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Exotic plants utilized by the locals: a checklist

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ABSTRACT: Based on a combination of literature reviews and interviews with locals, this research synthesizes the ways in which an exotic plant is used by the inhabitants of the Sambalpur area in the Indian state of Odisha. Fifty different species of herbs were found in the research region, representing 43 different genera and 26 different families. Ten species came from the Asteraceae family (20%), six from the Amaranthaceae (12%), four from the Poaceae (8%), three from the Onagraceae (6%), two from the Capparaceae (4%), the Euphorbiaceae (4%), the Lamiaceae (4%), the Malvaceae (4%) and the Portulacaceae (4%) and one from the remaining 17 families. About 82% were annuals, while the rest were perinnials. Thirty-three (69%) of the 50 species are indigenous to the Tropics, while two (5% each) are from the Americas and Europe. This article also discusses the many ways in which locals have been known to put exotic herbs to use. To aid in the preservation of indigenous flora and fauna, this research gives a complete and up-to-date inventory of the plant species found in Sambalpur district.

KEY WORDS: Nativity, Invasive species, biodiversity, Sambalpur

I. INTRODUCTION

According to the International Union for the Conservation of Nature and Natural Resources (IUCN), an invasive species is any non-native organism that has successfully colonized a new ecosystem or habitat, posing a danger to the local biodiversity. Many invasive species exist today because they were unintentionally transported or introduced on purpose for trade, profit, or human well-being [3]. Exotic or alien species are those that have been intentionally introduced to a new ecosystem. After the foreign species have acclimated to their new habitat, they invade. They can thrive in a variety of climates and are very invasive in their natural habitats. environment. The cultivation of invasive alien plant species (IAPs) makes them much more of a threat to long-term sustainability [15]. This has led to the worldwide problem of biodiversity decline. These plant communities are the primary culprits in the decline of native species. Non-native ecosystems are shown to have varying impacts on the environment and economy.

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The economic advantages of exotic or alien plant species far outweigh any costs associated with them. During the ongoing alien invasion, local populations raise alien species for use as food, medicine, fuel, or fodder [22]. International commerce facilitates the spread of these alien invasive organisms. The widespread use of IAPs causes serious difficulties for human health, including respiratory illnesses like asthma [12]. The primary production, hydrology, geomorphology, and biogeochemical cycle are only some of the ecological activities that invasive plants disrupt [28]. These species do not help preserve native plant variety by competing with natives for scarce resources; rather, they change the rules of survival for all life on Earth [33]. These invasive species' litter decayed much more slowly than native plant community litter [23, 28]. The structure, composition, and function of natural ecosystems are all disturbed by plant invasions [8-10]. Invasive plants have a number of features, including a fast rate of reproduction and development, a capacity for rapid spread, the ability to adjust physiologically to new circumstances, and the resilience to thrive in a wide range of environments. Invasive alien plants (IAPs) are plants that may readily form relationships with humans and spread to other regions, altering the local ecosystem and soil composition as they do so. Crop seeds, garden plants, and wind breakers are all believed to be major vectors of IAP introduction to agricultural fields [16].

Collection of baseline data about their invasion status, growth form and life cycle are the first and most important step for effective and proper management of IAPs. Precisely distinguishing between native and alien species is necessary not only when developing conservation and vegetation management plans but also for improving our understanding of the different components of biodiversity [15]. Sambalpur district is one of the ten districts of western Odisha. This district is located in the Mahanadi river basin. It has a total area of 6702km^2 and 60% of the district is covered by dense forest. Sambalpur district is located at 21.466°N 83.983°E. It is bounded by Deogarh district to the east, Jharsuguda district to the west, Sundargarh district to the north and Subarnapur and Angul district in the south. The economy of this district is mainly depending on agriculture and forest.

