

<http://www.pjbs.org>

PJBS

ISSN 1028-8880

**Pakistan
Journal of Biological Sciences**

ANSI*net*

Asian Network for Scientific Information
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

Screening of Endangered Medicinal Plants Species by Questionnaire Survey in Barind Tract in Bangladesh

N.A. Siddique, M.A. Bari, M.M. Pervin, N. Nahar, L.A. Banu,
K.K. Paul, M.H. Kabir, A.K.M.N. Huda, M.U. Mollah and K.M.K.B. Ferdaus
Institute of Biological Sciences, University of Rajshahi, Rajshahi-6205, Bangladesh

Abstract: This study deals with over two hundred medicinal plants of ethnobotanical importance, used by the village doctors especially village Kavirajs in Barind Tract for medicinal purposes. This study aims at the identification of endangered medicinal plants by questionnaire survey and also preservation and perpetuation of this knowledge of the local plants possessing medicinal properties for the benefit and further fruitful investigation on modern scientific lines.

Key words: Screening, barind tract, medicinal plants, Bangladesh

INTRODUCTION

Barind Tract is situated between 24°23" to 25°15" North latitude and 88°02' to 88°57" east longitude with an elevation of 20-23 meters above the mean sea level. Locally known as Barendra Bhumi, the Barind Tract is located in the centre and west of Rajshahi division and covers an area of 7,727 km². The major part of the tract is almost level and is crossed by a few minor rivers. The little Jamuna and Atrai flood plains occupy fault through which clearly divides the tract into three main blocks. Most of the land is poorly drained and is shallowly flooded by rain water in the rainy season. A transitional area in the south is more deeply flooded. Better drained soils occur near the northern and eastern edges. 'Red' soils occur only in the north-east. Except in the west, the difference in elevation between the Barind Tract and adjoining floodplains is small. Tista alluvium has invaded the northern edge of the tract shallowly burying small of the old soils. Mean annual rainfall is 1250 mm (50 inch) in the west increasing to 2000 mm (80 inch) in the north-east. Four calendar months in the west (Jun- Sep) and five in the east (May- Sep) an average rainfall exceeding 200 mm (8 inch). The predominant soil is poorly drained, even on the sloping relief of the dissected high Barind. Agro-ecologically the Barind Tract is divided into three regions, namely the Level Barind Tract, the High Barind Tract, the North-Eastern Barind Tract^[1-3].

In the ancient time most of the people were depended on plants as remedy of disease. Still now some of the patients in Bangladesh including Barind Tract take medicine in the form of Ayurvedic and Unani formulation which are derived from plants. In Bangladesh most of the medicinal plants for Ayurveda can not meet the demand^[4].

The situation is compounded by the depletion of local resources due to habitat degradation, unsustainable harvesting in an optimal way. If the present situation is continued in course of time the important medicinal plants will be extinct from the environment. Making health care and medical facilities available to the people is now a major concern of a large number of countries^[5]. *Withania somnifera* (L.) Dunal, (Ashwagandha) a member of the Solanaceae, is rare and endangered. Propagation is mainly by seed, but seed viability is limited to one year. In addition, *in vitro* propagation methods offer powerful tools for germplasm conservation and the mass-multiplication of threatened plant species^[6].

MATERIALS AND METHODS

In the present investigation four sites were selected for survey. Paba and Durgapur Upazilla in Rajshahi district are considered to be a site 1. Godagari and Tanore Upazilla in Rajshahi district are considered to be a site 2. Mohanpur Upazilla in Rajshahi district and Naogaon Sadar Upazilla in Naogaon district are considered to be a site 3 and Chapi Nawabganj Sadar and Sibganj Upazilla in Chapi Nawabganj district are considered to be a site 4. All the relevant materials were thoroughly studied before going into the field. The questionnaires were designed for collection of ethnobotanical and socio-economic data. Local communities were selected to participate in this survey on the basis of their reputation for being home to a number of medicinal plants practitioners. Village meetings were held in each of the target villages and the aims and objectives of the survey were discussed. The study was conducted in May 2004. The entire plants as far as possible with their flowers and fruits were

collected and took photo/snap. The questionnaires were designed for collection of information by following ethnobotanical document data sheet.

Specification of threatened medicinal plants: The IUCN^[7], Red list categories prepared by the Species Survival Commission (SSC), WCMC^[8] and Red data book of

Ethnobotanical documentation data sheet

A. General information

Date:-----

Name:-----

Father's / husband's Name:-----

Village/Para:----- Holding No:----- Union:----- Thana/Upazila:----- Dist:-----

Age:----- Sex:----- Profession:-----

Family member No.:----- Male:----- Female:----- Young:----- Adult:-----

B. Social Information

Name of the Tribe:----- Population:----- Education:-----

Linguistic:----- Religion:-----

Health care by whom:----- Self / Medicine men:-----

Financial Condition:----- Source of income:-----

Method:----- Treatment Area:-----

Name of disease(s):-----

Fees:----- Number of patients (per week)-----

Collection No. Date	Local name of plant Scientific name Family	Size of Plant Population (Availability)*	Cause	Habit	Habitat	Part(s) of Plant used	How used (In amount/dose)	In which used

C. Botanical information

Source (wild/ cultivated)	Mode of Propagation	Need of Domestication	Scop of Domestication	Need of conservation If yes, why?	Scop of conservation If yes, why ?	Mode of Preservation/ Storage:	Duration	Folklore and Believes	As suggested by them

Enumeration :-----

Other information:-----

Vascular Plants^[9] were followed for identification of availability.

Endangered (E): A taxon is endangered when it is not critically endangered but is facing a very high risk of extinction in the wild in the near future. In the present investigation endangered was determined on individual plant bases by estimation any of the following criteria.

- Suspected reduction of at least 50% over last 10 years.
- Suspected reduction of at least 50% over the 3 generation.
- Area of occupancy estimated to be 500 km².

Vulnerable (V): A taxon is vulnerable when it is not critically endangered or endangered but is facing a high risk of extinction in the wild in the medium- term future. In the present investigation vulnerable was determined on individual plant bases by estimation any of the following criteria.

- Suspected reduction of at least 20% over last 10 years.
- Suspected reduction of at least 20% over the 3 generation.
- Area of occupancy estimated to be 200 km².

Available (A): Taxa are found available in surrounding and have no difficulties for their propagation and there is no chance of extinction in near future.

The relevant information was collected through interviewing and filling questionnaires from 200 herbal doctors. The information was then compared with each other and people of other villages were told to share and add their experiences in order to identification of endangered medicinal plants. After making the collection, the next step in taxonomic procedure is identification. The collected plants were identified comparing the herbarium sheets preserved in Rajshahi university herbarium. The collected plant specimen was also identified by with the help of the following books and journal. In some cases Lawrence^[10], Khan and Huq^[11], Biswas^[12], Prain^[13] were consulted. For the current and up to date nomenclature name changes in Bangladesh Angiosperms Huq^[14], Pasha and Zaman^[15] were consulted. For medicinal information Gani^[16] and Hay^[17] were consulted.

RESULTS AND DISCUSSION

Ethnobiologically a total of 200 medicinal plant species were reported to be used by village Kavirajs. The method of using these plants varied according to the

nature of ailment. In majority of the cases, a decoction of leaves, stems, fruits and roots/tubers is drunk or rubbed on the body to cure ailment(s) mostly decoction is extracted by just crushing the parts in a mortar but sometimes plants parts are boiled with water and the liquid decanted. Decoction of some plants is applied externally on the wounds or the infected part of the body i.e., *Cissus quadrangularis*. In some cases (skin ailments) the patients are plastered to set dislocated or fractured bone or for muscular pain i.e., *Heliotropium indicum*, *Cissus quadrangularis* and *Lasia spinosa*.

