

Study of Alien and Invasive Flora of Valley District of Manipur and Their Control

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Abstract

A survey work is carried out to study the alien and invasive flora of different parts of valley district in Manipur, during the period of February 2011 to December, 2014, so as to investigate the information of the invasive species of herbs shrubs and vines. These categories are the successful plant species which are grown and effects the plant diversity i.e. natural flora of Valley district and can withstand in the prevailing environment. In the present scenario of the valley districts of Manipur maximum invasive species recorded i.e. *E. adenophorum* (Spreng.) King & H. followed by *A. haustonianum* Mill., *Mikania micrantha* H.B.K., *Lantana camara* L., *Chromolaena odorata* (L.) King & Robinson, *Achyranthes aspera* L. etc. However, some invasive parasites like *Cuscuta reflexa* Roxb. and *Loranthus scurrula* L. also interfere the forest flora. *M. micrantha* H.B.K., *Momordica dioica*, *Dioscorea bulbifera* L., *D. alata* L., *Thunbergia grandiflora* Wall., *Smilax lanceifolia* Roxb., *Entada phaseoloides*, etc. are some of the vines showing green carpeting on the roof of the forest flora is also remarkable. Therefore, necessary steps should be taken up to control the luxuriant growth of the invasive plant species, So that they do not compete / interfere with the indigenous forest of Manipur.

Keywords: Alien, Invasive flora, Control, Valley District, Manipur

I. INTRODUCTION

Preston and Williams (2003) opined that “Invasive alien species are emerging as one of the major threats to sustainable development, on a par with global warming and the destruction of life-support systems”. Alien is the non-native / exotic plant species, which have been introduced both accidentally and intentionally. National and Intentional introductions of the plants have been motivated by economic, environmental and social considerations. Preston and Williams (2003) opined that “Invasive alien species are emerging as one of the major threats to sustainable development, on a par with global warming and the destruction of life-support systems. These aliens come in the form of plants, animals and microbes that have been introduced into an area from other parts of the world, and have been able to displace indigenous species.” *Pinus*, *Eucalyptus* and *Acacia* species are important sources of pulp, timber and fuel wood, yet at the same time they have placed tremendous strain on the water resources. Preston and Williams (2003) described that in Southern and Eastern Africa, these species are the backbone of plantation forestry, bringing in valuable foreign currency, yet at the same time decimating land and water resources. However, in South Africa, they consume 7 % of available water. Although only a small percentage of these alien species will become invasive, when they do, their impacts are immense, insidious and usually irreversible, and they may be as damaging to native species and ecosystems on a global scale as the loss and degradation of habitats (IUCN/SSG/ISSG 2000, 2001 and 2004).

Preventing introduction of potentially invasive alien species is by far the preferred strategy. To prevent spread, every alien species should be treated as potentially invasive unless and until convincing evidence indicates that this is not so. For deliberate introductions it is recommended that standardized risk analysis (RA) and risk management procedures (RMP) be developed, perhaps based on the RA and RMP developed under the Cartagena Protocol of the CBD. Preventive measures must be taken at both the source and the destination of the invasion (McNeely, 2001).

Pallewatta et al. (2002) reported that problems of invasive alien species (IAS) are causing significant ecological, economic, and social damages and pose ongoing threats to all the countries within the region. In the Proceedings of a Workshop on Forging Cooperation throughout South and Southeast Asia, 14-16 August 2002, Bangkok, Thailand on “Prevention and Management of Invasive Alien Species” (IAS) in collaboration with the Government of the United States of America and the Global Invasive Species Programme (GISP), have concluded and recommend some action programme related to the prevention and management of IAS.

The Forest Department, Government of Manipur has got an achievement in protecting and replacing greenery of the forest area of the state thereby increased 328 Km², of forest according to a report published by the Forest Survey of India in 2009.

II. STUDY AREA

Manipur is situated at the Indo-Myanmar border region. The state is surrounded by Nagaland in north, Mizoram in south, Assam in the west, and Myanmar in the east. The geographical feature of Manipur with an area of 22,327 m² may be divided in three well defined regions (Fig.-1: a-b).



Fig. 1: a. Map of India. b. Physical Map of Manipur State.

A. The Manipur Valley Area

Valley area covers only 8% of the total area of the state with 70% of the population. It is oval shape elevated plain with an average altitude of 792.4 m.