II. MATERIALS AND METHOD

Extensive floristic surveys were conducted from January 2013 to April 2020 in the Sambalpur district, allowing for a comprehensive look at the environment at all times of year. One of western Odisha's 10 districts, Sambalpur is located in the city of the same name. The Mahanadi River flows through this area. The district is 6702 km2 in size and is mostly forested (60%). The coordinates 21.4666°N 83.9833°E pinpoint the Sambalpur district. Towards the east is Deogarh, to the west is Jharsuguda, to the north is Sundargarh, and to the south are Subarnapur and Angul. According to data from the 2011 census, the area has a total population of 1,041,099 people. The literacy rate of Sambalpur is 76.91%, and there are 973 females for every 1000 men. According to the 2011 Indian Census, the majority of the locals spoke Odia; 4.98 percent spoke Kisan; 3.98 percent spoke Hindi; 3.42 percent spoke Munda; and 1.49 percent spoke Kharia. The agricultural and forestry industries are vital to the economy of this area. The forest is vital to the economy of this area. Sambalpur Forest Division's protected woods are vital to the livelihoods of the people who live in the surrounding areas. There was an alphabetical list of medicinal plants that included their scientific names, families, common names, native regions, and common applications. Local flora books were used for species identification [14, 24], and established RESULTS were consulted when creating nativities.

Sambalpur, a district in Odisha, is home to 50 endemic and exotic plant species (43 genera) that belong to 26 families. Herbs were shown to have both annual and perennial growth patterns. The displayed animals' native cultures come from all across the globe. People in the region ate, burned, cooked, grew, decorated, medicated, poisoned, and otherwise made use of the plants listed in Table 1. Contributions from the 26 associated plant families range from 20% for Asteraceae to 8% for Poaceae and 6% for Onagraceae, with the other families contributing 4% each: Capparaceae, Euphorbiaceae, Lamiaceae, Malvaceae, and Portulacaceae. The remaining households all chip in 2% (Table 2). Eighty-two percent of the herb species are annuals, whereas the remaining eighteen percent are perennials (Figure 1). Fourteen separate nations may claim birthright to the 50 documented plants. Sixty-nine percent are indigenous to the tropical Americas, followed by five percent from the Americas and three percent from Europe. The remaining 2% comes from the rest of the species in those nations (Figure 2). Even though most plants are now far from their original habitat, they continue to perform vital roles in human existence. As a result, 38% of these species

are employed for medicinal purposes, while 36% are put to some other use. Feed, flowers, veggies, weeds, and poisonous plants all chip in 4%. Only 2% of species are utilized as soil binders, another 2% are used as soil thatchers, and the other 4% have unknown economic use (Figure 3).

III. DISCUSSION

In the current article, we reported finding fifty different kinds of exotic plants in the Sambalpur area of Odisha, belonging to twenty-six different families. Different researchers have distinguished between naturalized and harmful alien species [8, 28, 39]. There are several examples of exotic species that have turned toxic after being naturalized. Invasive species identified in the research included Ageratum conyzoides L., Argemone mexicana L., Blumea lacera (Burm.f.) DC., Cassia tora L., Hyptis suaveolens (L.) Poit., Parthenium hysterophorus L., Xanthium indicum L., and Xanthium strumarium L. In addition to Ageratum conyzoides L., Parthenium hysterophorus L. was also among the most pervasive and poisonous weeds. According to the taxonomical research, the Asteraceae family was the most pervasive invasive family, outcompeting all other species by a wide margin.

seed adaptability to climate change. The plant species have a high reproductive capacity, allowing for the rapid production of tiny seeds that are carried to new locations by the wind, air, and water. The literature review revealed that the Asteraceae family is much more invasive in other parts of India [4, 16, 25–29, 31]. Asteraceae were also shown to be the most common weed family by Mallick et al. (2019) [7]. Another poisonous member of this family that might spread black fever was Parthenium hysterophorus L. Its fast-growing, invasive seeds quickly spread to new areas and spread swiftly once there. Since annuals finish their life cycles and generate seeds to propagate in a short time of a year, they exhibited dominance among invasive species (82% vs. 18%). It is the capacity of herbs to thrive in adverse conditions and adapt to new environments that has contributed to their invasiveness.

