RESEARCH ARTICLE

Flowering Plant Diversity of District Karnal, Haryana, India

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ABSTRACT

During an extensive study carried out to assess the floristic diversity of the Karnal District, Haryana, 345 angiospermic plants were recorded belonging to 245 genera and 77 families. Out of that, 309 species belong to dicotyledons (218 genera and 69 families), 36 species belong to monocotyledons (27 genera & 8 families). Habit wise grouping shows 196 (56.81%) are herbs followed by 64 (18.55%) trees, 50 (14.49%) shrubs and 35 (10.14%) climbers. Among the families of angiosperms, Fabaceae with 47 species is the dominant family followed by Asteraceae, Poaceae, and Malvaceae. *Ipomoea* is the dominant genus with 8 species followed by *Solanum, Euphorbia, Sida*, *Cyperus,* and *Ficus*. The present study provides basic information about floristic composition, which will be supportive for management and conservation of the plant wealth of the area. Plants are enlisted with botanical name, family, local name, habit and distributional status of each species.

Key words: Floristic diversity, Angiospermic plants, Karnal District, Haryana.

INTRODUCTION

In the course of floristic studies, plant taxonomists are engaged in collecting information about diversity and distribution of plants throughout the world (Qureshi *et al.* 2011). Floristic studies record the enumeration, distribution, ecological status and association of plant species over different geographic areas. The study of socio-economical significance of plant diversity is, however, of much greater importance than of diversity alone. This is an established fact that we get enormous benefits from plants and they fulfill almost all our requirements in the form of food, fodder, fuel, medicine, timber and resins etc. (Gaur, 1999). Due to large scale anthropogenic disturbances in the form of exclusive agricultural practices, industrialization, livestock feed, fuel-wood collection and forest fires, the floral as well as faunal diversity of our planet is facing threats of extinction, which will eventually lead to losses

of genetic diversity. This is much needed to defend this valuable wealth for the interests of our own and of upcoming generations. Detailed studies are required for every terrestrial and aquatic habitat for proper documentation of species diversity. For a detailed and near to complete assessment, smaller areas provide better outputs as they can be thoroughly investigated. Keeping in view these points, an extensive study of Karnal district of Haryana, India has been conducted for accurate documentation of angiosperm diversity of the area.

MATERIAL AND METHODS

Study Area:

Karnal district falls in the north-eastern part of the Haryana State, India and is bounded by north latitudes 29°25'05" and 29°59'20" and east longitudes 76°27'40" and 77°13'08" (Fig. 1). The area of the district is 1,967 km^2 and maximum height from mean sea level is around 240 m. Karnal is bordered by the river Yamuna in the east, district Panipat in the south, district Kaithal in the west and district Kurukshetra in the north and is famous as a *Basmati* Rice Zone. Loamy clay, loam, clay and sandy are the soil types in different parts of the district. Mean annual temperature is 25°C and mean annual rainfall is 696 mm, majority of which occurs during monsoon months. Hot summers, cold winters and too little rain fall are the chief climatic characteristics of the area.

Methodology:

The area undertaken for study was extensively surveyed during different seasons from 2011 till 2014 to assess the diversity of flowering plants. Specimens were collected for various plants in flowering and/or fruiting stage. Required information was recorded in the field in order to study diagnostic features of plants. Standard methods of field study were followed for the collection of data during surveys and for preparing voucher specimens during and after the field trips (Jain & Rao, 1977). Voucher specimens for all species in flowering/fruiting stage were collected in numbers more than two, the plants photographed in the field and later identified by consulting available floras and other literature (Duthie, 1903-22; Maheshwari, 1963; Jain *et al.*, 2000; Kumar, 2001; Negi, 2010; Singh *et al.*, 2014). Virtual herbaria on various web resources were also consulted to further confirm the identification, most prominent being efloraofindia and Flowers of India (URLs: https://sites.google.com/site-/efloraofindia & www.flowersofindia.net). For further latest nomenclatural issues, many other web resources like GRIN, TPL and Flora of China were also consulted. The herbarium specimens are deposited at Department of Botany, Kurukshetra University, Kurukshetra, Haryana. For enumeration of families and their systematic arrangement, the latest system of Angiosperm Phylogeny Group, i.e. APG III is followed (APG, 2009, Haston *et al.* 2009). The species enumerated in this paper are tabulated with latest accepted botanical names, family, local names, habit and distributional status of the taxon in the area.

RESULTS AND DISCUSSION

Table 1 enumerates the findings of the study. A total of 345 flowering plants were recorded from the Karnal district belonging to 245 genera and 77 families (Fig. 2). Among them, 309 species belongs to dicotyledons (218 genera, 69 families) and 36 species belong to monocotyledons (27 genera, 8 families).

Fig. 1. Map Showing Study Area

Table 1: Account of species diversity from the study area- names of families, species recorded for each family, common names, habit and distributional status* of each species

ARACEAE Juss.
Lemna minor L.; Aq. H.; Com.
Spirodela polyrrhiza (L.) Schleid.; Aq. H.; Com.

HYDROCHARITACEAE Juss.
Hydrilla verticillata (L. f.) Royle; *Vern.*: *Kureli*; Aq. H.; Com.

COMMELINACEAE Mirb.
Commelina benghalensis L.; *Vern.*: *Kanteri*; H.; Com.
C. forskaolli Vahl.; H.; Com.
C. paludosa Bl.; *Vern.*: *Kena*; H.; Com.
Murdania nudiflora (L.) Bre.; *Vern.*: *Kansura*; H.; R.

PONTEDERIACEAE Kunth
Eichhornia crassipes (Mart.) Solms.; *Vern.*: *Jalkumbhi*; Aq. H.; Com.
Monochoria hastata (L.) Solms,. *Vern.*: *Launkia*; Aq. H.; R.

CANNACEAE Juss.
Canna indica L.; *Vern.*: *Keli*; H.; Fr.

TYPHACEAE Juss.
Typha angustata Bory & Chaub.; *Vern.*: *Patera*; Aq. H.; Fr.

CYPERACEAE Juss.
Cyperus alopecuroides Rottb.; *Vern.*: *Motha Patera*; H.; Fr.
C. compactus Retz.; H.; Occ.
Cyperus difformis L.; *Vern.*: *Dharti-dora*; H.; Fr.
C. iria L.; *Vern.*: *Motha*; H.; Fr.
C. rotundus L.; *Vern.*: *Bara-nagarmotha*; H.; Com.
Kyllinga nemoralis (J.R. & G. F.) Dandy *ex* Hut. & Dal.; H.; Com.

