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(RESEARCH ARTICLE)

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Documentation of angiospermic plants of Puthia Upazila of Rajshahi and their important medicinal values

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Abstract

Diversity of angiosperms of Puthia Upazila of Rajshahi district, Bangladesh conducted during October 2019 to December 2021. A total of 194 species belonging to 162 genera under 72 families were recorded. Habit analysis shows that herbs, shrubs, climbers and trees are represented by 76, 37, 26 and 55 species, respectively. Amaranthaceae, Asteraceae, Apocynaceae, Caesalpiniaceae, Convolvulaceae, Cucurbitaceae, Euphorbiaceae, Fabaceae, Moraceae, Malvaceae, Mimosaceae, Myrtaceae, Poaceae, Rutaceae, and Solanaceae are the dominant families with high species diversity. 148 medicinal plants have been documented with their uses for the cure of more than 200 diseases, and some of these are asthma, cough, cold, chicken pox, constipation, dysentery, diarrhea, diabetes, eczema, fever, headache, heart disease, itches, jaundice, menstrual disease, paralysis, piles, skin diseases, snake bite, sex problems, toothache, vomiting, worm, wound and others. Scientific names, local names, habits, families, medicinal uses and part(s) used are provided for each species.

Keywords: Diversity; Angiosperms; Medicinal Uses; Puthia; Rajshahi; Bangladesh

1. Introduction

Angiosperm is any of the more than 300,000 species of flowering plants (division Anthophyta), the kingdom Plantae's largest and most varied group. Angiosperms account for approximately 80% of all currently known green plants. The ovule (egg) is fertilized and develops into a seed in an enclosed hollow ovary in angiosperms, which are vascular seed plants. The ovary is normally encased in a flower, which is the portion of the angiospermous plant that houses the male or female reproductive organs, or both. Fruits are made from the angiospermous plant's mature floral organs.

Different habits of angiosperm found in the study area:

- Tree: Trees are plants that grow to be tall, large, and powerful. They have a lengthy lifespan. During a few months, some of them bloom brightly. Others are the ones who provide fruit. There are many trees that have leaves all year. During the winter, several plants drop their leaves. *Ficus benghalensis* and *Mangifera indica* are two of the trees that grow in this area.
- Shrub: Shrubs are smaller than trees. They can be bushy, with a lot of small, woody branches. *Hibiscus rosa-sinensis, Justicia gendarusa*, and other shrubs are some examples.
- Herb: Herbs are typically small plants with soft stems. They usually do not live for a long time. Herbs provide us with a lot of our vegetables. *Cynodon dactylon* and *Oryza sativa* are two common herbs.

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- Climber: The stems of some plants are brittle. They are unable to stand on their own. For support, they must cling to a stick or a wall. Climbers, such as *Cuscuta reflexa*, are examples of these plants. Other plants with flimsy stems scurry across the ground. Creepers, such as *Epipremnum aureum*, are what they're called.

Angiosperms are vascular plants that produce seeds. Flowers with ovules enclosed in an ovary are their reproductive structures. Angiosperms can be found in a wide variety of environments, from forests and grasslands to seashores and deserts. Trees, herbs, submerged aquatics, bulbs, and epiphytes are just a few of the life forms found in angiosperms. Orchids, Compositae (daisies), and Legumes are the three largest plant families (beans). Flowering plants, also known as angiosperms, number around 352,000 species. Around 245–202 million years ago, flowering plants split from gymnosperms, and the first flowering plants were discovered around 160 million years ago. During the Lower Cretaceous, they diversified greatly and became widespread around 120 million years ago, but they only replaced conifers as the dominant trees around 60–100 million years ago [15].

Angiospermic flora was carried out in Bangladesh by [2-5], [8-14], [16-17] and [20-62]. The aim of the present research was to explore and assesses the diversity and medicinal uses of angiosperms in Puthia Upazila of Rajshahi, Bangladesh.

2. Material and methods

2.1. Study area

Puthia upazila is situated at 24°22'30"N and 88°51'0"E. The Puthia upazila lies about for 34 Kilometers East of Rajshahi city. It is situated in the East side from Rajshahi city in the line of Dhaka- Rajshahi highway road, in the South of Bagmara upazila , North of Bagha upazila and west side of Natore district (Natore sadar) [63].

Figure 1 Map of the study area

2.2. Methodology

The research is based on fresh materials collected during thirty one field visits to Puthia Upazila of Rajshahi, Bangladesh from October 2019 to December 2021 to cover the seasonal variations. The visits covered all types of habitats, particular river bank; char land area, slope, village grove, fruit gardens, fallow lands, crop fields, roadsides of the study area. Plant parts with either flowers or fruits were collected using traditional herbarium techniques to make voucher specimens for documentation.

2.3. Identification

Collected angiosperms were identified with the help of various literatures [1], [6] and [19]. For the current name and up-to-date nomenclature [1], [7] and [18] were also consulted.

3. Results

Between October 2019 and December 2021, an assessment of angiosperm variety was done at the Puthia upazila of Rajshahi district, Bangladesh. A total of 194 species were discovered, divided into 162 genera and 72 families. Magnoliopsida (Dicotyledones) has 169 species distributed among 139 genera and 64 families, while Liliopsida (Monocotyledones) has 25 species distributed across 23 genera and 8 families. Fabaceae is the largest family in Magnoliopsida, with 11 species, whereas Poaceae is the largest family in Liliopsida, with 8 species. Herbs, shrubs, climbers, and trees are all represented by 76, 37, 26, and 55 species, respectively, according to habitat study (Table 1). The prominent families with great species diversity are Amaranthaceae, Asteraceae, Apocynaceae, Caesalpiniaceae, Convolvulaceae, Cucurbitaceae, Euphorbiaceae, Fabaceae, Moraceae, Malvaceae, Mimosaceae, Myrtaceae, Poaceae, Rutaceae, and Solanaceae. Botanical name, local name, habit, habitat, flowering and fruiting time, occurrence status, voucher number, and family were provided for each species (Table 2; Figure 3). Herbs account for 76 (39.17 percent) of the 194 species found here, while trees account for 55 (28.35 percent), shrubs for 37 (19.07 percent), and climbers for 26 (13.40 percent) (Figure 2). Out of 194 species, 27 % was wild and 73% was planted species (Figure 4).

The distribution of angiosperm species within the families differs. There are 11 species in the Fabaceae family. There are 10 species in each of the Solanaceae and Cucurbitaceae families. There are 8 species in each of the Moraceae and Poaceae families. There are seven species in each of the Amaranthaceae, Apocynaceae and Asteraceae family. There are 5 species in each of the Myrtaceae and Rutaceae families. There are 4 species in each of the Araceae and Arecaceae, Brassicaceae, Convolvulaceae, Lamiaceae and Verbenaceae families. There are 3 species in each of the Acanthaceae, Anacardiaceae, Caesalpiniaceae, Combretaceae, Euphorbiaceae, Lauraceae, Liliaceae, Lythraceae, Malvaceae, Meliaceae, Nyctaginaceae and Rubiaceae families. There are 2 species in each of the Annonaceae, Apiaceae, Mimosaceae, Oleaceae, Oxalidaceae, Polygonaceae, Pontederiaceae, Portulacaceae, Rosaceae, Sapotaceae, Vitaceae and Zingiberaceae families. 32 families had a single species in each.

