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## Distribution and beneficial uses of invasive alien angiosperms in the roadside areas of JP. Nagar, Uttar Pradesh

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### Abstract

A survey of invasive alien angiosperms of J. P. Nagar was made and we found a total richness of 24 species belonging to 14 families. Dicots represented 22 species and monocots 2 species. About 54.16% of these angiosperms were introduced from Tropical America and maximum number of angiosperms (6) were from the family Asteraceae. *Parthenium hysterophorus* L. shows highest frequency (69.23%) followed by *Ageratum conyzoides* (L.) L. (53.07%), *Alternanthera ficoidea* (L.) Sm. (42.30%), *Sida acuta* Burm.f. (39.16%) and *Euphorbia hirta* L. (36.15%). Many of the invasive alien species are of economic importance also, due to which some alien species, often cultivated (ornamental), may provide food, medicine, and fodder to the local communities.

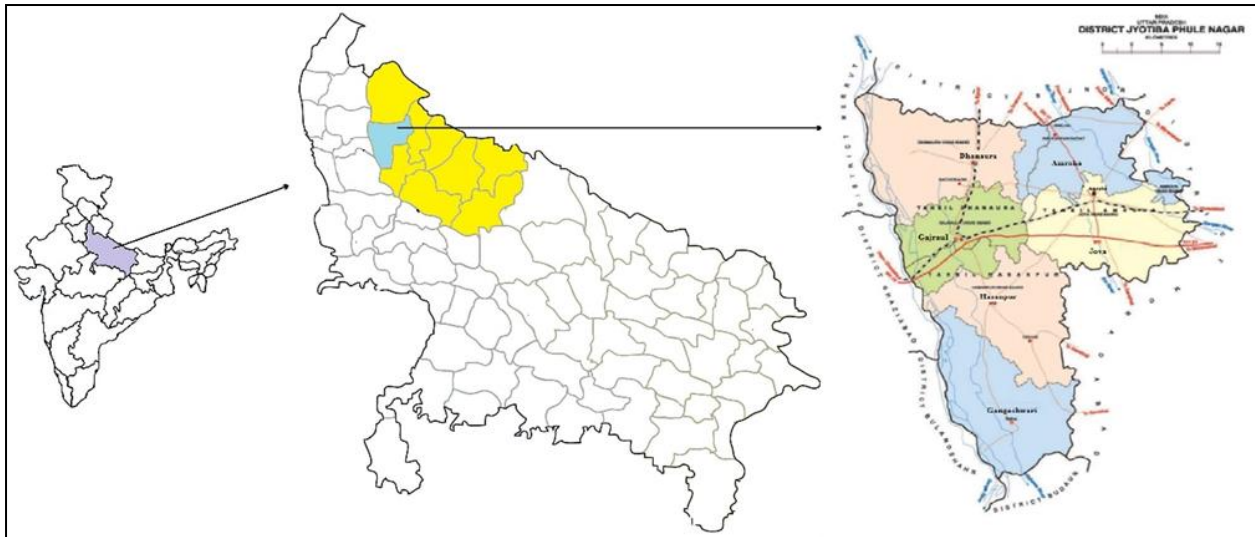
**Keywords:** Invasive alien angiosperms, nativity, frequency, beneficial uses, J. P. Nagar

### Introduction

Invasive alien species are species that are introduced as a consequence of human activities to new geographic areas, where they become established and then proliferate and spread. These alien invasive species not only compete for nutrients, moisture and light but for space too. Invasion is usually noticed once the plant has already naturalized. Invasive alien angiosperms have been studied in various parts of India during 20<sup>th</sup> century by various workers such as Kshirsagar and Patil (2002) <sup>[11]</sup>, Kshirsagar (2005) <sup>[10]</sup>, Raghubanshi *et al.*, (2005) <sup>[16]</sup>, Singh and Chowdhary (2005) <sup>[22]</sup>, Khuroo *et al.*, (2007) <sup>[8]</sup>, Sharma *et al.*, (2007) <sup>[20]</sup>, Raizada (2007) <sup>[17]</sup>, Reddy *et al.*, (2008) <sup>[19]</sup>, Khanna (2009) <sup>[7]</sup>, Sood *et al.* (2011) <sup>[23]</sup>, Chandrasekar (2012) <sup>[2]</sup>, Das and Duarah (2013) <sup>[4]</sup>, Udaykumar *et al.* (2014) <sup>[24]</sup>, Veerasamy & Rajendran (2014) <sup>[26]</sup>, Mishra *et al.* (2015) <sup>[13]</sup>, Deshmukh *et al.* (2015) <sup>[5]</sup>, Kumar and Bihari (2015) <sup>[12]</sup>, Wagh and Jain (2015) <sup>[27]</sup>, Rastogi *et al.* (2015) <sup>[18]</sup>, Beena Kumari *et al.* (2016) <sup>[1]</sup>.