B. The Jiribam Plain Area

The region covers about 277 m² which is 1 % of the total geographical area of the state. This plain area lies beyond the Manipur western hill tracts.

The valley is supposed to be formed by the deposition of stream that was blocked by some convulsion of the earth movement. According to geologists, the valley was formed as a result of a lake being filled by sediments carried by the river. It is regarded that the Loktak Lake is the remnant of the original lake that in the past occupied the present site of whale of the Central valley.

The valley has level flood plain at an elevation of about 760 m above the mean sea level, with an elevation ranging between 746 m and 1,583 m. The 900 m contours forms the outer limits of the valley which is one of the Himalayas mid lands like the Nale of Kashmir and the Kathmandu valley. And moreover the valley has a feature less plain in the absence of number of hills and mounds rising above the flat surface.

Like other states of the India, Manipur valley experiences winter season from December to February, summer season from March to April and rainy season from May to September, and season of retreating monsoon from October to November. Winter is marked by cold night and warm and windy days. Besides, the passing of the western depressions causes a little rain of about 3-4 days. The coldest period is in the month of January. The hot weather season starts with gradual increase in temperature with occasional thundershowers. Jiribam is recorded to be the hottest region during the month of September .about one fifth of this season is the pleasant spring season the period of major festival and dances in Manipur

Manipur prevails, monsoon type of rainfall. The rainy season is associated with heavy rainfall, widespread cloudiness, high humidity, variable surface winds, dull, sultry and oppressive weather with occasional flood. Rain heralds the onset of agricultural activities, and rice is the largest agricultural product of the state.

Soil in the valley of Manipur are due to the age long deposition of various sediments which were carried down by the rivers and tributaries from the surrounding to the low lying areas of the valley. The soil so formed in the valley can be divided into

three types -Sandy loam, Clayed loam and Loamy. Soils found in Manipur as a whole are Peat, New alluvial , Old alluvial soil, Laterite and Ferruginous and ferruginous loamy soils. The alluvial soils are formed due to sedimentation of soil particles as well as a number of organic and inorganic materials carried down by the rivers and tributaries and deposited near the river beds. It covers an area of 1,600 m². The alluvial soil contains sand and clays in an appropriate amount but also percolate the excess water keeping soil moist.

The valley is well marked by the thick natural vegetation but the increasing exploitation to meet the needs of the ever increasing demand on the one hand and the lack of conservation conscious causes the degradation of the forest. The pine forest of the eastern hills and the ever green mixed forest of the western hills of the state are separated out by the flora of the valley. Hence, the valley has mixed vegetation with the varieties of forest trees ranges, evergreen to deciduous to types found scattered throughout the region.

Agriculture plays a vital role in the uplifting of the economy of Manipur .It is the largest sector as it provides foods for the people, feeds for animals, raw materials for industry etc. and also the employment opportunities to a large section of the wide population of the valley. About 60 % of the population live in the villages and their main work is to be engaged in the agricultural sector. As the cultivars and agricultural laborers together is around 70% of the population in the valley, they directly or indirectly depend on agriculture for their sustenance.

Major pattern of cropping in the valley is dominated by the cultivation of rice thereby mono-cultivation and double-cropping is also in practice along with the help of irrigation facilities. Maize, sugarcane, pulses, chili are also cultivated. Rabi and kharif oilseeds particularly mustard, sunflower and wheat is also grown in various parts on a limited scale.

III. METHODOLOGY

The survey work was carried out from 2011 to 2014 in the different selected sites of four districts of Manipur. These sites are: 1. Imphal East District and Jiribam, 2. Imphal West District, 3. Bishnupur District, 4. Thoubal District.

The numbers and other characters of the invasive and alien plant species were collected. The survey and data collection on the plants were carried out during all the seasons of the year. Field Books were maintained to record the following information: collection number, date of collection, local name, botanical name family, habit, habitat and impacts.

Mounted herbarium specimens were used for the purpose of identification. Critical morphological studies have been made for the collected plant specimens. The specimens have been studied by making dissection of a number of flowers both live and preserved. The authentic identification of the plants have been done with the help of the available floristic literature such as Flora of British India vol.1-7 (Hooker, 1872 – 1897); Flora of India, vol. 1 (Sharma et al. Edt. 1993); Flora of Assam, vol. 1-4, (Kanjilal et al., 1934 – 1940); Forest Flora of Meghalaya, vol. 1 & 2 (Haridasan & Rao ,1985 & 1987).