In some cases combinations of plant parts are used for best results i.e. for fever. Combinations of leaves or seeds of *Cassia occidentalis* and leaves of *Andrographis paniculata* are found to be best result. Again combinations in rhizome of *Lasia spinosa*, leaves of *Polygonum lapathifolium* are best for sore, scabies, combination in roots of *Hemidesmus indicus*, roots of *Aristolochia indica* and rhizome of *Ipomoea mauritiana* are found to be best for sexual debility. In some cases single plant is used for different diseases i.e., root of *Curculigo orchioides* is used for piles, Jaundice, Asthma, Gonorrhoea, leaves of *Andrographis paniculata* are used for worm control, fever, cough, stomach pain. Similar results were denoted by Sugandhi^[18]. Ailments like body ache, headache, cuts, wounds, scabies, boils and skin diseases are treated by external application of the paste.

Number of occurrence of individual medicinal plant species in four sites were analyzed with their dispersion values (%). For the convenience of determining their positions the respondent percentage were divided into 10 grade.

The number of medicinal plant species falling within each specific percentage grade were counted from values presented in Table 1.

The actual number in arrange range mentioned in Table 2 was counted from the mean percentages of total respondent mentioned in Table 1.

The Table 2 gives a clear picture that highlighted the occurrence grade in four sites belonging to three levels of occupancy magnitudes, available, vulnerable and endangered. Within the highest percentage grade (91-100%) the same number of 17 available plants found in number of plants within the range of 91-100% grading. The sites A and B showed the same 29 number of endangered plants within the grade 91-100% in comparison to the values 32 and 30 in the sites C and D, respectively.

Within the lowest range (0-10%) 52 plants found in site C and D but the sites A and B showed the number 51 and 49 plants, respectively. Ninty six vulnerable plants found in site A, 103 plants in site B 105 plants in site C

Table 1: Degree of occupancy of medicinal plants measured by questionnaire survey in four sites of the Barind Tract (400 herbal doctors were respondents)

		% of respondents measured by questionnaire survey														
		Site. A Upazill: Poba and Godagari (105 respondents).			Site. B Upazill: Tanore and Mahanpur) (100 respondents)			Site. C Upazill: Chapi Nawabgonj and Sibgonj) (105 respondents)			Site. D Upazill:Naogaon and Mohadebpur (90 respondents)			Mean % of total respondents		
Sl. No	Scientific Name	Available	Vulnerable	Endanger	Available	Vulnerable	Endanger	Available	Vulnerable	Endanger	Available	Vulnerable	Endanger	Available	Vulnerable	Endanger
1	<i>Abroma augusta</i>	3.95	4.76	91.29	3.00	5.00	92.00	3.39	5.76	90.85	4.18	4.44	98.38	3.88	4.74	91.38
2	<i>Abrus precatorius</i>	4.91	3.74	91.35	1.00	8.00	91.00	5.91	2.86	91.23	6.34	2.22	91.44	4.54	4.21	91.25
3	<i>Abutilon indicum</i>	90.50	1.87	7.63	12.00	2.00	86.00	13.38	0.91	85.71	15.56	2.22	82.22	32.86	1.75	65.39
4	<i>Acalypha hispida</i>	23.81	30.47	45.72	76.00	14.00	10.00	76.20	14.28	9.52	75.57	14.44	9.99	62.89	18.29	37.86
5	<i>Acalypha indica</i>	76.20	14.18	9.62	23.00	30.00	47.00	23.81	30.47	45.72	23.34	31.11	45.55	36.58	26.44	36.98
6	<i>Accacia farnesiana</i>	45.85	21.19	32.96	3.00	85.00	02.00	85.50	3.08	11.42	75.56	13.33	11.11	72.97	10.15	16.88
7	<i>Achyranthes aspera</i>	52.38	19.04	28.58	23.00	9.00	68.00	23.81	9.53	66.66	66.68	23.33	9.99	41.47	15.22	43.31
8	<i>Adhatoda vasica</i>	1.52	7.77	90.71	2.00	1.00	97.00	1.90	3.62	94.48	1.12	3.77	95.11	1.64	3.79	94.57
9	<i>Aegle marmelos</i>	42.85	28.57	28.58	14.00	38.00	48.00	14.28	38.09	47.63	13.35	38.88	47.77	21.12	35.88	43.00
10	<i>Aerva lanata</i>	71.42	14.29	14.29	39.00	8.00	53.00	38.09	9.52	52.39	37.79	9.99	52.22	46.58	10.45	42.97
11	<i>Aerva sanguinolenta</i>	91.53	6.56	1.91	85.00	5.00	10.00	85.72	4.76	9.52	85.57	4.44	9.99	86.95	5.19	7.86
12	<i>Ageratum conyzoides</i>	47.62	19.05	33.33	24.00	12.00	64.00	23.80	12.38	63.82	23.34	12.22	64.44	29.69	13.91	56.40
13	<i>Alocasia indica</i>	14.29	4.76	80.95	80.00	15.00	5.00	80.95	14.29	4.76	81.12	14.44	4.44	64.09	12.13	23.78
14	<i>Aloe indica</i>	3.96	5.85	90.19	2.00	1.00	97.00	4.78	1.61	93.61	4.44	01.88	93.68	4.04	2.34	93.62
15	<i>Aloe vera</i>	14.28	27.15	68.57	24.00	12.00	64.00	23.81	11.43	64.76	26.67	11.11	62.22	22.19	12.92	64.89
16	<i>Alpinia nigra</i>	4.76	75.19	20.05	15.00	4.00	81.00	14.29	4.76	80.95	14.45	4.44	81.11	12.13	22.09	65.78
17	<i>Altemanthera sessilis</i>	9.52	38.09	52.39	72.00	16.00	12.00	71.42	14.29	14.29	71.12	14.44	14.44	56.02	20.70	23.28
18	<i>Amaranthus spinosus</i>	9.52	4.77	85.71	9.00	5.00	86.00	9.52	4.77	85.71	10.01	4.44	85.55	9.51	4.75	85.74
19	<i>Amaranthus viridis</i>	66.66	9.53	23.81	52.00	19.00	29.00	52.38	19.04	28.58	51.13	19.99	28.88	55.54	16.89	27.57
20	<i>Ammania baccifera</i>	4.78	7.61	87.61	23.00	24.00	53.00	23.81	23.81	52.38	25.56	22.22	52.22	19.28	19.41	61.31
21	<i>Amorphophalus campamilatus</i>	85.71	9.52	4.77	19.00	29.00	52.00	19.05	28.57	52.38	18.90	28.88	52.22	35.67	23.93	40.34
22	<i>Andrographis paniculata</i>	1.90	3.72	94.38	2.00	3.00	95.00	6.34	3.66	90.00	1.23	6.66	92.11	2.86	4.47	92.87
23	<i>Anisomeles indica</i>	61.90	13.33	24.77	62.00	10.00	28.00	61.90	9.52	28.58	61.13	9.99	28.88	61.73	10.71	27.56
24	<i>Argemone mexicana</i>	95.23	1.92	2.85	23.00	38.00	39.00	23.81	38.09	38.10	57.79	38.88	3.33	49.95	29.22	20.83
25	<i>Argyreia argentea</i>	9.52	4.77	85.71	15.00	5.00	80.00	14.28	4.77	80.95	14.45	4.44	81.11	13.31	4.74	81.95
26	<i>Argyreia nervosa</i>	23.80	9.52	66.68	15.00	10.00	75.00	14.29	9.51	76.20	9.99	12.44	77.87	15.77	10.36	73.87
27	<i>Aristolochia indica</i>	0.01	0.25	99.14	0.00	1.00	99.00	0.25	0.61	99.14	0.67	0.01	99.32	0.25	0.60	99.15
28	<i>Asclepias acida</i>	4.76	80.95	14.29	12.00	12.00	76.00	11.42	12.38	76.20	12.23	12.22	75.55	10.11	29.38	60.51
29	<i>Asparagus racemosus</i>	1.91	2.76	95.33	2.00	3.00	95.00	1.91	4.86	93.23	2.46	6.22	91.32	2.07	4.50	93.43
30	<i>Azadirachta indica</i>	23.81	30.47	45.72	94.00	4.00	2.00	87.61	9.52	5.87	88.89	9.99	1.22	73.57	13.49	12.94
31	<i>Bacopa monniera</i>	85.71	9.52	4.77	52.00	18.00	30.00	52.38	18.09	29.53	51.13	18.88	29.99	61.75	15.78	23.57
32	<i>Barleria cristata</i>	90.55	1.90	7.55	10.00	5.00	85.00	9.52	4.77	85.71	10.01	4.44	85.55	30.03	4.02	65.95
33	<i>Barleria prionites</i>	66.67	23.81	9.52	73.00	15.00	12.00	66.67	23.81	9.52	66.68	23.33	9.99	68.25	21.48	10.27
34	<i>Biophytum sensitivium</i>	93.33	4.76	1.91	53.00	29.00	18.00	52.38	28.57	19.05	51.13	28.88	19.99	62.46	22.81	14.73
35	<i>Blumea lacera</i>	90.54	0.44	9.52	9.00	5.00	87.00	9.52	4.77	85.71	10.01	4.44	85.55	29.76	3.66	66.58
36	<i>Boerhaavia diffusa</i>	76.78	8.94	14.28	55.00	30.00	15.00	55.15	30.57	14.28	54.45	31.11	14.44	60.34	15.05	14.51
37	<i>Bombax ceiba</i>	38.09	9.52	52.39	39.00	8.00	53.00	38.09	9.52	52.39	30.01	9.99	60.00	36.29	9.26	54.45
38	<i>Bothriochloa intermedia</i>	4.10	02.85	93.05	4.00	6.00	90.00	02.76	4.76	94.91	3.45	4.44	92.11	3.47	4.02	92.51
39	<i>Eryophyllum calycinum</i>	2.71	6.85	90.44	1.00	1.00	98.00	1.94	4.72	93.34	2.34	4.44	93.22	2.74	3.51	93.75
40	<i>Calotropis gigantea</i>	52.38	23.81	23.81	25.00	54.00	21.00	23.81	52.38	23.81	24.45	52.22	23.33	31.41	45.61	22.98
41	<i>Calotropis procera</i>	6.55	4.34	89.11	2.00	5.00	93.00	9.52	1.28	89.20	7.23	2.22	90.55	6.33	3.21	90.46

