Journal Homepage: - www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/13576
DOI URL: http://dx.doi.org/10.21474/IJAR01/13576

RESEARCH ARTICLE

DIVERSITY OF HERBACEOUS SPECIES IN THE RAJSHAHI METROPOLITAN AREA OF BANGLADESH

Laila Al Faria[1], Md. Firoz Alam[2] and A.H.M. Mahbubur Rahman[1]

1. Plant Taxonomy Laboratory, Department of Botany, Faculty of Biological Sciences, University of Rajshahi, Rajshahi-6205, Bangladesh.
2. Department of Botany, Faculty of Biological Sciences, University of Rajshahi, Rajshahi-6205, Bangladesh.

Manuscript Info

Manuscript History
Received: 24 August 2021
Final Accepted: 27 September 2021
Published: October 2021

Key words:-
Species Diversity, Herbaceous Taxa, Rajshahi Metropolitan Area, Bangladesh

Abstract

Objectives: The present research aimed to document the diversity of herbaceous species in the study area. The study also recorded the status of occurrence and species diversity.

Materials and Methods: The work is based on fresh materials collected during eighty-five visits to Rajshahi metropolitan area, Bangladesh from July 2018 to June 2021 to cover the seasonal variations. Plant parts with either flowers or fruits were collected using traditional herbarium techniques to make voucher specimens for documentation.

Results: A total of 281 species belonging to 68 families and 246 genera were recorded. 10 Pteridophyta and 58 Angiosperm families are including 13 Liliopsida and 45 Magnoliopsida. Family Asteraceae was the most dominant in all families followed by Acanthaceae, Amaranthaceae, Araceae, Brassicaceae, Euphorbiaceae, Fabaceae, Lamiaceae, Malvaceae, Polygonaceae, Poaceae and Solanaceae. 33 families were monophyletic and had one species and 1 genus each and 23 families are represented by 2 to 5 species each.

Conclusion: Out of 281 species, the status of occurrence was recorded for proper conservation management and sustainable utilization of the taxa which show 210 to be common, 61 as rare, 10 are found as threatened species in the study area. The present study will help in identifying the herbaceous vascular taxa for further investigation.

Introduction:-

Herbaceous plants include plants that have an annual, biennial, or perennial life cycle. Annual herbaceous plants die completely at the end of the growing season or when they have flowered and fruited, and then new plants grow from seed. Herbaceous perennial and biennial plants may have stems that die at the end of the growing season, but parts of the plant survive under or close to the ground from season to season (Levine, 1995). Herbs are major components of plant diversity and are an important segment of global biodiversity. These are also remarkable for their presence in a wide range and a major source of medicine and aroma for human beings. Herbs are variable in their presence as well as the presence of certain chemical compounds in their body system. Among a mega diversity of the plants, some herbs are of significant medicinal as well as a source of aromatic values. The composition of herbaceous vegetation varied according to the climate and land use conditions. According to (Hornby, 2001), herbs are usually

Corresponding Author:- A.H.M. Mahbubur Rahman
Address:- Plant Taxonomy Laboratory, Department of Botany, Faculty of Biological Sciences, University of Rajshahi, Rajshahi-6205, Bangladesh.

small tender plants, lacking woody stems above ground. Floristic studies acquire increasing importance in recent years in response to the need of developing and understand and under developing countries to assess their plant wealth (Vediya and Kharad, 2011).

Similar research work on herbaceous flora was carried out in Bangladesh by Easmin et al. (2021), Rahman (2021), Bakar et al (2021), Rahman and Khatun (2020), Sarker and Rahman (2019), Khatun and Rahman (2018), Zahra and Rahman (2018), Sarker and Rahman (2017), Rahman and Mamun (2017), Islam and Rahman (2017), Rahman (2017), Sultana and Rahman (2016), Sarker and Rahman (2016), Nahar and Rahman (2016a, 2016b), Roy and Rahman (2018), Roy et al (2016), Islam and Rahman (2016), Ismail and Rahman (2016), Rahman and Jamila (2015), Rahman and Jamila (2016), Rahman et al (2015a), Rahman et al (2015b), Rahman et al (2015c), Debnath and Rahman (2017), Rahman and Mahfuza (2015), Rahman and Parvin (2015), Uddin et al (2014), Rahman and Gulshana (2014), Rahman and Rahman (2014), Rahman et al (2014a), Rahman et al (2014b), Rahman et al (2014c), Rahman and Rojonogondha (2014), Rahman and Keya (2014), Kona and Rahman (2015), Keya and Rahman (2017), Rahman and Akter (2013), Rahman (2013a), Rahman (2013b), Rahman (2013c), Rahman (2013d), Rahman (2013e), Rahman (2013f), Ara et al (2011), Rahman et al. (2008a), Rahman et al (2008b), Rahman et al (2007a), Rahman et al (2007b) and Rahman et al (2007c). The aim of the present research was to explore and assesses the diversity of vascular herbaceous flora in the Rajshahi metropolitan area of Bangladesh.

Materials And Methods:-

Study area:-

Geographical position and climate are in Rajshahi Metropolitan Area. Rajshahi is situated at 24.1500°N and 89.0667°E. Soil: Soil water suspension measured by glass electrode PH meter. This is the best soil for the growth of various plants. The winter season (November-January) is cool and has little rainfall; the summer season (April-October) is warm and has rainfall. The maximum monthly temperature can reach up to 39.9°C during April and the minimum monthly temperature 5.8°C during January (BPC, 2001).

Methodology:-

The work is based on fresh materials collected during eighty-five visits to Rajshahi metropolitan area, Bangladesh from July 2018 to June 2021 to cover the seasonal variations. The visits covered all types of habitats, particular riverbank; 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.

Identification:-

Collected herbaceous species were authentically identified with the help of various books and journals (Hooker, 1877), (Prain, 1903) and (Ahmed **et. al.,** 2008-2009). For the current name and up-to-date nomenclature Huq (1986) and Pasha and Uddin (2013) were also consulted.

Results:-

The diversity of herbaceous species in the Rajshahi metropolitan area of Bangladesh was recorded from July 2018 to June 2021. Extensive floristic surveys of herbaceous flora and collection have been made throughout the study area. A total of 281 species belonging to 68 families and 246 genera were recorded. 10 Pteridophyta and 58 Angiosperm families are including 13 Liliopsida and 45 Magnoliopsida. Out of 281 species, 74.46% (209) species was recorded in Magnoliopsida, 20.56% (58) species in Liliopsida and 4.96% (14) species in Pteridophyta **(Figure 1).** Family Asteraceae (15.30%; 43 species) was the most dominant in all families followed by Fabaceae (8.54%; 24 species), Poaceae (6.40%; 18 species), Amaranthaceae (4.62%; 13 species), Lamiaceae (4.62%; 13 species), Malvaceae (4.27%; 12 species), Solanaceae (3.91%; 11 species), Acanthaceae (3.55%; 10 species), Euphorbiaceae (3.20%; 9 species), Brassicaceae (3.20%; 9 species), Polygonaceae (3.20%; 9 species) and Araceae (3.20%; 9 species) **(Figure 3).** 33 families were monophyletic and had one species and 1 genus each and 23 families are represented by 2 to 5 species each. Status of occurrence was recorded for proper conservation management and sustainable utilization of the taxa which show 210 (74.73%) to be common, 61 (21.70%) as rare and 10 (3.55%) are found as threatened in the study area **(Figure 2).** For each species scientific name, local name, family name, flowering time, status of occurrence and voucher number were provided.

The common winter herbaceous flora of the area is *Ageratum conyzoides* L. *Arenaria serpyllifolia* L., *Bulbostylis barbata* (Rottb.) Clarke, *Carex fedia* Nees, *Cyathocline purpurea* (D.Don) O. Kuntze, *Grangea maderaspatana* (L.) Poir, *Nepeta hindostana* (Roth.) Haines and *Phalaris minor* Retz. The common rainy season weeds of the area are *Biophytum sensitivum* (L.) DC., *Conyza canadensis* (L.) Croq., *Digeria muricata* (L.) Mart., *Echinochloa frumentacea* L., *Cotula anthemoides* L., *Commelina benghalensis* L., *Urochloa panicoides* Beauv. and Cyperus spp. The common summer season weeds are *Bulbostylis barbata* (Rottb.) Clarke, *Carex fedia* Nees, *Cynodon dactylon* (L.) Pers., *Eclipta prostrata* (L.) L., *Euphorbia prostrata* A. Ait. *Gisekia pharnaceoides* L. *Grangea maderaspatana* (L.) Poir. *Portulaca oleracea* L. and *Nicotiana plumbaginifolia* Viv. Out of 281 species, 48 exotic species was recorded in the study area. Some exotic species are *Ageratum conyzoides* L., *Blumea lacera* (Burm.f) DC., *Chromolaena odorata* (L.) King & Robin, *Parthenium hysterophorus* L., *Spilanthes calva* DC., *Synedrella nodiflora* (L.) Gaertn., *Wedelia trilobata* (L.) Hitche, *Senna occidentalis* Roxb., *Senna tora* (L.) Roxb., *Evolvulus nummularius* (L.) L., *Crotalaria retusa* L., *Sida acuta* Burm f., *Scoparia dulcis* L., *Eichhornia crassipes* (Mart.) Solus in A.DC. etc.

