



# Diversity and Ethnobotany of Alien Naturalised Flora of Coastal Karnataka

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**Abstract:** Coastal Karnataka comprises three coastal districts. The biodiversity is rich and unique in this region because western ghats pass through these coastal districts. These regions are under threat due to natural and anthropogenic factors. Biological invasion by alien species is one such threat that falls under both categories. Now the alien flora has become naturalized and has become part of native flora. Some plant species have become beneficial because of their medicinal value. However, the threat to biodiversity cannot be ignored due to invasive behavior by some species.

The present paper attempts to identify and document the diversity of alien and naturalized flora of coastal regions of Karnataka with ethnobotanical uses of some plant species. Altogether 74 species of flowering plants belonging to 29 families have been identified. The habit-wise analysis of the plants indicates the presence of 63 herbs, followed by 09 shrubs, 02climbers, and 02 trees. Asteraceae is the most dominant family with 13 species. The region accounts for 42% of the alien flora of the country. Of the 74 species of recorded plants, 21 are used for various medicinal and other uses by the indigenous communities and tribals in the study area.

**Keywords:** Coastal Karnataka, Invasive Alien flora, Diversity, Ethnobotany

## I. INTRODUCTION

Alien species are exotic or non-native organisms that inhabit outside their natural habitat. IUCN defined alien invasive species as the species which become established outside their natural habitat and threaten the native biodiversity. CBD has identified “biological invasion as the second-worst threat to biodiversity after habitat destruction” [1]. An estimate says that 40% of the species in Indian flora are alien [2]. The knowledge about their diversity, ecology, phenology, reproductive biology, physiology, and other aspects have been considered as essential elements for the conservation and management of local biodiversity on a sustainable basis.

The coastal belt of Karnataka is considered the most important region from both ecological and biodiversity points of view. The three coastal districts of the state harbor the Western Ghats one of the hotspots of the world. We believe that scientific knowledge of these habitats would help in the better management of sustainability and conservation. In this paper, we restrict ourselves to the study of the diversity of alien angiosperm plant species in the coastal belt of Karnataka along with the ethnomedicinal importance of some of these alien plant species.

## II. STUDY AREA AND METHODOLOGY

The Karnataka coast is commonly called Malabar, which extends 320 km in length and 8-25 km in width towards inland areas [Fig 1]. This region lies between the coordinates of 74.9 - east longitude and 13.55 - north latitude. It comprises three districts viz. Uttara Kannada, Udupi and Dakshina Kannada. A catalog of alien flora indicating the family, habitat, and nativity is prepared based on one year's random field observations. Species identification was done using floras [3], [4], [5]. Available printed literature and websites are intensively studied and compared. The regional contribution of alien flora to the country is calculated as per [6]. The ethnomedicinal significance was compiled as per [7]. Web sources were also searched for information on the origin and nativity of these invaders. Invasive alien species occurring in this region were compiled based on the literature survey, field observation, and discussion with local people.

## III. RESULTS AND DISCUSSIONS

According to World Conservation Monitoring Centre (WCMC), 1,604,000 species have been described at the global level [8]. India accounts for 8% of the global biodiversity existing in only 2.4% land area of the world, the number

of flowering plant species endemic to the present political boundaries of this country is 4900 out of a total of 15000, i.e. 33% [9]. According to a report, there are 5400 endemics in 17000 angiospermous species of India, which comes to 31.76 % [10]. Despite an existing India-wide inventory of alien plant species, an inventory documenting the occurrence of naturalized alien plant species in each of the Indian states (including union territories) was not available yet (Inderjit et al. 2018).

In the present study, altogether 74 species of flowering plants belonging to 29 families have been identified and presented [TABLE I]. The habit-wise analysis of the plants indicates the presence of 63 (85%) herbs, followed by 09 (12%) shrubs, 02 (2%) climbers, and 02 (1%) trees [Fig. 2]. Asteraceae is the most dominant family with 16 species. Family Solanaceae was represented by 5 species; 4 species each by Asclepiadaceae, Caesalpineaceae and Euphorbiaceae; 3 species each by Amaranthaceae, Convolvulaceae, Malvaceae and Mimosaceae. 2 species by Pontederiaceae, Lamiaceae, Onagraceae, Verbenaceae and Tiliaceae. The rest of the families are represented by one species each. The region accounts for 42% of the alien flora of the country. Of the 74 species of recorded plants, 21 are used for various tribal and nontribal communities in the study area [TABLE II].