Table 1: Continue

		% of respondents measured by questionnaire survey														
		Site. A Upazill: Poba and Godagari (105 respondents).			Site. B Upazill: Tanore and Mahanpur) (100 respondents)			Site. C Upazill: Chapi Nawabgonj and Sibgonj) (105 respondents)			Site. D Upazill:Naogaon and Mohadebpur (90 respondents)			Mean % of total respondents		
Sl. No	Scientific Name	Available	Vulnerable	Endanger	Available	Vulnerable	Endanger	Available	Vulnerable	Endanger	Available	Vulnerable	Endanger	Available	Vulnerable	Endanger
42	<i>Cannabis sativa</i>	4.11	14.28	91.11	5.00	4.00	91.00	04.28	4.77	90.95	4.57	4.44	90.99	4.50	4.37	91.13
43	<i>Cassia alata</i>	1.36	1.91	96.73	1.00	3.00	96.00	0.92	2.37	96.71	1.23	7.18	91.59	1.13	3.62	95.25
44	<i>Cassia fistula</i>	92.37	2.86	4.77	92.00	4.00	4.00	92.37	2.86	4.77	93.34	2.22	4.44	2.98	92.53	4.49
45	<i>Cassia obtusifolia</i>	38.09	9.52	52.39	92.00	5.00	3.00	92.37	4.27	3.36	93.34	4.44	2.22	78.96	5.80	15.24
46	<i>Cassia occidentalis</i>	38.03	21.91	40.06	39.00	21.00	40.00	38.03	21.91	40.06	28.88	21.12	50.00	35.98	21.48	42.54
47	<i>Cassia siamea</i>	42.85	20.95	36.20	77.00	13.00	10.00	76.20	13.33	10.47	75.56	13.33	11.11	67.90	15.15	16.95
48	<i>Cassia sophera</i>	11.42	76.20	12.38	12.00	70.00	18.00	11.42	76.20	12.38	17.12	70.66	12.22	11.49	76.26	12.25
49	<i>Cassia tora</i>	92.37	4.77	2.86	38.00	9.00	53.00	38.09	9.52	52.39	30.01	9.99	60.00	49.62	8.32	42.06
50	<i>Centella asiatica</i>	4.76	76.19	19.05	85.00	4.00	11.00	85.71	4.76	9.53	82.23	4.44	13.33	64.42	22.34	13.24
51	<i>Chenopodium album</i>	14.28	9.52	76.20	33.00	10.00	57.00	33.33	9.52	57.15	33.30	11.12	55.55	28.48	10.04	61.48
52	<i>Chrozophora rottleri</i>	63.82	23.80	12.38	42.00	11.00	47.00	42.82	11.43	45.75	44.45	11.11	44.44	48.27	14.33	37.40
53	<i>Cissus quadrangularis</i>	3.91	2.85	93.24	3.00	4.00	93.00	2.85	6.91	90.24	5.06	0.22	94.72	3.71	3.49	92.80
54	<i>Cissus repens</i>	9.52	38.09	52.39	20.00	5.00	75.00	19.05	4.76	76.19	18.90	4.44	76.66	16.86	13.07	70.07
55	<i>Clematis gouriana</i>	52.38	18.09	29.53	85.00	10.00	5.00	91.71	3.52	4.77	85.57	9.99	4.44	78.66	10.40	10.94
56	<i>Cleome viscosa</i>	14.28	4.77	80.95	85.00	2.00	13.00	85.11	0.60	14.29	85.44	1.12	13.44	67.46	2.21	30.42
57	<i>Clerodendrum inerme</i>	19.05	4.76	76.19	38.00	10.00	52.00	38.09	9.52	52.39	37.79	9.99	52.22	33.23	8.56	58.21
58	<i>Clitoria ternatea</i>	23.81	11.43	64.76	22.00	14.00	68.00	21.15	14.28	68.57	17.78	14.44	68.78	21.18	13.37	65.45
59	<i>Coccinea cordifolia</i>	38.09	9.52	52.39	47.00	20.00	33.00	47.62	20.62	31.76	92.22	2.22	5.56	65.23	13.09	30.68
60	<i>Commelina longifolia</i>	28.56	4.77	66.67	23.00	10.00	67.00	23.80	9.52	66.68	23.35	82.23	66.66	24.67	8.57	66.76
61	<i>Corchorus fascicularis</i>	11.42	12.38	76.20	81.00	3.00	14.00	81.95	3.76	14.29	3.33	3.33	14.44	64.15	5.62	30.23
62	<i>Crotalaria juncea</i>	38.09	31.42	30.49	28.00	42.00	30.00	28.57	42.85	28.58	28.90	42.22	28.88	30.89	39.62	29.49
64	<i>Crotalaria spectabilis</i>	9.52	85.72	4.76	9.00	85.00	6.00	85.72	9.52	4.76	85.57	9.99	4.44	9.51	85.50	4.99
65	<i>Crotalaria verrucosa</i>	14.30	21.90	63.80	91.00	7.00	2.00	90.50	4.83	4.67	4.44	91.12	4.44	71.73	9.54	18.73
63	<i>Croton tiglium</i>	42.82	11.43	45.75	74.00	12.00	14.00	63.82	23.80	12.38	63.34	23.33	13.33	60.59	17.67	21.37
67	<i>Curculigo orchioides</i>	0.77	0.85	98.38	1.00	1.00	98.00	0.26	0.01	99.23	1.27	3.62	95.11	0.58	1.74	97.68
66	<i>Curcuma amada</i>	9.52	76.19	14.29	9.00	16.00	76.00	1.91	2.85	95.24	2.23	2.22	95.55	5.66	24.31	70.03
68	<i>Curcuma aromatica</i>	72.38	03.80	23.82	52.00	23.00	25.00	52.38	23.80	23.82	54.45	22.22	23.33	57.80	18.20	24.00
69	<i>Curcuma caesia</i>	14.28	59.04	26.68	15.00	58.00	27.00	14.28	59.04	26.68	14.57	57.77	27.66	14.53	57.71	27.76
70	<i>Curcuma zoderia</i>	9.52	4.77	85.71	15.00	58.00	27.00	14.28	59.04	26.68	16.68	57.77	25.55	13.87	44.89	41.24
71	<i>Cuscuta reflexa</i>	38.09	9.52	52.39	47.00	30.00	23.00	47.62	30.47	21.91	92.22	2.22	5.56	56.23	18.05	25.72
72	<i>Cymbopogon citratus</i>	75.52	14.96	9.52	45.00	22.00	33.00	45.85	21.19	32.96	46.67	21.11	32.22	53.26	19.98	26.96
73	<i>Cynodon dactylon</i>	76.20	11.42	12.38	43.00	21.00	36.00	42.85	20.95	36.20	44.45	21.11	34.44	51.62	18.62	29.76
74	<i>Cyperus rotundus</i>	9.52	4.77	85.71	22.00	8.00	70.00	21.98	9.52	68.50	21.13	9.99	68.88	18.65	8.07	73.28
75	<i>Cyperus tagetiformis</i>	23.81	11.43	64.76	14.00	5.00	81.00	14.28	4.77	80.95	14.45	4.44	81.11	16.63	6.41	76.96
76	<i>Desmodium motorium</i>	1.91	3.81	94.28	2.00	4.00	94.00	2.87	9.52	87.61	5.56	2.22	92.22	3.08	4.88	92.04
77	<i>Desmodium gangeticum</i>	1.91	12.38	85.71	5.00	8.00	87.00	4.78	7.61	87.61	5.57	7.77	86.66	4.31	8.94	86.75
78	<i>Desmodium pulchellum</i>	14.30	11.42	74.28	91.00	2.00	7.00	91.50	0.99	7.51	90.01	2.22	7.77	71.45	4.41	24.14
79	<i>Desmodium triflorum</i>	2.86	9.52	87.62	37.00	28.00	35.00	37.14	28.57	34.29	38.90	28.88	32.22	28.97	23.74	47.29
80	<i>Digera arvensis</i>	85.72	4.76	9.52	92.00	08.00	2.00	91.56	6.53	1.91	87.79	9.99	2.22	89.26	6.82	3.92
81	<i>Duranta repens</i>	9.52	76.19	14.32	75.00	10.00	15.00	76.19	9.52	14.29	75.57	9.99	14.44	59.06	26.42	14.52
82	<i>Datura fastuosa</i>	14.28	11.42	74.30	62.00	18.00	20.00	61.90	17.14	20.96	61.12	17.77	21.11	49.82	16.08	34.10