Table 1 Showing the families of the plant species recorded

SL. No.	Family name	No. of the Herb species	No. of the Shrub species	No. of the Climber species	No. of the Tree species
1	Acanthaceae	1	2	-	-
2	Amaranthaceae	6	1	-	-
3	Anacardiaceae	-	-	-	3
4	Annonaceae	-	-	-	2
5	Apiaceae	2	-	-	-
6	Apocynaceae	3	3	-	1
7	Araceae	3	-	1	-
8	Arecaceae	-	-	-	4
9	Asclepiadaceae	-	1	-	-
10	Asphodelaceae	1	-	-	-
11	Asteraceae	5	1	1	-
12	Balsaminaceae	1	-	-	-
13	Basellaceae	-	-	1	-
14	Bombacaceace	-	-	-	1
15	Boraginaceae	1	-	-	-
16	Brassicaceae	4	-	-	-
17	Caesalpiniaceae	-	-	-	2
18	Cannaceae	1			
19	Caricaceae	-	-	-	1

20	Chenopodiaceae	1	-	-	-
21	Combretaceae	-	-	-	3
22	Commelinaceae	1	-	-	-
23	Convolvulaceae	-	1	3	-
24	Crassulaceae	1	-	-	-
25	Cucurbitaceae	-	-	10	-
26	Cuscutaceae	-	-	1	-
27	Cyperaceae	1			
28	Dilleniaceae	-	-	-	1
29	Ebenaceae	-	-	-	1
30	Elaeocarpaceae	-	-	-	1
31	Euphorbiaceae	2	1	-	-
32	Fabaceae	4	4	2	2
33	Lamiaceae	4	-	-	-
34	Lauraceae	-	1	-	2
35	Liliaceae	2	-	1	-
36	Lythraceae	1	1	-	1
37	Malvaceae	2	1	-	-
38	Meliaceae	-	-	-	3
39	Menispermaceae	-	-	1	-
40	Mimosaceae	1	-	-	1
41	Molluginaceae	1	-	-	-
42	Moraceae	-	-	-	8
43	Moringaceae	-	-	-	1
44	Musaceae	-	1	-	-
45	Myrtaceae	-	-	-	5
46	Nelumbonaceae	1			
47	Nyctaginaceae	1	-	2	-
48	Nymphaeaceae	1	-	-	-
49	Oleaceae	-	2	-	-
50	Oxalidaceae	1	-	-	1
51	Papaveraceae	1	-	-	-
52	Pedaliaceae	1	-	-	-
53	Piperaceae	-	-	1	-
54	Plantaginaceae	1	-	-	-
55	Poaceae	4	4	-	-
56	Polygonaceae	2	-	-	-
57	Pontederiaceae	2	-	-	-

58	Portulacaceae	2	-	-	-
59	Punicaceae	1	-	-	-
60	Rhamnaceae	-	-	-	1
61	Rosaceae	-	2	-	-
62	Rubiaceae	-	2	-	1
63	Rutaceae	-	1	-	4
64	Sapindaceae	-	-	-	1
65	Sapotaceae	-	-	-	2
66	Solanaceae	5	5	-	-
67	Sterculiaceae	-	-	-	1
68	Tiliaceae	-	1	-	-
69	Trapaceae	1	-	-	-
70	Verbenaceae	1	2	-	1
71	Vitaceae	-	-	2	-
72	Zingiberaceae	2	-	-	-
	Total=194	76	37	26	55

Table 2 Assessment of Angiosperm Taxa at Puthia Upazila of Rajshahi District, Bangladesh

SL. No.	Botanical Name	Local Name	Family	Habit *	Relative Occurrence**	Plant Population ***	Phenology #	Voucher No.
1	*Ammannia coccinea*	Bon morich	Lythraceae	H	W	CN	Jul-Dec	M. 98
2	*Abelmoschus esculentus*	Dherosh	Malvaceae	H	P	VC	Feb-Aug	M. 99
3	*Abroma augustum*	Ulat kambal	Sterculiaceae	T	P	VC	Jun-Dec	M. 100
4	*Acacia auriculiformis*	Akashmoni	Fabaceae	T	P	VC	TY	M. 101
5	*Manilkara zapota*	Shofeda	Sapotaceae	T	P	R	TY	M. 102
6	*Aegle marmelos*	Bel	Rutaceae	T	P	VC	Apr-Dec	M. 103
7	*Ageratum conyzoides*	Dochunti	Asteraceae	H	W	VC	TY	M. 104
8	*Albizia procera*	Koroigas	Mimosaceae	T	P	VC	May-Jan	M. 105
9	*Allium cepa*	Piyaj	Liliaceae	H	P	VC	Feb-Jun	M. 106
10	*Allium sativum*	Rosun	Liliaceae	H	P	VC	Feb-Apr	M. 107
11	*Alstonia scholaris*	Chatim	Apocynaceae	T	P	R	Nov-May	M. 108
12	*Alternanthera sessilis*	Chanshi	Amaranthaceae	H	W	VC	TY	M. 109
13	*Amaranthus dubius*	Daata	Amaranthaceae	S	P	VC	Feb-Oct	M. 110

14	*Amaranthus spinosus*	Kantanotey	Amaranthaceae	H	W	VC	TY	M. 111
15	*Amaranthus tricolor*	Lalshak	Amaranthaceae	H	P	VC	TY	M. 112
16	*Amaranthus viridis*	Shaknotey	Amaranthaceae	H	W	VC	TY	M. 113
17	*Annona squamosa*	Aata	Annonaceae	T	P	VC	Mar-Dec	M. 114
18	*Anthocephalus chinensis*	Kodom	Rubiaceae	T	P	CN	July-Nov	M. 115
19	*Aphanamixis polystachya*	Pitraaj	Meliaceae	T	P	VC	Feb-May	M. 116
20	*Arachis hypogaea*	Chinabadam	Fabaceae	H	P	R	Mar-Dec	M. 117
21	*Areca catechu*	Shupari	Arecaceae	T	P	VC	TY	M. 118
22	*Argemone mexicana*	Sheyalkata	Papaveraceae	H	W	CN	Feb-Jun	M. 119
23	*Artocarpus heterophyllus*	Kathal	Moraceae	T	P	VC	Apr-Jul	M. 120
24	*Artocarpus lacucha*	Dewa	Moraceae	T	P	R	Apr-Jun	M. 121
25	*Asparagus racemosus*	Shotomuli	Liliaceae	H	W	R	Nov-Mar	M. 122
26	*Averrhoa carambola*	Kamranga	Oxalidaceae	T	P	CN	Sep- Mar	M. 123
27	*Azadirachta indica*	Nim	Meliaceae	T	P	VC	Mar-Jul	M. 124
28	*Aloe vera*	Ghritakumari	Asphodelaceae	H	P	CN	Mar- May	M. 125
29	*Andrographis paniculata*	Kalomegh	Acanthaceae	H	P	R	Oct-Dec	M. 126
30	*Alocasia macrorrhizos*	Mankochu	Araceae	H	P	VC	TY	M. 127
31	*Asclepias curassavica*	Morichaful	Apocynaceae	H	P	R	TY	M. 128
32	*Allamanda cathartica*	Alkananda	Apocynaceae	S	P	R	Mar- Jan	M. 129
33	*Brassica napus*	Shorisha	Brassicaceae	H	P	VC	Mar-Juy	M. 130
34	*Brassica oleracea var botrytis*	Fulkopy	Brassicaceae	H	P	VC	Feb-Jun	M. 131
35	*Brassica oleracea var capitata*	Patacopy	Brassicaceae	H	P	VC	Dec- Mar	M. 132
36	*Bryophyllum pinnatum*	Pathorkuchi	Crassulaceae	H	P	VC	TY	M. 133
37	*Bambusa arundinacea*	Bash	Poaceae	S	P	VC	TY	M. 134
38	*Basella alba*	Puishak	Basellaceae	C	P	VC	Nov- Mar	M. 135
39	*Benincasa hispida*	Chalkumra	Cucurbitaceae	C	P	VC	May- Nov	M. 136
40	*Bougainvillea spectabilis*	Baganbilash	Nyctaginaceae	C	P	R	WS	M. 137
41	*Bombax ceiba*	Shimul	Bombacaceae	T	P	CN	Feb-Apr	M. 138

