



# Diversity, Uses and Origin of Invasive Alien Plants in Dhenkanal district of Odisha, India

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## Abstract

An exhaustive floristic survey was carried out during 2013-2014 in the Dhenkanal district of Odisha state to assess the diversity, nativity and uses of invasive alien plants. From the study it was found that 131 species with 97 genera and under 39 different families were invasive alien plants. Analysis of habit revealed that the herbs were dominant with 114 species (87.65%) followed by shrubs (12), trees (02) and climbers (03). And the dominant family was Asteraceae with 25 (19.23%) species followed by Amaranthaceae (08), Euphorbiaceae (08), Caesalpiniaceae (07), Convolvulaceae (07), Fabaceae (06), Mimosaceae (05), Poaceae (05), Solanaceae (05), Asclepiadaceae (04), Cleomaceae (04), Tiliaceae (04), Cyperaceae (03), Lamiaceae (03). These families included most invasive species, such as *Chromolaena odorata*, *Lantana camara*, *Hyptis suaveolens*, *Ageratum conyzoides*, *Parthenium hysterophorus*, *Eichhornia crassipes*, *Alternanthera philoxeroides*, and others. The dominance of Asteraceae species among all IAPS found in this region was resulted due to higher potential for adaptability and rapid growth. It was found from the literature that different native places of IAPS of Dhenkanal district were Tropical America (83), Tropical Africa (12), Tropical South America (9), Europe (4), Brazil (3), Tropical north America (3), West Indies (3), Mediterranean (3), Tropical Central South America (2), Tropical Central America (1), Tropical East Africa (1), Peru (1), Mascarene Islands (1), Mexico (1), Temperate South America (1), Madagascar (1), West Asia (1), Afghanistan (1) and Tropical West Asia (1). From the interaction with local people and literature survey it was found that IAPS were used as medicine (70), fuel (3), ornamental (6), rope making (2) and leafy vegetable (4).

**Keywords:** Dhenkanal, diversity, exotic, invasive alien plant species (IAPS).

## Introduction

Invasive alien plant species are the plants whose introduction or spread threatens the environment, the agricultural economy, human health and biodiversity of a region. Biological invasion by alien species is recognized as an important component of anthropogenic biodiversity change in global level, which has a significant impact on economy, species diversity, and change in the invaded ecosystem where it was naturalized<sup>1</sup>. The Introduction of IAPS can occur accidentally or by means of import for some purposes and they are able to escape from the captive field and large scale spread over a region is the result<sup>2</sup>. Most often introduction of exotic species into new habitats is taken place for certain economic reasons like to cater demand of paper industries and forage requirement<sup>3</sup> and in many cases it can be linked to the consequences of economic activities in a large scale as a result, in several countries about 20% of total plant species are now become non-indigenous. The mobile nature of our society, intentional trade and transport are helping the rapid spread of IAPS. In case of many islands, the exotic plant species are going to be more than 50% of total flora due to inflow of people from main land and aggressive development of tourism sector<sup>4</sup>.

Invasive alien plants are become a problem in every continent of the globe, causing a huge economic loss in agricultural sector,

decline of species diversity, acute respiratory illness and encroachment to every type of ecosystem. In the country like South Africa, 161 species of IAPS are causing serious problem in regional level<sup>5</sup> and the status of IAPS indicates the spread in large area with ability to dominate the vast landmass in just a few years. The situation in United States is also no better and about 125-150 billion US Dollar is lost in each year due to foreign pests and weeds<sup>6</sup>.

India is a biodiversity rich country with different climate, soil, topography and vegetation which encourages different alien plants to proliferate extensively. According to the inventory of invasive alien plant species, 173 species are identified as invasive alien<sup>7</sup> and regional documentation of IAPS in Dhenkanal district of Odisha has not been done so far, so the current study was conducted to find out the diversity, uses and origin of IAPS in the district.