Table 1: Continue

		% of respondents measured by questionnaire survey														
		Site. A Upazill: Poba and Godagari (105 respondents).			Site. B Upazill: Tanore and Mahanpur) (100 respondents)			Site. C Upazill: Chapi Nawabgonj and Sibgonj) (105 respondents)			Site. D Upazill:Naogaon and Mohadebpur (90 respondents)			Mean % of total respondents		
Sl. No	Scientific Name	Available	Vulnerable	Endanger	Available	Vulnerable	Endanger	Available	Vulnerable	Endanger	Available	Vulnerable	Endanger	Available	Vulnerable	Endanger
83	<i>Echinochloa colomum</i>	11.42	76.20	12.38	12.00	70.00	18.00	11.42	76.20	12.38	5.22	72.55	22.22	10.01	75.23	14.76
84	<i>Eclipta alba</i>	90.04	0.44	9.02	12.00	10.00	78.00	12.38	9.52	78.10	11.13	9.99	78.88	31.38	7.48	61.14
85	<i>Embelica officinalis</i>	14.28	14.28	71.44	14.00	14.00	72.00	14.28	14.28	71.44	14.45	14.44	71.11	14.25	14.25	71.50
86	<i>Enhydra fluctuans</i>	47.62	30.47	21.91	33.00	33.00	34.00	33.34	33.33	33.33	33.34	33.33	33.33	36.83	32.53	30.64
87	<i>Eryngium foetidum</i>	22.86	5.05	72.09	85.00	4.00	11.00	85.71	4.76	9.53	81.12	4.44	14.44	68.67	4.56	26.77
88	<i>Ethulia conyzoides</i>	38.03	9.52	52.45	10.00	16.00	74.00	9.52	14.28	76.20	5.57	5.55	88.88	15.78	11.33	72.89
89	<i>Euphorbia antiquorum</i>	7.51	4.77	87.72	2.00	3.00	95.00	4.91	2.86	92.23	6.23	3.33	90.44	5.17	3.49	91.34
90	<i>Euphorbia hirta</i>	76.20	19.04	4.76	23.00	14.00	63.00	23.81	14.28	61.91	24.45	14.44	61.11	36.86	15.44	47.70
91	<i>Euphorbia nerifolia</i>	21.98	9.52	68.50	74.00	14.00	12.00	63.82	23.80	12.38	64.45	24.44	11.11	56.06	17.94	26.00
92	<i>Euphorbia orbiculata</i>	23.81	11.43	64.76	55.00	22.00	23.00	57.14	22.85	20.01	56.67	22.22	21.11	48.15	22.75	28.75
93	<i>Euphorbia pulcherrima</i>	63.82	23.80	12.38	5.00	9.00	86.00	1.91	2.86	95.23	8.90	2.22	88.88	19.90	9.47	70.63
94	<i>Euphorbia thymifolia</i>	76.20	19.04	4.76	23.00	12.00	65.00	23.81	11.43	64.76	24.45	12.22	63.33	36.86	13.72	49.42
95	<i>Euphorbia tirucalli</i>	23.81	4.75	71.44	5.00	9.00	86.00	9.52	14.28	76.20	9.99	12.24	77.77	12.08	10.07	77.85
96	<i>Euphorbia trigona</i>	71.21	8.78	20.01	19.00	12.00	69.00	19.04	11.43	69.53	18.90	12.22	68.88	32.03	11.11	56.86
97	<i>Evolvulus numularius</i>	12.38	9.52	78.10	15.00	5.00	80.00	14.28	4.77	80.95	14.45	4.44	81.11	14.03	5.93	80.04
98	<i>Ficus racemosa</i>	23.81	38.09	38.10	95.00	2.00	3.00	95.23	1.92	2.85	96.67	1.11	2.22	77.67	10.78	11.55
99	<i>Glinus oppositifolius</i>	28.57	42.85	28.58	81.00	14.00	5.00	80.95	14.28	4.44	80.01	14.44	5.55	67.63	21.39	10.98
100	<i>Gloriosa superba</i>	1.91	2.86	95.23	1.00	1.00	98.00	1.91	0.76	97.33	1.23	0.44	98.33	1.51	2.34	96.15
101	<i>Glycosinus arborea</i>	3.52	91.71	4.77	93.00	5.00	2.00	95.23	2.86	1.91	96.67	2.22	1.11	73.61	23.95	2.44
102	<i>Glycyrrhiza glabra</i>	33.33	33.33	33.34	93.00	4.00	3.00	91.71	7.33	0.96	75.56	13.33	11.11	73.40	14.49	12.11
103	<i>Gynandropsis gynandra</i>	14.28	4.77	80.95	2.00	6.00	92.00	1.91	5.71	92.38	5.57	5.55	88.88	5.95	5.51	88.55
104	<i>Hedyotis corymbosa</i>	14.28	38.09	47.63	12.00	18.00	70.00	11.05	17.53	71.42	11.12	17.77	71.11	12.11	22.84	65.05
105	<i>Heliotropium indicum</i>	38.09	9.52	52.39	38.00	10.00	52.00	38.09	9.52	52.39	30.01	9.99	60.00	36.05	9.75	54.20
106	<i>Hemidesmus indicus</i>	0.85	0.91	98.24	1.00	1.00	98.00	0.85	0.91	99.24	0.25	0.25	99.50	0.73	0.52	98.75
107	<i>Hydrolea zeylanica</i>	75.52	14.96	9.52	45.00	20.00	35.00	45.85	20.95	33.20	41.12	21.11	37.77	51.87	19.25	28.88
108	<i>Hyptis suaveolens</i>	52.38	35.24	12.38	76.00	12.00	14.00	76.20	12.38	11.42	75.56	12.22	12.22	70.03	17.96	12.01
109	<i>Ichnocarpus furtescens</i>	14.28	4.77	80.95	10.00	18.00	72.00	9.92	14.28	75.80	3.34	1.11	95.55	9.49	9.44	81.07
110	<i>Ipomoea aquatica</i>	33.33	33.33	33.34	15.00	10.00	75.00	14.28	9.52	76.20	13.35	9.99	76.66	18.99	15.71	65.30
111	<i>Ipomoea fistulosa</i>	91.81	7.60	0.59	29.00	5.00	66.00	28.57	4.76	66.67	28.90	4.44	66.66	44.57	5.44	49.99
112	<i>Ipomoea mauritiana</i>	0.85	0.91	98.24	1.00	1.00	98.00	0.28	4.69	95.03	1.45	0.44	98.11	0.89	1.77	97.34
113	<i>Jatropha curcas</i>	23.81	14.28	61.91	76.00	19.00	5.00	76.20	19.04	4.76	75.57	19.99	4.44	62.89	18.07	19.04
114	<i>Jatropha gossypifolia</i>	23.82	28.57	47.61	24.00	28.00	48.00	23.82	28.57	47.61	21.13	29.99	48.88	23.19	28.78	48.03
115	<i>Justicia ganderusa</i>	5.52	4.77	89.71	3.00	5.00	92.00	1.90	5.72	92.38	2.23	5.55	92.22	3.16	5.26	91.58
116	<i>Justicia oreophylla</i>	14.28	11.44	74.28	12.00	14.00	74.00	11.44	14.28	74.28	11.12	14.44	74.44	12.21	13.54	74.25
117	<i>Lasia spinosa</i>	10.95	3.81	85.24	12.00	5.00	83.00	0.95	3.81	85.24	1.12	3.33	85.55	11.26	3.98	84.76
118	<i>Leea macrophylla</i>	1.91	0.05	97.54	2.00	1.00	97.00	0.91	1.21	97.88	1.45	4.09	94.46	1.56	1.72	96.72
119	<i>Leonurus sibiricus</i>	52.38	12.38	35.24	77.00	11.00	12.00	76.20	12.38	11.42	75.56	12.22	12.22	70.28	11.99	17.73
120	<i>Lepidium sativum</i>	23.80	12.38	63.82	92.00	2.00	6.00	92.38	4.72	2.90	93.34	4.44	2.22	75.38	5.88	18.74
121	<i>Leucas aspera</i>	85.71	13.33	0.96	33.00	33.00	34.00	33.33	33.33	33.34	26.45	41.33	32.22	46.62	28.24	25.14
122	<i>Leucas cephalotes</i>	11.42	76.20	12.38	52.00	14.00	34.00	52.38	13.33	34.29	52.23	13.33	34.44	42.00	29.21	28.79
123	<i>Leucas lavendulifolia</i>	11.42	76.20	12.38	52.00	19.00	29.00	52.38	18.86	28.76	52.23	18.88	28.88	42.00	33.23	24.77