### CONCLUSIONS

Endemism and invasions represent ecological phenomena at extremes of several contexts of evolutionary and ecological processes. Once established and naturalized, detection and prevention of these species become next to impossible. The phenomenon of invasion is a great challenge to biodiversity, endemics, ecosystems, and conservation. The present study documented the presence of 74 invasive alien flowering plants in the coastal region of Karnataka. The habit-wise analysis of the plants indicates the presence of 85% herbs, followed by 12% shrubs, (2%) climbers, and 1% trees. Asteraceae is the most dominant family with 21% of species. The region accounts for 42% of the alien flora of the country. Of the 74 species of recorded plants, 21 are used for various tribal and nontribal communities in the study area. In this background, the results gain importance as the coastal region is important from both ecological and biodiversity points of view. The three coastal districts of the state harbor the Western Ghats one of the hotspots of the world.

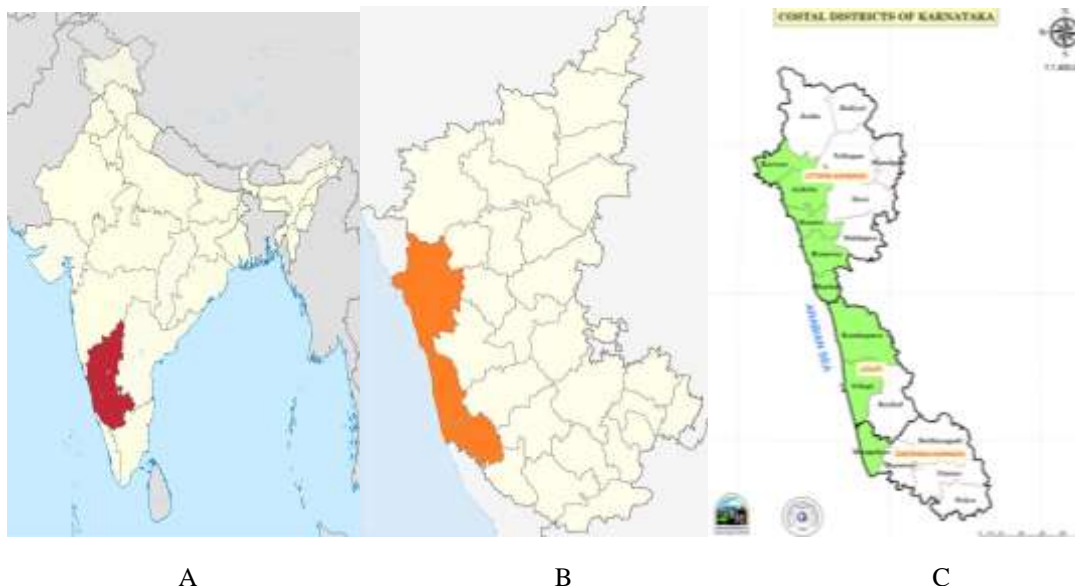


Fig. 1: Study Area: A. India map B. Karnataka C. Coastal Karnataka (with three districts viz. Uttara Kannada, Udupi and Dakshina Kannada)