After going through the extensive review of literature on the global invasive species (Mooney and Drake, 1987; Heywood, 1989; Drake et al., 1989; Huxel, 1999; Jenkins, 1999; Lonsdale, 1999; Mooney, 1999; Elton, 2000; Mooney and Hobs, 2000; Almeilla and Freitas, 2001; Cowie, 2001; Mc Neely et al., 2001; Cox, 2004; Cracraft and Francesca, 1999; D' Antonio and Vitousek, 1992) of India and Manipur and spread history origin / nativity (except few) field observation a list of 82 plant species of invasive and aliens plant species were prepared.

The nativity / origin of the species is provided as describe by Mathew, 1969; Maheswari and Paul, 1975; Nayar, 1977; Sharma, 1984; Hajra and Das, 1982; Saxena, 1991; Pandey and Parmar, 1994; Reddy and Raju, 2002; Reddy and Reddy, 2004; Negi and Hajra, 2007.

Some of the Herbarium of the collected plants specimens were prepared and submitted to the Herbaria maintained by the Department of Ecology and Environmental Science for future references.

IV. RESULTS

Enumeration of species: The alien invasive flora of the valley district have been recorded and enumerated as follows.

A. Invasive Herb Species

Table 1:
Alien and Invasive flora of Valley district of Manipur

Scientific name and family	Local name / Vern. Name	Origin / Nativity
<i>Achyranthes aspera</i> L. (Amaranthaceae)	<i>Khujumpere</i>	South east Africa and/ or Africa
<i>Acmella calva</i> (DC.) R.K. Jansen (Asteraceae)	<i>Manjang</i>	America
<i>Ageratum conyzoides</i> L. (Asteraceae)	<i>Khongjai napi macha</i>	Tropical America
<i>A.haustonianum</i> Mill. (Asteraceae)	<i>Khongjai napi achouba</i>	Tropical America
<i>Alternanthera philoxeroides</i> (Mart.) Griseb. (Amaranthaceae)	<i>Kabo napi</i>	Tropical America

<i>Amaranthus spinosus</i> L. (Amaranthaceae)	Chengkruk tingkhang panbi	South and Central America
<i>Arisaema tortuosum</i> (Wall.) Schott. (Araceae)	Lincheisu	Himalayan Mountains
<i>Basella alba</i> L. (Basellaceae)	Urok sumbal	Tropical Asia and Africa
<i>Bidens pilosa</i> L. (Asteraceae)	Sampakpi	Tropical America
<i>Blumeopsis falcate</i> (D.Don) Merr. (Asteraceae)	Haochak	Southern China and the India Sub continent
<i>Canna indica</i> L. (Cannaceae)	Laphurit	Tropical America
<i>Chamaesyce hirta</i> (L.) Millsp. (Euphorbiaceae)	Pakhang leiton	Tropical America
<i>Commelina benghalensis</i> L. (Commelinaceae)	Wangden Khoibee	Southern Africa
<i>Crotolaria juncea</i> L. (Fabaceae)	U-hawaimatol	India
<i>Cymbopogon citratus</i> (DC.) Stapf (Poaceae)	Lemon grass	South Asia, Southeast Asia and Australia
<i>Cynodon dactylon</i> (L.) Pers.(Poaceae)	Tingthou	Europe
<i>Dicrocephala latifolia</i> DC. (Asteraceae)	Lalukok	Cape, India and the Himalayas
<i>Eclipta prostrata</i> L. (Asteraceae)	Uchi sumbal	Tropical America
<i>Eichhornia crassipes</i> (Mart.) Solms (Pontederiaceae)	Kabo napi	Amazon Basin
<i>Elshotzia blanda</i> Benth.	Lomba	Tropical America
<i>Eupatorium adenophora</i> (Spreng.) King & H. Rob. (Asteraceae)	Japan napi	Mexico
<i>Fagopyrum cymosum</i> (Trevir.) Meisn. (Polygonaceae)	Wakha yendem	China
<i>F. esculentum</i> Moench. (Polygonaceae)	Wakha yendem	North Western Europe
<i>Galinsoga parviflora</i> Cav. (Asteraceae)		Tropical America
<i>Gomphostemma velutinum</i> Benth. (Lamiaceae)	Tokuma	Southeast Asia, China and the Indian subcontinent
<i>Gynura cusimbua</i> S. Moore (Asteraceae)	Tera paibi	China
<i>Ipomoea carnea</i> Mart. Ex Choisy (Convolvulaceae)	Lamkhop chei	Tropical America
<i>Leucas plukenetti</i> (Roth) Spreng. (Lamiaceae)	Mayang lembum	India
	Yangen shumjit	Indo-China, China, Southeast Asia
<i>Mimosa pudica</i> L. (Mimosaceae)	Kangphal ekaithabi	Brazil
<i>Parthenium hysterophorus</i> L. (Asteraceae)	Congress grass	Tropical North America
<i>Polygonum barbatum</i> Comm. ex Meisn. (Polygonaceae)	Yelang	North Temperate regions

