f.) Benth.*ex* Hook.f.	Asclepiadaceae	Titakunja	Climber	4-12	Seeds	Medicinal
Eclipta 4prostrata44(L.) L.	Asteraceae	Kesut	Herb	1-12	Seeds	Dye yielding
Eupatorium odoratum L.	Asteraceae	-	Shrub	8-1	Seeds	Weed
Ficus hispidaL.f.	Moraceae	Domur	Tree	4-8	Seeds	Medicinal
Ficus infectoria Willd.	Moraceae	Jagya Domur	Tree	2-12	Seeds	Religious
Ficus religiosaL.	Moraceae	Ashatha	Tree	6-8	Seeds	Religious
Flacourtia jamgomas (Lour.) Raeusch.	Flacourtiaceae	Paniala	Tree	3-10	Seeds	Timber yielding
Gnaphalium indicumThwaites.	Asteraceae	Kalpahi bon	Herb	1-5	Seeds	Medicinal
Gouania leptostachya DC.	Rhamnaceae	-	Climber	7-12	Seeds	Weed
Grangea maderaspatana (L.) Poir.	Asteraceae	Namuti	Herb	12-4	Seeds	Weed
Gymnema sylvestre(Retz.) R. Br. *ex* Sm.	Asclepiadaceae	Gurmar/ Meshshringa	Climber	8-3	Seeds and stem cuttings	Medicinal
Hemigraphis hirta (Vahl) T. Anderson	Acanthaceae	Mushakani	Herb	7-1	Seeds and rootstocks	Weed
***Hiptage bengalensis* (L.)** Kurz	Malpighiaceae	-	Climber	3-7	Seeds	Ornamental
Hybanthus linearifolius (Vahl) Urb.	Violaceae	Nunbora	Herb	1-12	Seeds	Weed
Hydrocotyle asiatiaca L.	Apiaceae	Thankuni	Herb	7-1	Stem cuttings	Medicinal
Ipomoea quamoclit L.	Convolvulaceae	Tarulata	Climber	8-12	Seeds	Ornamental
Jatropha gossypiifoliaL.	Euphorbiaceae	Lal veranda	Shrub	4-8	Seeds and stem cuttings	Medicinal
****Lantana camara*** L. [Fig.-2]	Verbenaceae	Bhutbhairabi	Shrub	1-12	Seeds & stem cuttings	Weed
Leucas aspera (Willd.) Link	Lamiaceae	-	Herb	8-10	Seeds	Weed
Lindenbergia indica Vatke	Scrophulariaceae	Haludbasanta	Herb	3-12	Seeds	Weed
Luffa cylindrica(L.) M. Roem.	Cucurbitaceae	Parul/ Dhundul	Climber	6-12	Seeds	Medicinal
Lysiloma latisiliquum(L.) Benth.	Fabaceae	Subabul	Tree	11-3	Seeds	Fodder
Mangifera indicaL.	Anacardiaceae	Aam	Tree	2-7	Seeds	Fruit yielding
****Mikania micrantha***Kunth	Asteraceae	Taralata	Climber	1-12	Seeds	Medicinal
Ocimum basilicum L.	Lamiaceae	Dula tulsi	Herb	8-1	Seeds	Medicinal
Oldenlandia diffusa (Willd.) Roxb.	Rubiaceae	Khetpapra	Herb	3-6	Seeds	Weed
****Parthenium hysterophorus*** L.	Asteraceae	Jayadrath	Herb	1-12	Seeds	Weed
Passiflora foetidaL. [Fig.-1]	Passifloraceae	Begambahar (wild)	Climber	4-1	Seeds	Ornamental
Pergularia deamia (Forssk.) Chivo.	Asclepiadaceae	Dudhlata	Climber	9-1	Seeds	Weed
Phyllanthus 44reticulatusPoir.	Euphorbiaceae	Panjuli	Herb	2-10	Seeds and rootstocks	Weed
Pisum sativum L.	Fabaceae	Matar	Climber	4-12	Seeds	Fruit yielding
***Quirivelia frutescens* (L.)** M.R. Almeida & S. M. Almeida	Apocynaceae	Shyamlata /Siamalata	Climber	10-3	Seeds	Medicinal
Ruellia 4prostrata Poir	Acanthaceae	Chotpoty	Herb	4-1	Seeds	Weed
Rungia pectinata (L.) Nees	Acanthaceae	-	Herb	5-12	Seeds	Weed
Senna sophera (L.) Roxb.	Fabaceae	Sena	Shrub	7-12	Seeds	Weed
S.tora (L.) Roxb.	Fabaceae	Chakunda	Shrub	7-12	Seeds	Weed
Sida cordifoliaL.	Malvaceae	Swetberela	Herb	8-1	Seeds	Weed
Solanum sisymbriifolium Lam.	Solanaceae	Swetrangani	Shrub	8-12	Seeds	Medicinal
Streblus asper Lour.	Moraceae	Seorah	Tree	6-11	Seeds	Timber yielding
Tinospora sinensis (Lour.) Merr.	Menispermaceae	Padmagulancha	Climber	6-2	Seeds and stem cuttings	Medicinal