42	*Borassus flabellifer*	Tal	Arecaceae	T	P	VC	Jun-Aug	M. 139
43	*Cajanus cajan*	Arhor daal	Fabaceae	S	P	CN	Dec-Apr	M. 140
44	*Canna indica*	Kolaboti	Cannaceae	H	P	R	TY	M. 141
45	*Calotropis gigantea*	Akondo	Asclepiadaceae	S	W	CN	SS	M. 142
46	*Capsicum frutescens*	Morice	Solanaceae	H	P	CN	TY	M. 143
47	*Carissa carandas*	Koromcha	Apocynaceae	H	P	R	Mar-Junn	M. 144
48	*Carrica papaya*	Pepe	Caricaceae	T	P	VC	TY	M. 145
49	*Catharanthus roseus*	Noyontara	Apocynaceae	H	P	VC	TY	M. 146
50	*Celosia cristata*	Morogful	Amaranthaceae	H	P	R	TY	M. 147
51	*Centella asiatica*	Thankuni	Apiaceae	H	W	VC	TY	M. 148
52	*Cestrum nocturnum*	Hasnahena	Solanaceae	S	P	CN	TY	M. 149
53	*Chenopodium album*	Bothua	Chenopodiaceae	H	P	VC	Dec- Mar	M. 150
54	*Chrysanthamum coronarium*	Chandromollika	Asteraceae	S	P	R	Dec- Mar	M. 151
55	*Cinnamomum tamala*	Tejpata	Lauraceae	T	P	R	Feb- Oct	M. 152
56	*Cinnamomum verum*	Darchini	Lauraceae	T	P	VR	Jan- Mar	M. 153
57	*Citrus aurantifolia*	Lebu	Rutaceae	T	P	VC	Mar- Sep	M. 154
58	*Citrus grandis*	Jambura	Rutaceae	T	P	CN	Feb- Nov	M. 155
59	*Clerodendrum inerme*	Bamunhati	Verbenaceae	H	W	CN	NK	M. 156
60	*Croton bonplandianus*	Bontulshi	Euphorbiaceae	H	P	VC	TY	M. 157
61	*Clerodendrum viscosum*	Vat	Verbenaceae	S	W	VC	Jan-Jul	M. 158
62	*Clitoria tarnetea*	Oporajita	Fabaceae	H	P	R	Jan-Mar	M. 159
63	*Coccinia cordifolia*	Telakucha	Cucurbitaceae	C	W	VC	Mar-Dec	M. 160
64	*Cocos nucifera*	Narikel	Arecaceae	T	P	VC	Mar-Jul	M. 161
65	*Colocasia esculenta*	Kochu	Araceae	H	P	VC	TY	M. 162
66	*Commelina benghalensis*	Kanshira	Commelinaceae	H	W	VC	Apr- Nov	M. 163
67	*Corchorus capsularis*	Pat	Tiliaceae	S	P	VC	May-Aug	M. 164
68	*Coriandrum sativum*	Dhonepata	Apiaceae	H	P	VC	Dec-Feb	M. 165
69	*Cucumis sativus*	Sosha	Cucurbitaceae	C	P	CN	Apr-Oct	M. 166
70	*Cucurbita maxima*	Mishtikumra	Cucurbitaceae	C	P	CN	Mar- Oct	M. 167
71	*Curcuma longa*	Holud	Zingiberaceae	H	P	CN	Mar-Feb	M. 168
72	*Cuscuta reflexa*	Shornolota	Cuscutaceae	C	W	CN	Aug-Mar	M. 169

73	*Cyperus rotundus*	Muthaghash	Cyperaceae	H	W	VC	Mar-Oct	M. 170
74	*Cynodon dactylon*	Durba	Poaceae	H	P	VC	TY	M. 171
75	*Dalbergia sissoo*	Sishu	Fabaceae	T	P	CN	Mar-Jun	M. 172
76	*Datura metel*	Dhutura	Solanaceae	S	W	CN	Jan-Dec	M. 173
77	*Delonix regia*	Krishnochura	Caesalpiniaceae	T	P	CN	Apr-Sep	M. 174
78	*Dillenia indica*	Chalta	Dilleniaceae	T	P	VR	May-Feb	M. 175
79	*Diospyros malabarica*	Gaab	Ebenaceae	T	P	CN	May-Aug	M. 176
80	*Eclipta alba*	Kalokesh	Asteraceae	H	W	CN	TY	M. 177
81	*Elaeocarpus robustus*	Jolpai	Elaeocarpaceae	T	P	CN	Mar- Dec	M. 178
82	*Epipremnum aureum*	Moneyplant	Araceae	C	P	VC	TY	M. 179
83	*Eicchornia crassipes*	Kochuripana	Pontederiaceae	H	P	VC	TY	M. 180
84	*Erythrina variegata*	Mather	Fabaceae	S	W	CN	Feb-May	M. 181
85	*Eucalyptus citrodora*	Ukaliptas	Myrtaceae	T	P	VC	TY	M. 182
86	*Euphorbia hirta*	Dudhiya	Euphorbiaceae	H	W	VC	TY	M. 183
87	*Ficus benghalensis*	Botgach	Moraceae	T	P	CN	May-Aug	M. 184
88	*Ficus hispida*	Khoksha dumur	Moraceae	T	W	VC	Apr-Sep	M. 185
89	*Ficus racemosa*	Dumur	Moraceae	T	P	VC	Apr-Sep	M. 186
90	*Ficus religiosa*	Pakur	Moraceae	T	P	CN	Jul-Nov	M. 187
91	*Gardenia jasminoides*	Gondhoraj	Rubiaceae	S	P	R	Mar-Jul	M.188
92	*Glinus oppositifolius*	Gima shak	Molluginaceae	H	W	CN	TY	M. 189
93	*Gomphrena globasa*	Botam ful	Amaranthaceae	H	P	R	TY	M. 190
94	*Heliotropium indicum*	Hatishur	Boraginaceae	H	W	VC	TY	M. 191
95	*Hibiscus rosa-sinensis*	Joba	Malvaceae	S	P	VC	Jan-Dec	M. 192
96	*Impatiens balsamina*	Dopati	Balsaminaceae	H	P	R	Mar-Oct	M. 193
97	*Imperata cylindrica*	Ullu	Poaceae	H	W	CN	TY	M. 194
98	*Ipomoea alba*	Dudh kolmi	Convolvulaceae	C	W	CN	TY	M. 1
99	*Ipomoea aquatica*	Kalmishak	Convolvulaceae	C	P	CN	Jan-Dec	M. 2
100	*Ipomoea batatus*	Mistialu	Convolvulaceae	C	P	CN	TY	M. 3
101	*Isachne globosa*	Jhirjhiri ghash	Poaceae	H	W	VC	TY	M. 4
102	*Ixora coccinia*	Rongon	Rubiaceae	S	P	CN	TY	M. 5
103	*Ipomoea fistulosa*	Dholkolmi	Convolvulaceae	S	W	CN	TY	M. 6