The rare herbaceous species of the study area are *Andrographis paniculata* (Burm.f.) Wall ex Nees., *Barleria cristata* L., *Celosia argentea* L., *Centella asiatica* (L.) Urban in Mart., *Rauvolfia serpentina* (L.) Benth ex Kurz., *Blumea laciniata* (Roxb.) DC., *Blumea membranacea* DC., *Blumea oxyodonta* DC., *Chromolaena odorata* (L.) King & Robin, *Emilia sonchifolia* (L.) DC., *Gerbera jamesonii* Bolus ex Hooker f., *Grangea maderaspatana* (L.) Poir., *Sonchus wightianious* DC., *Vernonia patula* Merrill., *Bryophyllum daigremontianum* (Hamet & perr.) A.Berger., *Chrozophora rottleri* (Geiseler) A. Juss.ex Spreng, *Euphorbia helioscopia* L., *Euphorbia prostata* Ait., *Christia vespertilionis* (L.f.) Bakh. f., *Crotalaria retusa* L., *Crotalaria spectabilis* Roth., *Desmodium heterophyllum* (Willd) DC., *Lupinus albus* L., *Medicago lupulina* L., *Medicago sativa* L., *Vicia hirsuta* (L.) S.F. Gray, *Leonurus sibiricus* L., *Leucas cephalotes* (Roth) Spreng, *Ocimum basilicum* L., *Pogostemon auricularius* (L.) Hassk., *Salvia plebeja* R. Br., *Ammania baccifera* L., *Hibiscus cannabinus* L., *Hibiscus radiatus* Cav., *Hibiscus surattensis* L., *Malva verticillata* L., *Orobanche aegyptiaca* Pers., *Polygala erioptera* DC., *Persicaria hydropiper* (L.) Spach., *Polygonum effusum* Meissn., *Rumex vesicarius* L., *Androsace umbellata* (Lour.) Mess., *Ranunculus sceleratus* L., *Hedyotis corymbosa* (L.) Lamk., *Stachytarpheta jamaicensis* (L.) Vahl., *Acorus calamus* L., *Cladium bicolor* (Ait) Vent., *Colocasia gigantea* (Blume) Hook.f., *Costus speciosus* (Koenig ex Retz.) Smith., *Heliconia humilis* Jacq, *Crinum asiaticum* L., *Rhynchostylis retusa* (L.) Blume, *Vetiveria zizanioides* (L.) Nash in Small, *Curcuma zedoaria* (Christ) Rose, *Zingiber officinale* Rose, *Adiantum raddianum* C.Presl, *Diplazium esculentum* (Rretz.) Sw., *Microsorum punctatum* (L.) Copel, *Sphenomeris chinensis* (L.) Maxon, *Microlepia speluncae* C. Presl. and *Hygrophila schulli* (Buch-Ham) M.R & S.M.Almeida, *Digera muricata* (L.) Mart., *Wedelia chinensis* (Osbeck) Merr., *Cullen corylifolium* (L.) Medic., *Hemistepta lyrata* Bunge ex Fischer et Mem., *Hyptis suaveolens* (L.) Poit., *Enhydra fluctuans* Lour., *Bacopa monnieri* (L.) Pennell., *Glinus oppositifolius* (L.) A.DC., *Rorippa indica* (L.) Hiern are threatened species and *Striga euphrassioides* (Vahl.) Benth. and *Orobanche aegyptica* Pers. are the two important parasites of the area.

Table 1:- Herbaceous Vascular Taxa in Rajshahi Metropolitan Area of Bangladesh.

Scientific name	Local name	Family name	Status of occurrence	Flowering time	Voucher number
Magnoliopsida (Dicotyledones)					
Andrographis paniculata (Burm.f.) Wall ex Nees	Kalomegh	Acanthaceae	R	Nov-May	LF 10
Barleria cristata L.	Janti	Acanthaceae	R	Nov-Feb	LF 224
Barleria prionitis L.	Kanta Janti	Acanthaceae	C	Nov-Feb	LF 52
Eranthemum pulchellum Andre	Shukh murali	Acanthaceae	C	Feb-Apr	LF 159
Hemigraphis hirta (Vahl.) T. Anderson	Buri pana	Acanthaceae	C	Jan-Jul	LF 105
Hygrophila schulli (Buch-Ham) M.R & S.M.Almeida	Kulekharha	Acanthaceae	T	Oct-Jan	LF 254
Nelsonia canescens (Lamk.) Spreng	Paramul	Acanthaceae	C	Oct-Feb	LF 186
Pachystachys lutea Nees in DC	Lollypop	Acanthaceae	C	Jan-Dec	LF 09
Ruellia tuberosa L.	Chatpoty	Acanthaceae	C	Jan-Dec	LF 226
Rungia pectinata (L.) Nees in DC.	Pindi	Acanthaceae	C	Jan-Dec	LF 218

Achyranthes aspera L.	Apang	Amaranthaceae	C	Jan-Dec	LF 167
Aerva lanata (L.) Juss ex Schult	Chaya	Amaranthaceae	C	Apr-Jul	LF 273
Aerva sanguinolenta (L.) Blume	Nuriya	Amaranthaceae	C	Jan-Dec	LF 97
Alternanthera ficoidea (L.) Roem & Schult	Jhuli Khata	Amaranthaceae	C	Feb-Mar	LF 212
Alternanthera philoxeroides (Mart.) Griseb	Malancha	Amaranthaceae	C	Mar-Jun	LF 01
Alternanthera sessilis R.Br. ex Roem & Schult	Sachishak	Amaranthaceae	C	Jan-Dec	LF 210
Amaranthus lividis L.	Ghobra notey	Amaranthaceae	C	Jan-Apr	LF 138
Amaranthus spinosus L.	Kanta notey	Amaranthaceae	C	Jan-Dec	LF 208
Amaranthus tricolor L.	Lalshak	Amaranthaceae	C	Jan-Dec	LF 175
Amaranthus viridis L.	Noteyshak	Amaranthaceae	C	Jan-Dec	LF 13
Celosia argentea L.	Morogful	Amaranthaceae	R	Sep-Jan	LF 21
Digera muricata (L.) Mart.	Gungatiay	Amaranthaceae	T	Feb-Jul	LF 204
Gomphrena globosa L.	Botamful	Amaranthaceae	C	Jun-Oct	LF 23
Centella asiatica (L.) Urban in Mart.	Thankuni	Apiaceae	R	Mar-Dec	LF 252
Coriandrum sativum L.	Dhoney	Apiaceae	C	Dec-Feb	LF 110
Daucus carota L.	Gajor	Apiaceae	C	May-Aug	LF 200
Hydrocotyle sibthorpioides Lamk.	Coin plant	Apiaceae	C	Jan-Dec	LF 27
Rauvolfia serpentina (L.) Benth ex Kurz	Sarpa gandha	Apocynaceae	R	Apr-Oct	LF 198
Ageratum conyzoides L.	Ochunti	Asteraceae	C	Nov-Jun	LF 249
Aster laevis L.	Aster	Asteraceae	C	Jan-Apr	LF 15
Blumea lacera (Burm.f) DC.	Kuksim	Asteraceae	C	Nov-Jul	LF 280
Blumea laciniata (Roxb.) DC.	Kuksim	Asteraceae	R	Jan-Dec	LF 287
Blumea membranacea DC.	Kuksim	Asteraceae	R	Jan-Mar	LF 05
Blumea oxyodonta DC.	Kuksim	Asteraceae	R	Feb-May	LF 283
Caesulia axillaris Roxb.	Golphuli	Asteraceae	C	Dec-Feb	LF 97
Calendula officinalis L.	Calendula	Asteraceae	C	Dec-Mar	LF 214
Callistephus chinensis Bail.	Aster	Asteraceae	C	Apr-Oct	LF 299
Chromolaena odorata (L.) King & Robin	Germanlata	Asteraceae	R	Nov-May	LF 276
Chrysanthemm coronarium L.	Chandra mollika	Asteraceae	C	Dec-Mar	LF 84
Cirsium arvense (L.) Scop.	Shial-kata	Asteraceae	C	Feb-Jun	LF 206
Cosmos bipinnatus Cav.	Cosmos	Asteraceae	C	Dec-Feb	LF 169
Dahlia hybrida Cav.	Dalia	Asteraceae	C	Oct-Apr	LF 209
Eclipta alba (L.) Hassk	Kalokeshil	Asteraceae	C	Jan-Dec	LF 36
Elephantopus scaber L.	Foot chandali	Asteraceae	T	Nov-Mar	LF 03
Emilia sonchifolia (L.) DC.	Mechitra	Asteraceae	R	Jan-Dec	LF 277
Enhydra fluctuans Lour.	Helencha	Asteraceae	T	Jan-Apr	LF 220
Gazania rigens (L.) Gaertn	Gazania	Asteraceae	C	Nov-Mar	LF 54
Gerbera jamesonii Bolus ex Hooker f.	Gerbera	Asteraceae	R	Sep-Apr	LF 213
Gnaphalium luteo-album L.	Barakamra	Asteraceae	C	Mar-Aug	LF 183
Gnaphalium polycaulon Pers.	Barakamra	Asteraceae	C	Dec-May	LF 222
Gnaphalium pulvinatum Del.	Barakamra	Asteraceae	C	Feb-Mar	LF 48
Grangea maderaspatana (L.) Poir.	Namuti	Asteraceae	R	Dec-May	LF 22
Helianthus annuus L.	Surjamukhi	Asteraceae	C	Jan-Dec	LF 11
Hemistepta lyrata Bunge ex Fischer	Sausurea	Asteraceae	T	Feb-May	LF 102