Name of the plant	Family	Local name	Habit	Fl. &Frt. periods	Mode of propagation	Major uses of plants, weeds, etc
Tragia 55involucrata L.	Euphorbiaceae	Bichuti	Climber	10-1	Seeds and rootstocks	Poisonous
Tridax procumbens (L.) L.	Asteraceae	Targanda	Herb	1-12	Seeds	Weed
Vernonia coeruleaJ. Kost.	Asteraceae	Chhoto kuksima	Herb	1-12	Seeds	Weed
Vincetoxicum indicum (Burm.f.) Mabb.	Asclepiadaceae	Antamul	Climber	10-2	Seeds and stem cuttings	Medicinal
Ziziphus oenoplia Mill.	Rhamnaceae	Shiakul	Climber	4-12	Seeds	Fruit yielding
MONOCOTYLODONS [LILIOPSIDA]						
Borassus flabellifer L.	Arecaceae	Taal	Tree	2-8	Seeds	Fruit yielding
Chloris barbata Sw.	Poaceae	-	Herb	8-10	Seeds and rootstocks	Weed
Cynodon dactylon (L.) Pers.	Poaceae	Durva	Herb	1-12	Seeds and rooted slips	Medicinal
Cyperus rotundus L.	Cyperaceae	Mutha	Herb	6-10	Seeds and rhizomes	Medicinal
Digitaria ciliaris(Retz.) Koeler	Poaceae	-	Herb	8-10	Seeds	Weed
Dioscorea alata L.	Dioscoreaceae	Ban alu	Climber	8-12	Root stocks	Medicinal
Dioscorea bulbifera L.	Dioscoreaceae	Khamalu/ Chuprialu	Climber	9-12	Root stocks	Medicinal
Eleusine indica (L.) Gaertn	Poaceae	-	Herb	8-11	Seeds and rootstocks	Weed
Gloriosa superba L. [Fig.-3]	Liliaceae	Ulatchandal	Climber	8-12	Seeds and root stocks	Ornamental
Musa paradisiaca L.	Musaceae	Pakakala	Herb	12-6	Rhizome	Fruit yielding
Phoenix sylvestris(L.) Roxb.	Arecaceae	Khejur	Tree	12-6	Seeds	Fruit yielding
Scindapsus officinalis (Roxb.) Schott	Araceae	-	Climber	7-9	Seeds	Ornamental
Typhonium trilobatum(L.) Schott	Araceae	Ghet kachu	Herb	6-10	Rhizome	Ornamental
PTERIDOPHYTES						
Adiantum lunatum Burm.f.	Petridaceae	-	NR	NR	NR	Weed
Dryopteris filix-mas (L.) Schott	Dryopteridaceae	-	NR	NR	NR	Weed
Pteris longifolia L.	Petridaceae	-	NR	NR	NR	Weed

** Fast growing invasive alien species*

Table-2: Numerical break up of taxa occurring at Pathra and its vicinity,Paschim Medinipur, West Bengal.

Type	Family	Genus	Species
Dicots	35	76	81
Monocots	7	10	13
Pteridophyta	2	3	3
TOTAL	**44**	**89**	**97**

Table- 3: Dominant families with number of species

Sl. No.	Families	Total No. of genus	Total No. of species
1.	Asteraceae	9	9
2.	Fabaceae	6	7
3.	Euphorbiaceae	5	5
4.	Amaranthaceae	3	4
5.	Acanthaceae, Asclepiadaceae & Poaceae	4	4

Table-4: Habit groups along with their numbers

Sl. No.	Type	Total numbers
1	Herbs	37
2	Climbers	34
3	Shrubs	9
4	Trees	14
5	Pteridophytes	3
	Total	**97**

OBSERVATIONS AND DISCUSSION

Recent floristic survey at Pathra and its adjoining areas revealed the record of 97 species under 89 genera and 44 families. Attempts have also been taken to record the habit groups, flowering fruiting periods, mode of their propagations, dominant families along with grouping of plants for their common uses (Table-1).

With proper enumeration of the recorded 97 species it was found that herbs acquired the highest position in the list i.e. 37 species then followed by climbers (34 species), trees (14 species), shrubs (9 species) and pteridophytes (3 species).