J. P. Nagar (Amroha) is north-western district of Uttar Pradesh state in northern India, located north-west of Moradabad, near the Sot River. The district came into existence on 24<sup>th</sup> April 1997 in the memory of famous social reformer St. Mahatama Jyotiba Phule by combining 6 blocks namely Gangeshwari, Hasanpur, Amroha, Joya, Gajrola and Dhanora of 3 Tehsils Amroha, Dhanora & Hasanpur vide UP Gazette no. 1071/1 -5-97/224/sa-5 dated 15/4/1997 whose head office is placed in the ancient city Amroha (Fig. 1). The geographical area of district is about 2470 Sq. Km, extending from Latitude 28° 54' N to 39° 6' N and Longitude 78° 28' E to 78° 39' E. The maximum and minimum atmospheric temperatures are 43 °C and 4 °C respectively. The maximum and minimum atmospheric temperatures are 43 °C and 4 °C respectively. Invasive alien angiosperms of J. P. Nagar district have not been documented so far and there is no comprehensive program for monitoring the presence of alien species as this area has already invaded by a variety of alien plants. The present study aims to know about the status of invasive species in the road side areas in J. P. Nagar district (Fig. 1) along with their beneficial uses.

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**Fig 1:** Map of U.P. and J. P. Nagar

### Materials and Methods

The survey was conducted during 2018 covering two major roads of J. P. Nagar district namely Amroha-Hasanpur-Gangeshwari Road and Joya-Gajrola road (National Highway No. 24). A total of 400 quadrates (1x1 m) were randomly used to encountered plant species on both roadsides. The collected plant specimens were identified with the help of regional Flora and available literature (Duthie, 1903-1929; Reddy, 2008; Khanna, 2009; Beena *et al.*, 2016) [6, 7, 21] and preserved according to standard herbarium method in the Department of botany, Hindu college, Moradabad. Frequency of each Invasive species is determined and calculated according to Odum (1971) [14]. Additional habitats of invasive alien plants were also recorded through direct observations. Information about the traditional medicinal uses and other beneficial uses, of these invasive plant species were gathered by personal observation, field interviews and consulting with available literature (Perry, 1980; Chauhan, 1999) [3, 15]. The websites were also examined extensively for background information and nativity of the species.

### Results and Discussion

A total of 24 invasive alien plants of 14 families were recorded from the road side areas of the study site. The dominant family was Asteraceae (6 species) followed by Caesalpiniaceae (4) and Convolvulaceae and Amaranthaceae (2). Most species are originated from Tropical America. Herbs were reported 11, shrub 8, Undershrub 3, climber and aquatic represent 1 species (Table- 1 & Fig. 2). 19 species only reproduced by seed, 3 species by vegetative reproduction, and 2 species by both seed and vegetative. *Parthenium hysterophorus* L. shows highest frequency (69.23%) followed by *Ageratum conyzoides* (L.) L. (53.07%), *Alternanthera ficoidea* (L.) Sm. (42.30%), *Sida acuta* Burm.f. (39.16%) and *Euphorbia hirta* L. (36.15%). The contribution of Tropical America (54%) followed by South America (21%), Tropical South America (9%) is noteworthy (Table-1 & Fig. 3). From the interaction with local people it was found that invasive alien angiosperms were used as medicine, fodder, ornamental, vegetable and fibre (Table- 2).

