



DIVERSITY, DISTRIBUTION AND USES OF INVASIVE ALIEN ANGIOSPERMS OF RAMPUR DISTRICT (U.P.), INDIA

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Abstract

Invasive alien angiosperms have become an environmental concern in India. A survey of invasive alien angiosperms of Rampur district was made. The data revealed that both aquatic and terrestrial invasive alien angiosperms are becoming threat to the native flora as they reproduce rapidly and crowding out native species. In the present paper 33 invasive alien angiosperms belonging to 23 families are recorded. The contribution of tropical America (70 %) including South America (15 %) is noteworthy. From the interaction with local people and literature survey it was found that invasive alien angiosperms were used as medicine (20), fodder (8), ornamental (8), vegetable (2) and fibre (1).

Keywords: Invasive alien angiosperms, Uses, Nativity, Rampur district.

I. INTRODUCTION

Alien species are non-native or exotic species which introduced either accidentally or deliberately by humans to fulfill their needs. After introduction, they can expand their population and create monospecific thickets. 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. As a result, the introduction of alien species has been recognized as one of the most serious threats to our ecological, social and economic well-being (Cox, 2004; Kohli *et al.*, 2004). About 25 % of the introduced species in India became invasive in a short period of time of 50-100 years (Dogra *et al.*, 2010). Invasive alien angiosperms have been studied in various parts of India during 20 century by various workers such as Prakash (2001); Kshirsagar and Patil (2002); Kshirsagar (2005), Raghubanshi *et al.*, (2005); Singh and Chowdhary (2005); Khuroo *et al.*, (2007); Sharma *et al.*, (2007); Negi and Hajra (2007); Murphy (2007); Srinivasan *et al.*, (2007); Raizada (2007); Raizada *et al.*, (2008); Reddy *et al.*, (2008), Khanna (2009), Singh *et al.*, (2010), Sujay *et al.* (2010), Sood *et al.* (2011), Sekar (2012), Chandrasekar (2012), Das and Duarah (2013), Udaykumar *et al.* (2014), Veerasamy & Rajendran (2014), Mishra *et al.* (2015), Deshmukh *et al.* (2015), Kumar and Bihari (2015), Wagh and Jain (2015), Rastogi *et al.* (2015).

District Rampur is located between Longitude 79°05' East and Latitude 28°48' North, spread in area of 2367 Sq. Km falls in Moradabad Division of Uttar Pradesh State. It was incorporated into the state of U.P. in 1949. It is home to farms that cover long stretches of land. The height from sea level is 192 Meter in north and 166.4 Meter in South. It is known for its various industries, including sugar refining and cotton milling. The district comprises of six tehsils: Rampur, Bilaspur, Milak, Shahabad, Swar and Tanda. It is surrounded by District Udham Singh Nagar in North, Bareilly in East, Moradabad in West and Badaun in South. Situated on the national highway 24, the state capital is 302 km in East and national capita is 185 km in West. During Summers the temperature is usually from 44.2 °C to 30 °C and during Winters it is from 23 °C to 5 °C. Vegetation is highly dependent on rainfall, which is, in most cases, seasonal and erratic. The average rainfall varies between 800 to 900 mm. The relative humidity is up to 90% in monsoon season and in drier part of the year it decreases to less than 20%. Invasive alien

angiosperms of Rampur district have not been studied so far and there is no comprehensive programme for monitoring the presence of non-native species. In view of this, the present study attempted to prepare a list of alien species of the area (Fig. 1).



“Fig. 1. Study area map (Rampur district)”

II. MATERIALS AND METHODS

Authors collected total 33 invasive alien angiosperms in the study area during April 2016 - March 2017. The specimens were identified using regional floras (Duthie, 1929) and preserved according to standard herbarium techniques in the Department of Botany, Hindu College, Moradabad. The nativity of the species is provided based on available literature (Negi & Hajra, 2007; Murphy 2007; Reddy *et al.*, 2008; Dogra *et al.*, 2010; Mishra *et al.*, 2015) and websites were also examined extensively for background information.