## Material and Methods

**Study area:** Dhenkanal is one of the landlocked central district of Odisha with 4452 Sq. Km geographical area lying between Longitude 85° 58' to 86° 2' East and Latitude 20° 29' to 21° 11' North. It is surrounded by Keonjhar, Cuttack, Jajpur and Angul districts at north, south, east and west respectively. The second

largest river of Odisha, Brahmani is flowing through the district making it suitable for wide range of flora. This district experiences climate of hot and dry sub humid type with 1696 mm average annual rainfall. The temperature ranges from 19.6°C to 33.3°C with relative humidity ranging from 31 to 88%. Out of the total geographical area of 4452 Sq. km., forest area comprises 1737.62 Sq. Km.

**Methods:** The study was conducted during 2012-14 to compile a comprehensive list of invasive alien plant species and interaction with local inhabitants were made to collect information regarding the various uses of Invasive Alien plant Species (IAPS) by the local populace. Plant samples were collected and photographed from their natural habitat including agricultural field, water bodies, marshes, pathways and adjoining area of forest patches in the district and identified by referring "Flora of Orissa"<sup>8</sup> and other available literatures. Collected plant specimens were processed to prepare herbaria by following the standard procedure (BSI) and were deposited in the Herbarium of P.G. Department of Botany, Utkal University, Bhubaneswar, Odisha.

After an extensive review of literature, history, diversity, sources and behaviour of exotic invasive plant species were analyzed<sup>9-21</sup>, and the list of invasive alien plant species of Dhenkanal district was prepared. The nativity of species were represented based on the reports published by several workers<sup>22-31</sup>.

## Results and Discussion

The exhaustive floristic survey of Dhenkanal district revealed that a total of 131 species (table-1) belonging to 97 genera and under 39 different families were invasive alien plant species with 114 species (89.3%) (Table 3) were herb which followed by shrubs (12), trees (02) and climbers (02). Asteraceae was the dominant family with 25 (19.23%) species (Table 4) followed by Amaranthaceae (08), Euphorbiaceae (08), Caesalpiniaceae (07), Convolvulaceae (07), Fabaceae (06), Mimosaceae (05), Poaceae (05), Solanaceae (05), Asclepiadaceae (04). (Table 4). These top ten families contributed 80 species with a proportion of 77.67%. Most of the species were found growing in all kinds of ecosystems like forests, agricultural fields, waste and fallow lands, gardens and road-sides. Genera-wise quantitative analysis showed that *Cassia* with 7 species followed by *Ipomoea* (6 species), *Alternanthera* (4 species), *Cleome* (3 species), *Corchorus* (3 species), *Ludwigia* (3 species) and other genera contain less than three. The predominance of the family Asteraceae species in invasive categories shows the high impact on this region. The extensive survey on floristic composition of the region indicated that about half of total IAPS were growing luxuriantly and became threat to endemic flora and gradually their populations were occupying the habitats of endemic flora.

The history of IAPS in this region revealed that many species were introduced for economic purpose like timber, ornamental, and green coverage of barren land and some were migrated to this region by transport of food grains from other regions. Climatic conditions of the region became suitable for them and they showed rapid proliferation to spread all over the district. Most of the weeds, both aquatic and terrestrial, were reported in the locality for a very long period of time.

Among the 131 species, 27 species were identified as invaders with prolific growth in wetland, and some of these were *Aeschynomene americana*, *Alternanthera paronychioides*, *Alternanthera philoxeroides*, *Bidens pilosa*, *Casia alata*, *Cyperus difformis*, *Cyperus iria*, *Echinochloa colona*, *Echinochloa crusgalli*, *Eclipta prostrata*, *Eichhornia crassipes*, *Gnaphalium pensylvanicum*, *Gnaphalium polycaulon*, *Grangea maderaspatana*, *Ipomoea carnea*, *Ludwigia adscendes*, *Ludwigia octovlavis*, *Ludwigia perennis*, *Monocharia vaginalis*, *Pistia stratiotes*, *Portulaca quadrifida*, *Saccharum spontaneum*, *Salvania molesta*, *Sesbania bispinosa*, *Sonchus asper*, and *Typha angustata* (table-1). These species were located in all wetlands of the district and were in the complete state of naturalization. In forest ecosystem, *Chromolena odorata*, *Lantana camara* and *Hyptis suaveolens* were found in dominant stage whereas along road side *Parthenium hysterophorus* and *Sida acuta* were well established and in unused land, *Argemone mexicana*, *Cassia tora*, *Cleome viscosa*, *Chamaesyce hirta*, *Croton bonplandianum*, *Eclipta prostrata*, *Ipomoea carnea*, *Mimosa pudica*, *Tridax procumbens* were occupied most of the land cover.