<i>P. hydropiper</i> L. (Polygonaceae)	Chawai sabi	Unknown
<i>Rumex maritimus</i> L. (Polygonaceae)	Torongkhongchak	Introduced
<i>R. nepalensis</i> Spreng. (Polygonaceae)	Torongkhongchak	Northern Hemisphere
<i>Scoparia dulcis</i> L. (Scrophulariaceae)	Yanglee-manbi	Tropical America
<i>Sida rhombifolia</i> L. (Malvaceae)	U-hal	America
<i>Stachytarpheta urticifolia</i> Sims (Verbenaceae)	Tharoi-phijup	Tropical America
<i>Stellaria media</i> (L.) Vill. (Caryophyllaceae)	Yerum keirum	Europe
<i>Verbena officinalis</i> L. (Verbenaceae)		Asia, England, Central and Southern Europe and North Africa
<i>Xanthium strumarium</i> L. (Asteraceae)	Sampakpi	Tropical America

B. Invasive Shrub

Scientific name	Family	Vernacular name	Origin /Nativity
<i>Acacia concinna</i> Phil.	Mimosaceae		Central & South India
<i>Alangium chinense</i> (Lour.) Harms	Alanginaceae		China
<i>Litsea monopetala</i> (Roxb.) Pers.	Lauraceae		Sikkim, Bangladesh, Burma and South west China
<i>Meizotropis buteiformis</i> Voigt.	Fabaceae		Kumaun Himalaya
<i>Artemisia nilagirica</i> (Clarke) Pamp	Asteraceae	Laibakngou	Mediterranean area of Francis and Croatia
<i>Arundo donax</i> L.	Poaceae	Yenthou	Asia
<i>Cassia didymobotrya</i> Fresen.	Fabaceae		Tropical Africa
<i>C. alata</i> L.	Fabaceae		West Indies
<i>C. fistula</i> L.	Fabaceae		West Indies
<i>C. hirsuta</i> L.	Fabaceae		Tropical America
<i>C. javanica</i> L.	Fabaceae		Indonesia
<i>C. occidentalis</i> L.	Fabaceae		Tropical South America
<i>Chromolaena odorata</i> (L.) King & Robinson	Asteraceae	Kambirei	Tropical America
<i>Cinnamomum zeylanicum</i> Blume	Lauraceae	Ushingsha	Sri Lanka
<i>Coix lacryma jobi</i> L.	Poaceae	Chaning	Tropical Asia
<i>Dendrocalamus giganteus</i> Munro	Poaceae	Marubob	Southern Myanmar and North-Western Thailand
<i>Diospyros cordifolia</i> Roxb.	Ebenaceae		Tropics
<i>Jatropha curcas</i> L.	Euphorbiaceae	Kege manbi	Mexico
<i>Lantana camara</i> L.	Verbenaceae	Nongban lei	Tropical America
<i>Leonurus sibiricus</i> L.	Lamiaceae		Central and Southwest Asia
<i>Litsea cubeba</i> Pers.	Lauraceae		China
<i>Glochidion coccineum</i> (Buch.-Ham.) Mull. Arg.	Euphorbiaceae	Ningthourembi	South-east Asia
<i>Mallotus philippinensis</i> Muell.	Euphorbiaceae	Ureirom laba	India
<i>Melastoma malabathricum</i> L.	Melastomaceae	Nura-khudong lei	Africa, India and Australia
<i>Mussaenda glabra</i> Vahl.	Rubiaceae	Hanurei	Tropical Africa, Asia and Malaysia
<i>Saccharum spontaneum</i> L.	Poaceae	Imom	Tropical West Asia
<i>Sambucus hookeri</i> Rehder	Caprifoliaceae	Yerum lei	Europe including Britain
<i>Schefflera arboricola</i> (Hayata) Merr.	Araliaceae		Taiwan (Asia)
<i>Solanum torvum</i> Sw.	Solanaceae		West Indies
<i>S. xanthocarpum</i> Schrad.	Solanaceae		India
<i>Thevetia neriiifolia</i> Juss.ex A.DC.	Apocynaceae	Utonglei	Tropical America
<i>Thysanolaena latifolia</i> (Roxb. Ex. Hornem.) Honda	Poaceae	Yangen sumjit	Indo-China
<i>Vangueria spinosa</i> Roxb.	Rubiaceae		South Africa
<i>Wendlandia paniculata</i> (Roxb.)DC.	Rubiaceae	Pheija-laba	Tropical Africa