104	*Jasminum grandiflorum*	Jui	Oleaceae	S	W	R	Jun-Nov	M. 7
105	*Justicia adhatoda*	Basok	Acanthaceae	S	W	CN	TY	M. 8
106	*Justicia gendarusa*	Jogotmodon	Acanthaceae	S	P	CN	Dec-May	M. 9
107	*Lablab purpureus*	Shim	Fabaceae	C	P	VC	Nov-Mar	M. 10
108	*Lagenaria sicararia*	Lau	Cucurbitaceae	C	P	CN	Feb-May	M. 11
109	*Lagerstroemia speciosa*	Jarul	Lythraceae	T	P	R	Apr-Aug	M. 12
110	*Lannea coromandelica*	Jiga	Anacardiaceae	T	P	CN	Apr-Dec	M. 13
111	*Lawsonia inermis*	Mehedi	Lythraceae	S	P	CN	Jun-Dec	M. 14
112	*Leonuros sibiricus*	Roktodron	Lamiaceae	H	W	CN	TY	M. 15
113	*Leucas aspera*	Setodron	Lamiaceae	H	W	R	TY	M. 16
114	*Limonia acidissima*	Kodbel	Rutaceae	T	P	CN	Feb-Dec	M. 17
115	*Litchi chinensis*	Lichu	Sapindaceae	T	P	VC	Apr-Jun	M. 18
116	*Litsea monopetala*	Pepolti	Lauraceae	S	W	R	Mar-Nov	M. 19
117	*Luffa acutangula*	Jhinga	Cucurbitaceae	C	P	R	Apr-Oct	M. 20
118	*Luffa cylindrica*	Dhundol	Cucurbitaceae	C	P	VC	Jun-Nov	M. 21
119	*Lycopersicon esculentum*	Tometo	Solanaceae	H	P	VC	Mar-Dec	M. 22
120	*Mangifera indica*	Aam	Anacardiaceae	T	P	VC	Jan-Jun	M. 23
121	*Mentha arvensis*	Pudina pata	Lamiaceae	H	P	CN	Jul-Sep	M. 24
122	*Mimosa pudica*	Lojjaboti	Mimosaceae	H	W	CN	Sep-Dec	M. 25
123	*Mimusops elengi*	Bokul	Sapotaceae	T	P	CN	Mar-Jun	M. 26
124	*Mirabilis jalapa*	Sondhamaloti	Nyctaginaceae	H	P	CN	Mar-Nov	M. 27
125	*Mikania cordata*	Ashamlota	Asteraceae	C	P	VC	TY	M. 28
126	*Momordica charantia*	Korolla	Cucurbitaceae	C	P	CN	Jul-Nov	M. 29
127	*Monochoria hastata*	Barunkha	Pontederiaceae	H	W	CN	TY	M. 30
128	*Moringa oleifera*	Sojna	Moringaceae	T	P	CN	Jan-Aug	M. 31
129	*Morus indica*	Tut	Moraceae	T	P	CN	May-Jun	M. 32
130	*Murraya paniculata*	Kamini	Rutaceae	S	P	R	Mar-Jan	M. 33
131	*Musa sapientum*	Kola	Musaceae	S	P	VC	TY	M. 34
132	*Nerium indicum*	Korobi	Apocynaceae	S	P	R	Jan-Jul	M. 35
133	*Nelumbo nucifera*	Poddo	Nelumbonaceae	H	P	R	Jun-Oct	M. 36
134	*Nicotiana plumbaginifolia*	Bontamak	Solanaceae	H	W	R	Mar-Dec	M. 37
135	*Nyctanthes arbor-tristis*	Sheuli	Oleaceae	S	P	CN	Nov-Feb	M. 38
136	*Nymphaea nouchali*	Shapla	Nymphaeaceae	H	P	CN	Jun-Oct	M. 39

137	*Ocimum sanctum*	Tulshi	Lamiaceae	H	P	CN	Jun-Feb	M. 40
138	*Oryza sativa*	Dhan	Poaceae	H	P	VC	Jul-Oct	M. 41
139	*Oxalis corniculata*	Amrul	Oxalidaceae	H	W	CN	Sep-May	M. 42
140	*Parthenium hysterophorus*	Parthenium	Asteraceae	H	W	CN	TY	M. 43
141	*Phoenix sylvestris*	Khejur	Arecaceae	T	P	VC	Dec-Jul	M. 44
142	*Phyllanthus reticulatus*	Chitki	Euphorbiaceae	S	W	CN	Mar-Oct	M. 45
143	*Physalis minima*	Kopalfotka	Solanaceae	H	W	CN	WS	M. 46
144	*Piper betel*	Paan	Piperaceae	C	P	VC	Dec-May	M. 47
145	*Pisonia aculeata*	Baghachra	Nyctaginaceae	C	W	R	TY	M. 48
146	*Polyalthia longifolia*	Debdaru	Annonaceae	T	P	CN	Mar-Oct	M. 49
147	*Polygonum hydropiper*	Panimorich	Polygonaceae	H	W	CN	TY	M. 50
148	*Polygonum orientale*	Boropanimorich	Polygonaceae	H	W	R	TY	M. 51
149	*Portulaca oleracea*	Nonta shak	Portulacaceae	H	W	CN	May-Aug	M. 52
150	*Portulaca medosinensis*	Timeful	Portulacaceae	H	P	CN	May-Aug	M. 53
151	*Psidium guajava*	Peyara	Myrtaceae	T	P	VC	SRS	M. 54
152	*Punica granatum*	Dalim	Punicaceae	H	P	CN	Jan-Dec	M. 55
153	*Pyrus communis*	Nashpati	Rosaceae	S	P	VR	Jul-Sep	M. 56
154	*Raphanus sativus*	Mulashak	Brassicaceae	H	P	VC	Jan-May	M. 57
155	*Rosa centifolia*	Golap	Rosaceae	S	P	CN	May-Jul	M. 58
156	*Saccharum officinarum*	Aakh	Poaceae	S	P	CN	TY	M. 59
157	*Saccharum spontaneum*	Kash	Poaceae	S	P	CN	Jun-Aug	M. 60
158	*Scorparia dulcis*	Bondhone	Plantaginaceae	H	W	CN	TY	M. 61
159	*Senna sophera*	Kolkasunda	Fabaceae	H	W	VC	Apr-Aug	M. 62
160	*Senna alata*	Dadmardan	Fabaceae	S	P	R	Oct-Dec	M. 63
161	*Sesbania canabina*	Dhonche	Fabaceae	S	P	CN	Mar-Aug	M. 64
162	*Sida cordifolia*	Berela	Malvaceae	H	W	VC	Sep-Dec	M. 65
163	*Sesamum indicum*	Til	Pedaliaceae	H	P	CN	Feb-Oct	M. 66
164	*Solanum melongena*	Begun	Solanaceae	S	P	VC	Oct-Mar	M. 67
165	*Solanum nigrum*	Titbegun	Solanaceae	S	W	R	Jan-Dec	M. 68
166	*Solanum torvum*	Bihuti	Solanaceae	S	W	CN	Jan-Dec	M. 69
167	*Solanum tuberosum*	Gol alu	Solanaceae	H	P	CN	Oct-Feb	M. 70
168	*Spondius pinnata*	Aamra	Anacardiaceae	T	P	VC	Feb-Aug	M. 71
169	*Stephania japonica*	Aknadi	Menispermaceae	C	W	R	Jan-Dec	M. 72

170	*Streblus asper*	Shewra	Moraceae	T	W	CN	Feb-Jun	M. 73
171	*Swietenia mahagoni*	Mehogoni	Meliaceae	T	P	VC	Apr-Nov	M. 74
172	*Syzygium cumini*	Jam	Myrtaceae	T	P	CN	Mar-Jun	M. 75
173	*Syzygium jambos*	Golapjam	Myrtaceae	T	P	CN	Mar-Jun	M. 76
174	*Syzygium samarangense*	Jamrul	Myrtaceae	T	P	CN	Feb-May	M. 77
175	*Tabernaemontana divaricata*	Togor	Apocynaceae	S	P	R	May-Jan	M. 78
176	*Tagetes patula*	Gada	Asteraceae	H	P	VC	WS	M. 79
177	*Tamarindus indica*	Tetul	Caesalpiniaceae	T	P	R	Jun-Jul	M. 80
178	*Tectona grandis*	Shegun	Verbenaceae	T	P	R	Jun-Sep	M. 81
179	*Terminalia arjuna*	Arjun	Combretaceae	T	P	CN	Apr-Oct	M. 82
180	*Terminalia catappa*	Kathbadam	Combretaceae	T	P	R	Mar-Dec	M. 83
181	*Terminalia chebula*	Haritoki	Combretaceae	T	P	R	May-Mar	M. 84
182	*Trapa bispinosa*	Panifol	Trapaceae	H	P	CN	RS	M. 85
183	*Trichosanthes arguina*	Chichinga	Cucurbitaceae	C	P	CN	Apr-Aug	M. 86
184	*Trichosanthes dioica*	Potol	Cucurbitaceae	C	P	CN	Apr-Sep	M. 87
185	*Typhonium trilobatum*	Mankuchri	Araceae	H	W	CN	May-Nov	M. 88
186	*Vigna mungo*	Mashkalai	Fabaceae	H	P	VC	Nov-Jan	M. 89
187	*Vigna sinensis*	Borboti	Fabaceae	C	P	CN	Apr-Jul	M. 90
188	*Vitex negundo*	Nisinda	Verbenaceae	S	W	R	May-Sep	M. 91
189	*Vitis trifolia*	Bon angur	Vitaceae	C	W	CN	May-Dec	M. 92
190	*Vitis vinifera*	Aangur	Vitaceae	C	P	R	May-Dec	M. 93
191	*Xanthium indicum*	Hagra	Asteraceae	H	W	CN	TY	M. 94
192	*Zea mays*	Vutta	Poaceae	S	P	VC	Mar-Ju	M. 95
193	*Zingiber officinale*	Ada	Zingiberaceae	H	P	CN	Mar-Feb	M. 96
194	*Zizyphus mauritiana*	Boroi	Rhamnaceae	T	P	CN	Sep-Mar	M. 97

H=Herb, S=Shrub, T=Tree, C=Climber; **P=Planted, W=Wild *** VC=Very Common, CN=Common, R=Rare, VR=Very rare # Jan=January, Feb=February, Mar=March, Apr=April, Jun=June, Jul=July, Aug=August, Sep=September, Oct=October, Nov=November, Dec=December. NK=Not know, RS=Rainy Season, SRS=Summer & Rainy Season, SS=Summer Season, TY=Throughout the year, WS=Winter season.