TABLE I: INVASIVE ALIEN FLOWERING PLANTS OF COASTAL KARNATAKA

Sl. No.	Species	Family	Habit	Nativity	Flowering/ Fruiting Season
01	<i>Acanthospermum hispidum</i> DC.	Asteraceae	Herb	Trop. America	January-June
02	<i>Aerva javanica</i> (BURM.F.) JUSS. EX SCHULT.	Amaranthaceae	Herb	Trop. America	January and October.
03	<i>Ageratum conyzoides</i> L.	Asteraceae	Herb	Tropical America	October onwards
04	<i>Argemone mexicana</i> L.	Papaveraceae	Herb	Trop. Central & South America	December - February
05	<i>Asclepias curassavica</i> L.	Asclepiadaceae	Herb	Tropical America	June to October
06	<i>Bidens pilosa</i> L.	Asteraceae	Herb	Tropical America	September - November
07	<i>Blumea lacera</i> DC.	Asteraceae	Herb	Tropical America	December to March
08	<i>Cassia hirsuta</i> L.	Caesalpiniaceae	Herb	Tropical America	October to February
09	<i>Cassia occidentalis</i> L.	Caesalpiniaceae	Herb	Tropical South America	Throughout the year
10	<i>Cassia tora</i> L.	Caesalpiniaceae	Herb	Tropical South America	July - September
11	<i>Catharanthus pusillus</i> (MURR.) G. DON	Apocynaceae	Herb	Tropical America	July - January
12	<i>Celosia argentea</i> L.	Amaranthaceae	Herb	Tropical Africa	November - December
13	<i>Chrozophora rotleri</i> (GEIS.) A.JUSS. EX SPRENG.	Euphorbiaceae	Herb	Tropical Africa	February - August
14	<i>Cleome viscosa</i> L.	Cleomaceae	Herb	Tropical America	July - October
15	<i>Corchorus aestuans</i> L.	Tiliaceae	Herb	Tropical America	August - February
16	<i>Crotalaria retusa</i> L.	Fabaceae	Herb	Tropical America	Year-round
17	<i>Croton bonplandianum</i> BAILL.	Euphorbiaceae	Herb	Temperate South America	November - May
18	<i>Cryptostegia grandiflora</i> R.BR.	Asclepiadaceae	Herb	Madagascar	-
19	<i>Cuscuta reflexa</i> ROXB.	Convolvulaceae	Herb	Mediterranean	November - March
20	<i>Datura innoxia</i> MILL.	Solanaceae	Herb	Tropical America	July - September
21	<i>Dicoma tomentosa</i> CASS.	Asteraceae	Herb	Trop.Africa	August - April
22	<i>Digera muricata</i> (L.) MART.	Amaranthaceae	Herb	SW Asia	June - October
23	<i>Echinops echinatus</i> ROXB.	Asteraceae	Herb	Afghanistan	November - January
24	<i>Eclipta prostrata</i> (L.) L.	Asteraceae	Herb	Tropical America	August - December
25	<i>Eichhornia crassipes</i> SOLMS.	Pontederiaceae	Herb	Tropical America	November-February.
26	<i>Emilia sonchifolia</i> (L.) DC.	Asteraceae	Herb	Tropical America	July-December
27	<i>Euphorbia heterophylla</i> L.	Euphorbiaceae	Herb	Tropical America	throughout the year
28	<i>Evolvulus nummularius</i> L.	Convolvulaceae	Herb	Tropical America	throughout the year
29	<i>Grangea maderaspatana</i> POIR.	Asteraceae	Herb	Trop.South America	March-July.
30	<i>Impatiens balsamina</i> L.	Balsaminaceae	Herb	Tropical America	-
31	<i>Lagascea mollis</i> CAV.	Asteraceae	Herb	Trop.Central America	April-November.
32	<i>Leonotis nepetaefolia</i> R.BR.	Lamiaceae	Herb	Tropical Africa	October - November
33	<i>Ludwigia adscendens</i> (L.) HARA	Onagraceae	Herb	Tropical America	April - November
34	<i>Ludwigia perennis</i> L.	Onagraceae	Herb	Tropical Africa	throughout the year
35	<i>Malvastrum coromandelianum</i> GARCKE	Malvaceae	Herb	Tropical Africa	March - September
36	<i>Mimosa pudica</i> L.	Mimosaceae	Herb	Brazil	September-October
37	<i>Mirabilis jalapa</i> L.	Nyctaginaceae	Herb	Peru	August-November
38	<i>Monochoria vaginalis</i> PRESL.	Pontederiaceae	Herb	Tropical America	July-November.
39	<i>Ocimum americanum</i> L.	Lamiaceae	Herb	Tropical America	July - August
40	<i>Oxalis corniculata</i> L.	Oxalidaceae	Herb	Europe	Most of the year
41	<i>Parthenium hysterophorus</i> L.	Asteraceae	Herb	Trop. North America	May - July