Besides the negative impact of IAPS on endemic flora and agriculture, some of them were found to be useful to local people. *Prosopis juliflora*, *Borassus flabellifer* and *Leucaena leucocephala* were used as timber and several invasive alien herbs like *Argemone mexicana*, *Cassia tora*, *Cleome viscosa*, *Croton bonplandianum*, *Eclipta prostrata*, *Mimosa pudica*, *Tridax procumbens*, etc. were used as medicine for different ailments. *Alternanthera philoxeroides* and *Portulaca oleracea* were used as leafy vegetables by local tribes, table-1. The people of the area were preferring some of the alien tree species for firewood requirement due to their first growth nature.

It was also found from literature that different native places of IAPS of Dhenkanal district (table-2) were Tropical America (83), Tropical Africa (12), Tropical South America (9), Europe (4), Brazil (3), Tropical north America (3), West Indies (3), Mediterranean (3), Tropical Central South America (2), Tropical Central America (1), Tropical East Africa (1), Peru (1), Mascarene Island (1), Mexico (1), Temperate South America (1), Madagascar (1), West Asia (1), Afghanistan (1) and Tropical West Asia (1)

Table-1

**List of invasive alien plant species found in Dhenkanal district of Odisha**

Sl. No.	Species	Family	Habit	Use	Nativity
1	<i>Acacia mearnsii</i> De Willd.	Mimosaceae	Tree	M, Fuel	Trop. South America
2	<i>Acanthospermum hispidum</i> DC.	Asteraceae	Herb	M	Brazil
3	<i>Aerva javanica</i> (Burm.f.) Juss.ex Schult.	Amaranthaceae	Herb	M	Trop. America
4	<i>Aeschynomene americana</i> L.	Fabaceae	Herb	Co	Trop. America
5	<i>Ageratum conyzoides</i> L.	Asteraceae	Herb	M	Trop. America
6	<i>Alternanthera paronychioides</i> St. Hil	Amaranthaceae	Herb	M	Trop. America
7	<i>Alternanthera philoxeroides</i> (Mart.) Griseb.	Amaranthaceae	Herb	V	Trop. America
8	<i>Alternanthera pungens</i> Kunth	Amaranthaceae	Herb	M, C	Trop. America
9	<i>Alternanthera tenella</i> Colla	Amaranthaceae	Herb	V	Trop. America
10	<i>Antigonon leptopus</i> Hook. and Arn.	Polygonaceae	Climber	M	Trop. America
11	<i>Argemone mexicana</i> L.	Papaveraceae	Herb	A, M	Trop. Central and South America
12	<i>Asclepias curassavica</i> L.	Asclepiadaceae	Herb	C	Trop. America
13	<i>Asphodelus tenuifolius</i> Cav.	Liliaceae	Herb	Nk	Trop. America
14	<i>Bidens pilosa</i> L.	Asteraceae	Herb	M	Trop. America
15	<i>Blainvillea acmella</i> (L.) Philipson	Asteraceae	Herb	C	Trop. America
16	<i>Blumea eriantha</i> DC.	Asteraceae	Herb	C	Trop. America