3.1. Medicinally important Plants

The important medicinal plants at upazila Puthia of Rajshahi district were carried out. A total of 148 medicinal plant species belonging to 127 genera and 64 families were collected and recorded for their use in 200 ailments. The majority of the residents in the study region are poor and illiterate. On the one hand, these people are beyond the reach of contemporary medicines, and on the other hand, the market price of the majority of accessible drugs is exorbitant. As a result, they use these medicinal plants to treat the following diseases: abscess, asthma, abortion, cough, cold, small pox, constipation, dysentery, diarrhea, diabetes, eczema, fever, fracture of bone, headache, heart disease, itches, jaundice, menstrual disease, paralysis, piles, skin diseases, snake bite, toothache, vomiting, worm, wound, and others (Table 3). Different plant parts of different spp. are used as medicine for treating various diseases. Leaves of 30, fruit of 22, whole plant of 31, root of 10, bark of 7, seed of 7, stem of 5, flower of 6, rhizome of 3, petiole of 1 and others of 21 species were used as medicine (Table 3; Figure 5). There are scientific names, local names, families, medicinal uses and part(s)

employed for each species. The study also recommended that the current information on local people's therapeutic use of plants could be utilized in future botanical and pharmacological research to find new medication sources.

Table 3 List of medicinal plants and their use in different ailments by the local people at Puthia of Rajshahi, Bangladesh

SL. No.	Scientific Name	Family	Parts used	Medicinal use
1	*Abelmoschus esculentus*	Malvaceae	Root	Externally, the juice of the roots is used to treat cuts, wounds, and boils.
2	*Ageratum conyzoides*	Asteraceae	Leaves and stems	Anti-asthmatic and headache-relieving properties are found in the leaves and stems of this plant.
3	*Allium cepa*	Liliaceae	Bulb	Bulb is a type of bulb that has been used to treat diabetes and is said to lower blood sugar levels.
4	*Allium sativum*	Liliaceae	Bulb	Fever, diabetes, and intestinal worms are among the ailments that garlic cloves are used to treat.
5	*Andrographis paniculata*	Acanthaceae	Whole Plant	Plant extracts are used to treat snake bites, bug bites, diabetes, dysentery, fever, and malaria, among other ailments.
6	*Alternanthera sessilis*	Amaranthaceae	Whole Plant	To check blood vomiting.
7	*Amaranthus spinosus*	Amaranthaceae	Whole Plant	Burning sensations, hallucination, leprosy, piles, bronchitis, and leucorrhoea are all treated with this plant.
8	*Amaranthus viridis*	Amaranthaceae	Whole Plant	Fever, pain, asthma, diabetes, dysentery.
9	*Ammannia coccinea*	Lythraceae	Leaves	Externally, the leaves are used to treat ringworm and parasitic skin infections.
10	*Arachis hypogaea*	Fabaceae	Seeds	Anti inflammatory, aphrodisiac.
11	*Argemone Mexicana*	papaveraceae	Leaves	The leaves, in combination with black pepper, are used to treat diabetes.
12	*Asclepias curassavica*	Apocynaceae	Whole plant	ringworm, skin ulcers, dysentery, used as an eyewash for infected eyes
13	*Aloe vera*	Asphodelaceae	Leaves	Used to treat weakness.
14	*Alocasia macrorrhizos*	Araceae	Stem	The sap of the stem is used to treat earache or boils in the ear. Applied externally, it is used to treat cuts.
15	*Allamanda cathartica*	Apocynaceae	Whole plant	Liver tumors, jaundice, malaria.
16	*Asparagus racemosus*	Liliaceae	Roots	Gastric ulcers, indigestion.
17	*Abroma augustum*	Sterculiaceae	Whole plant	Absence of menstrual periods, which causes abdominal pain and pain in the pelvic region, is treated with this medication.
18	*Acacia auriculiformis*	Fabaceae	Whole plant	To treat rheumatism, sore eyes, aches, allergies, itching, and rashes.
19	*Manilkara zapota*	Sapotaceae	Fruit	Fruit is eaten as a remedy for indigestion and diarrhoea.
20	*Aegle marmelos*	Rutaceae	Leaves	Memory power is improved by frying leaves in butter.
21	*Albizia procera*	Mimosaceae	Bark	Bark decoction can be used to treat pregnancy issues and stomach aches.

22	*Alstonia scholaris*	Apocynaceae	Bark, root	Bark is used to treat rheumatism and skin diseases, and the root juice is taken with milk to treat leprosy.
23	*Annona squamosa*	Annonaceae	Leaves	The leaves are used to treat cancerous tumors as a vermicide.
24	*Anthocephalus chinensis*	Rubiaceae	Leaves	Diabetes can be cured by eating the leaves. In mouth gargle, an extract of the leaves is used.
25	*Aphanamixis polystachya*	Meliaceae	Bark	Spleen and liver diseases, tumors, and abdominal complaints are all treated with the bark.
26	*Artocarpus heterophyllus*	Moraceae	Leaves	To promote suppuration, the plant's latex is applied externally to glandular swelling and abscesses. The young leaves are used to treat skin conditions.
27	*Artocarpus lacucha*	Moraceae	Fruits	Hair loss is reduced and hair growth is stimulated by extract from the fruit.
28	*Averrhoa carambola*	Oxalidaceae	Fruit, leaves, flowers, seed	The fruit is used to treat fevers, the leaves to treat rheumatism, the flowers to treat coughs, and the seed to treat asthma, colic, and jaundice.
29	*Azadirachta indica*	Meliaceae	Leaves	Chicken pox can be treated with a paste made from leaves. Our bodies are kept free of irritation by boiling water with leaves. Insects aren't attracted to rice with leaves.
30	*Bryophyllum pinnatum*	Crassulaceae	Leaves	Blood dysentery is treated with leaf juice.
31	*Bambusa Arundinacea*	poeceae	shoots	By inducing uterine contractions, shoots are used to help with labor and placenta expulsion.
32	*Benincasa hispida*	Cucurbitaceae	Fruit	Fruits are used in cases of jaundice, fever, and menstrual disorders.
33	*Bombax ceiba*	Bombacaceae	Leave, root,bark	Cholera, fractures, toothaches, coughs, urinary problems, influenza, and snake bites are among the conditions for which young root, gum, leaves, shoots, and bark are used.
34	*Capsicum frutescens*	Solanaceae	Fruits	fruit is commonly applied to the skin for arthritis pain and swelling.
35	*Catharanthus roseus*	Apocynaceae	Whole plant	The plant is used to treat cancer and diabetes; the root paste is used to treat septic wounds; the root decoction is used to treat fever; and the leaves are used to treat menorrhagia.
36	*Celosia cristata*	Amaranthaceae	Whole plant	Plants are cooling and alexiteric, making them useful in the treatment of dysentery and strangury. The flowers are astringent and are used to treat diarrhoea and heavy menstrual periods.
37	*Centella asiatica*	Apiaceae	Leaves	To treat dysentery and improve memory, leaf extract is taken orally.
38	*Carissa carandus*	Apocynaceae	Fruit	The fruit has been used for diabetes.
39	*Canna indica*	Cannaceae	Root	Amenorrhoea and gonorrhea are treated with root. .
40	*Clerodendrum inerme*	Verbenaceae	Leaves	Fever, cough, skin rashes, and boils are all treated with the leaves.
41	*Clitoria tarnetea*	Fabaceae	Root	The root is beneficial for corneal ulcers, leucoderma, and burning sensations.