et Mem.					
Lactuca sativa L.	Lettuce	Asteraceae	C	Dec-Apr	LF 06
Launaea aspleniifolia DC.	Tikchana	Asteraceae	C	Jan-Dec	LF 250
Parthenium hysterophorus L.	Gandibooti	Asteraceae	C	Dec-Jan	LF 42
Sonchus asper (L.) Hill	Banpalang	Asteraceae	C	Sep-Jun	LF 187
Sonchus wightianious DC.	Banpalang	Asteraceae	R	Nov- Jun	LF 33
Spilanthes calva DC.	Marhatatiga	Asteraceae	C	Jan-Dec	LF 184
Synedrella nodiflora (L.) Gaertn	Gunjoni vutraj	Asteraceae	C	Jan-Dec	LF 143
Tagetes patula L.	Genda	Asteraceae	C	Jan-Dec	LF 216
Tagetes erecta L.	Gadaphul	Asteraceae	C	Jan-Dec	LF 28
Tridax procumbens L.	Tridhara	Asteraceae	C	Jan-Dec	LF 59
Vernonia cinerea (L.) Less	Kuksim	Asteraceae	C	Jan-Dec	LF 146
Vernonia patula (Dryand.) Merr.	Shialmutra	Asteraceae	R	Sep-Mar	LF 288
Wedelia trilobata (L.) Hitche	Keshraj	Asteraceae	C	Feb-Aug	LF 182
Wedelia chinensis (Osbeck) Merr.	Moha vringoraj	Asteraceae	T	Feb-Sep	LF 245
Xanthium indicum J.Koenig	Ghagra	Asteraceae	C	Jan-Dec	LF 275
Youngia japonica (L.) DC.	Crepis	Asteraceae	C	Aug-Jan	LF 269
Zinnia pauciflora L.	Zinnia	Asteraceae	C	Jun-Aug	LF 39
Impatiens balsamina L.	Dopati	Balsaminaceae	C	Mar-Oct	LF 260
Heliotropium indicum L.	Hatisur	Boraginaceae	C	Jan-Dec	LF 196
Brassica juncea (L.) Czern	Raisarisha	Brassicaceae	C	Mar-Jul	LF 31
Brassica napus L.	Sarisha	Brassicaceae	C	Mar-Jul	LF 194
Brassica nigra (L.) Koch.in Rohling	Kalosorisha	Brassicaceae	C	Mar-Jul	LF 233
Brassica oleracea L. var.*botrytis* L.	Phulkapi	Brassicaceae	C	Feb-Jun	LF 41
Brassica oleracea L. var. *capitata* L.	Badhakapi	Brassicaceae	C	Jun-May	LF 35
Brassica rapa L.	Shalgom	Brassicaceae	C	Dec-Mar	LF 190
Lepidium apetalum Willd.	Pidilum	Brassicaceae	C	Apr-Aug	LF 13
Raphanus sativus L.	Mula	Brassicaceae	C	Jan-May	LF 188
Rorippa indica (L.) Hiern	Bansarisha	Brassicaceae	T	Apr-Jan	LF 244
Senna obtusifolia (L.) Irwin & Barbeby	Chakunda	Caesalpiniaceae	C	Aug-Feb	LF 07
Senna occidentalis Roxb.	Barachal kasunda	Caesalpiniaceae	C	Jan-Dec	LF 192
Senna sophera (L.) Roxb.	Kalka sundha	Caesalpiniaceae	C	Sep-Jul	LF 262
Senna tora (L.) Roxb.	Teraj	Caesalpiniaceae	C	Jul-Dec	LF 43
Cannabis sativa L.	Bhang	Cannabaceae	C	Jan-Dec	LF 289
Cleome viscosa L.	Hurhuria	Capparaceae	C	Jan-Dec	LF 174
Dianthus chinensis L.	China salpar	Caryophyllaceae	C	Feb-Mar	LF 180
Chenopodium album L.	Bathuashak	Chenopodiaceae	C	Dec-Mar	LF 47
Chenopodium ambrosioides L.	Banbathua	Chenopodiaceae	C	Nov-Mar	LF 178
Spinacea oleracea L.	Palong shak	Chenopodiaceae	C	Feb-Mar	LF 57
Evolvulus nummularius (L.) L.	Bhuiokra	Convolvulaceae	C	Jan-Dec	LF 176
Bryophyllum daigremontianum (Hamet & perr.) A.Berger	Hajar	Crassulaceae	R	Dec-Apr	LF 51
Bryophyllum pinnatum (Lamk.) Allg.	Patharkuchi	Crassulaceae	C	Dec-Apr	LF 45
Kalanchoe laciniata (L.) Pers	Himsagar	Crassulaceae	C	Jan-May	LF 164
Acalypha indica L.	Muktajhuri	Euphorbiaceae	C	Dec-Apr	LF 172
Chrozophora rottleri	Khudiokra	Euphorbiaceae	R	Mar-Oct	LF 55

(Geiseler) A. Juss.ex Spreng					
Croton bonplandianus Baill	Bondhoney	Euphorbiaceae	C	Apr-Sep	LF 170
Euphorbia helioscopia L.	Mahabi	Euphorbiaceae	R	May-Oct	LF 49
Euphorbia hirta L.	Dhuhia	Euphorbiaceae	C	Jan-Dec	LF 231
Euphorbia prostrata Ait.	Sij	Euphorbiaceae	R	Jan-Oct	LF 65
Euphorbia thymifolia L.	Choto dhuhia	Euphorbiaceae	C	Jan-Dec	LF 166
Phyllanthus niruri L.	Bhuiamla	Euphorbiaceae	C	Aug-Oct	LF 61
Phyllanthus urinaria L.	Hajarmani	Euphorbiaceae	C	Apr-Oct	LF 53
Alysicarpus bupleurifolius (L.) DC	Pan nata	Fabaceae	C	Mar-Aug	LF 285
Alysicarpus vaginalis DC.	Pan nata	Fabaceae	C	Jul-Aug	LF 162
Arachis hypogaea L.	Badam	Fabaceae	C	Mar-Dec	LF 230
Christia vespertilionis (L.f.) Bakh. f.	Chama chika	Fabaceae	R	Nov-Dec	LF 160
Cicer arietinum L.	Boot	Fabaceae	C	Nov-Jan	LF 67
Crotalaria juncea L.	Shonpat	Fabaceae	C	Feb-Mar	LF 168
Crotalaria pallida Ait	Jhunjhuni	Fabaceae	C	May-Dec	LF 156
Crotalaria retusa L.	Atashi	Fabaceae	R	Sep-Mar	LF 71
Crotalaria spectabilis Roth	Jhunjhuni ghati	Fabaceae	R	Aug-FEb	LF 154
Crotalaria verrucosa L.	Bansan	Fabaceae	C	May-Dec	LF 73
Cullen corylifolium (L.) Medic	Buchki dana	Fabaceae	T	Nov-Jan	LF 152
Desmodium heterophyllum (Willd) DC	Bon motorchuti	Fabaceae	R	Mar-Jul	LF 144
Desmodium triflorum (L.) DC	Kodalia	Fabaceae	C	Feb-Sep	LF 83
Lathyrus sativus L.	Khesari	Fabaceae	C	Feb-Sep	LF 140
Lupinus albus L.	Sada lupin	Fabaceae	R	Jan-Apr	LF 148
Medicago lupulina L.	Holud lupin	Fabaceae	R	Mar-Jun	LF 79
Medicago sativa L.	Alfaalfa	Fabaceae	R	May-Sep	LF 23
Melilotus alba Desr.	Sada Methi	Fabaceae	C	Mar-Oct	LF 81
Melilotus indica (L.) All	Bon Methi	Fabaceae	C	Feb-Aug	LF 75
Pisum sativum L.	Motor	Fabaceae	R	Nov-Mar	LF 150
Uraria picta (Jacq.) Desv	Shankar Jata	Fabaceae	C	Jun-Dec	LF 142
Vicia faba L.	Barashim	Fabaceae	C	Jul-Mar	LF 85
Vicia hirsuta (L.) S.F. Gray	Masuri Chana	Fabaceae	R	Dec-Mar	LF 77
Vicia sativa L.	Ankari	Fabaceae	C	Jul-Nov	LF 87
Fumaria indica Lamk	Bonsulpha	Fumariaceae	C	Nov-Jan	LF 256
Exacum pedunculatum L.	Chirattam	Gentianaceae	C	Jan-Dec	LF 136
Anisomeles indica (L.) O. kuntze	Gobura	Lamiaceae	C	Mar-Sep	LF 89
Coleus scutellarioides (L) Benth.in Wall	Pathor chur	Lamiaceae	C	Mar-Sep	LF 99
Hyptis suaveolens (L.) Poit	Tokma	Lamiaceae	T	Jan-Dec	LF 134
Leonurus sibiricus L.	Roktodron	Lamiaceae	R	Jan-Dec	LF 93
Leucas aspera (Wlld.) Link	Dondo kolosh	Lamiaceae	C	Jan-Dec	LF 251
Leucas cephalotes (Roth) Spreng	Bara halkus	Lamiaceae	R	Apr-Dec	LF 124
Mentha arvensis L.	Pudina	Lamiaceae	C	Jan-Feb	LF 130
Ocimum americanum L.	Bontulsi	Lamiaceae	C	Jun-Feb	LF 267