Table 1: Continue

		% of respondents measured by questionnaire survey														
		Site. A Upazill: Poba and Godagari (105 respondents).			Site. B Upazill: Tanore and Mahanpur) (100 respondents)			Site. C Upazill: Chapi Nawabgonj and Sibgonj) (105 respondents)			Site. D Upazill:Naogaon and Mohadebpur (90 respondents)			Mean % of total respondents		
Sl.	Scientific Name	Available	Vulnerable	Endanger	Available	Vulnerable	Endanger	Available	Vulnerable	Endanger	Available	Vulnerable	Endanger	Available	Vulnerable	Endanger
124	<i>Marsilea quadrifoliata</i>	4.76	9.53	85.71	22.00	14.00	64.00	21.15	14.28	64.57	23.34	13.33	63.33	17.81	12.78	69.41
125	<i>Melilotus alba</i>	23.81	23.81	52.38	5.00	8.00	87.00	4.78	7.61	87.61	6.67	7.77	85.66	10.06	11.79	78.15
126	<i>Mentha arvensis</i>	76.20	13.33	10.47	42.00	22.00	34.00	42.85	20.95	36.20	43.34	21.11	35.55	51.09	19.34	29.57
127	<i>Mentha spicata</i>	76.20	12.38	11.42	52.00	13.00	35.00	52.38	12.38	35.24	52.23	12.11	35.55	58.20	12.46	29.34
128	<i>Mikania cordata</i>	33.33	9.52	57.15	23.00	11.00	64.00	23.80	11.43	64.77	24.45	11.11	64.44	26.14	10.76	63.10
129	<i>Mimosa intisia</i>	23.81	28.57	47.62	10.00	76.00	14.00	1.52	84.20	14.28	3.99	70.66	13.35	13.33	64.35	22.32
130	<i>Mimosa pudica</i>	0.31	0.86	98.83	1.00	1.00	98.00	1.00	1.00	98.00	1.06	0.11	98.83	0.65	1.13	98.22
131	<i>Mollugo pentaphylla</i>	37.14	28.57	34.29	3.00	10.00	87.00	2.86	9.52	87.62	3.34	9.99	86.67	11.85	14.52	73.63
132	<i>Monochoria hastata</i>	85.72	4.76	9.52	95.00	2.00	3.00	95.23	1.91	2.86	95.56	2.22	2.22	92.87	2.72	4.41
133	<i>Moringa oleifera</i>	93.33	4.76	1.91	38.00	32.00	30.00	38.09	31.42	30.49	37.78	31.11	31.11	51.80	24.82	23.38
134	<i>Mucuna pruriens</i>	12.38	1.91	85.71	91.00	2.00	7.00	90.50	0.25	9.25	89.99	1.11	8.90	70.96	0.81	28.23
135	<i>Nicotiana plumbaginifolia</i>	4.76	91.77	3.53	14.00	8.00	78.00	14.52	7.39	78.09	13.35	7.77	78.88	31.89	6.98	61.13
136	<i>Ocimum americanum</i>	11.42	76.20	12.38	76.00	12.00	12.00	76.20	11.42	12.38	76.67	11.11	12.12	60.07	27.68	12.25
137	<i>Ocimum basilicum</i>	52.38	13.33	34.29	76.00	12.00	12.00	76.20	11.42	12.38	76.67	11.11	12.22	70.31	11.96	17.73
138	<i>Ocimum gratissimum</i>	52.38	18.86	28.76	76.00	12.00	12.00	76.20	11.42	12.38	75.56	12.22	12.22	70.03	13.62	16.35
139	<i>Ocimum sanctum</i>	12.38	7.09	90.53	01.00	03.00	96.00	2.38	4.09	93.53	0.13	6.88	92.99	1.72	5.02	93.26
140	<i>Oxalis corniculata</i>	95.23	2.85	1.92	15.00	42.00	43.00	14.28	42.85	42.87	15.56	42.22	42.22	35.02	32.48	32.52
141	<i>Paederia foetida</i>	0.95	4.76	94.29	3.00	17.00	80.00	0.95	4.76	94.29	1.12	4.44	94.44	1.51	4.74	90.75
142	<i>Passiflora foetida</i>	80.95	14.28	4.47	94.00	4.00	2.00	93.33	4.76	1.91	93.34	4.44	2.22	90.40	6.87	2.73
143	<i>Peperomia pellucida</i>	93.32	3.81	2.87	24.00	32.00	44.00	23.81	30.47	45.72	24.45	31.11	44.44	41.39	24.34	34.27
144	<i>Pergularia daemia</i>	85.71	9.52	4.77	9.00	9.00	82.00	9.52	4.77	85.71	10.01	4.44	85.55	28.56	6.93	64.51
145	<i>Phyllanthus niruri</i>	23.81	11.43	64.76	76.00	19.00	5.00	76.20	19.04	4.76	75.57	19.99	4.44	62.89	17.36	19.75
146	<i>Phyllanthus urinaria</i>	19.04	38.09	42.87	33.00	10.00	57.00	33.33	9.52	57.15	31.13	9.99	58.88	29.12	16.90	53.98
147	<i>Physalis minima</i>	52.38	27.61	20.01	52.00	27.00	21.00	52.38	27.61	20.01	51.12	27.77	21.11	51.97	27.48	28.49
148	<i>Piper chaba</i>	42.85	31.81	25.34	15.00	15.00	70.00	14.28	14.28	71.44	14.45	14.44	71.11	21.64	18.88	59.48
149	<i>Piper longum</i>	14.28	14.28	71.44	3.00	2.00	95.00	2.85	1.91	95.24	6.67	1.11	92.22	6.70	4.82	88.48
150	<i>Plumbago auriculata</i>	2.85	9.52	87.63	5.00	10.00	85.00	4.76	9.52	85.72	4.46	9.99	85.55	4.29	9.75	85.99
151	<i>Plumbago indica</i>	4.76	9.52	85.72	3.00	10.00	87.00	2.85	9.52	87.63	3.34	9.99	86.67	3.48	9.75	86.77
152	<i>Plumbago zeylanica</i>	2.85	2.91	94.24	3.00	2.00	95.00	2.86	6.52	91.62	1.56	2.22	96.22	2.56	3.16	94.28
153	<i>Polygonum hydropiper</i>	95.23	1.91	2.86	85.00	5.00	10.00	4.76	85.72	9.52	86.67	3.76	9.99	88.15	3.85	8.00
154	<i>Polygonum lanigerum</i>	76.20	14.28	9.52	85.00	10.00	5.00	91.72	3.52	4.76	86.67	9.99	3.44	84.89	9.44	5.67
155	<i>Polygonum lapathifolium</i>	9.52	85.72	4.76	91.00	2.00	7.00	90.50	0.28	9.22	88.89	2.22	8.89	89.02	3.51	7.47
156	<i>Polygonum orientale</i>	42.85	42.45	14.70	42.00	42.00	16.00	42.85	42.85	14.30	43.34	42.22	14.44	42.76	42.38	14.86
157	<i>Portulaca oleracea</i>	95.23	2.85	1.92	85.00	5.00	10.00	85.72	4.76	9.52	86.67	4.44	8.89	88.15	4.26	7.59
158	<i>Pothos scandens</i>	95.23	2.90	1.89	91.00	2.00	7.00	0.90	91.55	6.66	91.12	2.22	6.66	91.22	2.23	5.55
159	<i>Psidium guajava</i>	14.28	42.85	42.87	92.00	4.00	4.00	93.33	4.76	1.91	94.45	4.44	1.11	73.51	14.01	12.48
160	<i>Psilotrichum ferrugineum</i>	14.28	7.61	78.11	14.00	8.00	78.00	14.28	7.61	78.11	13.35	7.77	78.88	13.98	7.74	78.28
161	<i>Pterocarpus santalinus</i>	45.85	20.95	33.20	59.00	39.00	12.00	52.38	38.10	9.52	52.24	37.77	9.99	52.36	33.95	13.69
162	<i>Ranunculus scleratus</i>	52.38	27.61	20.01	85.00	10.00	5.00	85.71	9.52	4.77	85.57	9.99	4.44	77.16	14.28	8.56
163	<i>Rauwolfia serpentina</i>	5.36	3.91	90.73	2.00	7.00	93.00	1.91	7.07	93.84	2.23	6.22	91.55	2.89	4.88	92.23
164	<i>Rauwolfia tetraphylla</i>	5.36	3.91	90.73	2.00	3.00	95.00	1.91	7.86	90.23	2.23	6.22	91.55	2.89	5.24	91.87