42	*Commelina benghalensis*	Commelinaceae	Whole plant	A paste made from the plant that can be used to treat burns.
43	*Coriandrum sativum*	Apiaceae	Leaves	Diabetes, hyperlipidemia, liver disease, and cancer are all treated with leaves as a herbal medicine.
44	*Croton bonplandianus*	Euphorbiaceae	Leaves	High blood pressure can be managed with the help of leaves.
45	*Curcuma longa*	Zingiberaceae	Rhizome	Scabies is treated with a rhizome paste.
46	*Cynodon dactylon*	Poaceae	Whole plant	To stop bleeding, fresh juice is applied to cuts and wounds.
47	*Cyperus rotundus*	Cyperaceae	Tuber	Decoction of the tuber is used in fever.
48	*Calotropis gigantea*	Asclepiadaceae	Stem	Dysentery, spleen complaints, convulsions, lumbago, scabies, ringworm, and pneumonia are all treated with stem bark.
49	*Chrysanthamum coronarium*	Asteraceae	Flowers	Flowers have been used to treat a variety of ailments, including chest pain, high blood pressure, diabetes, and headaches.
50	*Cajanus cajan*	Fabaceae	Leaf,seeds ,stem	Gingivitis, stomatitis, and a toothbrush are all treated with the leaf, seeds, and young stems.
51	*Corchorus capsularis*	Tiliaceae	Root,Leaves	The root has antipyretic and antidiarrheal properties, while the leaves are used to treat diabetes.
52	*Clerodendrum viscosum*	Verbenaceae	Leaves and roots	Asthma, tumors, and certain skin diseases are all treated with leaves and roots.
53	*Coccinia cordifolia*	Cucurbitaceae	Roots, leaves and fruits	diabetes, ulcers, stomach ache, skin disease, jaundice, diabetes, wound healing, ulcers, stomach ache, skin disease
54	*Cucumis sativus*	Cucurbitaceae	Fruit	Internally, the fresh fruit is used to treat blemished skin and heat rash.
55	*Cucurbita maxima*	Cucurbitaceae	Seed	Seed oil extracts are used to lower blood pressure and slow the progression of gastric and breast cancers.
56	*Cuscuta reflexa*	Cuscutaceae	Stem	Stem juice used in head to prevent hair fall
57	*Carica papaya*	Caricaceae	Fruits	Fruits can help avoid having a heart attack or stroke. When a patient with dengue fever was given a papaya juice extract, their platelet count and white blood cell count returned to normal within 24 hours.
58	*Cinnamomum tamala*	Lauraceae	Bark and leaves	The bark powder is used as toothpowder to treat dental caries, gingivitis, cough, and asthma.
59	*Cinnamomum verum*	Lauraceae	Bark	The bark powder is used to treat dental caries, gingivitis, cough, and asthma.
60	*Citrus aurantifolia*	Rutaceae	Fruit	juice is a stomachic, antiscorbutic, refrigerant, and antiseptic appetizer. It relieves vomiting and relieves skin irritation.
61	*Citrus grandis*	Rutaceae	Fruit	The fruit is beneficial in the treatment of influenza, cough, catarrh, and asthma.
62	*Datura metel*	Solanaceae	Fruits	Its fruit juice is applied to the scalp to treat dandruff and hair loss.

63	*Dalbergia sissoo*	Fabaceae	Leaves	In the acute stage of gonorrhoea, a decoction of the leaves is beneficial.
64	*Dillenia indica*	Dilleniaceae	fruit bark	Oral thrush and offensive odor in the mouth are treated with a decoction of the bark. To clean the scalp hair, the pulp of the fruit is mixed with water.
65	*Diospyros malabarica*	Ebenaceae	Fruit	Diarrhoea and dysentery can be treated with ripe fruit.
66	*Eclipta alba*	Asteraceae	Whole plant	Hair loss and graying are both treated with the entire plant.
67	*Euphorbia hirta*	Euphorbiaceae	Whole plant	Fresh milk latex is used to treat bronchial asthma, kidney stones, the common cold, and skin conditions.
68	*Eicchornia crassipes*	Pontederiaceae	Flowers	The flowers are used to treat the horses' skin.
69	*Erythrina variegata*	Fabaceae	Leaves	Leaves are used to disperse venereal buboes and to relieve joint pain.
70	*Elaeocarpus robustus*	Elaeocarpaceae	Leaves	Rheumatoid arthritis is treated with leaves.
71	*Ficus benghalensis*	Moraceae	Leaves	Leaves are good for ulcers.
72	*Ficus racemosa*	Moraceae	Fruits	The fruits are astringent, stomachic, and carminative, and are used to treat menorrhagia, haemoptysis, bronchitis, dry cough, and kidney and spleen diseases.
73	*Ficus hispida*	Moraceae	Whole plant	All parts of the plant are cooling, astringent to the bowels, and antidysenteric, and can be used to treat ulcers, biliousness, psoriasis, anemia, piles, jaundice, and nose and mouth haemorrhage. Diabetic patients are advised to eat fruits.
74	*Glinus oppositifolius*	Molluginaceae	Whole plant	Colds and headaches are treated with the leaves. The juice is used to treat itch and other skin conditions.
75	*Gomphrena globasa*	Amaranthaceae	Whole plant	Its flowers are decocted and drunk to treat asthma, bronchitis, and lucorrhea.
76	*Gardenia jasminoides*	Rubiaceae	Fruits	Swelling (inflammation), liver disorders, and diabetes are all treated with the fruits.
77	*Heliotropium indicum*	Boraginaceae	Leaves	Wounds, skin ulcers, and furuncles are treated with the juice extracted from the pounded leaves of the plants.
78	*Hibiscus rosa-sinensis*	Malvaceae	Flower	Cooling and astringent, the flower buds relieve body burning, urinary discharges, seminal weakness, and piles.
79	*Ipomoea fistulosa*	Convolvulaceae	Whole plant	Whole plant is used jaundice, fever, bronchitis.
80	*Ixora coccinia*	Rubiaceae	Leaves and the fruit	Dysentery, ulcers, and gonorrhea are treated with a mixture of juice leaves and fruit.
81	*Ipomoea batatus*	Convolvulaceae	Root	Root is aphrodisiac and laxative, and it can help with strep throat and diarrhoea.
82	*Ipomoea aquatica*	Convolvulaceae	Shoot	The young shoot is used for diabetes and fever.

83	*Ipomoea alba*	Convolvulaceae	Whole plant	Filariasis is treated with whole herbs that are used to treat snakebite leaves.
84	*Justicia adhatoda*	Acanthaceae	Leaves, roots, flowers, and bark	Coughs, colds, and asthma have all been treated with the leaves, roots, flowers, and bark of this plant.
85	*Jasminum grandiflorum*	Oleaceae	Root	The plant's root would be cooked with goat's milk and sugar to relieve pain from urinary retention and kidney stone removal.
86	*Justicia gendarusa*	Acanthaceae	Leaves	Internally, a tea made from the leaves is used to treat head pains and paralysis.
87	*Lagenaria siceraria*	Cucurbitaceae	Fruits	In the treatment of ulcerpiles hypertension, fruits are used. Rheumatism is treated with its pulp, which is boiled in oil.
88	*Leonuros sibiricus*	Lamiaceae	Whole plant	Painful and excessive menstruation, post-partum bleeding, oedema, kidney complaints, kidney stones, eczema, and abscesses are all treated with this plant.
89	*Leucas aspera*	Lamiaceae	Leaves	Leaves are used in chronic rheumatism.
90	*Lycopersicon esculentum*	Lamiaceae	Fruits	Breast, bladder, cervix, colon, and rectum cancers, as well as stomach, lung, ovaries, pancreas, and prostate cancers, are all treated with fruit. Diabetes, heart and blood vessel disease (cardiovascular disease), cataracts, and asthma are all treated with it.
91	*Litsea monopetala*	Lauraceae	Leaves	The leaves are used to treat arthritis as a topical medicine.
92	*Lawsonia inermis*	Lythraceae	Bark	Jaundice, leprosy, and obstinate skin diseases are all treated with bark.
93	*Luffa acutangula*	Cucurbitaceae	Leaves	Splenitis, haemorrhoids, ringworms, and leprosy are treated with pounded leaves.
94	*Luffa cylindrica*	Cucurbitaceae	Fruits	Biliousness, spleen diseases, leprosy, piles, fever, and bronchitis are all treated with fruits.
95	*Lablab purpureus*	Fabaceae	Seeds	Seeds have stomachic, tonic, antispasmodic, and anti-inflammatory properties.
96	*Litchi chinensis*	Sapindaceae	Fruit	Cough, stomach ulcers, diabetes, testicular swelling, epigastric and neuralgic pains are all treated with this drug.
97	*Lannea coromandelica*	Anacardiaceae	Leaves, bark, stem and gum	Lannea coromandelica's leaves, bark, stem, and gum are commonly used to treat a variety of ailments. Fever, dysentery, ulcers, inflammations, impotency, wounds, and a variety of other ailments are treated with it as folk medicine.
98	*Limonia acidissima*	Rutaceae	Fruit	Fever, dysentery, ulcers, inflammations, impotency, wounds, and a variety of other ailments are all treated with it as folk medicine.
99	*Mimosa pudica*	Mimosaceae	Root	Used as a antidote for snake and scorpion bites.
100	*Musa sapientum*	Musaceae	Flowers	Flowers are used to treat bronchitis, dysentery, and ulcers.