42	<i>Passiflora foetida</i> L.	Passifloraceae	Herb	Trop.South America	September - October
43	<i>Pedaliium murex</i> L.	Pedaliaceae	Herb	Tropical America	November - December
44	<i>Peperomia pellucida</i> (L.) Kunth	Piperaceae	Herb	Tropical South America	September - December
45	<i>Phyllanthus tenellus</i> ROXB.	Euphorbiaceae	Herb	Mascarene Islands	June-December
46	<i>Pilea microphylla</i> (L.) LIEBM.	Urticaceae	Herb	Tropical South America	August-November
47	<i>Pistia stratiotes</i> L.	Araceae	Herb	Tropical America	April – December
48	<i>Portulaca oleracea</i> L.	Portulacaceae	Herb	Tropical South America	-
49	<i>Ruellia tuberosa</i> L.	Acanthaceae	Herb	Tropical America	-
50	<i>Scoparia dulcis</i> L.	Scrophulariaceae	Herb	Tropical America	June – September
51	<i>Sida acuta</i> BURM. F.	Malvaceae	Herb	Tropical America	August - September
52	<i>Solanum americanum</i> MILL.	Solanaceae	Herb	Tropical America	August- January
53	<i>Spilanthes radicans</i> JACQ.	Asteraceae	Herb	Tropical South America	October - March
54	<i>Stachytarpheta jamaicensis</i> (L.) VAHL	Verbenaceae	Herb	Tropical America	December - March
55	<i>Synedrella nodiflora</i> GAERTN.	Asteraceae	Herb	West Indies	December - April
56	<i>Tribulus terrestris</i> L.	Zygophyllaceae	Herb	Tropical America	January - April
57	<i>Tridax procumbens</i> L.	Asteraceae	Herb	Tropical Central America	Throughout the year
58	<i>Triumfetta rhomboidea</i> JACQ.	Tiliaceae	Herb	Tropical America	September - November
59	<i>Xanthium strumarium</i> L.	Asteraceae	Herb	Tropical America	Throughout the year
60	<i>Antigonon leptopus</i> Hook. & Arn.	Polygonaceae	Climber	Tropical America	-
61	<i>Solanum seaforthianum</i> ANDR.	Solanaceae	Climber	BRAZIL	Throughout the year
62	<i>Calotropis gigantea</i> (L.) R.BR.	Asclepiadaceae	Shrub	Tropical Africa	Throughout the year
63	<i>Calotropis procera</i> R.BR.	Asclepiadaceae	Shrub	Tropical Africa	do
64	<i>Cassia alata</i> L.	Caesalpinaceae	Shrub	West Indies	September - January
65	<i>Chromolaena odorata</i> (L.) R.M. KING & H. ROBINSON	Asteraceae	Shrub	Tropical America	-
66	<i>Ipomoea carnea</i> JACQ.	Convolvulaceae	Shrub	Tropical America	September- November
67	<i>Datura metel</i> L.	Solanaceae	Shrub	Tropical America	March - December
68	<i>Lantana camara</i> L.	Verbenaceae	Shrub	Tropical America	Throughout the year
69	<i>Opuntia stricta</i> HAW.	Cactaceae	Shrub	Tropical America	Throughout the year
70	<i>Solanum torvum</i> SWARTZ	Solanaceae	Shrub	West Indies	February - November
71	<i>Urena lobata</i> L.	Malvaceae	Shrub	Tropical Africa	Throughout the year
72	<i>Prosopis chilensis</i> (MOLINA) STUNTZE	Mimosaceae	Shrub	Mexico	-
73	<i>Acacia farnesiana</i> (L.) WILLD.	Mimosaceae	Tree	Tropical South America	July - December
74	<i>Borassus flabellifer</i> L.	Arecaceae	Tree	Tropical Africa	March - September

TABLE II: ETHNO-MEDICINAL SIGNIFICANCE OF INVASIVE ALIEN PLANT SPECIES OF COASTAL KARNATAKA

Sl. No.	Species	Ethnic/Tribal group	Uses
01	<i>Ageratum conyzoides</i> L.	Tribals/Non-tribals	Leaf paste - to arrest bleeding from cuts
02	<i>Asclepias curassavica</i> L.	Halakki Vokkaliga	Leaf juice - Anthelmintic
04	<i>Borassus flabellifer</i> L.	Non-tribals	Tender inflorescence paste - Skin diseases
05	<i>Calotropis gigantea</i> (L.) R.BR.	Tribals/Non-tribals	Root/Leaf paste – Skin diseases, Rheumatism
06	<i>Calotropis procera</i> R.BR.	Non-tribals	Root paste – Respiratory problems
07	<i>Cassia alata</i> L.	Tribals/Non-tribals	Leaf paste – Skin diseases, Snake-bite
08	<i>Cassia tora</i> L.	Non-tribals	Leaf juice - Dysentery
09	<i>Cuscuta reflexa</i> ROXB.	Non-tribals	Stem decoction - Scabies