POACEAE Barnhart
Apluda mutica L.; *Vern.*: *Tachhila*; H.; Fr.
Arundo donax L.; *Vern.*: *Narsal*; H.; Occ.
Cenchrus ciliaris L.; *Vern.*: *Anjhan*, *Dhamanio*; H.; Com.
Coix lacryma-jobi L.; *Vern.*: *Samkru*, *Gurlu*; H.; R.
Cymbopogon martini (Roxb.) Wats.; *Vern.*: *Sofia*; H.; Occ.
Cynodon dactylon (L.) Pers.; *Vern.*: *Doob*; H.; Com.
Dactyloctenium aegyptium (L.) Willd.; *Vern.*: *Makara*; H.; Com.
Dichanthium annulatum (Forsk.) Stapf.; *Vern.*: *Barlu*; H.; Com.
Digitaria ciliaris (Retz.) Koel. ; H.; Fr.
Eleusine indica (L.) Gaertn.; *Vern.*: *Mandla*; H.; Fr.
Imperata cylindrica (L.) Raeus.; *Vern.*: *Uloo*; H.; Fr.
Paspalum distichum L.; Aq. H.; Fr.
Paspalidium flavidum (Retz.) A. Camus; H.; Com.
Phalaris minor Retz.; *Vern.*: *Chiriya-bajra*; H.; Com.
Saccharum munja Roxb.; *Vern.*: *Sarkanda*; H.; Fr.
S. ravennae (L.) L.; *Vern.*: *Dolu*; H.; Fr.
S. spontaneum L.; *Vern.*: *Kaans*; H.; Fr.
Setaria glauca (L.) Beauv.; *Vern.*: *Bandra*; H.; Com.
S. verticillata (L.) Beauv.; *Vern.*: *Laptuna*; H.; Fr.

PAPAVERACEAE Juss.
Argemone mexicana L.; *Vern.*: *Satyanashi*; H.; Com.
A. ochroleuca Sweet; *Vern.*: *Satyanashi*; H.; R.
Fumaria indica (Haussk.) Pugsley; *Vern.*: *Pitpapra*; H.; Fr.

MENISPERMACEAE Juss.
Cissampelos pareira L.; *Vern.*: *Jaljamini*; Cl.; Com.
Cocculus hirsutus (L.) Diels.; *Vern.*: *Karta ki Bel*; Cl.; Com.
Tinospora cordifolia (Willd.) Miers; *Vern.*: *Gulel*; Cl.; Occ.

RANUNCULACEAE Juss.
Ranunculus sceleratus L.; *Vern.*: *Jaldhaniya*; H.; Com.

NELUMBONACEAE A. Rich.
Nelumbo nucifera Gaertn.; *Vern.*: *Kamal*; Aq. H.; Occ. Cult.

VITACEAE Juss.
Cayratia trifolia (L.) Domin; *Vern.*: *Amalbel*; Cl.; Fr.

ZYGOPHYLLACEAE R. Br.
Balanites aegyptiaca (L.) Del.; *Vern.*: *Hingot*; Tr.; Fr.
Tribulus terrestris L.; *Vern.*: *Gokhru*; H.; Fr.

FABACEAE Lindl.
Abrus precatorius L.; *Vern.*: *Ratti*, *Chirmathi*; Cl.; Occ.
Acacia nilotica (L.) Willd. ex Del.; *Vern.*: *Kikar*, *Babool*; Tr.; Com.
A. farnesiana (L.) Willd.; *Vern.*: *Vilayati Babool*; Tr.; R.
A. leucophloea (Roxb.) Willd.; *Vern.*: *Jandi*; Tr.; Fr.
Aeschynomene indica L.; *Vern.*: *Didhen*, *Phulan*; H.; R.
Albizzia lebbeck (L.) Benth.; *Vern.*: *Kala Siris*; Tr.; Occ.
A. procera (Roxb.) Benth.; *Vern.*: *Siris*; Tr.; Occ.
Alhagi pseudalhagi (Bieb.) Desv.; *Vern.*: *Bharbharra*; Sh.; Occ.
Alysicarpus bupleurifolius (L.) DC.; *Vern.*: *Nir-murri*; H.; Fr.
A. hamosus Edgew.; *Vern.*: *Latanga*; H.; R.
A. monilifer (L.) DC.; *Vern.*: *Juhi Ghas*; H.; Occ.
Bauhinia purpurea L.; *Vern.*: *Kachnar*; Tr.; Occ.
B. variegata L.; *Vern.*: *Kachnar*; Tr.; Occ.
Butea monosperma (Lamk.) Taub.; *Vern.*: *Dhak*, *Palash*; Tr.; Occ.
Caesalpinia bonduc (L.) Roxb.; *Vern.*: *Kantkranj*; Sh.; Occ.
Cassia occidentalis L.; *Vern.*: *Badi Kasondi*; H.; Com.
C. tora L.; *Vern.*: *Chakvad*; H.; Fr.

Table 1: continued…

Crotalaria medicaginea Lam.; H.; Fr.
Dalbergia sissoo Roxb.; *Vern.*: *Shisham*; Tr.; Fr.
Desmodium gangeticum (L.) DC.; *Vern.*: *Salpalni*; H.; Fr.
D. triflorum (L.) DC.; *Vern.*: *Kudaliya*; H.; Com.
Erythrina suberosa Roxb.; *Vern.*: *Dhauldhak*; Tr.; R.
Indigofera linifolia Retz.; *Vern.*: *Sankhahuli*; H.; Fr.
I. linnaei Ali; *Vern.*: *Leel*; H.; Fr.
Lathyrus aphaca L.; *Vern.*: *Jangli Matar*; H.; Com.
Leucaena leucocephala (Lam.) de Wit.; *Vern.*: *Subabool*; Tr.; Fr.
Medicago lupulina L.; H.; R.
M. polymorpha L.; *Vern.*: *Maina*; H.; Com.
Melilotus alba Medik. ex Desv.; *Vern.*: *Safed Ban-methi*; H.; R.
M. indica (L.) All.; *Vern.*: *Senji*; H.; Com.
Millettia peguensis Ali; *Vern.*: *Tuma*; Tr.; Occ.
Mimosa hamata Willd.; *Vern.*: *Mundi*; Sh.; Occ.
M. pudica L.; *Vern.*: *Lajwanti*; H.; Occ. Cult.
Parkinsonia aculeata L.; *Vern.*: *Vilayti kikar*; Sh.; Occ.
Pithecellobium dulce (Roxb.) Benth.; *Vern.*: *Jangal Jalebi*; Tr.; Fr.
Pongamia pinnata (L.) Pierre; *Vern.*: *Karanj*; Tr.; Com. Cult.
Prosopis cineraria (L.) Druce; *Vern.*: *Jandi*; Tr.; Fr.
P. juliflora (Sw.) DC.; *Vern.*: *Jangli Kikar*; Tr.; Com.
Rhynchosia minima (L.) DC.; *Vern.*: *Kulthi*; Cl.; Com.
R. rothii Benth. *ex* Aitch. ; Cl.; R.
Sesbania bispinosa (Jacq.) Wight.; Sh.; Occ.
S. sesban (L.) Merr.; *Vern.*: *Dhaincha*; Sh.; Com. Cult.
Tamarindus indica L.; *Vern.*: *Imli*; Tr.; Occ.
Tephrosia purpurea (L.) Pers.; *Vern.*: *Sharpunkha*; H.; Fr.
Teramnus labialis (L.f.) Spreng.; Cl.; Occ.
Vicia hirsuta (L.) Gray; *Vern.*: *Jhunjhuni*; H.; Com.
V. sativa L.; *Vern.*: *Chatri-matri*; H.; Com.