Table 1: Continue

		% of respondents measured by questionnaire survey														
		Site. A Upazill: Poba and Godagari (105 respondents).			Site. B Upazill: Tanore and Mahanpur) (100 respondents)			Site. C Upazill: Chapi Nawabgonj and Sibgonj) (105 respondents)			Site. D Upazill:Naogaon and Mohadebpur (90 respondents)			Mean % of total respondents		
Sl.	Scientific Name	Available	Vulnerable	Endanger	Available	Vulnerable	Endanger	Available	Vulnerable	Endanger	Available	Vulnerable	Endanger	Available	Vulnerable	Endanger
165	<i>Ricinus communis</i>	47.62	20.95	31.43	90.00	8.00	2.00	90.91	8.04	1.05	91.12	6.66	2.22	79.91	10.91	9.18
166	<i>Rumex maritimus</i>	2.86	9.52	87.62	12.00	2.00	88.00	11.50	0.88	87.62	11.12	1.11	87.77	9.37	3.37	87.26
167	<i>Salvia plebeja</i>	61.90	9.52	28.58	62.00	14.00	24.00	61.91	13.33	24.76	61.12	13.33	25.55	61.73	12.54	25.73
168	<i>Scindapsus officinalis</i>	0.91	7.95	91.14	1.00	1.00	98.00	3.91	0.95	95.14	2.23	2.22	91.55	2.01	2.44	95.55
169	<i>Scoparia dulcis</i>	91.53	3.70	4.77	52.00	27.00	21.00	52.38	27.61	20.01	51.12	27.77	21.11	60.31	22.97	16.72
170	<i>Sida spinosa</i>	76.20	9.52	14.28	23.00	28.00	49.00	23.81	28.57	47.62	24.56	27.77	47.67	36.89	23.46	39.65
171	<i>Sida acuta</i>	90.12	1.99	7.83	22.00	14.00	64.00	21.92	14.28	63.80	22.23	15.55	62.22	39.06	11.45	49.49
172	<i>Sida cordata</i>	90.50	0.25	9.25	15.00	12.00	73.00	14.33	11.42	74.25	14.45	12.22	73.33	33.57	8.97	57.46
173	<i>Sida cordifolia</i>	92.43	2.90	4.67	12.00	2.00	86.00	12.38	1.91	85.71	16.67	1.11	82.22	33.37	1.97	64.66
174	<i>Smilax zeylanica</i>	2.85	4.91	92.24	2.00	6.00	92.00	3.91	4.85	91.24	5.56	3.22	91.22	3.58	4.94	91.48
175	<i>Solanum ferox</i>	61.90	17.14	20.96	14.00	12.00	26.00	14.28	11.42	74.30	62.23	11.11	26.66	38.11	12.91	48.98
176	<i>Solanum filicifolium</i>	71.42	19.04	9.54	62.00	10.00	28.00	61.90	9.52	28.58	62.24	9.99	27.77	64.39	12.13	23.48
177	<i>Solanum indicum</i>	61.90	17.14	20.96	62.00	15.00	23.00	61.90	14.28	23.82	62.23	14.44	23.33	62.00	15.21	22.79
178	<i>Solanum nigrum</i>	61.90	9.52	28.58	71.00	10.00	9.00	71.42	9.04	19.54	80.02	9.99	9.99	71.08	9.63	19.23
179	<i>Solanum surattense</i>	52.38	20.96	26.66	52.00	21.00	27.00	52.38	20.96	26.66	52.23	21.11	26.66	52.24	21.01	26.75
180	<i>Solanum xanthocarpum</i>	61.90	14.28	23.82	71.00	8.00	21.00	71.90	7.14	20.96	71.12	7.77	21.11	68.98	9.29	21.73
181	<i>Stephania japonica</i>	14.28	14.28	71.44	10.00	2.00	88.00	9.52	2.87	87.61	11.12	2.22	86.66	11.23	5.34	83.43
182	<i>Skeudnera virosa</i>	14.29	4.76	80.95	80.00	5.00	15.00	80.95	4.76	14.29	4.44	81.12	14.44	64.09	4.74	31.17
183	<i>Syzygium cumini</i>	14.28	42.85	42.87	93.00	5.00	2.00	95.23	2.85	1.92	96.67	2.22	1.11	74.79	13.23	11.98
184	<i>Tamarindus indica</i>	23.81	22.86	53.33	14.00	70.00	14.00	14.28	74.28	11.44	0.45	60.44	11.11	16.63	61.39	21.98
185	<i>Terminalia arjuna</i>	14.28	4.77	80.95	38.00	10.00	52.00	38.03	9.52	52.45	38.89	9.99	51.12	32.31	8.57	59.13
186	<i>Terminalia belerica</i>	14.28	9.52	76.20	15.00	4.00	81.00	14.28	4.77	80.95	14.78	4.11	81.11	15.33	5.60	79.07
187	<i>Terminalia chebula</i>	14.28	4.77	80.95	19.00	12.00	69.00	19.05	12.38	68.57	18.90	12.22	68.88	17.81	10.34	71.85
188	<i>Tinospora cordifolia</i>	0.91	2.86	96.23	2.00	2.00	96.00	0.52	4.19	95.29	1.56	7.22	91.22	1.24	4.08	94.68
189	<i>Tragia involucrata</i>	63.82	23.80	12.38	23.00	12.00	65.00	23.81	11.43	64.76	23.34	12.22	64.44	33.49	14.86	51.65