Ocimum basilicum L.	Babui Tulsi	Lamiaceae	R	Oct-Mar	LF 128
Ocimum tenuiflorum L.	Kalo Tulsi	Lamiaceae	C	Jan-Dec	LF 91
Pogostemon auricularius (L.) Hassk.	Aripa chuli	Lamiaceae	R	Sep-Jan	LF126
Salvia plebeja R. Br.	Bui Tulsi	Lamiaceae	R	Mar-Jun	LF 101
Salvia splendens Sellow ex Roem & Schultes	Salvia	Lamiaceae	C	Jan-Dec	LF 109
Ammania baccifera L.	Jangli Mendi	Lythraceae	R	Apr-Sep	LF 96
Abelmoschus esculentus (L.) Moench	Dheros	Malvaceae	C	Jan-Dec	LF 116
Abutilon hirtum (Lamk.) Sweet	Golpetari	Malvaceae	C	Oct-Apr	LF 258
Abutilon indicum (L.) Sweet	Petari	Malvaceae	C	Jul-Apr	LF 120
Alcea rosea L.	Hollyhock	Malvaceae	C	Dec-Jun	LF 107
Hibiscus cannabinus L.	Mesta pat	Malvaceae	R	Jan-Dec	LF 118
Hibiscus radiatus Cav.	Shata kanta	Malvaceae	R	Jul-Feb	LF 95
Hibiscus surattensis L.	Ram bhindi	Malvaceae	R	Sep-Feb	LF 122
Malva verticillata L.	Napha	Malvaceae	R	Dec-Feb	LF 103
Sida acuta Burm f.	Kureta	Malvaceae	C	Sep-May	LF 114
Sida cordata (Burm.f) Bross.	Junka	Malvaceae	C	Aug-Dec	LF 100
Sida cordifolia L.	Berela	Malvaceae	C	Sep-Dec	LF 254
Urena lobata L.	Bon okra	Malvaceae	C	Jan-Dec	LF 115
Mimosa pudica L.	Lajjabati	Mimosaceae	C	Sep-Dec	LF 25
Glinus oppositifolius (L.) A. DC.	Gima shak	Molluginaceae	T	Jun-Dec	LF 117
Mollugo pentaphylla L.	Khetpapra	Molluginaceae	C	Jun-Jan	LF 108
Boerhavia diffusa L.	Punarnava	Nyctaginaceae	C	Apr-Aug	LF 119
Nymphaea nauchali Burm. f	Nil shapla	Nymphaeaceae	C	Jun-Oct	LF 106
Ludwigia adscendens (L.) Hara	Kesordam	Onagraceae	C	Mar-Dec	LF 121
Ludwigia perennis L.	Kesordam	Onagraceae	C	Feb-Dec	LF 104
Orobanche aegyptiaca Pers.	Orobanche	Orobanchaceae	R	Dec-Apr	LF 297
Biophytum sensitivum (L.) DC.	Panilajuk	Oxalidaceae	C	Jan-Dec	LF 123
Oxalis corniculata L.	Amrul	Oxalidaceae	C	Sep-May	LF 112
Oxalis rubra A.St-Hil.	Boro amrul	Oxalidaceae	C	Sep-May	LF 125
Argemone mexicana L.	Shialkata	Papaveraceae	C	Feb-Jun	LF 113
Phlox drummondii Hook	Phlox	Polemoniaceae	C	Dec-Feb	LF 86
Polygala erioptera DC.	Teradudhi	Polygalaceae	R	Jan-Dec	LF 98
Persicaria hydropiper (L.) Spach	Bishkatali	Polygonaceae	R	Aug-Apr	LF 290
Persicaria lapathifolia (L.) S.F.Gray	Panimorich	Polygonaceae	C	Mar-Aug	LF 111
Persicaria orientalis (L.) Spach	Bara panimorich	Polygonaceae	C	Mar-Aug	LF 130
Polygonum effusum Meissn	Raniphul	Polygonaceae	R	Feb-May	LF 94
Polygonum plebejum R.Br.	Chemtisag	Polygonaceae	C	Jan-Apr	LF 145
Rumex dentatus L.	Bon Palong	Polygonaceae	C	Jan-May	LF 92
Rumex meritimus L.	Bon Palong	Polygonaceae	C	Jan-May	LF 135
Rumex vesicarius L.	Tok Palong	Polygonaceae	R	Dec-Mar	LF 90
Portulaca grandiflora Hook	Porchulaca	Portulacaceae	C	Mar-Aug	LF 137
Portulaca oleracea L.	Nunia Shak	Portulacaceae	C	May-Aug	LF 78
Portulaca quadrifida L.	Choto Nunia	Portulacaceae	C	May-Aug	LF 139
Anagallis arvensis L.	Pakhichosha	Primulaceae	C	Dec-Mar	LF 127
Androsace umbellata (Lour.) Mess.	Satrojaki	Primulaceae	R	Feb-Apr	LF 141
Ranunculus sceleratus L.	Palik	Ranunculaceae	R		LF 129
Fragaria vesca L.	Strawberry	Rosaceae	C	Dec-Apr	LF 261
Dentella repens (L.) J.R. & G Forst	Bhuipat	Rubiaceae	C	Dec-Jul	LF 66
Dentella serpyllifolia Wall. ex Craib	Bhuipat	Rubiaceae	C	Dec-Jul	LF 131
Hedyotis corymbosa (L.) Lamk	Khetpapra	Rubiaceae	R	Jan-Dec	LF 80
Bacopa monnieri (L.) Pennell.	Brammi	Scrophulariaceae	T	May-Dec	LF 147