In general the survival of the species is carried out by the process of reproduction. They can reproduce following different methods. From the above survey report it was shown that out of 97 species, only 66 species reproduces by the agent of seed; 9 species through seeds and root-stocks; 9 species by seeds and stem cuttings; 2 species each by the process of stem cuttings, rhizomes, root-stocks; stem and other 1 species each through stems and leaf-cuttings; seeds and rhizome. The reproductive process of 3 pteridophytes is yet to be ascertained.

In view of the selection of 5 families, out of recoded 44 families in respect of their highest number of genus and species, it was found that in the family Asteraceae scoredthe highest (9/9) followed by Fabaceae (6/7); Euphorbiaceae (5/5); Amaranthaceae (3/4) and Acanthaceae, Asclepiadaceae and Poaceae (4/4).

Regarding the flowering and fruiting period it was found that 46 species showed it in

January; 42 species in February; 44 species March; 47 species in April; 49 species in May; 52 species in June; 57 species in July; 69 species both in August, September; 73 species in October; 67 species in November and 68 species in December. The extended flowering and fruiting periods i.e. throughout the years was exhibited bythe species like *Acalypha indica* L., *Alternanthera sessilis* (L.) R. Br. *ex*DC., *Amaranthus spinosa* L., *Amaranthus viridis* L., *Canscora diffusa* (Vahl) R.Br. *ex* Roem.& Schult., *Croton bonplandianus* Baill., *Cynodon dactylon* (L.) Pers., *Eclipta prostrata*(L.) L., *Hybanthus linearifolius* (Vahl) Urb., *Lantana camara* L., *Mikania micrantha* Kunth , *Parthenium hysterophorus* L., *Tridax procumbens* (L.) L., *Vernonia coerulea* J. Kost..From the above observation it was clear that most of the species showed flowering and fruiting activity among the months of August to December and lowest activity among the months of January to March.

Regarding the types of plants and their common uses it was revealed that 40 species are weeds; 31 species are medicinal; 10 species are ornamentals; 6 species are fruit yielding; 4 species are timber yielding; 2 species are religious and rests 4 species, 1 species each can be utilised as fodder, poisonous, dye yielding and in the jewellery system.

Out of 97 species listed species, only 18 species arealien, they are *Argemonemexicana*L., *Cardiospermum halicacabum* L.,*Cascabela thevetia* (L.) Lippold , *Chloris barbata* Sw., *Clitoria ternatea* L., *Croton bonplandianus* Baill., *Digitaria ciliaris* (Retz.) Koeler, *Eupatorium odoratum* L., *Ipomoea quamoclit* L., *Jatropha gossypiifolia* L., *Lantana camara* L., *Lysiloma latisiliquum* (L.) Benth., *Mikania micrantha* Kunth, *Parthenium hysterophorus* L.,*Passiflora foetida* L., *Senna tora* (L.) Roxb., *Solanum sisymbriifolium* Lam., *Tridax procumbens* (L.) L..

Fig.-1: *Passiflora foetida* L. Fig.-2: *Lantana camara* L.


Fig.-3: *Gloriosa superba* L. Fig.-4: *Argemone mexicana* L.

CONCLUSION

Pathra is a village temple under Gram Panchayat and historically it was an important hub for Hindus, Jains and Buddhists from 8th Century to 12th Century. From the vegetation point of view Pathra is a treasure trove, there are growing as many as 97 floristic components ultimately constitute a flora of its own. The denizensof Pathra and its adjoining areas have religious beliefs, taboos, socio-cultural peace over this place from time immemorial.This floral diversity can be considered as "treasure house" due to its bio-resource, bio-prospection and ultimate source of information for the conservators, academicians and researchers. The floristic elements (plants) are also the source of medicines, food, fodder, fuel, pollinators, keystone species, water conservation, nutrient cycle monitoring, soil conservation and ultimately conservation of germplasm of wild relatives. At present the minds of the young people are changing towardssuch type of biodiversity pockets.Most of these vegetations pockets are now in threatened condition. So the first and foremost point is the massive involvement of the local people to conserve our local vegetation structure (local plant biodiversity) to ensure the sustainable development through extensive local area exploration, documentation of floral components (recommendable database) and their utilisation to fulfil our needs as well as for the interests of future generation. It appears from the study that Pathra and its adjoining areas are rich in floral diversity and human activities as a visiting place has not affected its floristic components to a great extent. Above all floristic as well as conservation point of view such pockets should be maintained scientifically from their gradual disappearance through grazing, natural calamities etc giving topmost priority.

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