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INVENTORY ON EXOTIC PLANT SPECIES IN TEMPLES AND SACRED COURTYARDS IN KHANDESH REGION (MAHARASHTRA: INDIA)

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Abstract:

Sir, J.D. Hoker (2004) remarked that "India has no flora as a separate entity but it is an admixture of floras from adjacent countries". This prompted the present authors to pay attention especially to the exotic plants species invaded in Indian landmass. This inventory is extended hitherto untapped sacred places in Khandesh region of Maharashtra, India. It revealed a total of 119 exotic plant species pertaining to 100 genera and 52 angiospermic families. They are either cultigens (71 species) brought purposefully or wild (48 species) invaded unintentionally. They exhibited different habital categories *viz*., herbs (58 species) shrub (13 species) climbers (18 species) and trees (30 species). The herbaceous and arborescent exotic taxas are dominated in the said region of investigation. Their nativities belonged to 27 various continents, countries and geographical regions of both Old and New Worlds. However, the New World (American) exotic species dominated more in this region, although it is a distant continent. The fund of data will be useful while extending measures for biodiversity management and conservation in the state of Maharashtra.

Key Words: Exotic plants, Sacred Courtyards, Bioinvasion, Khandesh.

Introduction:

It is needless, nay obvious that alien plants species are an important component of global environmental changes since they interfere with ecosystems, compete with indigenous biodiversity (Patil 2021). Reasons for their invention are various, but broadly can be categorized as (i) intentional (ii) unintentional (due to negligence, transport, trade etc.). The process of urbanization, modernization and globalization has further accelerated the rate of invasion worldwide. At this juncture, it is imperative to know the state of affairs in this regard especially in developing countries like India (Patil 2021). The literary resume with particular emphasizes on a alien plant invasion indicated that the most sacred places, temples, etc are largely ignored while embarking upon biodiversity investigation. The present authors therefore attempted to document exotic floral elements hitherto neglected Khandesh region of the state of Maharashtra comprising three district *viz.*, Jalgaon, Dhule and Nandurbar. The results of this investigation are being presented in this communication.

Methodology:

Regular visits were paid to the temples and such other sacred courtyards in the district *viz.*, Jalgaon, Dhule and Nandurbar. This region is largely agrarian and also tribal peoples of different religions, caste and tribes inhabit which have their sentiments, festivals, worships, deities etc. These campuses studded with cultivated as well as wild plant species. They were identified using different state, regional and district floras (*cf.* Cooke, 1958; Naik, 1988; Patil, 2003; Kshirsagar and Patil, 2008; Bailey,1949). They are evaluated for their exotic status consulting relevant taxonomic literature as mentioned against each species in the Table-I Information regarding their status about wildness or cultivated is also provided. The result occurred during the study are discussed in the light of plant invasion (bioinvasion)

Result And Discussion:

Biodiversity is crucial for functioning of all ecosystems and also the mainstay of mankind. A large number of exotic species have invaded Indian subcontinent. There are intentional and unintentional introductions. Some of the wild exotic species have become invasive and causing various hazardous in nature. It is, therefore, very necessary to take stock of situation regarding plants invasion in our country. The present inventory is extended specially in sacred places which are generally bypassed in our biodiversity investigation or paid cursory attention to fill in this lacuna. The present authors extended a careful search for exotic plant taxa in Khandesh region of Maharashtra (India)

This inventory divulged a total of 119 exotic plant species pertaining 100 genera and 52 families of angiosperms. Of these, dicotyledonous taxa (106 species, 89 genera and 47 families) play a major role in invading in the sacred places of khandesh region (Maharashtra:India). However, the monocotyledonous have a minor role (13 species 11 genera and 5 families). They belongs to different habital categories *viz.*, herb (58), shrubs (13), climbers (18) and trees (30). The figures in parenthesis denote number of species. The herbaceous and arborescent species contributed more in bioinvasion in the said region. They are either cultivated (71 species) or run wild (48 species) in nature as an integral segment of biodiversity. The former cultivated ones are also useful in this region for various purposes as edible fruits, vegetable, shade trees and as ornamental ones.

Few exotic species, however; are found as wild or cultivated ex. *Clitoria ternatea* (cultivated as a garden plant) *Coccinia grandis* (cultivated as fruit vegetable) and *Lantana camera* (as ornamental or hedge plant). However some of the exotic species have became invasive eg.*Lantana camara, Tridax procumbens,* species of *Cassia, Celosia argentea, Eclipta prostrata, Xanthium indicum,* etc.(*cf.*Patil,2024 a,b.)