IV. CONCLUSION

In this present paper we had reported about the use of 50 exotic herbs belong to 43 genera and 26 families from the Sambalpur district of Odisha. It is a first attempt to prepare a checklist of invasive herb species which will help to understand the presence, distribution and reproduction of herbs in Sambalpur district of Odisha. Present work will provide a better way to plan for early detection of invasion and establishment of routine monitoring of invasive plant by land managers, taxonomist, agriculturist, botanist and ecologist**.** One of the advantages of this work is that a few species have a great medical importance.

Table: 1. List of exotic herbs, their families, habit, nativity and uses.

Sl. no	Plant Species	Family	Habit	Nativity	Uses
1	Aerva lanata (L.) Juss. ex. Schult.	Amaranthaceae	P	Madagascar	M
2	Aeschynomene indica L.	Fabaceae	A	North America	Fu
3	Ageratum conyzoides L.	Asteraceae	A	Trop. America	Nox
4	Alternanthera sessilis (Linn) DC.	Amaranthaceae	P	Trop. America	V, M
5	Amaranthus spinosus L.	Amaranthaceae	A	Trop. America	V
6	Argemone mexicana L.	Papaveraceae	A	S. America (Seventeenth cent.)	M, Nox
7	Bidens pilosa L.	Asteraceae	A	Trop. America	M, Fo
8	Blumea lacera (Burm.f.) DC.	Asteraceae	A	Trop. America	Nox, M
9	Cardiospermum halicacabum L.	Sapindaceae	A	Trop. America	M
10	Cassia tora L.	Caesalpiniaceae	A	S. America (1824)	V, Nox, M
11	Celosia argentea L.	Amaranthaceae	A	Trop. America	V, M
12	Chenopodium album L.	Chenopodiaceae	A	Europe	V
13	Chloris barbata Sw.	Poaceae	P	Trop. America	Fo, Fu
14	Chromolaena odorata L.	Asteraceae	A	Trop. America	M
15	Cleome gynandra L.	Capparaceae	A	Trop. America	M
16	Cleome viscosa L.	Capparaceae	A	Trop. America	V, M
17	Cuscuta reflexa Roxb.	Cuscutaceae	A	Mediterranean	M
18	Cynodon dactylon (L.) Pers.	Poaceae	P	Trop. America	M
19	Echinochloa colona (L.) Link	Poaceae	A	Trop. America	Fo
20	Eclipta prostrata L.	Asteraceae	A	Trop. America (Bf1824)	M
21	Eichhornia crassipes (Mart.) Solm.	Pontederiaceae	P	Trop. America	St
22	Euphorbia heterophylla auct. Non L.	Euphorbiaceae	A	Trop. America	O
23	Euphorbia hirta L.	Euphorbiaceae	A	Trop. America	M
24	Evolvulus nummularius L.	Convolvulaceae	P	Trop. America	M
25	Gomphrena celosioides Mart.	Amaranthaceae	A	S. America	Fo
26	Gomphrena globosa L.	Amaranthaceae	A	America	O
27	Heliotropium indicum L.	Boraginaceae	A	S. America	M
28	Hyptis suaveolens (L.) Poit.	Lamiaceae	A	Trop. America	M, Nox
29	Ludwigia adscendens (L.) Hara	Onagraceae	A	Trop. America	Sb
30	Ludwigia octovalvis (Jacq.) Raven	Onagraceae	A	Trop. America	M, Sb
31	Ludwigia perennis L.	Onagraceae	A	Trop. America	M, Sb
32	Melochia corchorifolia L.	Sterculiaceae	A	Trop. America	NK