<i>Xylosma longifolia</i> Clos	Salicaceae	Nongleishang	Unknown
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C. Invasive Trees

Scientific name & Family	Vern. name	Origin/ Native
<i>Albizia lebbek</i> (L.) Benth. (Fabaceae)	Khok	Indomalaya, New Guinea and Northern Australia
<i>A. odoratissima</i> (L.f.) Benth. (Fabaceae)	Khok	India
<i>procera</i> Benth. (Fabaceae)		South East Asia, Australia
<i>Alnus nepalensis</i> D. Don (Betulaceae)	Pareng	Nepal, Pakistan and Southwest China
<i>Artocarpus heterophyllus</i> Lam. (Moraceae)		Western Ghats of India
<i>Bombax ceiba</i> L. (Bombacaceae)	Tera	Brazil to Argentina
<i>Caryota urens</i> L. (Arecaceae)	Singkaap	Indian Sub-continent
<i>Cedrella toona</i> Rottler (Meliaceae)	Tairel	Tropical Asia and Tropical Australia
<i>C. serrata</i> Royle (Meliaceae)	Ching tairel	Southern Mexico South to Northern Argentina
<i>Dillenia pentaphylla</i> (Dilleniaceae)	Heikreng	South eastern Asia, Bangladesh and Sri Lanka
<i>Duabanga sonneratioides</i> Buch.-Ham. (Lythraceae)	Tal	Southeast India
<i>Emblica officinalis</i> Gaertn. (Euphorbiaceae)	Heikru	India
<i>Erythrina stricta</i> Roxb. (Fabaceae)	Kurao	Unknown
<i>Eucalyptus citriodora</i> Hook. (Myrtaceae)	Nasik	Temperate and Tropical Australia
<i>E. globulus</i> Labill. (Myrtaceae)	Nasik	Australia
<i>Eugenia praecox</i> Roxb. (Myrtaceae)	Shilleima	Assam (India), Asia
<i>Eurya japonica</i> Thunb. (Pentaphyllaceae)	U-yangan	Australia
<i>Ficus benghalensis</i> L. (Moraceae)	Khongnang bot	India and Pakistan
<i>F. cunea</i> Steud. (Moraceae)		India
<i>F. hispida</i> L.f. (Moraceae)	Asi- heibong	India
<i>F. glomerata</i> Roxb. (Moraceae)	Heibong	India
<i>F. palmata</i> Forsk. (Moraceae)		India
<i>Gmelina arborea</i> Roxb. (Verbenaceae)	Waang	India, Sri-Lanka and Myanmar
<i>Loranthus scurrula</i> L. (Loranthaceae)		China
<i>Macranga denticulata</i> Mull.- Arg. (Euphorbiaceae)		Bhutan-China
<i>Machilus odoratissima</i> Nees (Lauraceae)	Uningthou- manbi	Temperate, Sub-Tropical and Tropical Southeast Asia
<i>M. bombycina</i> King ex Hook.f. (Lauraceae)		Brahmaputra valley of Assam, India