The above said plant taxa have invaded in this region from 27 different continents, countries and geographical regions. Their analysis nativity-wise revealed: parts of Africa (25 species), America (44 species),

Asia excluding India (11 species), Europe (10 species). Australia, however, is represented by a single species. The other countries or geographical regions contributed generally a solitary species. They are Java, Madagascar, Afro-Asia, Malaysia, Manmar, Mediterranean region, Persian gulf, Malaysian Archipelago. Baluchistan, Persia, Indonesia, Ethiopia, Mangolia, West Indies and Fertile crescent. However, some others have fair representation e.g. Brazil (4 species), China (5 species), Malaysia, Afghanistan, Mexico and Pantropical one 1 (2 species each). This resume indicated that the American species are more dominant as compared to other continents.

In a nutshell, this investigation shades lights on the exotic plant species either wild or cultigens covering sacred places. Their nativities are revealed indicating contacts of ancient Indians or reflects natural phenomenon like bioinvasion. This fund of data will be useful while implementing measures for biodiversity management and conservation especially when climate changes are putting long strides worldover.

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References :

1. Bailey, L.H. (1949) Manual Of Cultivator Plants. Macemillan, New York, USA
2. Cooke, T.(1958) The Flora Of The Presidency Of Bombay, Vol. 1-3, Bot. Surv. India, Culcutta, India.
3. Hooker, J.D. (1904) Sketch Of The Flora Of British India, M/S Bishen Singh Mahendra Pal Singh, Dehradun, India
4. Kshirsagar, S.R. And, D.A. Patil (2008) Flora Of Jalgaon District (Maharashtra), Bishen Singh Mahendra Pal Singh, Dehradun, India
5. Naik,V.N.(1988) Flora Of Marathawada, Vol 1-2, Amrut Prakashan, Aurangabad (M.S.) India.
6. Patil, D.A. (2021) Plant Invention In India, Lambert Academic Publishing Beau Bassin, Mauritius
7. Patil, D.A. (2024 a) Exotic Flora Of Maharashtra State (Diversity And Nativity) Agrobios Research, Jodhpur, India.
8. Patil, D.A. (2024 b) Invasive Alien Flora Of Maharashtra State (Diversity And Nativity), Agrobios Research, Jodhpur, India.

Table-I: Plants Exotic: Temple & Sacred Courtyards In Khandesh

Sr.No.	Botanical Name	Habit	Family	Nativity & Reference
1	*Abelmoschus esculentus* (L.) Moench.	H	Malvaceae	Tropical Africa: Purseglove, 1968.
2	**Achyranthes aspera* L.	H	Amarantaceae	Africa: Singh *et al*., 2015.
3	*Adansonia digitata* L.	T	Bombacaceae	Tropical Africa: Patil, 1995.
4	*Albizia lebbeck* (L.) Willd.	T	Mimosaceae	Tropical Asia: Bhandari, 1978.
5	*Allium cepa* L.	H	Liliaceae	West Asia: Patil, 2003.
6	*Allium sativum* L.	H	Liliaceae	Europe: Patil, 2003.
7	*Aloe vera* L.	H	Liliaceae	North America: Naik, 1998.
8	**Amaranthus spinosus* L.	H	Amaranthaceae	Tropical America: Patil, 1995.
9	*Anethum graveolens* L.	H	Labiatae	Europe: Patil, 2003.
10	*Annona reticulata* L.	T	Umbellifereae	Tropical America: Patil, 2003.
11	*Annona squamosa* L.	T	Annonaceae	Tropical America; Patil, 2003.
12	*Arachis hypogaea* L.	H	Fabaceae	Brazil: Shetty & Singh, 1987.
13	**Argemone mexicana* L.	H	Papaveranceae	Tropical America: Shetty & Singh, 1987.
14	*Barleria prionitis* L.	S	Acanthaceae	Tropical Africa: Medakkar & Sharma, 2016.
15	*Bauhinia tomentosa* L.	T	Caesalpiniaceae	South Africa: Martin *et al*., 1987.
16	*Bauhinia variegata* L.	T	Caesalpiniaceae	China: Debnath & Debnath, 2017.
17	*Benincasa hispida* (Thunb.) Cogn	C	Cucurbitaceae	Java: Patil, 1995.
18	**Boerhavia repens* L. var. *diffusa* (L.) Hook *f*.	H	Nyctaginaceae	Tropical Africa: Panda *et al*., 2018.
19	*Bombax ceiba* L.	T	Bombacaceae	Africa: Gaikwad & Garad, 2015.
20	*Borassus flabellifer* L.	T	Arecaceae	Tropical Africa: Reddy, 2008.
21	*Bougainvillea spectabilis* Willd.	C	Nyctaginaceae	Brazil: Patil, 2003.
22	**Caesalpinia bonduc* (L.) Roxb.	C	Caesalpiniaceae	North America: Debnath & Debnath, 2017.
23	*Caesalpinia pulcherrima* (L.) Sw.	S	Caesalpiniaceae	Tropical America: Purseglove, 1968.
24	**Calotropis gigantea* (L.) R. Br	S	Asclepiadaceae	Tropical Africa: Reddy, 2008.
25	**Calotropis procera* (Ait.) R. Br.	S	Asclepiadaceae	Tropical Africa: Reddy, 2008.