Lindenbergia indica (L.) Vatke	Basonti	Scrophulariaceae	C	Oct-Jan	LF 88
Scoparia dulcis L.	Bondhone	Scrophulariaceae	C	Jan-Dec	LF 149
Capsicum frutescens L.	Morich	Solanaceae	C	Jan-Dec	LF 76
Lycopersicon esculentum Mill.	Tomato	Solanaceae	C	Mar-Dec	LF 151
Petunia hybrida Hort.ex Vilm.	Petunia	Solanaceae	C	Feb-Jun	LF 74
Physalis minima L.	Kopal Futki	Solanaceae	C	Jan-Dec	LF 153
Nicotiana plumbaginifolia Viv.	Ban Tamak	Solanaceae	C	Mar-Dec	LF 72
Solanum melongena L.	Brgun	Solanaceae	C	Oct-Mar	LF 155
Solanum nigrum L.	Tit Begun	Solanaceae	C	Jan-Dec	LF 82
Solanum sisymbrifolium Lamk.	Kanta Begun	Solanaceae	C	Jan-Dec	LF 161
Solanum tuberosum L.	Alu	Solanaceae	C	Jan-Dec	LF 68
Solanum villosum Mill.	Tit Begun	Solanaceae	C	Feb-Aug	LF 264
Solanum virginianum L.	Kantekari	Solanaceae	C	Jan-Feb	LF 70
Corchorus capsularis L.	Deshi Pat	Tiliaceae	C	Jun-Nov	LF 157
Corchorus olitorius L.	Tosha Pat	Tiliaceae	C	Aug-Dec	LF 62
Trapa bispinosa Roxb.	Paniphal	Trapaceae	C	Jun-Dec	LF 171
Pouzolzia zeylanica (L.) Benn.& R.Br.	Kullaruki	Urticaceae	C	Jan-Dec	LF 64
Phyla nodiflora (L.) Greene	Bhuiokra	Verbanaceae	C	Jan-Dec	LF 165
Stachytarpheta jamaicensis (L.) Vahl	Nilshapi	Verbanaceae	R	Mar-Aug	LF 60
Liliopsida (Monocotyledones)					
Agave americana L.	Shataldi Udvid	Agavaceae	C	Jul-Oct	LF 58
Agave cantula Roxb.	Bombai agaar	Agavaceae	C	Jul-Oct	LF 293
Dracaena spicata Roxb.	Dracaena	Agavaceae	C	Jan-Dec	LF 56
Polyanthus tuberosa L.	Rajani gondha	Agavaceae	C	Jul-Sep	LF 163
Aloe vera (L.) Burm.f	Ghrita kumari	Aloeaceae	C	Sep-Dec	LF 294
Acorus calamus L.	Bach	Araceae	R	Apr-Aug	LF 173
Alocasia macrorrhizos (L.) G Don in Sweet	Mankachu	Araceae	C	Jul-Oct	LF 265
Amorphophallus campanulatus (Roxb.) Blume ex Decne	Olkachu	Araceae	C	May-Oct	LF 19
Cladium bicolor (Ait) Vent	Cladium	Araceae	R	Apr-Jun	LF 50
Colocasia esculenta (L.) Schott.	Kachu	Araceae	C	May-Oct	LF 177
Colocasia gigantea (Blume) Hook.f	Salad Kachu	Araceae	R	Apr-Sep	LF 234
Dieffenbachia seguine (Jacq.)Schott	Segubet	Araceae	C	May-Sep	LF 179
Typhonium trilobatum (L.) Schott	Ghet Kochu	Araceae	C	Apr-Oct	LF 46
Xanthosoma violaceum Schott.	Dudh Kachu	Araceae	C	Apr-Oct	LF 181
Canna indica L.	Kolaboti	Cannaceae	C	Apr-Nov	LF 44
Commelina benghalensis L.	Kanchira	Commelinaceae	C	Feb-Dec	LF 242
Cyanotis cristata (L.) D.Dox	Tata-kansira	Commelinaceae	C	Sep-Feb	LF 268
Rhoeo discolor (L'Her) Hance in Walp	Rheo	Commelinaceae	C	Jan-Feb	LF 185
Tradescantia pallida (Rose) D.R.Hunt	Beguni pindo	Commelinaceae	C	Jan-Dec	LF 40
Costus speciosus (Koenig ex Retz.) Smith	Keumul	Costaceae	R	Sep-Dec	LF 240
Cyperus compressus L.	Chanch	Cyperaceae	C	Aug-Nov	LF 38
Cyperus cuspidatus	Sagarmukhi	Cyperaceae	C	Aug-Nov	LF 189

Kunth in Humb	methi				
Cyperus rotundus L.	Mutha Ghas	Cyperaceae	C	Jul-Nov	LF 247
Kyllinga microcephala Steud.	Gothubi	Cyperaceae	C	Jul-Nov	LF 191
Heliconia humilis Jacq.	Heliconia	Heliconiaceae	R	Apr-Aug	LF 34
Lemna perpusilla Torrey	Khudipana	Lemnaceae	C	Unknown	LF 18
Allium cepa L.	Peaj	Liliaceae	C	Feb-Jun	LF 32
Allium sativum L.	Rosun	Liliaceae	C	Feb-Apr	LF 195
Crinum asiaticum L.	Sak Darshan	Liliaceae	R	Mar-Aug	LF 30
Zephyranthes candida (Lindf) Herbert	Sada Ghasphul	Liliaceae	C	Jan-Sep	LF 197
Zephyranthe stubispatha (L'Her.) Herbert ex Traub	Holde Ghasphul	Liliaceae	C	Jun-Aug	LF 277
Musa paradisiaca L.	Kola	Musaceae	C	Mar-Dec	LF 199
Rhynchostylis retusa (L.) Blume	Shialleza orchid	Orchidaceae	R	May-Jul	LF 26
Vanda tessellata (Roxb.) Hook f.ex G.Don	Rasna	Orchidaceae	C	Aug-Sep	LF 20
Zeuxine nervosa (Wall ex Lendl.) Benth.ex C.B.Clarke	Nervizine orchid	Orchidaceae	C	Mar-Apr	LF 24
Alloteropsis cimicina (L.) Stapf in Prain	Alotara china	Poaceae	C	Jan-Dec	LF 203
Axonopus compressus (Sw.) Beauv.	Carpet grass	Poaceae	C	Jan-Dec	LF 248
Brachiaria setigera (Retz.) C.E. Hubb in Hook	Bara Jalghanti	Poaceae	C	Sep-Dec	LF 205
Chrysopogon aciculatus (Retz.) Trin	Prem kanta	Poaceae	C	Jan-Dec	LF 201
Digitaria stricta Roth ex roem. & Schult	Trick ghas	Poaceae	C	Sep-Dec	LF 207
Imperata cylindrica (L.) P.Beauv.	Kash	Poaceae	C	Jan-Dec	LF 243
Oplismenus burmanii (Retz.) Beauv.	Jabri durba	Poaceae	C	Sep-Jan	LF 235
Oplismenus compositus (L.) Beauv.	Gohur	Poaceae	C	Aug-Sep	LF 16
Saccharum spontaneum L.	Kash	Poaceae	C	Jan-Dec	LF 211
Vetiveria zizanioides (L.) Nash in Small	Binna gash	Poaceae	R	Sep-Dec	LF 193
Cynodon ductylon (L.) Pers.	Durba ghas	Poaceae	C	Jul-Dec	LF 296
*Eleusine indica (*L.) Gaerth	Malan kuri	Poaceae	C	Jun-Dec	LF 12
Eragrostis gangetica (Roxb.) Steud.	Chira ghas	Poaceae	C	Jun-Dec	LF 115
Eragrostis nutans (Retz.) Nees ex Steud.	Natakoni	Poaceae	C	Apr-Jun	LF 272
Eragrostis tenella (L.) P.Beauv.ex Roem	Koni Ghas	Poaceae	C	Mar-Sep	LF 117
Oryza sativa L.	Dhan	Poaceae	C	Sep-Jun	LF 08
Triticum aestivum L.	Gom	Poaceae	C	Jan-Apr	LF 119
Eichhornia crassipes (Mart.) Solus in A.Dc	Kachuri pana	Pontenderiaceae	C	Jan-Dec	LF 248
Monocaria hastata (L.) Solus in A.DC.	Bara Nukha	Pontenderiaceae	C	Jan-Dec	LF 221
Curcuma longa L.	Holud	Zingiberaceae	C	Aug-Oct	LF 04
Curcuma zedoaria (Christ) Rose	Shati	Zingiberaceae	R	Apr-May	LF 223
Zingiber officinale Rose	Ada	Zingiberaceae	R	Sep-Nov	LF 02
Pterodophyta (Pteridophytes)					
Adiantum caudatum Klotzsch	Biddapata	Pteridaceae	C	Unknown	LF 132
Adiantum raddianum C. Presl.	Biddapata	Pteridaceae	R	Unknown	LF 296
Ampleopteris prolifera (Retz.) Copel.	Dhekia	Thelypteridaceae	C	Unknown	LF 202
Diplazium esculentum (Rretz.) Sw.	Dhekia Shak	Athyriaceae	R	Unknown	LF 69

Lygodium flexuosum (L.) Sw.	Dhekia	Lygodiaceae	C	Unknown	LF 281
Marselia minuta L.	Susnishak	Marsileaceae	C	Unknown	LF 236
Marselia quadrifolia L.	Susnishak	Marsileaceae	C	Unknown	LF 239
Macrothelypteris torresiana (Gaudich.) Ching.	Sonali Dhekia	Thelypteridaceae	C	Unknown	LF 63
Microsorum punctatum (L.) Copel	Dhekia	Polypodiaceae	R	Unknown	LF 29
Nephrolepis cordifolia (L.) K.Presl.	Bagan Dhekia	Nephrolepidaceae	T	Unknown	LF 133
Pteris vittata L.	Dhekishak	Pteridaceae	C	Unknown	LF 37
Sphenomeris chinensis (L.)Maxon	Bagan Dhekia	Lindsaeaceae	R	Unknown	LF 284
Selaginella vaginata Spring	Sellaginella	Selaginellaceae	C	Unknown	LF 14
Microlepia speluncae C. Presl.	Fita Dhekia	Dennstaedtiaceae	R	Unknown	LF 270