III. RESULTS AND DISCUSSION

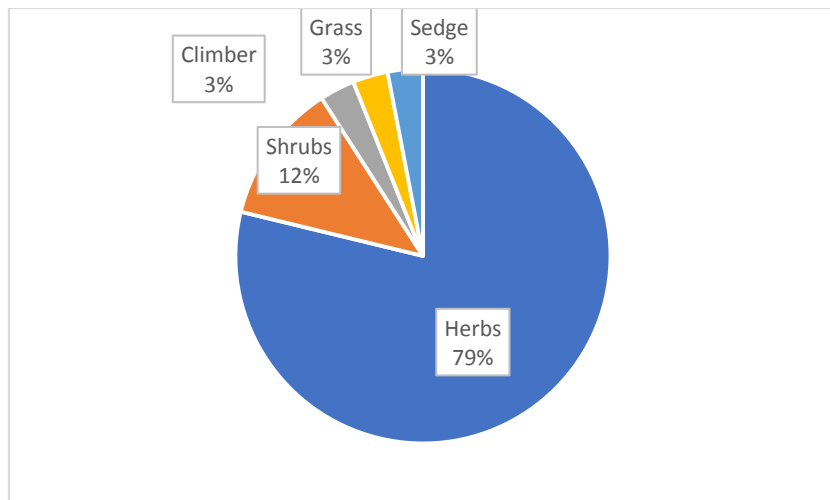
The present communication is an effort to list invasive alien angiosperms of Rampur district. Total 33 species belonging to 23 families are presented in Table-1. Habit-wise analysis shows that herbaceous species are dominant (26) followed by shrubs (4), grass (1) sedge (1) and climber (1) each (fig-2). Maximum number of these alien species belong to Family Asteraceae (7 species) followed by Amaranthaceae (3) Caesalpiniaceae and Solanaceae 2 species each. Literature and websites were consulted extensively for relevant information. About 70 % are distributed to Tropical America and South America (15 %), contributed maximum proportion to the invasive alien flora of Rampur. Contribution of different geographical regions in terms of nativity is shown in fig-3. From the interaction with local people and literature survey it was found that invasive alien angiosperms were used as medicine (20), fodder (8), ornamental (8), vegetable (2) and fibre (1).

“Table. 1. List of Invasive alien angiosperms in Rampur district.”

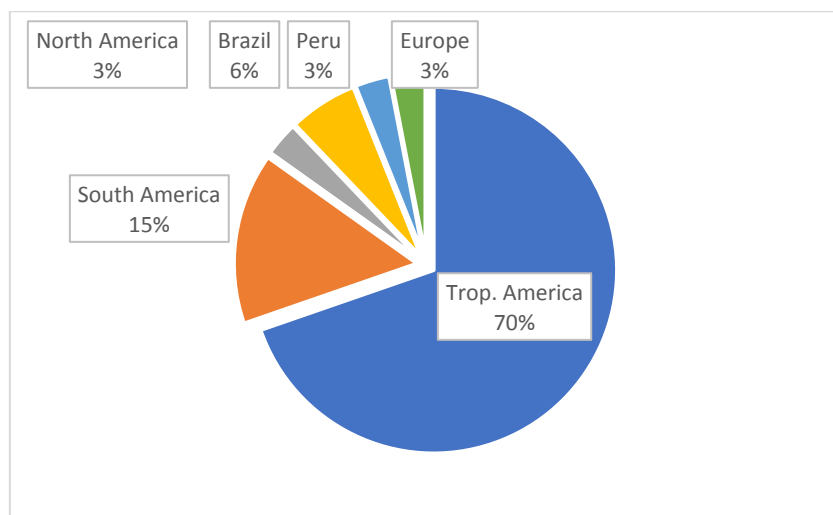
S. No.	Species/Family	Habit	Distribution	Life form	Uses	Nativity
1.	<i>Acanthospermum hispidum</i> DC. (Asteraceae)	Annual	Wastelands	Herb	Medicinal	Brazil
2.	<i>Ageratum conyzoides</i> L. (Asteraceae)	Annual	Wasteland	Herb	Medicinal	Trop America
3.	<i>Alternanthera sessilis</i> (L.) DC. (Amaranthaceae)	Perennial	River bed	Herb	Medicinal, Fodder	Trop. America
4.	<i>Amaranthus spinosus</i> L. (Amaranthaceae)	Annual	Roadside, cultivated	Herb	Medicinal, Fodder	Tropical America