10	<i>Datura metel</i> L.	Tribals/Non-tribals	Leaf paste – Skin diseases, Mumps, Rheumatism. Seed paste for Headache
11	<i>Eclipta prostrata</i> (L.) L.	Non-tribals	Leaf juice - Jaundice
12	<i>Lantana camara</i> L.	Non-tribals	Dried leaf powder – Wound healing, Leaf paste – stop bleeding from cuts
13	<i>Leonotis nepetaefolia</i> R.BR.	Tribals/Non-tribals	Leaf paste with coconut oil – Skin diseases
14	<i>Ludwigia adscendens</i> (L.) HARA	Non-tribals	Leaf paste/Root decoction – Rheumatism, Nerve tonic
15	<i>Mimosa pudica</i> L.	Tribals/Non-tribals	Juice of tender shoot tips with milk – Dysentery. Leaf paste with turmeric – Piles. Leaf paste – Cuts, wounds
16	<i>Ruellia tuberosa</i> L.	Non-tribals	Tuber paste – Skin diseases
17	<i>Sida acuta</i> BURM. F.	Non-tribals	Root decoction – Rheumatism, Nerve tonic
18	<i>Solanum torvum</i> SWARTZ	Male kudiya, Koraga	Leaf paste with salt – Anthelmintic. Root paste - Headache
19	<i>Tribulus terrestris</i> L.	Non-tribals	Seed powder with honey – Urinary stones
20	<i>Tridax procumbens</i> L.	Male kudiya	Roots - Headache
21	<i>Urena lobata</i> L.	Halakki Vokkaliga	Whole plant decoction – Body ache

Tribals: Koraga, Malekudiya (Dakshina Kannada & Udupi), Halakki Vokkaliga (Uttara Kannada). Non-tribals: Herbalists belonging to various non-tribal ethnic communities.

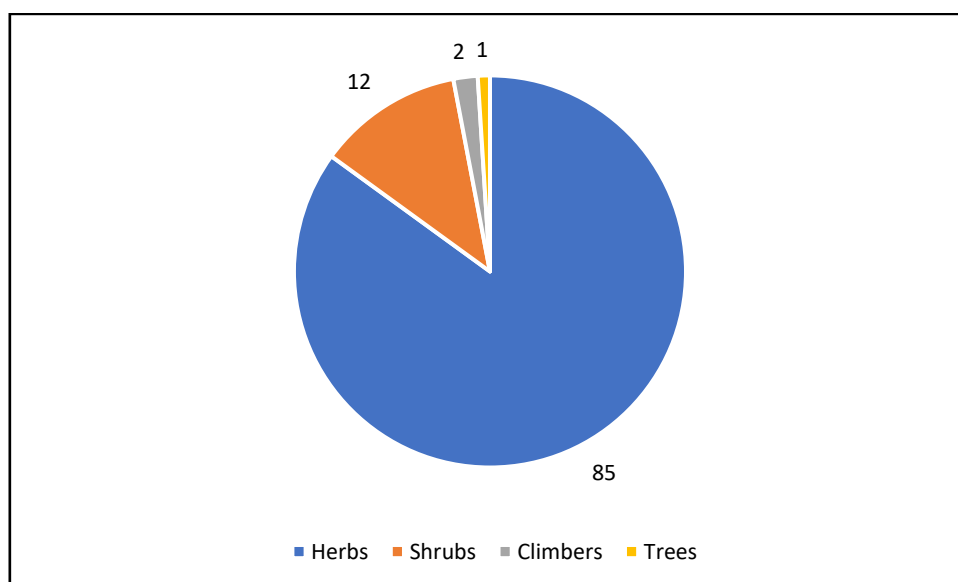


Fig. 2 Percent wise composition of Herbs, Shrubs, Climbers, and Trees

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