Jan = January, Feb = February, Mar = March, Apr = April, May = May, Jun = June , Jul = July, Aug = August, Sep = September, Oct = October, Nov = November, Dec = December, C = Common, R = Rare, T = Threatened

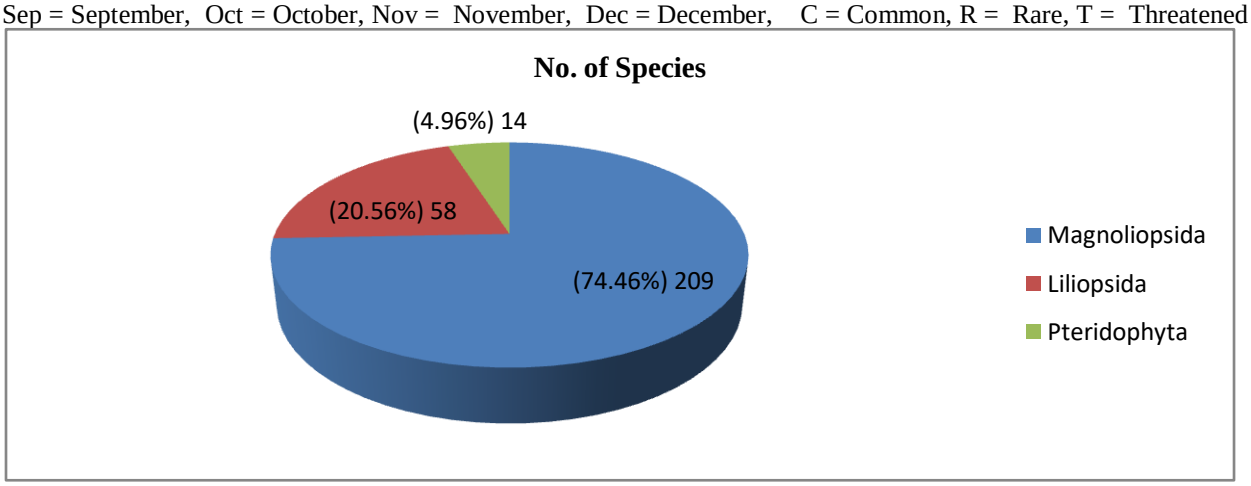

Figure 1:- Recorded diversity of Magnoliopsida, Liliopsida and Pteridophyta in the study area.

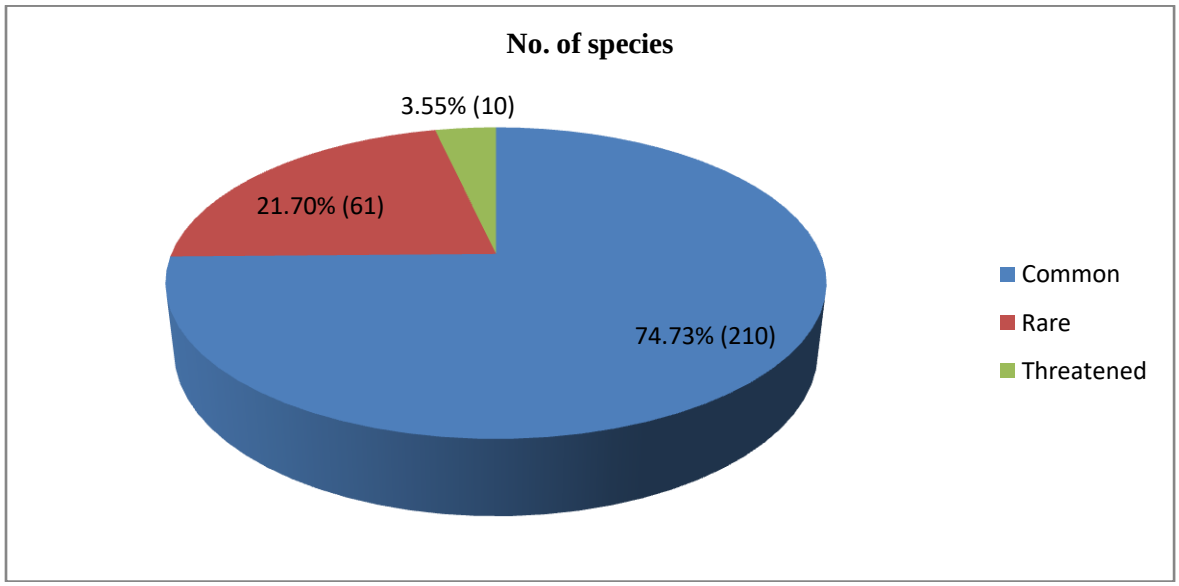

Figure 2:- Recorded herbaceous flora status of occurrence in the study area.

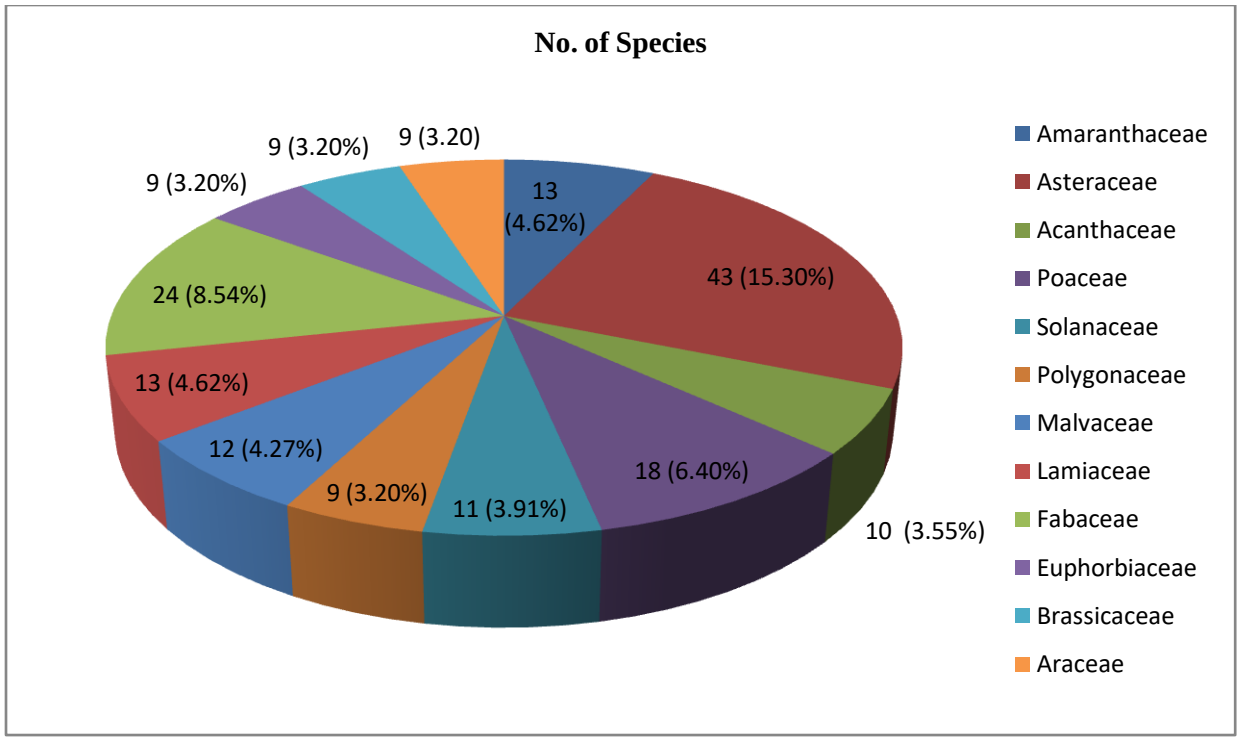

Figure 3:- Recorded dominant herbaceous plant families in the study area.