<i>Parkia roxburghii</i> G.Don (Mimosaceae)	Yongchak	Asia
<i>Pinus khasya</i> Royle (Pinaceae)	Uchan	South-east Asia
<i>Quercus dealbata</i> Wall. (Fagaceae)		Southeast Australian states of New South Wales, Victoria and Tasmania
<i>Q. serrata</i> Thunb. (Fagaceae)		China, Korea and Japan
<i>Rhus chinensis</i> Mill. (Anacardiaceae)	Heimang	Japan
<i>Schima wallichii</i> Choisy (Theaceae)	U-soi	India
<i>Talauma hodgsonii</i> Hook. f. & Thomson (Magnoliaceae)	U-thum	Himalaya and South eastern Asia
<i>Terminalia myriocarpa</i> Van Heurk & Mull. Arg. (Combretaceae)	Tolhao	South-east Asia
<i>Zanthoxylum acanthopodium</i> DC. (Rutaceae)	Mukthruhi	Warm temperate and sub tropical areas worldwide
<i>Zanthoxylum rhesta</i> (Roxb.) DC. (Rutaceae)	Ngang	India

D. Invasive Vine

Scientific Name & Family	Vern. name	Origin / Native
<i>Bryonopsis laciniata</i> L. (Cucurbitaceae)	Kwak-thabi	South east India
<i>Cuscuta reflexa</i> Roxb. (Convolvulaceae)	Uri-hangamapal	Mediterranean
<i>Hiptage benghalensis</i> (L.) Kurz. (Malpighiaceae)		Eastern India and Southeastern Asia (i.e. Sri Lanka, Southern)
<i>Argyreia nervosa</i> (Burm.f.) Bojer (Convolvulaceae)	Pungdingbi-uri	India
<i>Entada phaseoloides</i> (L.) Merr. (Fabaceae)		Africa
<i>Mikania micrantha</i> Kunth (Asteraceae)	U-hingchabi	Tropical America
<i>Passiflora foetida</i> L. (Passifloraceae)	Lam- sitaphal	Southern USA, Mexico, Central America, the Caribbean
<i>Smilax lanceifolia</i> Roxb. (Liliaceae)	Kwa-manbi	China
<i>Thunbergia alata</i> Bojer ex Sims (Acanthaceae)		Tropical and Southern Africa
<i>T. grandiflora</i> Wall. (Acanthaceae)		North-eastern India

E. Invasive Pteridophytic Flora

Scientific name/Family	Vern. name	Origin/Native
<i>Pteris biaurita</i> L. (Pteridaceae)		Africa and Madagascar
<i>P. ensiformis</i> Burm. f. (Pteridaceae)		Tropical Africa and Tropical Asia
<i>P. vittata</i> L. (Pteridaceae)	Laichankhrang	China
<i>Salvinia cucullata</i> Roxb. ex Bory (Salviniaceae)		South-eastern Brazil

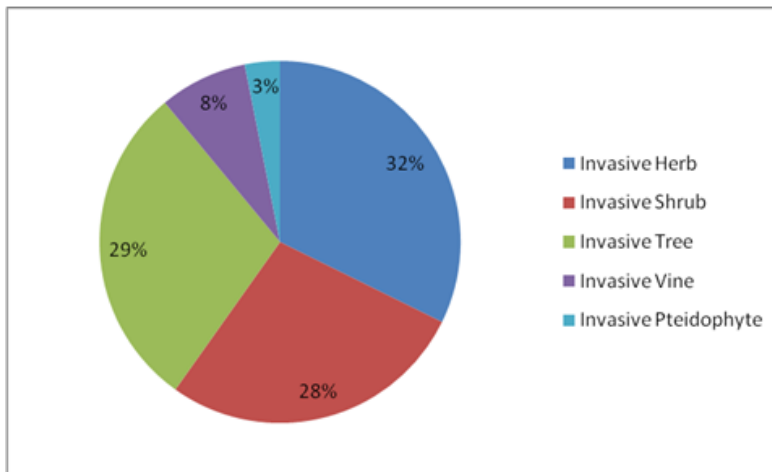


Fig. 1: Percentage showing distribution of Invasive habit distributed in the Valley district, Manipur.