101	*Mikania cordata*	Asteraceae	Leaves	To stop bleeding and promote healing, fresh leaves are pounded and applied to lacerations.
102	*Momordica charantia*	Cucurbitaceae	Fruits and leaves	The fruits and leaves are used to treat jaundice and other liver diseases, as well as ulcers and burns.
103	*Mangifera indica*	Anacardiaceae	Leaves	Fever and toothache are treated with a decoction of the leaves.
104	*Moringa oleifera*	Moringaceae	Seed	the seed is *used* for abdominal tumors.
105	*Mimusops elengi*	Sapotaceae	Flowers	Flowers are used as an expectorant, as well as to treat liver problems and asthma.
106	*Nelumbo nucifera*	Nelumbonaceae	Whole plant	Diarrhoea, insomnia, fever, body heat imbalance, and gastritis are all treated with the whole plant as a herbal medicine.
107	*Nymphaea nouchali*	Nymphaeaceae	Rhizomes	Powdered rhizomes are used to treat piles, dysentery, and dyspepsia.
108	*Nyctanthes arbor-tristis*	Oleaceae	Fruit,flower	Dried fruits are taken orally to relieve cough; a decoction of dried flowers is mixed with jaggery and given to females as an antifertility agent.
109	*Nerium indicum*	Apocynaceae	Root	Externally, root and root bark are applied as a paste to cancer.
110	*Ocimum sanctum*	Lamiaceae	*Leaves*	*Leaves are used in coughs, colds.*
111	*Oxalis corniculata*	Oxalidaceae	Whole plant	Juice of the plant cures piles.
112	*Physalis minima*	Solanaceae	Whole plant	Herb paste is said to be used to treat ear problems.
113	*Polygonum hydropiper*	Polygonaceae	Leaves and seeds	The leaves and seeds are used in a traditional cancer treatment.
114	*Portulaca oleracea*	Portulacaceae	Whole plant	Cardio-vascular diseases, dysuria, hematuria, gonorrhoea, dysentery, sore nipples, and mouth ulcers are all treated with it.
115	*Punica granatum*	Punicaceae	Leaves, stem	Insomnia can be relieved by the leaves, and abdominal pain can be relieved by the young stem.
116	*Piper betel*	Piperaceae	Leaves	Carminative, stomachic, stimulant, astringent, and antiseptic properties of the leaves are used to treat indigestion, constipation, congestion, coughs, and asthma.
117	*Polyalthia longifolia*	Annonaceae	Bark	Fever, skin diseases, hypertension, and helminthiasis are all treated with bark.
118	*Psidium guajava*	Myrtaceae	Root	Diarrhoea and dysentery are treated with a root paste mixed with water.
119	*Raphanus sativus*	Brassicaceae	Seed	Constipation is treated with dried ripe seed.
120	*Senna sophera*	Fabaceae	Root	The roots are used to make a decoction that is drunk to relieve painful menstruation and given to children to stimulate their nervous system.
121	*Sida cordifolia*	Malvaceae	Leaves	Fevers and delirium can be treated with a tea made from the leaves.
122	*Senna alata*	Fabaceae	Whole plant	Typhoid, diabetes, malaria, and asthma have all been treated with the plant in the past.

123	*Solanum nigrum*	Solanaceae	Whole plant	The plant's juice is used to treat ulcers and other skin conditions. Its root juice is used to treat asthma and whooping cough.
124	*Solanum melongena*	Solanaceae	Whole plant	Diabetes, cholera, bronchitis, dysuria, dysentery, otitis, toothache, skin infections, and asthenia are all treated with a decoction of the plant as powder or ash.
125	*Solanum torvum*	Solanaceae	Whole plant	Fevers, coughs, asthma, chest ailments, sore throats, rheumatism, dropsy, stomach aches, and gonorrhoea are all treated with the plant's juice.
126	*Saccharum officinarum*	Poaceae	Stem	In Indian sub-continent plant juice is commonly used to treat jaundice.
127	*Spondius pinnata*	Anacardiaceae	Bark	The bark is used to treat sore joints, as a refrigerant, and as a tonic antiseptic.
128	*Streblus asper*	Moraceae	Leaves	Leaves are used as a galactagogue and to treat urinary inflammation.
129	*Swietenia mahagoni*	Meliaceae	Seed	Seed is used to reduce diabetes.
130	*Syzygium cumini*	Myrtaceae	*Leaves,* fruits	Dermopathies, constipation, leucorrhea, and diabetes are treated with the leaves, while pharyngitis is treated with the fruits.
131	*Syzygium jambos*	Myrtaceae	Leaves, seeds, bark	The leaves are decocted and used as a diuretic as a treatment for rheumatism and sore eyes. The seeds are used to cure diarrhoea, dysentery, diabetes, and catarrh. A bark decoction can be used to treat asthma and bronchitis.
132	*Stephania japonica*	Menispermaceae	Whole plant, leaves, root	Skin illnesses, asthma, cough, and renal disorders are treated with the juice of the whole plant. Fever, diarrhea, and snake bites are treated using the roots.
133	*Tagetes patula*	Asteraceae	Leaves	Leaves are used for healing cuts and wounds.
134	*Typhonium trilobatum*	Araceae	Petiole	Poisonous insect bite.
135	*Trapa bispinosa*	Trapaceae	Fruits and seed	The powder of the fruits and seed is used as nutritional supplement to treat muscle weakness.
136	*Tabernaemontana divaricata*	Apocynaceae	Whole plant	Plant is used for skin disorders like, psoriasis, eczema, dermatitis, acne.
137	*Trichosanthes arguina*	Cucurbitaceae	Fruits	Fruits are utilised in treating blood pressure.
138	*Trichosanthes dioica*	Cucurbitaceae	Leaves and fruits	Leaves and fruits find mention for treating alcoholism and jaundice.
139	*Tamarindus indica*	Caesalpiniaceae	Pulp of the ripe fruit	Pulp of the ripe fruit is a household remedy for fever, dyspepsia, gastritis, dysentery and diarrhoea
140	*Tectona grandis*	Verbenaceae	Flowers	Flowers are useful in bronchitis, biliousness, urinary discharges.
141	*Terminalia arjuna*	Combretaceae	Bark	*Bark* powder protects the heart due to its cardioprotective property.
142	*Terminalia chebula*	Combretaceae	Fruit	Fruit powder proves to be very useful for *hair* loss
143	*Vitex negundo*	Verbenaceae	Leaves	Leaves are mostly used for the treatment of eye diseases.