Discussion:-

Herbaceous species diversity in the Rajshahi metropolitan area of Bangladesh was carried out. A total of 281 species belonging to 68 families and 246 genera were recorded. The collected information is comparable with the result of other studies at home and abroad. In Bangladesh, a total of 140 herbaceous species was recorded in Gobindaganj Upazila of Gaibandha district, Bangladesh (Sarker and Rahman, 2019). A total of 92 herbaceous species was recorded in the Sadar Upazila of Naogaon, Bangladesh (Rahman and Nahar, 2016). A total of 57 herbaceous species was recorded in Palash Upazila of Narsinghdi district, Bangladesh (Rahman and Debnath, 2014). Sixty-nine (69) herbaceous species was recorded in Bogra district, Bangladesh (Rahman and Keya, 2014). A total of 116 herbaceous species was recorded in Mahadebpur Upazila of Naogaon district, Bangladesh (Rahman and Kona, 2016). A total of 284 herbaceous species was recorded in the Rajkandi Reserve Forest of Moulovibazar, Bangladesh (Haque **et al.,** 2018). A total of 174 herbaceous species was recorded in Baraiyadhala National Park, Chittagong, Bangladesh (Harun-Ur-Rashid **et al.,** 2018). One hundred and seventy-eight (178) herbaceous species was recorded in Teknaf Wildlife Sanctuary, Bangladesh (Uddin **et al.,** 2013). A total of 141 herbaceous species was recorded in the Sadar Upazila of Munshiganj district, Bangladesh (Rahman **et al.,** 2013). Abroad, a total of 82 herbaceous species was recorded in Takht Bhai district Mardan, Khyber Pakhtunkhwa, Pakistan (Ibrahim **et al.,** 2019). Sixty-seven (67) herbaceous species was recorded in Sheikh Buddin National Park, district Dera Ismail Khan, Khyber Pakhtunkhwa, Pakistan (Attaullah **et al.,** 2016). A total of 348 herbaceous species was recorded in Pune District, India (Bagal, 2020). Forty-four (54) herbaceous species was recorded in Veerani Aloor, Kanyakumari district, Tamilnadu, South India (Kensa **et al.,** 2018) and a total of 577 herbaceous species was recorded in Muzaffarnagar District (U.P.), India (Malik, 2015). The present investigation was to document the diversity of herbaceous vascular flora in the Rajshahi metropolitan area of Bangladesh.

Conclusion:-

The present paper focused on herbaceous species growing throughout the Rajshahi metropolitan area was documented. A total of 281 species under 246 genera and 68 families were recorded. Out of 281 species, 210 were common, 61 were rare and 10 were threatened species and *Striga euphrassioides* (Vahl.) Benth. and *Orobanche aegyptica* Pers. are the two important parasites of the area. 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 earth crust.

Acknowledgements:-

The authors are grateful to the University of Rajshahi, Bangladesh for financial support to complete this research work. The authors are also thanks to the local people in Rajshahi metropolitan area, Bangladesh for their co-operation and help during the research work.

References:-

1. Ahmed ZU, Begum ZNT, Hassan MA, Khondker M, Kabir SMH, Ahmad M, Ahmed ATA, Rahman AKA & Haque EU(Eds) (2008-2009) Encyclopedia of Flora and Fauna of Bangladesh. Vols. 6-10. Asiatic Society of Bangladesh, Dhaka.
2. Ara T, Khokan EH & Rahman AHMM (2011) Taxonomic Studies on the Family Solanaceae in the Rajshahi University Campus. *Journal of Biodiversity and Environmental Sciences* 4(1): 29-34.
3. Attaullah KN & Muhammad Z (2016) A Check List of Angiospermic Flora of Sheikh Buddin National Park, district Dera Ismail Khan, Khyber Pakhtunkhwa, Pakistan. *South Asian Journal of Life Sciences* 4(1): 18-24.
4. Bagal JG (2020) Herbaceous Flora from Daund Tehsil of Pune District (M.S.), India. *Flora and Fauna* 26(1): 93-95 Doi: 10.33451/florafauna.v26i1pp93-95
5. Bakar S, Faria LA, Rani R & Rahman AHMM (2021) Diversity of vascular weeds species in six selected crop fields of Chuadanga district, Bangladesh. *Species* 22(69): 36-42.
6. Bangladesh Population Census (BPC) (2001) Bangladesh Bureau of Statistics; Cultural survey report of Gobindhaganj Upazila 2007.
7. Debnath A & Rahman AHMM (2017) A Checklist of Angiosperm Taxa at the Village Pandit Para under Palash Upazila of Narsingdi District, Bangladesh with Special Importance to Medicinal Plants. *Species* 18(58): 23-41.
8. Easmin MF, Faria LA, Rani R & Rahman AHMM (2021) Asteraceae: A Taxonomically and Medicinally Important Sunflower Family. *American International Journal of Biology and Life Sciences* 3(1):1-17
9. Hooker JD (1877) Flora of British India. Vols.1-7. L. Reeve and Co. Ltd. London, U.K.
10. Hornby AS (2001) Oxford Advanced Learners Dictionary. 6th Edition. Oxford University Press, Oxford, New York, 580.
11. Huq AM (1986) Plant Names of Bangladesh.Bangladesh National Herbarium, BARC, Dhaka, Bangladesh.
12. Ibrahim M, Khan MN, Ali S, Razzaq A, Zaman A, Iqbal M & Jan F (2019) Floristic Composition and Species Diversity of Plant Resources of rural area 'Takht Bhai' District Mardan, Khyber Pakhtunkhwa, Pakistan. *Medicinal and Aromatic Plants (Los Angeles)* 8.338 Doi: 10.35248/2167-0412.19.8.338
13. Islam M & Rahman AHMM (2017) A Preliminary Taxonomic Account of the Family Araceae in Rajshahi District of Bangladesh. *Discovery* 53(253): 30-48.
14. Islam MJ & Rahman AHMM (2016) An Assessment of the family Asteraceae at Shadullapur Upazila of Gaibandha District, Bangladesh with Particular Reference to Medicinal Plants. *Journal of Pregressive Research in Biology* 2(2): 108-118.
15. Ismail M & Rahman AHMM (2016) Taxonomic Study and Traditional Medicinal Practices on Important Angiosperm Plant Species in and around Rajshahi Metropolitan City. *International Journal of Botany Studies* 1(3): 33-39.
16. Kensa VM, Chinnu M & Lekshmi JL (2018) Herbaceous species diversity in Veerani Aloor, Kanyakumari district, Tamilnadu, South India. *GSC Biological and Pharmaceutical Sciences.* 04 (03): 068-073
17. Kona S & Rahman AHMM (2015) An Assessment of Angiosperm Diversity at Mahadebpur Upazila of Naogaon District, Bangladesh. *International Journal of Advanced Research* 3(10): 1067-1086.
18. Keya MA & Rahman AHMM (2017) Angiosperm Diversity at the Village Sabgram of Bogra, Bangladesh with Emphasis on Medicinal Plants. *American Journal of Plant Biology* 2(1): 25-34.
19. Khatun MA & Rahman AHMM (2018) Angiosperm Weeds Diversity and Medicinal Uses in Seven Selected Maize Fields at Puthia Upazila of Rajshahi District, Bangladesh. *Plant Environment Develoment* 7(1): 1-9.
20. Levine C (1995) A guide to wildflowers in winter: herbaceous plants of northeastern North America. New Haven: Yale University Press. P.1.
21. Malik V (2015) Herbaceous Flora of Muzaffarnagar District (U.P.), India. *Scholars Academic Journal of Biosciences* 3(2B): 182-196
22. Nahar J & Rahman AHMM (2016) Floristic Diversity of Naogaon Sadar, Bangladesh with Special Reference to Medicinal Plants. *Discovery* 52(252): 2352-2368.
23. Nahar J & Rahman AHMM (2016) Study of Angiosperm Plant Species at Sadar Upazila of Naogaon District, Bangladesh. *Discovery* 52(250): 1963-1978.