F. Photo Gallery Plate-I



A. *Bidens pilosa* L.



B. *Ageratum conyzoides* L.



C. *Argyreia nervosa* (Burm.f.) Bojer



D. *Melastoma malbathricum* L.

V. DISCUSSION AND CONCLUSION

A total of 127 invasive plant species were recorded, out of the total species 41 species recorded are Invasive herb, 35 belonging to shrub, 37 species of Invasive tree, 10 species to Invasive vine and 4 species to Invasive Pteridophytes, respectively (Table-1: A-E)

In the present investigation the dominant habit of the invasive plants groups are recorded to be herbs and trees followed by invasive shrub, vines and pteridophytes (Fig.1).

The increasing number of aliens in the flora of Valley district, Manipur is a matter of serious concern. The alien species like *Ageratum conyzoides* L., *Chromolaena odorata* (L.) King & Robinson, *Lantana camara* L. (Nativity - Tropical America), *Parthenium hysterophorus* L. has become harmful to humankind and their invasion and propagation has caused ecological problem to native flora. *Ageratum conyzoides* L. (Originated from Tropical America), and *Chromolaena odorata* (L.) King & Robinson are exotic from South America and now naturalized in most parts of the Assam and Manipur, similarly *Parthenium hysterophorus* L., which is an exotic species from Tropical America, was first reported in 1956 from the Western part of Peninsular India and has now naturalized in most of parts of Manipur, and Assam. The weed is an aggressive colonizer of degraded areas with poor ground cover and exposed soil such as fallow wastelands, roadsides and overgrazed pastures. It is considered as a noxious weed because of its prolific seed production and fast spreading ability, allelopathic effect on other plants, strong competitiveness with crops and health hazards to humans as well as animals. The weed causes human allergic problems. The colonizing behavior of *Croton bonplandianum* Bail., *Galinsoga parvifolia* and *Argemone mexicana* L. (Nativity of Tropical Central and South America) have also created socio-ecological problems and health hazards. *Croton bonplandianum* Bail. was introduced in 1897 in East Pakistan (now Bangladesh) from South America through ship mud (Negi

and Hajra, 2007). It grows in Manipur, Bihar, Assam as common weed. *Chromolaena odorata* (L.) King & Robinson first arrived in Kerala and its fast propagation has made it a serious menace for native elements in Manipur, and Assam and also in the Southwest and Northeast, warm and humid regions. *Lantana camara* L. was introduced as an ornamental hedge plant in the Indian Botanical Garden, Calcutta in 1809 (Negi and Hajra, 2007). The plant is spreading very fast in Manipur, Meghalaya and Assam due to human activities such as cultivation, road construction and forest fragmentation and degradation and now available in forest site also. *Ageratum conyzoides* introduced from Tropical America, has spread at an alarming rate, especially in agricultural fields, along the roadsides and in kitchen gardens etc. The invasive potential of weed is attributed to its fast growth, production of its large number of small-sized wind and water-disseminated seeds and vegetative proliferation through stolon. It is harmful to native floristic composition and their allelopathic effects and some time creates allergic problems to human being.

In the present scenario of the forests of Central District *Eupatorium adenophorum* recorded maximum invasive records followed by *Ageratum haustonianum* Mill., *Mikania micrantha* Kunth., *Lantana camara* L., *Chromolaena odorata* (L.) King & Robinson, etc. However, *Mikania micrantha* Kunth., *Momordica dioica* Roxb. ex Willd., *Dioscorea bulbifera* L., *D. alata* L., *Thunbergia grandiflora* Wall. etc. are some of the vines showing green carpeting on the roofs of the forest flora is also remarkable.

It has also been observed that some of the alien species viz. *Eichhornia crassipes* (Mart.) Solms, *Alternanthera philoxeroides* (Mart.) Griseb. are fast invading the aquatic habitats of indigenous species and it creates serious threats to native plants. In addition to negative impact on the local flora and economy, few invasive plants i.e. *Borassus flabellifer* L. (introduced to India in ancient time) etc. were useful to indigenous people. Some alien weed plants viz. *Entada phaseoloides* (L.) Merr., *Mimosa pudica* L., *Ipomoea carnea* Mart. ex Choisy, *Eclipta prostrata* (L.) L., *Croton bonplandianum* Bail., *Cassia tora* L., *Alternanthera philoxeroides* (Mart.) Griseb.

Therefore, necessary steps should be taken up so as to keep the forest flora with a luxuriant growth and protected from the invasive plant species. It may be suggested that long term and high investment research / programs required for controlling of the invasive species to safeguard the native biodiversity.

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