17	<i>Blumea lacera</i> (Burm.f.) DC.	Asteraceae	Herb	M	Trop. America
18	<i>Blumea obliqua</i> (L.) Druce	Asteraceae	Herb	C	Trop. America
19	<i>Borassus flabellifer</i> L.	Arecaceae	Tree	H, Fd	Trop. Africa
20	<i>Calotropis gigantea</i> R.Br.	Asclepiadaceae	Shrub	M	Trop. Africa
21	<i>Calotropis procera</i> (Ait.) R.Br.	Asclepiadaceae	Shrub	M	Trop. Africa
22	<i>Cardamine trichocarpa</i> Hochst. ex A.Rich.	Brassicaceae	Herb	Nk	Trop. America
23	<i>Cardiospermum halicacabum</i> L.	Sapindaceae	Climber	M	Trop. America
24	<i>Cassia absus</i> L.	Caesalpiniaceae	Herb	M	Trop. America
25	<i>Cassia alata</i> L.	Caesalpiniaceae	Shrub	M	West Indies
26	<i>Cassia hirsuta</i> L.	Caesalpiniaceae	Herb	M	Trop. America
27	<i>Cassia obtusifolia</i> L.	Caesalpiniaceae	Herb	M	Trop. America
28	<i>Cassia occidentalis</i> L.	Caesalpiniaceae	Herb	C	Trop. South America
29	<i>Cassia pumila</i> Lam.	Caesalpiniaceae	Herb	C	Trop. America
30	<i>Cassia tora</i> L.	Caesalpiniaceae	Herb	M, Fu	Trop. South America
31	<i>Catharanthus pusillus</i> (Murr.) G. Don	Apocynaceae	Herb	C	Trop. America
32	<i>Celosia argentea</i> L.	Amaranthaceae	Herb	C, M	Trop. Africa
33	<i>Chamaesyce hirta</i> (L.) Millsp.	Euphorbiaceae	Herb	M	Trop. America
34	<i>Chamaesyce indica</i> (Lam.) Croizat	Euphorbiaceae	Herb	M	Trop. South America
35	<i>Chloris barbata</i> Sw.	Poaceae	Herb	Fo	Trop. America
36	<i>Chromolaena odorata</i> (L.) King and Robins.	Asteraceae	Herb	Nk	Trop. America
37	<i>Chrozophora rotterli</i> (Geis.) Juss.	Euphorbiaceae	Herb	Nk	Trop. Africa
38	<i>Cleome gynandra</i> L.	Cleomaceae	Herb	M	Trop. America
39	<i>Cleome monophylla</i> L.	Cleomaceae	Herb	M	Trop. Africa
40	<i>Cleome rutidosperma</i> DC.	Cleomaceae	Herb	M	Trop. America
41	<i>Cleome viscosa</i> L.	Cleomaceae	Herb	M	Trop. America
42	<i>Conyza bipinnatifida</i> Wall.	Asteraceae	Herb	C	Trop. America
43	<i>Corchorus aestuans</i> L.	Tiliaceae	Herb	M	Trop. America
44	<i>Corchorus tridens</i> L.	Tiliaceae	Herb	V	Trop. Africa
45	<i>Corchorus trilocularis</i> L.	Tiliaceae	Herb	C	Trop. Africa
46	<i>Crassocephalum crepidioides</i> (Benth.) Moore	Asteraceae	Herb	C	Trop. America
47	<i>Crotalaria pallida</i> Ait.	Fabaceae	Herb	C	Trop. America
48	<i>Crotalaria retusa</i> L.	Fabaceae	Herb	C	Trop. America
49	<i>Croton bonplandianus</i> Boill.	Euphorbiaceae	Herb	C	Temperate South America
50	<i>Cryptostegia grandiflora</i> R.Br.	Asclepiadaceae	Herb	M	Madagascar
51	<i>Cuscuta chinensis</i> Lam.	Cuscutaceae	Herb	M	Mediterranean