33	Mimosa pudica L.	Mimosaceae	P	Brazil	M
34	Ocimum canum Sims	Lamiaceae	A	Trop. America	M
35	Oxalis corniculata L.	Oxalidaceae	A	Europe	M
36	Parthenium hysterophorus L.	Asteraceae	A	Trop. America	Nox
37	Phyla nodiflora (L.) Greene	Verbenaceae	A	Trop. America	M
38	Pistia stratiotes L.	Araceae	P	Trop. America	M, St
39	Portulaca oleracea L.	Portulacaceae	A	Trop. S. America	M, V
40	Portulaca quadrifida L.	Portulacaceae	A	Trop. America	M, V
41	Ruellia tuberosa L.	Acanthaceae	A	Trop. America	NK
42	Scoparia dulcis L.	Scrophulariaceae	A	Trop. America	M
43	Sida acuta Burm.f.	Malvaceae	A	Trop. America	M
44	Solanum nigrum L.	Solanaceae	A	Trop. America	M
45	Tridax procumbens L.	Asteraceae	P	Mexico	M
46	Urena lobata L.	Malvaceae	A	Trop. Africa	Fib, Fu
47	Vernonia cinerea L.	Asteraceae	A	S. America	M
48	Xanthium indicum L.	Asteraceae	A	Trop. America	M, Nox
49	Xanthium strumarium L.	Asteraceae	A	Trop. America	M, Fu, Nox
50	Zea mays L.	Poaceae	A	America	F, Fu, Fo

Note: F, food; FT, fruit; O, ornamental; NK, not known; M, medicinal; Fu, fuel; V, vegetable; Sp, species; Nox, noxious; Sa, sacred plant; Sb, soil binder; Ch, chemical compounds; Ave, avenue; T, thatching; A, annual; P, perennial.

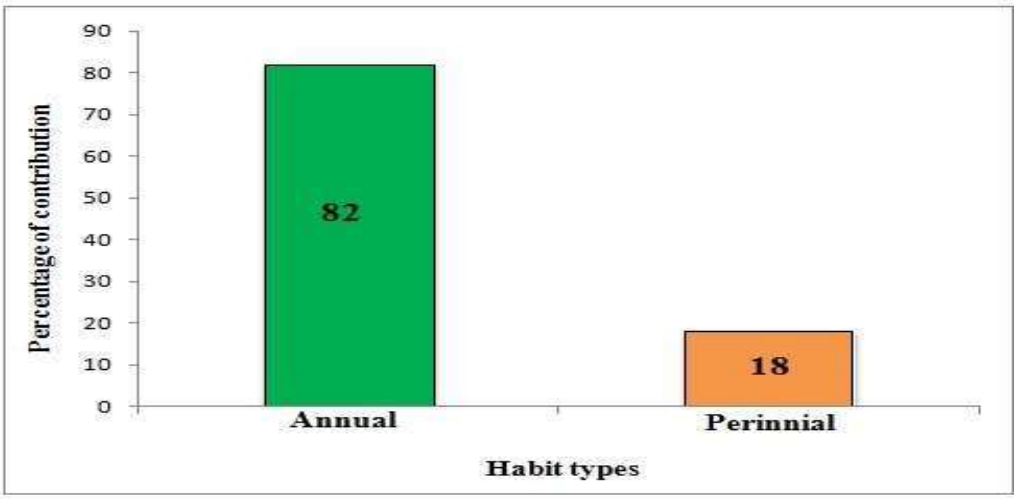

Figure 1: Percentage of contribution of annual and perennial exotic herbs

Table 2: Percentage of contribution of families among the recorded herbs

Sl.no	Family	Percentage of contribution
1	Acanthaceae	2
2	Amaranthaceae	12
3	Araceae	2

4	Asteraceae	20
5	Boraginaceae	2
6	Caesalpiniaceae	2
7	Capparaceae	4
8	Chenopodiaceae	2
9	Convolvulaceae	2
10	Cuscutaceae	2
11	Euphorbiaceae	4
12	Fabaceae	2
13	Lamiaceae	4
14	Malvaceae	4
15	Mimosaceae	2
16	Onagraceae	6
17	Oxalidaceae	2
18	Papaveraceae	2
19	Poaceae	8
20	Pontederiaceae	2
21	Portulacaceae	4
22	Sapindaceae	2