			fields			
5.	<i>Antigonon leptopus</i> Hook. & Arn. (Polygonaceae)	Perennial	Roadside	Climber	Ornamental	Trop. America
6.	<i>Argemone mexicana</i> L. (Papaveraceae)	Annual	Wasteland	Herb	Medicinal	South America
7.	<i>Blumea eriantha</i> DC. (Asteraceae)	Perennial	Wasteland	Herb	Fodder	Tropical America
8.	<i>Calotropis procera</i> (Ait)R.Br. (Asclepiadaceae)	Perennial	Wasteland	Shrub	Medicinal	Trop. Africa
9.	<i>Cleome viscosa</i> L. (Cleomaceae)	Perennial	Wasteland	Herb	Medicinal	Trop. America
10.	<i>Chloris barbata</i> Sw. (Poaceae)	Annual	Cultivated fields, River bank	Grass	Fodder	Trop. America
11.	<i>Croton bonplandianum</i> Boil. (Euphorbiaceae)	Perennial	Wasteland	Herb	Fodder	South America
12.	<i>Cyperus difformis</i> L. (Cyperaceae)	Annual	Wet area, Cultivated fields	Sedge	Fodder	Tropical America
13.	<i>Datura metel</i> L. (Solanaceae)	Perennial	Wasteland	Shrub	Medicinal	Tropical America
14.	<i>Eclipta prostrata</i> (L.) Mant. (Asteraceae)	Annual	Wasteland	Herb	Medicinal, Ornamental	Trop. America
15.	<i>Eichhornia crassipes</i> (C.Martius) Solms-Loub. (Ponteriaceae)	Perennial	River bank	Herb	Ornamental	Trop. America
16.	<i>Gomphrena serrata</i> L. (Amaranthaceae)	Annual	Garden, Road side	Herb	Fodder	Trop. America
17.	<i>Ipomoea carnea</i> Jacq. (Convolvulaceae)	Perennial	Wasteland	Shrub	Medicinal	Trop. America
18.	<i>Lantana camara</i> L. (Verbenaceae)	Perennial	Forest patch, Roadside, Wasteland	Shrub	Medicinal, Ornamental	Trop. America
19.	<i>Mimosa pudica</i> L. (Mimosaceae)	Annual	Gardens, Wet areas	Herb	Medicinal, Ornamental	Brazil
20.	<i>Mirabilis jalapa</i> L. (Nyctaginaceae)	Perennial	Gardens, Wet areas	Herb	Ornamental	Peru
21.	<i>Oxalis corniculata</i> L. (Oxalidaceae)	Perennial	Cultivated field	Herb	Vegetable	Europe
22.	<i>Parthenium hysterophorus</i> L (Asteraceae)	Annual	Wasteland	Herb	Fodder	North America
23.	<i>Portulaca oleracea</i> L. (Portulacaceae)	Annual	Wet area	Herb	Medicinal, Vegetable	South America
24.	<i>Ruellia tuberosa</i> L. (Acanthaceae)	Perennial	Gardens, Wet areas	Herb	Ornamental	Trop. America
25.	<i>Sida acuta</i> Burm.f. (Malvaceae)	Annual	Wasteland	Herb	Medicinal, Fibre	Trop. America
26.	<i>Senna occidentalis</i> (L.) Link. (Caesalpiniaceae)	Perennial	Wasteland	Herb	Medicinal	South America
27.	<i>Senna tora</i> (L.) Roxb. (Caesalpiniaceae)	Annual	Wasteland	Herb	Medicinal	South America
28.	<i>Solanum nigrum</i> L. (Solanaceae)	Annual	Wet area, Cultivated fields, Wastelands	Herb	Medicinal	Tropical America
29.	<i>Tribulus terrestris</i> L. (Zygophyllaceae)	Perennial	Wastelands, Garden	Herb	Medicinal	Tropical America
30.	<i>Triumfetta rhomboidea</i> Jacq.	Annual	Wasteland	Herb	Medicinal	Tropical

	(Tiliaceae)					America
31.	<i>Typha angustifolia</i> L. (Typhaceae)	Perennial	River bank	Herb	Ornamental	Tropical America
32.	<i>Tridax procumbens</i> L. (Asteraceae)	Perennial	Cultivated Field, roadside	Herb	Medicinal	Trop. America
33.	<i>Xanthium strumarium</i> L. (Asteraceae)	Annual	Roadside	Herb	Medicinal	Trop. America



“Fig. 2. Habit wise distribution of invasive alien angiosperms in Rampur District”



“Fig. 3. Contribution of different geographical regions to the invasive alien angiosperms of Rampur District”

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