144	*Vitis trifolia*	Vitaceae	Whole plant	Whole plant is used as diuretic, in tumors, neuralgia and splenopathy.
145	*Vigna sinensis*	Fabaceae	Seeds	Seeds are appetizer, prescribed in liver complaints with jaundice.
146	*Vitis vinifera*	Vitaceae	Fruits	Fruits were used for the treatment of constipation, cancer, cholera, smallpox, nausea, skin and eye infections as well as kidney and liver diseases.
147	*Xanthium indicum*	Asteraceae	Whole plant	The plant has been used to treat a variety of ailments, including arthritis, nasal problems, and cancer prevention.
148	*Zingiber officinale*	Zingiberaceae	Rhizome	The rhizome of the plant has been used in the treatment of colds, asthma, and bronchitis.

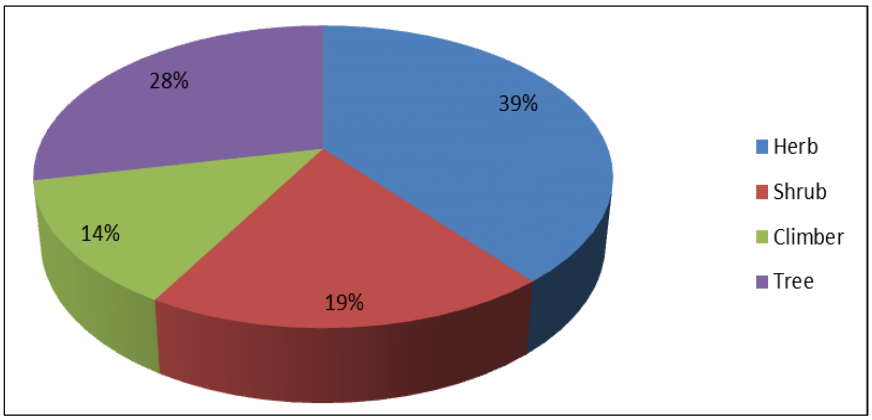

Figure 2 Habit diversity of the recorded species

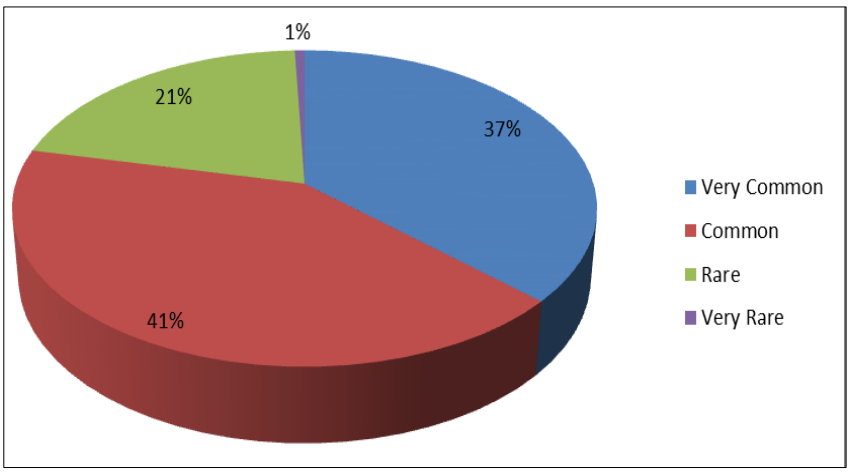

Figure 3 Percentage (%) of status of occurrence

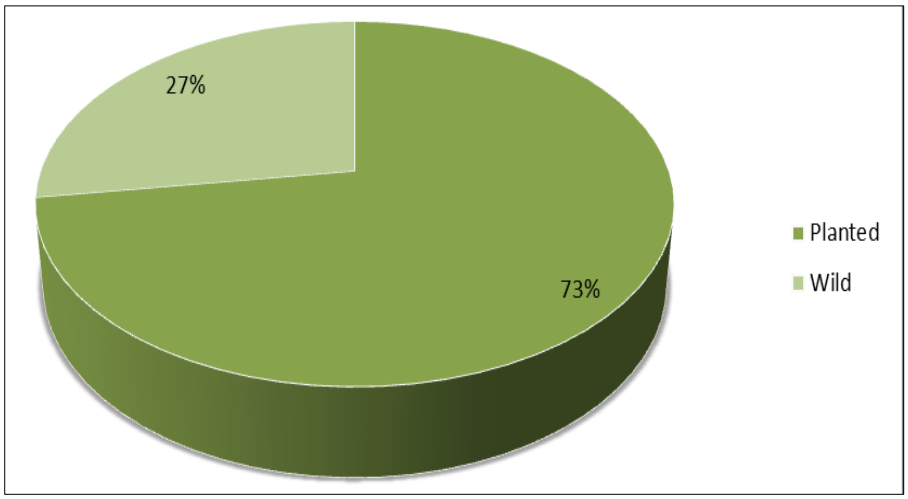

Figure 4 Percentage (%) of Wild and Planted plant species

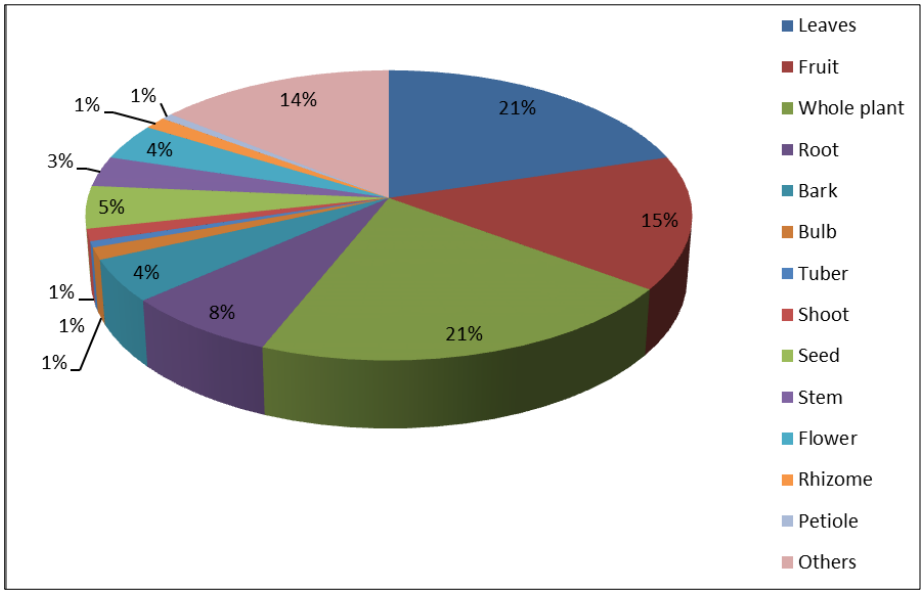

Figure 5 Number of plant parts used for medicinal purpose showed in pie chart

4. Discussion

A tentative inventory of angiosperm flora was undertaken at the Puthia upazila of Rajshahi district, Bangladesh, from October 2019 to December 2021. A total of 194 species were discovered, divided into 162 genera and 72 families (Table 1) the data gathered is comparable to the findings of other Bangladeshi investigations. In the Khagrachhari district, 243 species were found, divided into 195 genera and 95 families [10]. In Lawachara National Park, 374 species were identified, divided into 264 genera and 84 families [61]. In the Runctia Sal Forest, 153 species were found, divided into 120 genera and 52 families [58]. In Habiganj district, there are 245 species belonging to 183 genera and 72 families [64]. In Rajshahi district, 425 species from 321 genera and 108 families have been identified [32]. The Bangladesh Police Academy in Rajshahi has a total of 302 species belonging to 243 genera and 84 families [46]. There is no published information on the diversity of angiosperm plant species at Puthia upazila of Rajshahi, Bangladesh.

5. Conclusion

The present paper focused on diversity of angiosperms growing throughout the Puthia upazila of Rajshahi was documented. A total of 194 species under 162 genera and 72 families were recorded. Habit analysis shows that herbs, shrubs, climbers and trees are represented by 76, 37, 26 and 55 species, respectively. Out of the recorded species,148 medicinal plant species belonging to 127 genera and 64 families were collected and recorded for their use in 200 ailments. It was concluded that overutilization, over the collection, overexploitation, habitat degradation, overharvesting, deforestation, population explosion and overgrazing are the conspicuous biotic stresses which severely threatened the flora in the area which affect the population sustainability on crust of the earth.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that there are no conflicts of interests.

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