Sl. No.	Species	Family	Habit	Use	Nativity
52	<i>Cuscuta reflexa</i> Roxb.	Cuscutaceae	Herb	M	Mediterranean
53	<i>Cyperus difformis</i> L.	Cyperaceae	Herb	C	Trop. America
54.	<i>Cyperus iria</i> L.	Cyperaceae	Herb	N	Trop. America
55	<i>Datura innoxia</i> Mill.	Solanaceae	Shrub	M	Trop. America
56	<i>Datura metel</i> L.	Solanaceae	Shrub	M	Trop. America
57	<i>Dicoma tomentosa</i> Cass.	Asteraceae	Herb	M	Trop. Africa
58	<i>Digera muricata</i> (L.) Mart.	Amaranthaceae	Herb	V	SW Asia
59	<i>Dinebra retroflexa</i> (Vahl) Panz.	Poaceae	Herb	Nk	Trop. America
60	<i>Echinochloa colona</i> (L.) Link	Poaceae	Herb	M	Trop. South America
61	<i>Echinochloa crusgalli</i> (L.) Beauv.	Poaceae	Herb	A	Trop. South America
62	<i>Echinops echinatus</i> Roxb.	Asteraceae	Herb	M	Afghanistan
63	<i>Eclipta prostrata</i> (L.) Mant.	Asteraceae	Herb	M	Trop. America
64	<i>Eichhornia crassipes</i> (Mart.) Solms-Loub.	Pontederiaceae	Herb	Co, WT	Trop. America
65	<i>Emilia sonchifolia</i> (L.) DC.	Asteraceae	Herb	C	Trop. America
66	<i>Euphorbia cyathophora</i> Murr.	Euphorbiaceae	Herb	O	Trop. America
67	<i>Euphorbia heterophylla</i> L.	Euphorbiaceae	Herb	M	Trop. America
68	<i>Evolvulus nummularius</i> (L.) L.	Convolvulaceae	Herb	C	Trop. America
69	<i>Flaveria trinervia</i> (Spreng.) C. Mohr.	Asteraceae	Herb	M	Trop. Central America
70	<i>Fuirena ciliaris</i> (L.) Roxb.	Cyperaceae	Herb	Nk	Trop. America
71	<i>Galinosoga parviflora</i> Cav.	Asteraceae	Herb	M	Trop. America
72	<i>Gnaphalium pensylvanicum</i> Willd.	Asteraceae	Herb	Nk	Trop. America
73	<i>Gnaphalium polycaulon</i> Pers.	Asteraceae	Herb	Nk	Trop. America
74	<i>Gomphrena serrata</i> L.	Amaranthaceae	Herb	Nk	Trop. America
75	<i>Grangea maderaspatana</i> (L.) Poir.	Asteraceae	Herb	M	Trop. South America
76	<i>Hyptis suaveolens</i> (L.) Poit.	Lamiaceae	Herb	Ch	Trop. America
77	<i>Impatiens balsamina</i> L.	Balsaminaceae	Herb	O	Trop. America
78.	<i>Indigofera linnae</i> Ali	Fabaceae	Herb	Nk	Trop. Africa
79	<i>Ipomoea carnea</i> Jacq.	Convolvulaceae	Shrub	M	Trop. America
80	<i>Ipomoea eriocarpa</i> R.Br.	Convolvulaceae	Herb	M	Trop. Africa
81	<i>Ipomoea hederifolia</i> L.	Convolvulaceae	Herb	C	Trop. America
82	<i>Ipomoea obscura</i> (L.) Ker-Gawl.	Convolvulaceae	Herb	Nk	Trop. America
83	<i>Ipomoea pes-tigridis</i> L.	Convolvulaceae	Herb	M	Trop. East Africa
84	<i>Ipomoea quamoclit</i> L.	Convolvulaceae	Herb	O	Trop. America
85	<i>Lantana camara</i> L.	Verbenaceae	Herb	Bsk, O	Trop. America
86	<i>Leonotis nepetiifolia</i> (L.) R.Br.	Lamiaceae	Herb	M	Trop. Africa
87	<i>Leucaena leucocephala</i> (Lam.) de Wit	Mimosaceae	Herb	Fo, wd	Trop. America
88	<i>Ludwigia adscendes</i> (L.) Hara	Onagraceae	Herb	M	Trop. America
89	<i>Ludwigia octovlavis</i> (Jacq.) Raven	Onagraceae	Herb	M	Trop. Africa
90	<i>Ludwigia perennis</i> L.	Onagraceae	Herb	M	Trop. Africa
91	<i>Malachra capitata</i> (L.) L.	Malvaceae	Herb	M	Trop. America
92	<i>Martynia annua</i> L.	Martyniaceae	Herb	M	Trop. America
93	<i>Mecardonia procumbens</i> (Mill.) Small	Scrophulariaceae	Herb	Nk	Trop. North America
94	<i>Melilotus alba</i> Desv.	Fabaceae	Herb	Nk	Europe
95	<i>Melochia corchorifolia</i> L.	Sterculiaceae	Herb	M	Tropical America
96	<i>Mikania micrantha</i> Kunth	Asteraceae	Climber	C	Trop. America
97	<i>Mimosa pigra</i> L.	Mimosaceae	Shrub	M	Trop. North America
98	<i>Mimosa pudica</i> L.	Mimosaceae	Herb	M	Brazil
99	<i>Mirabilis jalapa</i> L.	Nyctaginaceae	Herb	O	Peru
100	<i>Monochoria vaginalis</i> (Burm.f.) Presl.	Pontederiaceae	Herb	Nk	Trop. America
101	<i>Nicotiana plumbaginifolia</i> Viv.	Solanaceae	Herb	Nk	Trop. America
102	<i>Ocimum canum</i> Sims	Lamiaceae	Herb	M	Trop. America
103	<i>Opuntia stricta</i> (Haw.) Haw.	Cactaceae	Herb	Nk	Trop. America
104	<i>Oxalis corniculata</i> L.	Oxalidaceae	Herb	M	Europe