ROSACEAE Juss.
Potentilla supina L.; H.; R.

RHAMNACEAE Juss.
Zizyphus jujuba Lamk.; *Vern.*: *Ber*, *Beri*; Tr.; Fr.
Z. nummularia (Burm.)Wt.&Arn.; *Vern.*: *Jhad Ber*; Tr.; Fr.
Z. oenoplia (L.) Mill.; *Vern.*: *Bamolan*; Sh.; Occ.

ULMACEAE Mirb.
Holoptelea integrifolia (Roxb.) Planch.; *Vern.*: *Papri*; Tr.; Occ.

CANNABACEAE Martinov
Cannabis sativa L.; *Vern.*: *Bhang*; Sh.; Com.

PUTRANJIVACEAE Meisn.
Putranjiva roxburghii Wall.; *Vern.*: *Pitrunjia*; Tr.; Occ.

MORACEAE Gaudich.
Broussonetia papyrifera (L.) Vent.; *Vern.*: *Jangli Toot*; Tr.; Occ.
Ficus benghalensis L.; *Vern.*: *Bargad*, *Bar*; Tr.; Fr.
F. palmata Forssk.; *Vern.*: *Anjiri*; Tr.; Fr.
F. racemosa L.; *Vern.*: *Goolar*; Tr.; Occ.
F. religiosa L.; *Vern.*: *Peepal*; Tr.; Com.
F. virens Aiton; *Vern.*: *Pilkhan*; Tr.; Occ.
Morus alba L.; *Vern.*: *Tut, Tutri*; Tr.; Occ.
M. macroura Micq.; *Vern.*: *Shahtoot*; Tr.; Occ.
Streblus asper Lour.; *Vern.*: *Choria*; Tr.; Occ.

URTICACEAE Juss.
Pouzolzia pentandra (Roxb.) Benn.; *Vern.*: *Pipira*; Aq. H.; Com.

CASUARINACEAE R. Br.
Casuarina equisetifolia L.; *Vern.*: *Saru*; Tr.; Occ.

CUCURBITACEAE Juss.
Coccinia indica Wt. & Arn.; *Vern.*: *Ram Kachri*; Cl.; Com.
Cucumis maderaspatanus L.; Cl.; Com.
Trichosanthes cucumerina L.; *Vern.*: *Jangli chichinda*; Cl.; Com.
T. dioica Roxb.; *Vern.*: *Parwal*; Cl.; Occ.
T. tricuspidata Lour.; *Vern.*: *Indrayan*; Cl.; R.

CELASTRACEAE R. Br.
Celastrus paniculatus Willd.; *Vern.*: *Malkangni*; Cl.; R.

OXALIDACEAE R. Br.
Oxalis corniculata L.; *Vern.*: *Khattamitha*; H.; Com.
O. debilis Kunth var. *corymbosa* (DC.) Lourteig; H.; R.
O. latifolia Kunth.; *Vern.*: *Khatmithi*; H.; R.

EUPHORBIACEAE Juss.
Acalypha indica L.; *Vern.*: *Kuppi*; H.; Occ.
Croton bonplandianum Baill.; *Vern.*: *Kala Bhangra*; H.; Fr.
Euphorbia cyathophora Murr.; *Vern.*: *Titli phool*; H.; Fr.
E. helioscopia L.; *Vern.*: *Dudhya*; H.; Fr.
Euphorbia heterophylla L.; H.; Fr.
E. hirta L.; *Vern.*: *Dudhi*; H.; Com.
E. prostrata Ait.; *Vern.*: *Dudhia Booti*; H.; Fr.
E. serpens Kunth; H.; Com.
Jatropha curcas L.; *Vern.*: *Ratanjot*; Sh.; R.
J. gossypifolia L.; *Vern.*: *Bherenda*; Sh.; R.
Mallotus nudiflorus (L.)Kul.&Wel.;*Vern.*:*Pindalu*; Tr.; Occ.
Ricinus communis L.; *Vern.*: *Arandi*; Tr.; Occ.

PHYLLANTHACEAE Martinov
Flueggea leucopyrus Willd.; *Vern.*: *Shinar*; Sh.; Occ.
Phyllanthus amarus Schum.; *Vern.*: *Jangli amli*; H.; Fr.
P. fraternus Web.; *Vern.*: *Dhadhan, Mokh*; H.; Com.
P. reticulatus Poir.; *Vern.*: *Kalamadhu*, *Makhi*; Sh.; Fr.
P. urinaria L.; H.; Occ.

Table 1: continued…

PASSIFLORACEAE Juss. *ex* Roussel
Passiflora foetida L.; Cl.; R.

SALICACEAE Mirb.
Casearia graveolens Dalz.; *Vern.*: *Safed Karai*; Tr.; R.
Flacourtia indica (Burm.f.)Merr.;*Vern.*:*Bilangada*;Tr.; Occ.
Salix tetrasperma Roxb.; Aq. Tr.; Occ.

COMBRETACEAE R. Br.
Terminalia arjuna (Roxb. ex DC.) Wt. & Arn.; *Vern.*: *Arjun*; Tr.; Fr.

T. bellerica (Gaetn.) Roxb.; *Vern.*: *Baheda*; Tr.; Fr. Cult.
T. chebula Retz.; *Vern.*: *Harad*; Tr.; Fr. Cult.

LYTHRACEAE J. St.-Hil.
Ammannia baccifera L.; *Vern.*: *Jangli Mehandi*; H.; Com.
A. coccinea Rottb. ; H.; Fr.
Lawsonia inermis L.; *Vern.*: *Mehandi*; Sh.; Occ.