23	Scrophulariaceae	2
24	Solanaceae	2
25	Sterculiaceae	2
26	Verbenaceae	2

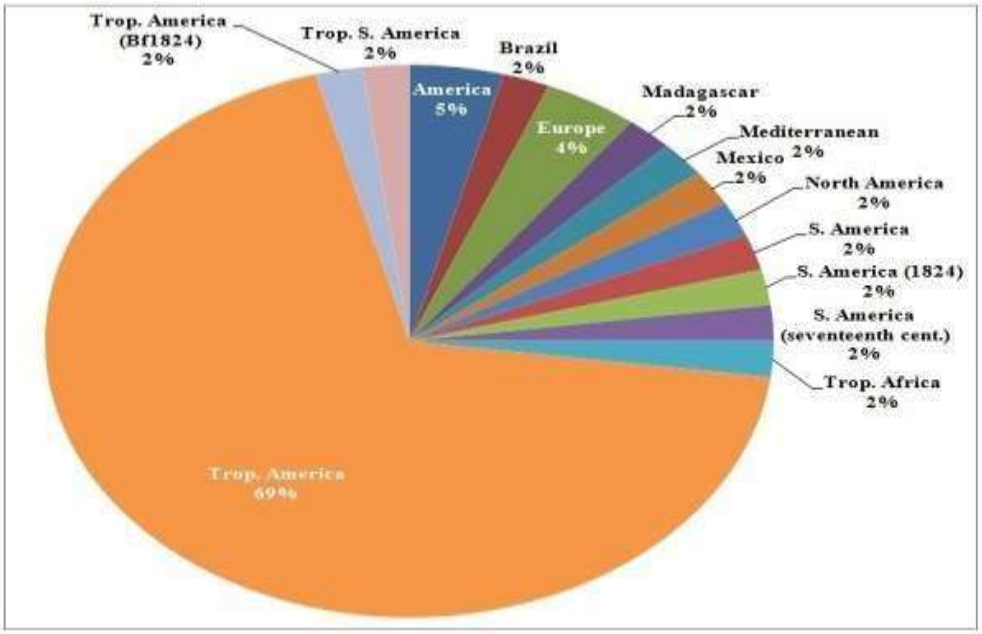

Figure 2: Percentage of contribution of countries from where the herbs have its origin

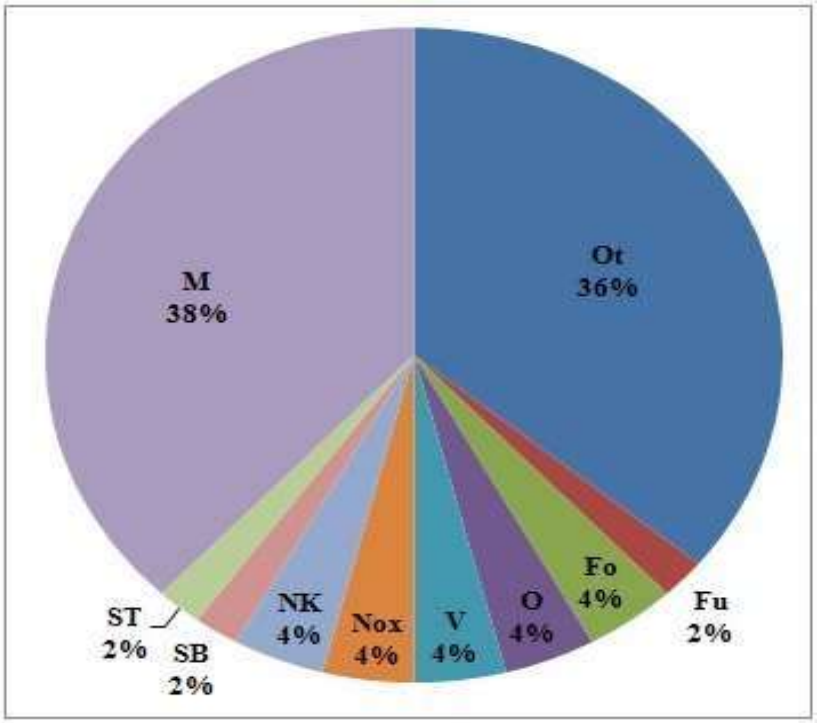

Figure 3: Percentage of contribution of exotic herbs for various uses

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