Sl. No.	Species	Family	Habit	Use	Nativity
105	<i>Parthenium hysterophorus</i> L.	Asteraceae	Herb	A	Trop. North America
106	<i>Passiflora foetida</i> L.	Passifloraceae	Herb	O, M	Trop. South America
107	<i>Pedaliium murex</i> L.	Pedaliaceae	Herb	M	Trop. America
108	<i>Peperomia pellucida</i> (L.) Kunth	Piperaceae	Herb	Nk	Trop. South America
109	<i>Phyllanthus tenellus</i> Roxb.	Euphorbiaceae	Herb	Nk	Mascarene Islands
110	<i>Pistia stratiotes</i> L.	Araceae	Herb	M	Trop. America
111	<i>Portulaca oleracea</i> L.	Portulacaceae	Herb	M,V	Trop. South America
112	<i>Portulaca quadrifida</i> L.	Portulacaceae	Herb	M	Trop. America
113	<i>Prosopis juliflora</i> (Sw.) DC.	Mimosaceae	Shrub	Wd	Mexico
114	<i>Saccharum spontaneum</i> L.	Poaceae	Herb	Rope Making	Trop. West Asia
115	<i>Salvinia molesta</i> D. S. Mitch.	Salviniaceae	Herb	Nk	Brazil
116	<i>Scoparia dulcis</i> L.	Scrophulariaceae	Herb	M	Trop. America
117	<i>Sesbania bispinosa</i> (Jacq.) Wight	Fabaceae	Shrub	Rope Making	Trop. America
118	<i>Sida acuta</i> Burm.f.	Malvaceae	Herb	M	Trop. America
119	<i>Solanum torvum</i> Sw.	Solanaceae	Shrub	M	West Indies
120	<i>Solanum viarum</i> Dunal	Solanaceae	Herb	C	Trop. America
121	<i>Sonchus asper</i> Hill	Asteraceae	Herb	M	Mediterranean
122	<i>Spermacoe hispida</i> L.	Rubiaceae	Herb	Nk	Trop. America
123	<i>Stachytarpheta jamaicensis</i> (L.) Vahl	Verbenaceae	Herb	M	Trop. America
124	<i>Synadenium grantii</i> Hook. f.	Euphorbiaceae	Shrub	M	Trop. America
125	<i>Synedrella nodiflora</i> (L.) Gaertn.	Asteraceae	Herb	M	West Indies
126	<i>Tribulus terrestris</i> L.	Zygophyllaceae	Herb	M	Trop. America
127	<i>Tridax procumbens</i> L.	Asteraceae	Herb	M	Trop. Central America
128	<i>Triumfetta rhomboidea</i> Jacq.	Tiliaceae	Herb	Ht	Trop. America
129	<i>Typha angustata</i> Bory. and Choub.	Typhaceae	Herb	M	Trop. America
130	<i>Urena lobata</i> L.	Malvaceae	Shrub	M	Trop. Africa
131	<i>Xanthium indicum</i> L.	Asteraceae	Herb	M, Fu	Trop. America