ONAGRACEAE Juss.
Ludwigia perennis L.; H.; Occ.
L. octovalvis (Jacq.) P.H. Raven; H.; Occ.

MYRTACEAE Juss.
Eucalyptus camaldulensis Dehnh.; *Vern.*: *Safeda*; Tr.; Com. Cult.
Syzygium cumini (L.) Skeels; *Vern.*: *Jamun*; Tr.; Com. Cult.
S. nervosum DC.; *Vern.*: *Jamoa*; Tr.; Com.

ANACARDIACEAE R. Br.
Spondias pinnata (L. f.) Kurz.; *Vern.*: *Ambara*; Tr.; R.

SAPINDACEAE Juss.
Dodonaea viscosa (L.) Jacq.; *Vern.*: *Vilayati Mehandi*; Sh.; Occ.

RUTACEAE Juss.
Aegle marmelos (L.) Correa; *Vern.*: *Bel Pattar*; Tr.; Occ.
Limonia acidissima L.; *Vern.*: *Kaith*; T.; R.
Murraya koenigii (L.) Spreng.; *Vern.*: *Karipatta*; Sh.; R. Cult.

SIMAROUBACEAE DC.
Ailanthus excelsa Roxb.; *Vern.: Mahanimb*; Tr.; Occ. Cult.

MELIACEAE Juss.
Azadirachta indica A. Juss. ; *Vern.*: *Neem*; Tr.; Fr.
Melia azedarach L. ; *Vern.*: *Bakain*; Tr.; Fr.
Toona ciliata M. Roem.; *Vern.*: *Tuna*; Tr.; Occ.

MALVACEAE Juss.
Abelmoschus moschatus Medik.; *Vern.*: *Muskdana*; H.; R.
Abutilon indicum (L.) Sweet; *Vern.*: *Kanghi*; Sh.; Com.
Bombax ceiba L.; *Vern.*: *Semal*; Tr.; Com.
Corchorus aestuans L.; *Vern.*: *Chonch*; H.; Com.
C. capsularis L.; *Vern.*: *Narcha*; H.; Com.
C. trilocularis L.; *Vern.: Bilpat*; H.; Com.
Helicteres isora L.; *Vern.*: *Maror-phali*; Tr.; R.
Hibiscus lobatus (Murr.) Kuntze; H.; Com.
H. vitifolius L.; *Vern.*: *Ban Kapas*; H.; Com.
Malva parviflora L.; *Vern.*: *Sonchal*; H.; Com.
Malvastrum coromandelianum (L.) Gar.; *Vern.*: *Khrenti*; H.; Com.
Melochia corchorifolia L.; H.; Com.
Sida cordifolia L.; *Vern.*: *Khrenti*; H.; Fr.
S. ovata Forssk.; *Vern.*: *Dabi*; H.; Com.
S. rhombifolia L. ; *Vern.*: *Swetbala*; H.; Com.
S. spinosa L.; *Vern.*: *Gulsakari*; H.; Com.
Triumfetta rhomboidea Jacq. ; *Vern.*: *Chikti*; H.; Com.
Urena lobata L.; *Vern.*: *Bachita*; Sh.; Com.

MORINGACEAE Martinov
Moringa oleifera Lamk.; *Vern.*: *Sonjana*; Tr.; Occ.

SALVADORACEAE Lindl.
Salvadora persica L.; *Vern.*: *Meswak*, *Peelu*; Tr.; R.

CAPPARACEAE Juss.
Capparis decidua (Forssk.) Edgew.; *Vern.*: *Dela*, *Karir*; Sh.; Occ.
C. sepiaria L.; *Vern.*: *Hins*; Sh.; Fr.
C. zeylanica L.; *Vern.*: *Aradanda*; Sh.; Occ.
Crataeva magna (Lour.) DC.; *Vern.*: *Barna*; Tr.; Occ.

CLEOMACEAE Bercht. & J.Presl.
Cleome gynandra L.; H.; Occ.
C. viscosa L.; *Vern.*: *Hulhul*; H.; Com.

BRASSICACEAE Burnett
Cardamine flexuosa With.; H.; Com.
Coronopus didymus (L.) Smith; *Vern.*: *Jangli Halon*; H.; Com.
Lepidium sativum L.; *Vern.*: *Haleo*; H.; R. Cult.
Sisymbrium irio L.; *Vern.*: *Jangli Sarson*; H.; Com.
Rorippa indica (L.) Hiern.; *Vern.*: *Khubkalan*; H.; Occ.

TAMARICACEAE Link
Tamarix aphylla (L.) H. Karst.; *Vern.*: *Farash*; Tr.; Fr.
T. dioica Roxb. ex Roth; *Vern.*: *Jhau*; Tr.; Occ.

PLUMBAGINACEAE Juss.
Plumbago zeylanica L.; *Vern.*: *Chitrak*; Sh.; Occ.

POLYGONACEAE Juss.
Polygonum barbatum L.; *Vern.*: *Narri*; H.; Fr.
P. glabrum Willd.; H.; Fr.
P. plebeium R. Br.; *Vern.*: *Macheti*; H.; Com.
Rumex dentatus L.; *Vern.*: *Jangli Palak*; H.; Fr.

Table 1: Continued…

CARYOPHYLLACEAE Juss.
Silene conoidea L.; *Vern.*: *Takla*; H.; Occ.
Spergula arvensis L.; H.; Com.
Stellaria media (L.) Villars; *Vern.*: *Buchbucha*; H.; Com.

AMARANTHACEAE Juss.
Achyranthes aspera L.; *Vern.*: *Chirchita, Latjira*; H.; Fr.
Alternanthera ficoidea (L.) Sm.; H.; Fr.
A. paronychioides A. St.-Hil. ; H.; Com.
A. pungens Kunth; *Vern.*: *Kantevali Santhi*; H.; Fr.
A. sessilis (L.) DC. ; H.; Fr.
Amaranthus spinosus L.; *Vern.*: *Kanta chaulai*; H.; Occ.
Amaranthus viridis L.; *Vern.*: *Chaulai*; H.; Com.
Celosia argentea L.; *Vern.*: *Sarwari*; H.; Occ.
Chenopodium album L.; *Vern.*: *Bathua*; H.; Com.
C. ambrosioides L.; H.; Fr.
C. murale L.; *Vern.*: *Khartua*; H.; Com.
Digera muricata (L.) Mart.; *Vern.*: *Tandla*; H.; Com.
Gomphrena celosioides Mart.; *Vern.*: *Kasia*; H.; Com.
Pupalia lappacea (L.) Juss.; *Vern.*: *Jhojhru*; H.; Fr.