**Table 1:** Invasive plant species in the Roadside areas of J.P. Nagar.

S. No.	Botanical Name	Family	Country of Origin	Life form	Propagation	Frequency (%)
1.	<i>Ageratum conyzoides</i> (L.) L.	Asteraceae	Trop. America	Herb	Seeds	53.07
2.	<i>Alternanthera ficoidea</i> (L.) Sm.	Amaranthaceae	Trop. America	Shrub	Seeds	42.30
3.	<i>Amaranthus spinosus</i> L.	Amaranthaceae	Trop. America	Herb	Seeds	30.12
4.	<i>Argemone Mexicana</i> L.	Papaveraceae	Central & South America	Shrub	Seeds	14.38
5.	<i>Datura innoxia</i> Mill.	Solanaceae	South America	Shrub	Seeds	23.07
6.	<i>Eclipta prostrata</i> (L.) L.	Asteraceae	Trop. America	Herb	Seeds	19.18
7.	<i>Eichornia crassipes</i> (Mart.) Solms	Pontederiaceae	South America	Aquatic	Vegetative	27.08
8.	<i>Euphorbia hirta</i> L.	Euphorbiaceae	Trop. America	Herb	Seeds	36.15
9.	<i>Ipomoea aquatica</i> Forssk.	Convolvulaceae	China	Shrub	Vegetative	22.32
10.	<i>Ipomoea carnea</i> Jacq.	Convolvulaceae	South America	Shrub	Vegetative	18.37
11.	<i>Lantana camara</i> L.	Verbenaceae	Tropical America	Shrub	Seeds, Vegetative	29.22
12.	<i>Mikania micrantha</i> Kunth.	Asteraceae	South America	Climber	Seeds, vegetative	28.45
13.	<i>Mimosa pudica</i> L.	Fabaceae	Central America	Herb	Seeds	25.75
14.	<i>Parthenium hysterophorus</i> L.	Asteraceae	South America	Herb	Seeds	69.23
15.	<i>Ruellia tuberosa</i> L.	Acanthaceae	Trop. America	Herb	Seeds	24.10
16.	<i>Senna alata</i> (L.) Roxb.	Caesalpiniaceae	West Indies	Shrub	Seeds	21.82
17.	<i>Senna obtusifolia</i> (L.) H.S.Irwin & Barneby	Caesalpiniaceae	Trop. America	Undershrub	Seeds	26.11
18.	<i>Senna occidentalis</i> (L.) Link	Caesalpiniaceae	Trop. South America	Shrub	Seeds	19.23
19.	<i>Senna tora</i> (L.) Roxb.	Caesalpiniaceae	Trop. South America	Undershrub	Seeds	23.07
20.	<i>Sida acuta</i> Burm.f.	Malvaceae	Trop. America	Herb	Seeds	39.16
21.	<i>Tribulus terrestris</i> L.	Zygophyllaceae	Trop. America	Herb	Seeds	15.24

22.	<i>Tridax procumbens</i> (L.) L.	Asteraceae	Trop. America	Herb	Seeds	07.69
23.	<i>Typha angustifolia</i> L.	Typhaceae	Trop. America	Herb	Seeds	08.12
24.	<i>Xanthium strumarium</i> L.	Asteraceae	Trop. America	Undershrub	Seeds	18.92