Abbreviations : A- Adulteration in food grains, Fu- Fuel, Bsk- Basket and mat making , C- Biologically active Compound, Co- Compost, Fo- Fodder, Ht- Hut making, Hf- Hand held Fan, M-Medicine, Nk- Not known, O-Ornamental, V-Vegetable, WT- Waste Water Treatment, Wd- Wood

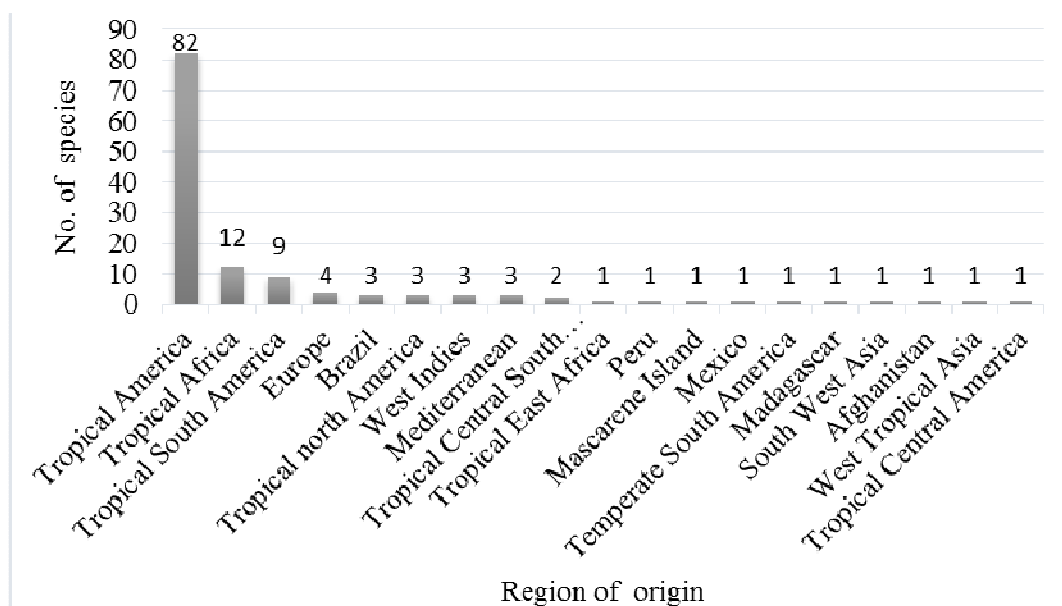
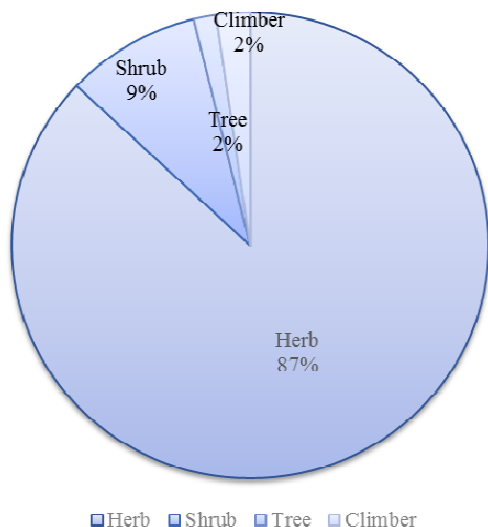
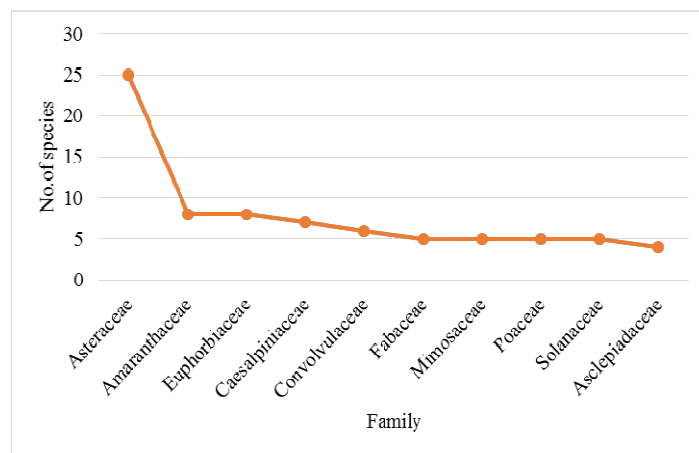