AIZOACEAE Martinov
Trianthema portulacastrum L.; *Vern.*: *Santhi*; H.; Com.
Zaleya pentandra (L.) Jeffrey; H.; R.

NYCTAGINACEAE Juss.
Boerhaavia chinensis (L.) Rottb.; *Vern.*:*Punarnava*; H.; Fr.
B. diffusa L.; *Vern.*: *Santhi*; H.; Com.
Mirabilis jalapa L.; *Vern.*: *Gulabbas*; H.; Fr.

MOLLUGINACEAE Bartl.
Glinus lotoides L.; *Vern.*: *Gandhi-buti*; H.; R.
Mollugo cerviana (L.) Ser. ; H.; Occ.

BASELLACEAE Raf.
Basella alba L.; *Vern.*: *Poi*; Cl.; R.

PORTULACACEAE Juss.
Portulaca oleracea L.; *Vern.*: *Kulfa*, Lunak; H.; Com.
P. quadrifida L.; *Vern.*: *Lunak*; H.; Com.

CACTACEAE Juss.
Opuntia elatior Mill.; *Vern.*: *Hath-hathoria*; Sh.; Occ.
O. monacantha (Willd.) Haw.; *Vern.*: *Nagphani*; Sh.; R.

EBENACEAE Gürke
Diospyros cordifolia Roxb.; *Vern.*: *Kaindu*; Tr.; Occ.

PRIMULACEAE Batsch *ex* Borkh.
Anagallis arvensis L; *Vern.*: Jonkmari; H.; Com.

RUBIACEAE Juss.
Oldenlandia corymbosa L.; *Vern.*: *Daman pappar*; H.; Occ.

GENTIANACEAE Juss.
Centaurium pulchellum (Sw.) Kra.;*Vern.*:*Barikchirayata*; H.;R.

APOCYANACEAE Juss.
Calotropis gigantea (L.)W.T.Aiton; *Vern.*: *Bada Aak*; Sh.; R.
C. procera (Ait.) R. Br.; *Vern.*: *Aak*; Sh.; Com.
Carissa carandas L.; *Vern.*: *Karonda*; Sh.; Occ.
C. spinarum L.; *Vern.*: *Jungli Karonda*; Sh.; Occ.
Dregea volubilis (L. f.) Benth. *ex* Hook. f.; Cl.; Occ.
Ichnocarpus frutescens (L.)R.Br.;*Vern.*:*Bandar bel*; Cl.; Fr.
Oxystelma esculentum(L.f.)R.Br.;*Vern.*:*Dudhialata*; Cl.; Fr.
Pergularia daemia (Forsk.) Chiov.; *Vern.*: *Aaksan*; Cl.; Fr.
Pentatropis spiralis (Forsk.) Decne; Cl.; Occ.
Telosma cordata (Burm. f.)Merril.;*Vern.*:*Kanjalata*; Cl.; R.

BORAGINACEAE Juss.
Cordia dichotoma Forst f.; *Vern.*: *Lasura*; Tr.; Occ.
Cynoglossum lanceolatum Forssk.; H.; R.
Ehretia laevis Roxb.; *Vern.*: *Chamror*; Sh.; Fr.
Heliotropium europaeum L.; *Vern.*: *Hathi-sundi*; H.; Occ.

CONVOLVULACEAE Juss.
Convolvulus arvensis L.; *Vern.*: *Hiranpag*; Cl.; Fr.
C. microphyllus Sieb. ex Spr.; *Vern.*: *Shankhpushpi*; H.; Fr.
Cuscuta chinensis Lam.; *Vern.*: *Amarbel*; Cl.; R.
C. reflexa Roxb.; *Vern.*: *Amarbel*; Cl.; Fr.
Ipomoea aquatica Forssk.; *Vern.*: *Sarnali, Kalmi*; H.; Com.
I. carica (L.) Sweet; Cl.; Fr.
I. carnea Jacq.; *Vern.*: *Behaya*; Sh.; Fr.
I. eriocarpa R. Br.; Cl.; Occ.
I. indica (Burm.) Merr. ; Cl.; Occ.
I. nil (L.) Roth; *Vern.: Neelkamli*; Cl.; Fr.
I. obscura (L.) Ker Gawl.; *Vern.*: *Pan bel*; Cl..; Fr.
I. pes-tigridis L.; *Vern.*: *Ghiabati*; Cl.; Occ.
Merremia aegyptia (L.) Urban; Cl.; Occ.
M. dissecta (Jacq.) Hallier f. ; Cl.; R.
Merremia hederacea (Burm. f.) Hall. f.; Cl.; Com.
Operculina turpethum (L.) Silva Manso; *Vern.*: *Nisoth*; Cl.; Occ.

SOLANACEAE Juss.
Datura metel L.; *Vern.*: *Dhatura*; Sh.; Fr.
D. stramonium L.; *Vern.*: *Kala Dhatura*; Sh.; Fr.
Lycium edgeworthii Dunal; Sh.; Fr.
Nicotiana plumbaginifolia Viv.; *Vern.*: *Ban tamaku*; H.; Com.
N. tabacum L.; *Vern.*: *Tambaku*; Sh.; R. Cult.
Physalis angulata L.; *Vern.*: Palpottan; H.; Com.
Solanum americanum Mill.; *Vern.*: *Makoi*; H.; Com.
S. hispidum Pers.; Sh.; R.
S. nigrum L.; *Vern.*: *Makoi*; H.; Occ.

Table 1: continued

S. sisymbrifolium Lam.; Sh.; R.
S. torvum Sw.; *Vern.*: *Bhankatiya*; Sh.; R.
S. villosum (L.) Moen.; *Vern.*: *Lal Makoe*; H.; Com.
S. virginianum L.; *Vern.*: *Berkateli*; Sh.; Fr.
Withania somnifera (L.) Dunal; *Vern.*: *Asgand*; Sh.; Com.

SPHENOCLEACEAE T. Baskerv.
Sphenoclea zeylanica Gaertn.; *Vern.*: *Phulanghas*; Aq. H.; Fr.

HYDROLEACEAE R. Br. *ex* Edwards
Hydrolea zeylanica (L.) Vahl.; H.; R.

SCROPHULARIACEAE Juss.
Antirrhinum orontium L.; H.; Fr.
Bacopa monnieri (L.) Penn.; *Vern.*: *Brahmi*; H.; Occ.
Scoparia dulcis L.; *Vern.*: *Mithi patti*; H.; Fr.
Verbascum chinense (L.) Santap.; *Vern.*: *Ban Tamakhu*; H.; Occ.
Veronica anagallis-aquatica L.; Aq. H.; Com.