190	<i>Trianthema portulacastrum</i>	23.80	26.66	49.54	28.00	23.00	49.00	26.66	23.80	49.54	25.68	23.33	50.99	26.03	24.20	49.77
191	<i>Trichosanthes dioica</i>	23.81	11.43	64.76	47.00	19.00	34.00	47.62	19.05	33.33	47.77	18.90	33.33	41.55	17.09	41.36
192	<i>Tridax procumbens</i>	19.05	12.38	68.57	10.00	16.00	74.00	9.52	14.28	76.20	9.99	11.12	78.89	12.14	13.44	74.42
193	<i>Triumfetta rhomboidea</i>	92.38	5.72	1.90	92.00	6.00	2.00	92.38	5.72	1.90	92.23	5.55	2.22	92.24	5.74	2.02
194	<i>Typhonium trilobatum</i>	19.05	28.57	52.38	3.00	91.00	6.00	91.71	3.52	4.77	85.57	5.55	4.44	71.83	11.27	16.90
195	<i>Urena lobata</i>	14.28	74.28	11.44	23.00	22.00	55.00	23.81	22.86	53.33	25.56	22.22	52.22	21.66	35.34	43.00
196	<i>Vanda roxburghii</i>	66.67	23.81	9.52	55.00	30.00	15.00	55.15	30.57	14.28	54.45	31.11	14.44	57.81	28.87	13.32
197	<i>Vitex negundo</i>	2.85	1.91	95.24	2.00	3.00	95.00	0.91	6.50	93.28	6.67	2.22	91.11	1.85	4.40	93.75
198	<i>Withania somnifera</i>	0.05	0.10	99.85	0.15	0.15	99.70	0.05	0.11	99.84	0.27	0.11	99.62	0.13	0.12	99.75
199	<i>Xanthium indicum</i>	4.76	80.71	14.53	38.00	10.00	52.00	38.03	9.52	52.45	37.78	9.99	52.23	29.64	27.55	42.81
200	<i>Zingiber officinale</i>	92.38	2.85	4.77	92.00	5.00	3.00	92.38	2.85	4.77	93.34	2.22	4.44	92.52	3.23	4.25

Table 2: Number of plants in four sites under different percentage grade

Range of %	Site: A			Site: B			Site: C			Site: D			Actual number in average range		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
91-100	17	2	29	20	1	29	17	1	32	16	1	30	05	1	30
81-90	14	3	16	15	2	19	15	2	17	19	2	23	08	1	12
71-80	16	7	21	12	2	11	17	6	22	16	1	09	16	2	14
61-70	12	3	13	11	4	12	08	1	16	11	6	20	25	2	19
51-60	11	2	12	14	4	09	14	5	12	15	4	13	20	1	12
41-50	09	5	10	09	4	09	09	3	08	07	15	11	15	3	18
31-40	13	16	12	14	7	15	14	8	13	10	10	12	22	7	09
21-30	21	23	17	23	20	27	23	21	15	24	23	19	18	28	37
11-20	36	43	27	33	54	31	31	49	27	30	36	24	28	57	30
0-10	51	96	43	49	103	38	52	105	38	52	102	39	43	98	19
Total No.	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200

1=Available, 2=Vulnerable, 3=Endangered

Table 3: Presence or absence of the most endangered medicinal plants in different sites

Scientific name	Range between 91 to 100%				
	Site: A	Site: B	Site: C	Site: D	Present in all site
<i>Abroma augusta</i>	+	+	-	+	-
<i>Abrus precatorius</i>	+	+	+	+	+
<i>Adhatoda vasica</i>	-	+	+	+	-
<i>Aloe indica</i>	-	+	+	+	-
<i>Andrographis paniculata</i>	+	+	+	+	+
<i>Aristolochia indica</i>	+	+	+	+	+
<i>Asparagus racemosus</i>	+	+	+	+	+
<i>Boerhavia repens</i>	+	+	+	-	-
<i>Bryophyllum calycinum</i>	-	+	+	+	-
<i>Leea macrophylla</i>	+	+	+	+	+
<i>Cannabis sativa</i>	+	+	+	-	-
<i>Cassia alata</i>	+	+	+	+	+
<i>Cissus quadrangularis</i>	+	+	-	+	-
<i>Curculigo orchoides</i>	+	+	+	+	+
<i>Desmodium motorium</i>	+	+	+	-	-
<i>Euphorbia antiquorum</i>	-	+	+	-	-
<i>Gloriosa superba</i>	+	+	+	+	+
<i>Hemidesmus indicus</i>	+	+	+	+	+
<i>Ipomoea mauritiana</i>	+	+	+	+	+
<i>Justicia ganderusa</i>	-	+	+	+	-
<i>Mimosa pudica</i>	+	+	+	+	+
<i>Ocimum sanctum</i>	-	+	+	+	-
<i>Plumbago zeylanica</i>	+	+	+	+	+
<i>Rauwolfia serpentina</i>	+	+	+	+	+
<i>Rauwolfia tetraphylla</i>	+	+	+	+	+
<i>Scindapsus officinalis</i>	+	+	+	+	+
<i>Smilax zeylanica</i>	+	+	+	+	+
<i>Tinospora cordifolia</i>	+	+	+	+	+
<i>Vitex negundo</i>	+	+	+	+	+
<i>Withania somnifera</i>	+	+	+	+	+