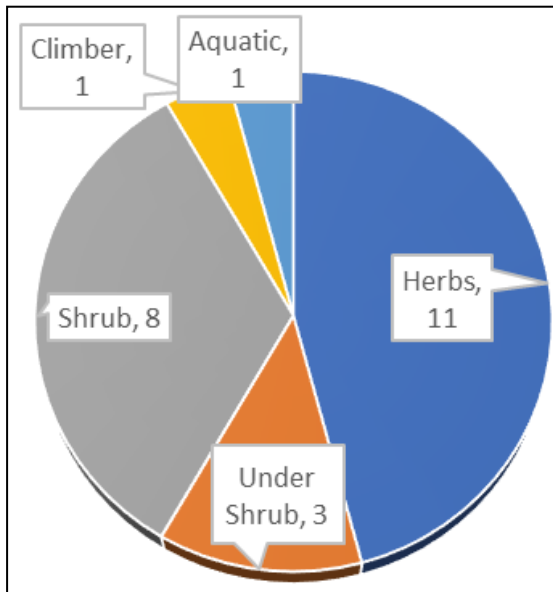


Fig 2: Lifeforms of IAS in J. P. Nagar

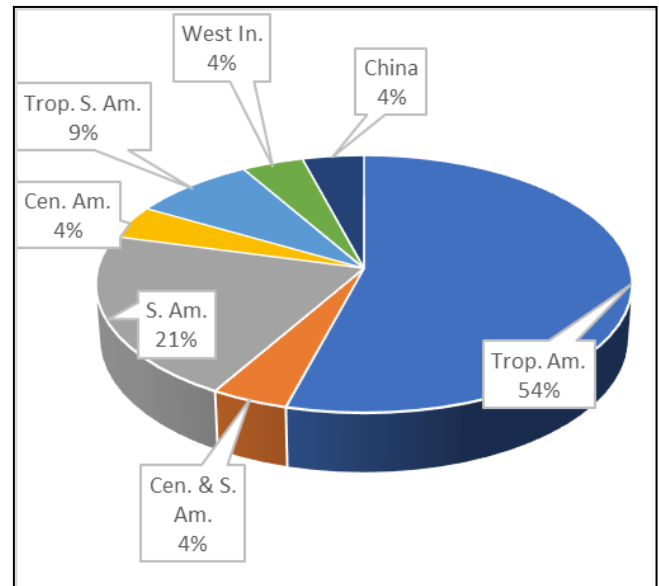


Fig 3: Various geographical regions of IAS

Table 2: Beneficial uses of Invasive species recorded in the study site

S. No.	Botanical Name	Traditional medicine Uses	Other Uses
1.	<i>Ageratum conyzoides</i> (L.) L.	Leave paste is applied on cuts and wounds to stop bleeding; Plant Juice is used in jaundice.	---
2.	<i>Alternanthera ficoidea</i> (L.) Sm.	Leaf is used as medicine in fever and in common weakness.	Whole plant is used as vegetables
3.	<i>Amaranthus spinosus</i> L.	Ash of fruits is used for Jaundice	Fodder
4.	<i>Argemone Mexicana</i> L.	Roots are used in piles. Roots are also used as anthelmintic.	---
5.	<i>Datura innoxia</i> Mill.	Leave paste are used directly on skin itch.	Used as Ornamental garden plants
6.	<i>Eclipta prostrata</i> (L.) L.	Leaf Juice is also used for jaundice. Fresh leaves are used in elephantiasis.	Whole plant is used as hair tonic for blackens hair and to prevent hair fall.
7.	<i>Eichhornia crassipes</i> (Mart.) Solms	Juice of this plant is used to treat fresh wounds injury and also used to ease swelling, burning.	The fibre from the stems can be used to make ropes, Dry plants are used as organic manure.
8.	<i>Euphorbia hirta</i> L.	Decoction of flower soothed eye infections and reduced conjunctivitis. Stem paste is applied on abscesses Plant is also used in asthma, bronchitis.	The milky juice is useful in destroying harmful snails and other aquatic pests
9.	<i>Ipomoea aquatica</i> Forssk.	Plant is used in ringworm infection and to treat asthma. Latex is used in skin diseases man and cattle.	Stem is used for making paper
10.	<i>Ipomoea carnea</i> Jacq.	Leaf extract is drunk in case of asthma. Leaves juice is used in jaundice, also used in urinary trouble.	Shoots are used as vegetable.
11.	<i>Lantana camara</i> L.	Leaves are used in snakebite. Leaves are boiled and use as an inhalant for respiratory problems. The decoctions of dried roots are used for gonorrhoea, cough, mumps, malaria and influenza.	Use as hedge plant, Live fencing. The stalks are used as raw material for paper pulp.
12.	<i>Mikania micrantha</i> Kunth.	Juice of the plant is useful in insect bite. Leaf extract is given to pigs, hens and dogs suffering from diarrhea	---
13.	<i>Mimosa pudica</i> L.	Leaf juice with milk is used as a good remedy for piles. Root decoction is used in toothache. Leaf decoction is used to treat stones in the urinary tract.	Ornamental
14.	<i>Parthenium hysterophorus</i> L.	Decoction of root is useful in Dysentery Leaf juice is applied externally on skin disorders	---
15.	<i>Ruellia tuberosa</i> L.	---	Ornamental
16.	<i>Senna alata</i> (L.) Roxb.	Leaf juice is applied directly on the infected areas of ringworm	Avenue tree
17.	<i>Senna obtusifolia</i> (L.) H.S. Irwin & Barneby	Leaf paste is applied externally on skin diseases.	---
18.	<i>Senna occidentalis</i> (L.) Link	Seeds and leaf paste are used in skin disease, Seed, stem etc are used as antidiabetic, Leaves, roots flowers are also used against hysteria.	---
19.	<i>Senna tora</i> (L.) Roxb.	Leaf paste is applied on ringworm, scabies and eczema. Leaves are also used in the treatment of body pain.	Tender shoot is used as vegetables.
20.	<i>Sida acuta</i> Burm.f.	Decoction of whole plant is useful in fever and indigestion	Bark provide fibres used for making

			ropes, canvas, stems are used for making house brooms.
21.	<i>Tribulus terrestris</i> L.	Seed powder reduced blood sugar and cholesterol	---
22.	<i>Tridax procumbens</i> (L.) L.	Leaf powder is used for diabetes, bronchitis and diarrhea	Leaves used as vegetables
23.	<i>Typha angustifolia</i> L.	Decoction of the stem is used for whooping cough.	Source of starch, Ornamental
24.	<i>Xanthium strumarium</i> L.	Root decoction is used for high fever	Source of tannin

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