LINDERNIACEAE Borsch
Lindernia ciliata (Colsm.) Pennell; H.; R.
L. crustacea (L.) F. Muell.; H.; Fr.

PEDALIACEAE R. Br.
Sesamum indicum L.; *Vern.*: *Til*; H.; Fr. Cult.

LAMIACEAE Martinov
Anisomeles indica (L.) Kuntze; *Vern.*: *Parpata*; Sh.; Fr.
Hyptis suaveolens (L.) Poit.; *Vern.*: *Vilaiti Tulsi*; H.; Occ.
Leucas aspera (Willd.) Link; H.; Fr.
Ocimum basilicum L.; *Vern.*: *Ram Tulsi*; H.; Com. Cult.
Pogostemon benghalensis (Burm. f.) Kunth; Sh.; R.
Salvia pleibia R.Br.; *Vern.*: *Kamarkass*; H.; Com.

PHRYMACEAE Schauer
Mazus pumilus (Burm. f.) Steenis; H.; Com.

OROBANCHACEAE Vent.
Lindenbergia macrostachya Benth.; Sh.; R.

ACANTHACEAE Juss.
Barleria prionitis L.; *Vern.*: *Kala Bansa*; Sh.; Occ.
Dicliptera paniculata (Forssk.) I. Darbysh. ; H.; Com.
Dipteracanthus prostratus (Poir.) Nees; *Vern.*: *Kali Dhawani*; H.; Fr.
Hemigraphis hirta (Vahl.) Anders. ; H.; Occ.
Hygrophila auriculata (Sch.) Heine; *Vern.*: *Gokul kanta*; Aq. H.; Fr.
Justicia adhatoda L.; *Vern.*: *Bansa, Basuti*; Sh.; Com.
Rungia pectinata (L.) Nees; H.; Occ.

BIGNONIACEAE Juss.
Jacaranda mimosifolia D. Don; *Vern.*: *Neela-gulmohar*; Tr.; Fr.
Haplophragma adenophyllum (Wall. *ex* G. Don) Dop ; Tr.; Fr. Cult.
Kigelia africana (Lam.) Benth.; *Vern.*: *Balam khira*; Tr.; Fr.

VERBENACEAE J. St.-Hil.
Clerodendrum indicum (L.) Kuntze; *Vern.*: *Bharangi*; Sh.; R.
C. phlomoides L. f.; *Vern.*: *Arni;* Sh.; Occ.
Gmelina arborea Roxb.; *Vern.*: *Bhadraparni*; Tr.; R.
Lantana camara L.; *Vern.*: *Raimuniya;* Sh.; Fr.
Phyla nodiflora (L.) Greene; *Vern.*: *Jal buti;* H.; Com.
Tectona grandis L.f.; *Vern.*: *Sagwan;* Tr.; Fr. Cult.
Verbena officinalis L.; *Vern.*: *Pamukh*; H.; Com.
Vitex negundo L.; *Vern.*: *Sambhalu*; Sh.; Fr.

ASTERACEAE Bercht. & Presl.
Ageratum conyzoides L.; *Vern.*: *Jangli pudina*; H.; Com.
A. houstonianum Mill.; *Vern.*: *Neela Mink*; H.; Com.
Artemisia scoparia Waldst. & Kit.; *Vern.*: Seeta-bani; H.; Fr.
Blumea laciniata (Roxb.) DC.; *Vern.*: *Kakranda*; H.; Com.
Caesulia axillaris Roxb.; Aq. H.; Fr.
Calyptocarpus vialis Less.; ; H.; Occ.
Centipeda minima (L.) A. Br. & Asch.; *Vern.*: *Nakk-chikni*; H.; R.
Cichorium intybus L.; *Vern.*: *Kasni*; H.; Com.
Cirsium arvense (L.) Scop.; *Vern.*: *Kateli*; H.; Com.
Cotula hemispherica (Roxb.) Wall. ; H.; Com.
Cyanthillium cinereum (L.) H. Rob.; *Vern.*: *Sahadevi*; H.; Com.
Echinops echinatus Roxb.; *Vern.*: Utakatira; H.; R.
Erigeron canadensis L.; Aq. H.; Fr.
E. linifolius Willd.; *Vern.*: *Phulni*; H.; Com.
Eclipta prostrata (L.) L.; *Vern.*: *Bhringaraj*; H.; Com.
Galinsoga parviflora Cav.; H.; Fr.
Grangea maderaspatana (L.) Poir.; H.; Occ.
Gnaphalium indicum L.; *Vern.*: *Buchbucha*; H.; Fr.
G. luteo-album L. *Vern.*: *Bal raksha*; H.; Com.
Ixeris polycephala Cass.; H.; Occ.
Launaea procumbens (Roxb.) Ram. & Raj.; H., Fr.
Parthenium hysterophorus L.; *Vern.*: *Gajar ghas*; H.; Com.
Pluchea lanceolata (DC.) Oliv. & Hiern; Sh.; Occ.
Pulicaria dysenterica (L.) Gaertn.; H.; Com.
Sonchus arvensis L.; *Vern.*: *Badi Sahadevi*; H.; Occ.
S. oleraceus L.; *Vern.*: *Pili Dudhi*; H.; Com.

Tabke 1: Continued…

Tridax procumbens L.; *Vern.*: *Khal-muriya*; H.; Com.
Verbesina encelioides (Cav.) Benth. & Hook. f. ex A. Gray; H.; Fr.
Xanthium strumarium L.; *Vern.*: *Chhota dhatura*; Sh.; Com.
Youngia japonica (L.) DC. ; H.; Occ.

APIACEAE Lindl.
Apium graveolens L.; *Vern.*: *Shalari*; H.; R.

Abbreviations:
H.-Herb; Cl.-Climber; Sh.-Shrub; Tr.-Tree;
Aq.-Aquatic; Com.-Common; Fr.-Frequent;
Occ.-Occasional; R-Rare; Cult.-Cultivated
(*With reference to this publication, common implies a species which is fairly well distributed and is growing gregariously; frequent means a species of wide occurrence but not gregarious; occasional species are those which have less number of individuals than the other two categories; rare ones include those reported from one or few localities only).