endangered plants within the grade 0-10 % in comparison to the values 43 and 39 in the sites A and D respectively. Five number of plant species found available, on an average over the four sites of field survey as evidenced by 91-100% grading. On the other hand only one plant was marked as the vulnerable as per highest grading. According to the highest percentage of respondent (91-100%) only 30 plant species were marked as the endangered species over the four sites of observation. The present extensive field survey confirmed that out of 200 medicinal plant species only 30 species were found

endangered over the field area. But in the four sites among these 30 species some ones failed to secure the highest range (91-100) in all four sites.

Percentage grading analysis (Table 2 revealed that 30 plant species are marked as the most endangered species running under the threat within the grade 91-100%. But it is interesting to note that all the plant species did not show the highest grade in four sites, some plants showed the highest graded in site A but failed to show in site B. Another analysis was necessary to screen the plant species found to fall within the highest grade in

Table 4: Rating of occupancy percentage (91-100%) of the most endangered medicinal plants

Scientific name	Endangered
<i>Withania somnifera</i>	99.75
<i>Aristolochia indica</i>	99.15
<i>Hemidesmus indicus</i>	98.75
<i>Mimosa pudica</i>	98.22
<i>Curculigo orchiodes</i>	97.68
<i>Ipomoea mauritiana</i>	97.34
<i>Leea macrophylla</i>	96.72
<i>Gloriosa superba</i>	96.15
<i>Scindapsus officinalis</i>	95.55
<i>Cassia alata</i>	95.25
<i>Tinospora cordifolia</i>	94.68
<i>Plumbago zeylanica</i>	94.28
<i>Vitex negundo</i>	93.75
<i>Asparagus racemosus</i>	93.43
<i>Andrographis paniculata</i>	92.87
<i>Rauvolfia serpentina</i>	92.23
<i>Rauvolfia tetraphylla</i>	91.87
<i>Smilax zeylanica</i>	91.48
<i>Abrus precatorius</i>	91.25

all four sites. In order to verify their respective positions in regards to their occurrence in highest grade, the values in four sites were counted (Table 3).

The results presented in the Table 3 indicated that 24 medicinal plant found most endangered in site A, 30 medicinal plants species found most endangered in site B, 28 plants species found most endangered in site C and 26 plants species found most endangered in site D. Among the 30 medicinal plants 11 numbers of medicinal plants (*Abroma augusta*, *Adhatoda vasica*, *Aloe indica*, *Boerhavia repens*, *Bryophyllum calycinum*, *Cannabis sativa*, *Cissus quadrangularis*, *Desmodium motorium*, *Euphorbia antiquorum*, *Justicia ganderusa* and *Ocimum sanctum*) were failed to cover all the sites estimated under the grading. Plant species failed to cover all the sites may be further segmented into the two groups, the plants failed to cover only two sites and another group of plants failed to cover only one site.

Identification of most endangered plant species in the Barind Tract: Nineteen medicinal plants species (*Withania somnifera*, *Aristolochia indica*, *Hemidesmus indicus*, *Mimosa pudica*, *Curculigo orchiodes*, *Ipomoea mauritiana*, *Leea macrophyllas*, *Gloriosa superba*, *Scindapsus officinalis*, *Cassia alata*, *Tinospora cordifolia*, *Plumbago zeylanica*, *Vitex negundo*, *Asparagus racemosus*, *Andrographis paniculata*, *Rauvolfia serpentine*, *Rauvolfia tetraphylla*, *Smilax zeylanica* and *Abrus precatorius*) found to cover the range 91-100% in all four sites proving that these plant species were truly endangered over the area running under highest level of threat (Table 3). The absolute endangered medicinal plants (19 medicinal plants) securing the highest 91-100% in all sites did not show the

equal strength of occurrence over the area. Some plants within highest grading percentage attained the highest values from top to 96% on the other hands, occupying the lower position from 91-95% through analysis of average grading values from the average figure. The corresponding values for each plant species were calculated and their values, in order of merit were presented in Table 4.

The Table 4 indicated that *Withania somnifera* proved to be the most endangered medicinal plant followed by another two (*Aristolochia indica*, *Hemidesmus indicus*).

REFERENCES

1. Morgan, J.P. and W.G. McIntire, 1959. Quarternary Geology of the Bangal Basin. East Pakistan and India. Bull. Geol. Soc. Am., 70: 319-342.
2. Rashid, M.H., M. Mohiuddin, R. Ara and M.J. Alam, 1990. Medicinal plant and its Cultivation. Bull. 4, Minor Forest Prod Ser., Bangladesh Forest Res Inst, Chittagong, p:17.
3. Annonymous, 1988. Land Resources Appraisal of Bangladesh for Agricultural Development. Part-2. Agro-ecological regions of Bangladesh,
4. Sudipto and A.R.K Sastry, 2000. Conservation of Medicinal Plants of India. Tenth Asian Symposium on Medicinal Plants, Dhaka, Bangladesh., pp: 87
5. Ghani, A., 2000. Medicinal plants for Drug Development potentiality of the medicinal plants of Bangladesh. Tenth Asian Symposium on Medicinal Plants. Dhaka, Bangladesh, pp: 39
6. Murch, S.J., K.L. Choffe, J.M.R. Victor, T. Y. Slimmon, S. Krishna Raj and P.K. Saxena, 2000. Thiazuron-induced plant regeneration from hypocotyl cultures of St. John's wort (*Hypericum perforatum* L. cv. Anthos). Plant Cell Rep., 19: 576-581
7. Annonymous, 1994. Red List Categories, prepared by the IUCN Species Survival Commission, As approved by 40th Meeting of the IUCN Council Gland, Switzerland.
8. Annonymous, 1999. World Conservation Monitoring Centre. 218 Huntingdon Road, Cambridge, U. K.
9. Rahman, M., 2001. Red data Book of Vascular plants. Bangladesh National herbarium, Dhaka, Bangladesh.
10. Lawrence, G.H.M., 1953. Taxonomy of vascular plants. Oxford and I B H Publishing Co. Calcutta, India.
11. Khan, M.S. and A.M. Huq, 1975. Medicinal plants of Bangladesh. (BARC) Dhaka, Bangladesh.
12. Biswas, K., 1950. Indian Banoushadi. Calcutta Univ. Press, 48, Hazra Road, Bullygange, Calcutta, India.

13. Prain, D., 1963. Bengal Plant Reprint. Botanical Survey of India, Calcutta.
14. Huq, A.M., 1986. Name changes in Bangladesh Angiosperms, Bangladesh National herbarium, BARC, Dhaka.
15. Pasha, M.K. and M.B. Zaman, 1988. Name changes in plant of Bangladesh III. Chattagong Univ., 12: 107-112
16. Gani, A., 1998. Medicinal Plants of Bangladesh, Asiatic Society of Bangladesh.
17. Hay, W.V.H., 1979. Flowering Plants of the World. Oxford Univ. Press, Oxford, London.
18. Sugandhi, R., 2000. Biodiversity conservation and potting and property right of tribal medicine of India. Tenth Asian Symposium on Medicinal Plants, Dhaka, Bangladesh., pp: 40.