Figure-1  
Nativity of invasive alien plant species in Dhenkanal district of Odisha



**Figure-2**

**Habit of invasive alien plant species in Dhenkanal district of Odisha**



**Figure-3**

**Family wise distribution of 10 top families of invasive alien plants of Dhenkanal district of Odisha**

## Conclusion

Invasive alien plant species diversity in Dhenkanal district of Odisha is one of the major threat for endemic flora due to their aggressive colonizing ability and adaptability. Their populations are increasing rapidly and started encroaching crop fields, which is a major concern for local people, as it directly affect the agricultural economy, Hence eradication of IAPS from this region is needed in an urgent basis. But the eradication procedure requires a huge financial provision which is not so easy for this region. So awareness among local people is only possible method to get rid of IAPS. Besides this, utilization of hidden medicinal potential can make IAPS beneficial to the people of the region. Moreover the effect of IAPS in economy, biodiversity and human health is yet to be assessed in a broad

spectrum in national and regional level. The current study can provide the status of IAPS in the region for further study and assessment.

**Table-2**

**Regions of Nativity of invasive alien plant species in Dhenkanal district of Odisha**

Sl. No.	Region of Nativity	No. of Species
1	Tropical America	82
2	Tropical Africa	12
3	Tropical South America	09
4	Europe	04
5	Brazil	03
6	Tropical north America	03
7	West Indies	03
8	Mediterranean	03
9	Tropical Central South America	02
10	Tropical East Africa	01
11	Peru	01
12	Mascarene Island	01
13	Mexico	01
14	Temperate South America	01
15	Madagascar	01
16	South West Asia	01
17	Afghanistan	01
18	West Tropical Asia	01
19	Tropical Central America	01

**Table-3**

**Habit of invasive alien plant species in Dhenkanal district of Odisha**

Sl. No.	Habit	No. of Species
1	Herb	114
2	Shrub	12
3	Tree	2
4	Climber	3

**Table-4**

**Family wise distribution of 10 top families of invasive alien plants of Dhenkanal district of Odisha**

Sl. No.	Family	No. Species
1	Asteraceae	25
2	Amaranthaceae	8
3	Euphorbiaceae	8
4	Caesalpinaceae	7
5	Convolvulaceae	6
6	Fabaceae	5
7	Mimosaceae	5
8	Poaceae	5
9	Solanaceae	5
10	Asclepiadaceae	4

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