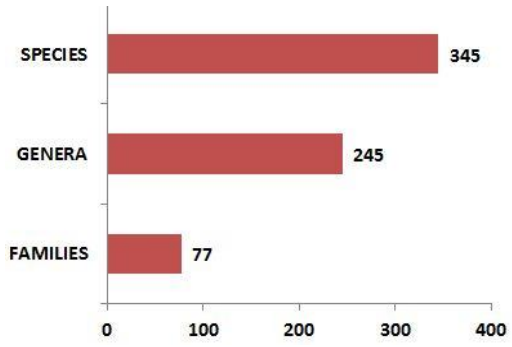

Figure 2: Proportion of Families, Genera and Species in the Area

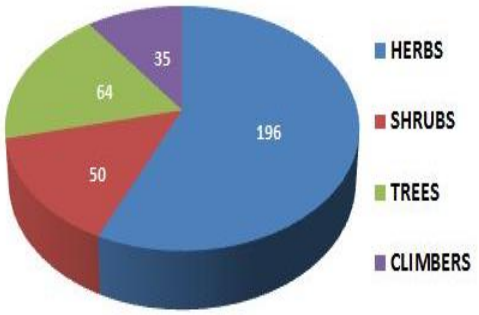

Figure 3: Proportion of Different Habit Groups

If we take into consideration the habit groups, 196 species (56.81%) are herbs forming the largest group, followed by 64 species (18.55%) of trees, 50 species (14.49%) of shrubs and 35 species of (10.14%) climbers (Fig. 3). Among the 345 flowering species, 112 species accounting for 32.46% are very common in the study area, with gregarious populations. While 98 species (28.40%) occur frequently, 86 species (24.92%) are occasionally found and 50 species accounting for 14.49% are rare in the study area. Among the families, Fabaceae with 47 species is the dominant family followed by Asteraceae (30 species), Poaceae (19 species), Malvaceae (19 species), Euphorbiaceae (17 species-including those of Phyllanthaceae), Convolvulaceae (16 species), Solanaceae (14 species), Amaranthaceae (14 species), Apocyanaceae (10 species), Moraceae (9 species), Acanthaceae (7 species) and Verbenaceae (7 species). *Ipomoea* is the dominant genus with 8 species followed by *Solanum*, *Euphorbia*, *Sida*, *Cyperus*, *Ficus*, *Phyllanthus*, *Alternanthera*, *Acacia*, *Chenopodium*, *Capparis*, *Polygonum*, *Merremia,* *Terminalia*, *Trichosanthes*, *Oxalis*, *Alysicarpus* and *Zizyphus.* Dominant tree species are *Terminalia arjuna*, *Dalbergia sissoo*, *Ficus religiosa*, *Zizyphus jujuba*, *Prosopis juliflora*, *Morus alba* and *Albizzia lebbeck* whereas some other prominent trees include *Prosopis cinerea*, *Fernandoa adenophylla*, *Moringa oleifera*, *Crataeva religiosa*, *Aegle marmelos*, *Butea monosperma*, *Cordia dichotoma*, *Ehretia laevis* and *Leucaena leucocephala*. Among shrubs, the most commonly encountered are *Lycium edgeworthii*, *Capparis zeylanica*, *Capparis sepiaria*, *Capparis aphylla* and *Balanites aegyptiaca*. *Boerhavia diffusa*, *Acacia nilotica*, *Achyranthes aspera*, *Argemone mexicana*, *Calotropis procera, Oxalis corniculata*, *Saccharum munjo*, *Withania somnifera*, *Eclipta prostrata*, *Nicotiana plumbaginifolia*, *Solanum americanum*, *Solanum villosum*, *Tridax procumbens*, *Abutilon indicum, Ageratum houstonianum*, *Parthenium hysterophorus*,