24. Pasha MK & Uddin SB (2013) Dictionary of Plant Names of Bangladesh (Vascular Plants). Janokalyan Prokashani. Chittagong, Dhaka, Bangladesh.
25. Prain D (1903) Bengal Plants.Vols.1-2. Botanical Survey of India. Calcutta, India.
26. Rahman AHMM & Khatun MA (2020) Leafy Vegetables in Chapai Nawabganj District of Bangladesh Focusing on Medicinal Value. *Bangladesh Journal of Plant Taxonomy* 27(2): 359-375.
27. Rahman AHMM & Akter M (2013) Taxonomy and Medicinal Uses of Euphorbiaceae (Spurge) Family of Rajshahi, Bangladesh. *Research in Plant Sciences* 1(3): 74-80.
28. Rahman AHMM & Debnath A (2014) Angiosperm Diversity of Pandit Para Village under Palash Upazila of Narsingdi District, Bangladesh. *Frontiers of Biological & Life Sciences* 2(4): 98-105.
29. Rahman AHMM & Gulshana MIA (2014) Taxonomy and Medicinal Uses on Amaranthaceae Family of Rajshahi, Bangladesh. *Applied Ecology and Environmental Sciences* 2(2): 54-59.
30. Rahman AHMM & Keya MA (2014) Assessment of Angiosperm Flora at the Village Sabgram under Sadar Upazila of Bogra District, Bangladesh. *International Journal of Advanced Research* 2(11): 443-458.
31. Rahman AHMM & Jamila M (2015) An Assessment of Angiosperm Taxa at the village Jamtala under sadar Upazila of Chapai Nawabganj District, Bangladesh. *Research & Reviews: Journal of Botanical Sciences* 4(4): 13-22
32. Rahman AHMM & Jamila M (2016) Angiosperm Diversity at Jamtala Village of Chapai Nawabganj District, Bangladesh with Emphasis on Medicinal Plants. Research in Plant Sciences. 4(1): 1-9.
33. Rahman AHMM & Mahfuza A (2015) Taxonomy and Traditional Medicinal Uses of Apocynaceae (Dogbane) Family of Rajshahi District, Bangladesh. *Research & Reviews: Journal of Botanical Sciences* 4(4): 1-12.
34. Rahman AHMM & Mamun MAA (2017) Investigation and Taxonomic Studies of Angiosperm Weed Flora in the Mulberry Field of Rajshahi University Campus. *Species* 18(58): 42-56.
35. Rahman AHMM & Parvin MIA (2015) Taxonomic Studies on the family Fabaceae (Weeds) at Rajshahi University Campus. *Plant* 3(3): 20-25.
36. Rahman AHMM & Rahman MM (2014) An Enumeration of Angiosperm weeds in the Paddy field of Rajshahi, Bangladesh with emphasis on medicinal Plants. *Journal of Applied Science And Research* 2(2): 36-42.
37. Rahman AHMM & Rojonigondha (2014) Taxonomy and Traditional Medicine Practices on Malvaceae (Mallow Family) of Rajshahi, Bangladesh. *Open Journal of Botany* 1(2): 19-24.
38. Rahman AHMM (2013a) A Checklist of Common Angiosperm Weeds of Rajshahi District, Bangladesh. *International Journal of Agricultural and Soil Science* 1(1): 1-6.
39. Rahman AHMM (2013b) Angiospermic flora of Rajshahi district, Bangladesh. *American Journal of Life Sciences* 1(3): 105-112.
40. Rahman AHMM (2013c) Assessment of Angiosperm Weeds of Rajshahi, Bangladesh with emphasis on medicinal plants. *Research in Plant Sciences* 1(3): 62-67.
41. Rahman AHMM (2013d) Study of Species Diversity on Cucurbitaceae family at Rajshahi Division, Bangladesh. *Journal of Plant Sciences* 1(2): 18-21.
42. Rahman AHMM (2013e) Systematic studies on Asteraceae in the northern region of Bangladesh. *American Journal of Life Sciences* 1(4): 155-164.
43. Rahman AHMM (2013f) Systematic studies on Cucurbitaceae family at Rajshahi division, Bangladesh. *Plant* 1(2): 10-15.
44. Rahman AHMM (2017) Annotated List in the Graveyards Trees of Rajshahi City, Bangladesh. *Discovery* 53(254): 107-116.
45. Rahman AHMM (2021) A Preliminary Assessment of Angiospermic Flora in and around Rajshahi metropolitan city, Bangladesh. *Applied Ecology and Enviromemtal Sciences* 9(4): 440-449.
46. Rahman AHMM, Afsana MW & Islam AKMR (2014a) Taxonomy and Medicinal Uses on Acanthaceae Family of Rajshahi, Bangladesh. *Journal of Applied Science And Research* 2(1): 82-93.
47. Rahman AHMM, Ferdous Z & Islam AKMR (2014b) A Preliminary Assessment of Angiosperm Flora of Bangladesh Police Academy. *Research in Plant Sciences* 2(1): 9-15.
48. Rahman AHMM, Hossain MM & Islam AKMR (2014c) Taxonomy and Medicinal Uses of Angiosperm weeds in the wheat field of Rajshahi, Bangladesh. *Frontiers of Biological and Life Sciences* 2(1): 8-11.
49. Rahman AHMM, Ferdows Z, Nitu SK & Islam AKMR (2015a) Herbaceous Plant Species in and around Rajshahi Metropolitan City, Bangladesh. *International Journal of Advanced Research* 3(5): 1002-1018.
50. Rahman AHMM, Akter S, Rani R & Islam AKMR (2015b) Taxonomic Study of Leafy Vegetables at Santahar Pouroshova of District Bogra, Bangladesh with Emphasis on Medicinal Plants. *International Journal of Advanced Research* 3(5): 1019-1036.

51. Rahman AHMM, Sultana Z, Rani R & Islam AKMR (2015c) Taxonomic Studies of the Family Commelinaceae at Rajshahi, Bangladesh. *International Journal of Advanced Research* 3(5): 978-989.
52. Rahman AHMM, Alam MS, Hossain MB, Nesa MN, Islam AKMR & Rahman MM (2008a) Study of Species Diversity on the family Asteraceae (Compositae) of the Rajshahi Division. *Research Journal of Agriculture and Biological Sciences* 4(6): 794-797.
53. Rahman AHMM, Alam MS, Khan SK, Ahmed F, Islam AKMR & Rahman MM (2008b) Taxonomic Studies on the family Asteraceae (Compositae) of the Rajshahi Division. *Research Journal of Agriculture and Biological Sciences* 4(2): 134-140.
54. Rahman AHMM, Islam AKMR & Naderuzzaman ATM (2007a) Studies on the herbaceous plant species in the graveyard areas of Rajshahi city. *Plant Environment Development* 1(1): 57-60.
55. Rahman AHMM, Islam AKMR, Naderuzzaman ATM, Hossain MD & Afza R (2007b) Studies on the Aquatic Angiosperms of the Rajshahi University Campus. *Research Journal of Agriculture and Biological Sciences* 3(5): 474-480.
56. Rahman AHMM, Anisuzzaman M, Ahmed F, Zaman ATMN & Islam AKMR (2007c) A Floristic Study in the Graveyards of Rajshahi City. *Research Journal of Agriculture and Biological Sciences* 3(6): 670-675.
57. Rahman AHMM (2013) Graveyards angiosperm diversity of Rajshahi city, Bangladesh with emphasis on medicinal plants. *American Journal of Life Sciences.* USA. 1 (3): 98-104.
58. Rahman AHMM, Ferdous Z & Islam AKMR (2014) A Preliminary Assessment of Angiosperm Flora of Bangladesh Police Academy. *Research in Plant Sciences* 2(1):9-15.
59. Roy TR & Rahman AHMM (2018) Inventory of Angiosperm Diversity in Ishwardi Pouroshova of Pabna District, Bangladesh, *Discovery Science* 14: 9-22.
60. Roy TR, Sultana RS & Rahman AHMM (2016) Taxonomic study and Medicinal Uses of Verbenaceae Family of Rajshahi District, Bangladesh. *Journal of Pregressive Research in Biology* 3(1): 160-172.
61. Sarker AK & Rahman AHMM (2016) A Preliminary Checklist of Angiosperm Flora at Katakhali Pouroshova of Rajshahi, Bangladesh. *Discovery* 52(251): 2127-2140.
62. Sarker P & Rahman AHMM (2019) Angiosperms in Gobindaganj Upazila of Gaibandha District, Bangladesh. *Bangladesh Journal of Plant Taxonomy* 26(2): 285-298.
63. Sarker U & Rahman AHMM (2017) Diversity of Weed Species in Mustard Fields of Manda Upazila of Naogaon District, Bangladesh. *Species* 18(59): 133-145.
64. Sultana R & Rahman AHMM (2016) Convolvulaceae: A Taxonomically and Medicinally Important Morning Glory Family. *International Journal of Botany Studies* 1(3): 47-52.
65. Uddin K, Rahman AHMM & Islam AKMR (2014) Taxonomy and Traditional Medicine Practices of Polygonaceae (Smartweed) Family at Rajshahi, Bangladesh. *International Journal of Advanced Research* 2(11): 459-469.
66. Uddin MZ, Alam MF, Rahman MA & Hassan MA (2013) Diversity in Angiosperm Flora of Teknaf Wildlife Sanctuary, Bangladesh. *Bangladesh Journal Plant Taxonomy* 20(2): 145-162.
67. Vediya SD & Kharad HS (2011) Floristic diversity of Isarizone, Megharj range forest district Sabarkantha Gujarat, India. *International Journal of Pharmacy and Life science* 2(9): 1033-1034.
68. Zahra F & Rahman AHMM (2018) Documentation of Angiosperm Weed Flora in and around Rajshahi Metropolitan City, Bangladesh. *Discovery Agriculture* 4: 33-46.