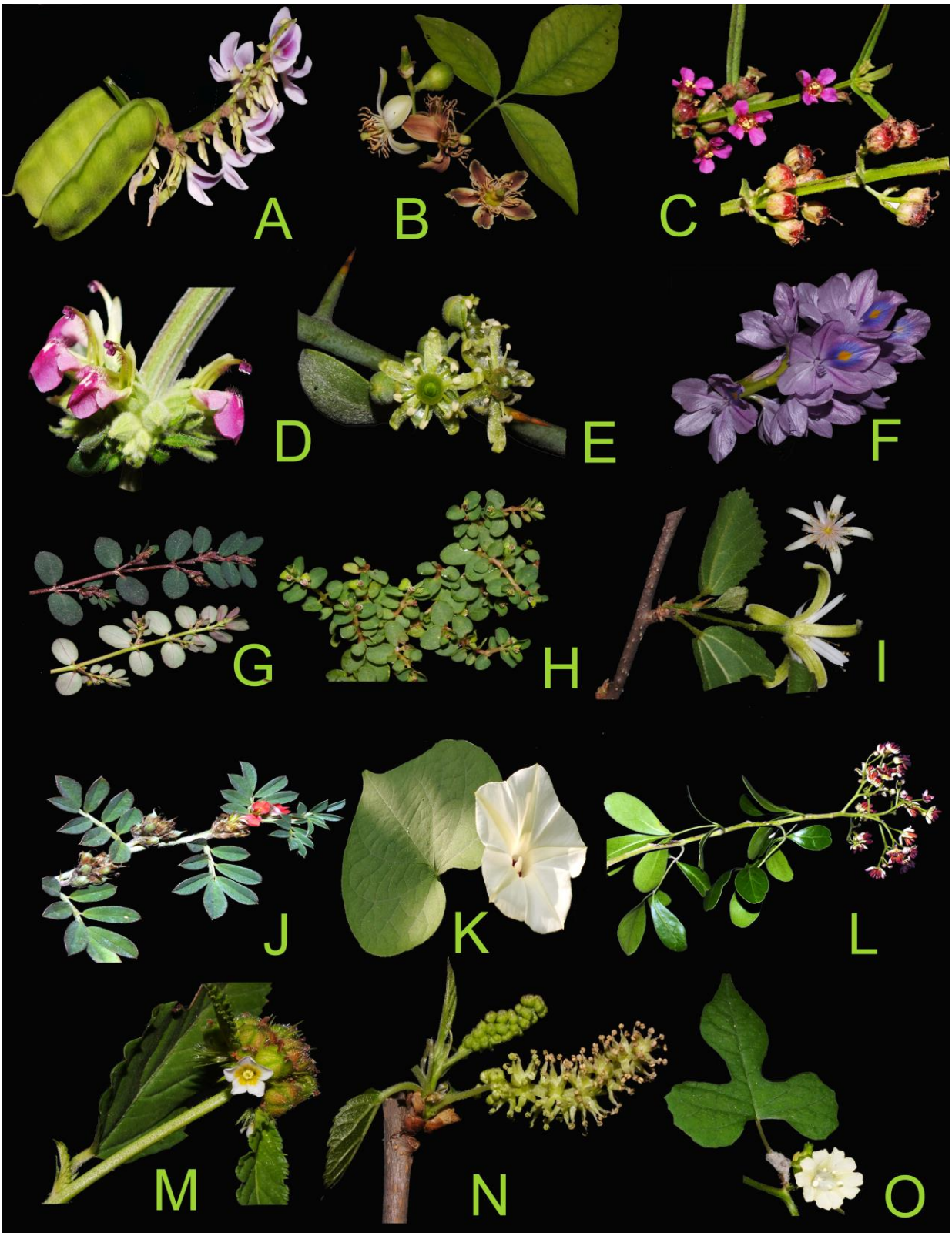

Plate 1. A. *Abrus precatorius* B. *Aegle marmelos* C. *Ammannia coccinea*
D. *Anisomeles indica* E. *Balanites aegyptiaca* F. *Eichhornia crassipes*
G. *Euphorbia prostrata* H. *Euphorbia serpens* I. *Grewia tenax* J. *Indigofera linnaei*
K. *Ipomoea obscura* L. *Limonia acidissima* M. *Melochia corchorifolia* N. *Morus alba*
O. *Merremia hederacea*

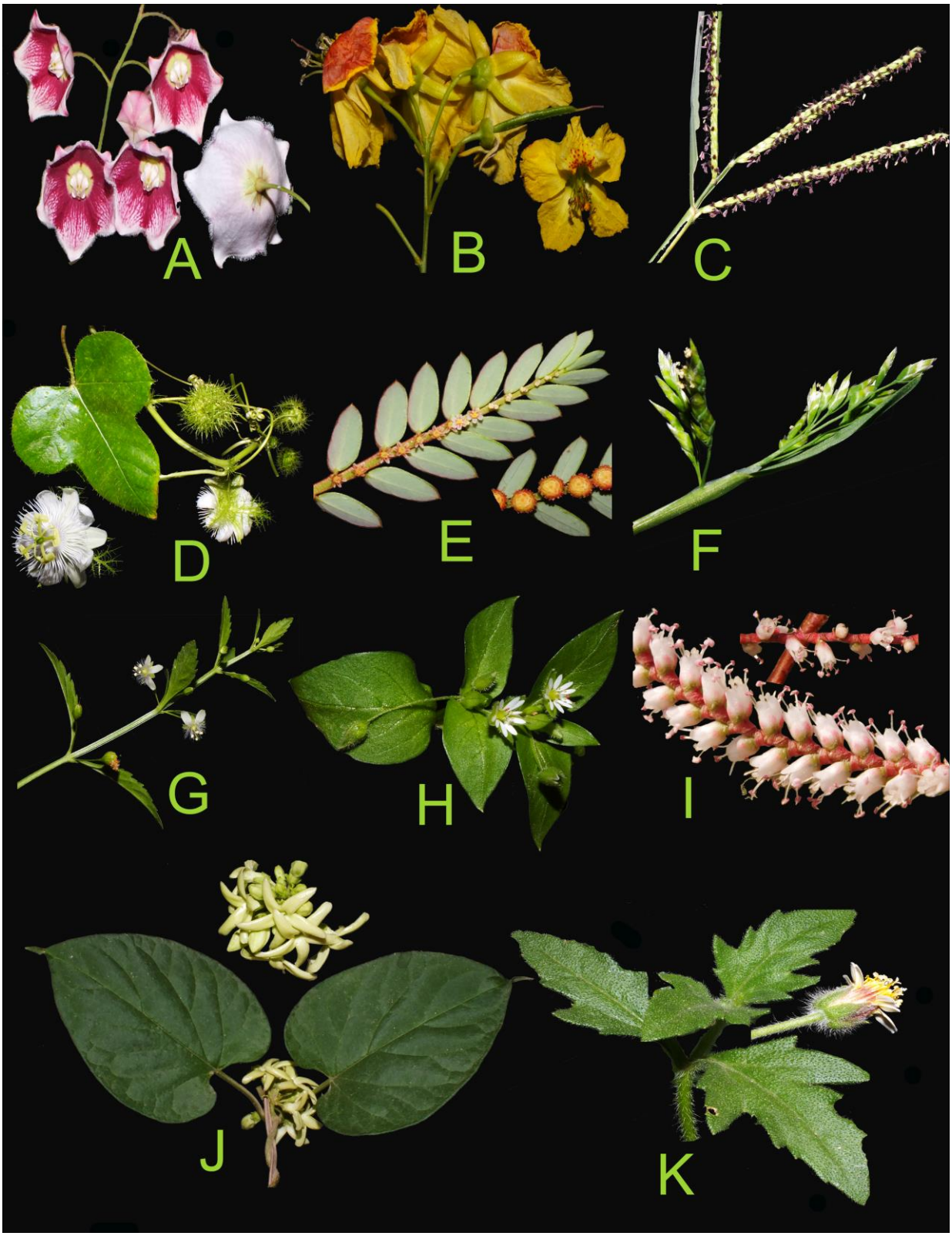

Plate 2: A. *Oxystelma esculentum* B. *Parkinsonia aculeata* C. *Paspalum distichum* D. *Passiflora foetida* E. *Phyllanthus urinaria* F. *Poa annua* G. *Scoparia dulcis* H. *Stellaria media* I. *Tamarix aphylla* J. *Telosma cordata* K. *Tridax procumbens*

Xanthium strumarium and *Erigeron linifolius* are some of the most common herbs. The study area is chiefly composed of agricultural land and very little area escapes cultivation. Still this is considerably rich in plant diversity. Exploration and monitoring of biodiversity of any area is requisite for management and conservation planning. This study reveals that the study area serves as a source of livelihood for the inhabitants and is extensively under cultivation. Excessive use of herbicides and fungicides for optimization of crop productivity has resulted in the damage of plant diversity and the fragmentation of the natural vegetation of the area. The present study, though preliminary, provides an insight of the plant wealth of the area. Subsequent studies are required to recognize the vegetation dynamics, climate change and other ecological aspects of the study area which will help in management and conservation practices for long term sustainability.

CONCLUSION

The extensive study of different parts of Karnal district of Haryana state, India revealed that this area, though chiefly and exclusively agrarian, is rich in diversity of wild plants, and in present work 345 angiosperm species have been recorded from the area, with majority formed by herbs and trees. However, an increased human activity due to urbanization and industrialization is posing a threat along with excessive and continued use of herbicides, pesticides and other chemicals in agriculture. Therefore, there is an urgent need to spread awareness among local people by promoting measures such as controlled grazing, reforestation, proper land management to promote the sustainable use of medicinal plants.

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