Sr.No.	Botanical Name	Habit	Family	Nativity & Reference
26	*Canna indica* L.	H	Cannaceae	Tropical America: Naik, 1998.
27	**Cardiospermum halicacabum* L.	C	Sapindaceae	South America: Patil, 2003.
28	*Carica papaya* L.	T	Caricaceae	Tropical America: Bailey, 1949.
29	*Cascabella thevetia* (L.) Lippold	T	Apocynaceae	Tropical America: Mathew, 1991.
30	*Cassia fistula* L.	T	Caesalpiniaceae	North America: Debnath & Debnath, 2017.
31	**Cassia occidentalis* L.	H	Caesalpiniaceae	South America: Patil, 2003.
32	**Cassia sophera* L.	H	Caesalpiniaceae	Tropical America: Debnath & Debnath, 2017.
33	**Cassia tora* L.	H	Caesalpiniaceae	South America: Reddy, 2008.
34	*Catharanthus roseus* (L.) G.Don	S	Apocynaceae	Tropical America, Singh et al., 1991.
35	**Celosia argentea* L.	H	Amranthaceaae	Tropical Africa: Reddy, 2008.
36	*Chrysanthemum indicum* L.	H	Asteraceae	South Europe: Bose & Pandey, 1970.
37	*Cicer arietinum* L.	H	Fabaceae	South Europe: Patil, 1990.
38	**Cissampelos pareira* L.	C	Menispermaceae	South America: Panda *et al*., 2018.
39	*Citrullus lanatus* (Thunb.) Matsura & Nakai	C	Cucurbitaceae	Tropical Africa: Almeida, 1998.
40	*Citrus aurantifolia* (Christm. & Panz.) Sw.	T	Rutaceae	Malaysia: Yadav & Sardesai, 2002.
41	*Citrus aurantium* L.	T	Rutaceae	South China: Yadav & Sardesai, 2002.
42	**Cleome gynandra* L	H	Capparidaceae	Tropical America: Reddy, 2008.
43	**Cleome viscosa* L	H	Capparidaceae	Tropical America: Reddy, 2008.
44	**Clitoria ternatea* L.	C	Fabaceae	Tropical America: Purseglove, 1968.
45	**Coccinia grandis* (L.) Voigt	C	Cucurbitaceae	Africa: Medakkar & Sharma 2016.
46	**Corchorus capsularis* L.	H	Tiliaceae	Pantropical: Singh & Srivastava, 2000.
47	*Coriandrum sativum* L.	H	Umbellifereae	South Europe: Bailey, 1949.
48	*Cymbopogon citratus* (DC.) Stapf	H	Poaceae	Malaysia: Purseglove, 1968.
49	**Cymbopogon martinii* (Roxb.) Wats.	H	Poaceae	Afro-Asian: Naik, 1998.
50	**Cynodon dactylon* (L.) Pers.	H	Poaceae	Tropical Africa: Wagh & Jain, 2015.
51	**Cyperus rotundus* L	H	Cyperaceae	Europe: Kaul, 1986.

Sr.No.	Botanical Name	Habit	Family	Nativity & Reference
52	**Datura innoxia* Mill.	H	Solanaceae	Tropical America: Reddy, 2008.
53	**Datura metel* L.	H	Solanaceae	Tropical America: Chandra Sekar, 2012.
54	*Daucus carota* L.	H	Umelliferae	Europe: Patil, 2003.
55	*Delonix regia* (Boj. ex Hook.) Raf.	T	Caesalpiniaceae	Madagascar: Patil, 2003.
56	**Echinops echinatus* Roxb.	H	Asteraceae	Afghanistan: Reddy, 2008.
57	**Eclipta prostrata* (L.) L.	H	Asteraceae	South & Tropical America: Reddy, 2008.
58	*Eleusine coracana* (L.) Gaertn.	H	Poaceae	Africa: Singh & Nigam, 2017.
59	**Euphorbia hirta* L.	H	Euphorbiaceae	Tropical America: Reddy, 2008.
60	**Evolvulus alsinoides* (L.) L.	H	Convolvulaceae	America: Daniel, 2008.
61	*Gmelina arborea* Roxb.	T	Verbenaceae	Malaya: Medakkar & Sharma, 2016.
62	*Gossypium herbaceum* L.	H	Malvaceae	Africa & Asia: Purseglove, 1968.
63	*Hibiscus rosa-sinensis* L.	S	Malvaceae	China: Patil, 1995.
64	*Hibiscus sabdariffa* L.	H	Malvaceae	Africa & Asia: Patil, 1995.
65	**Ipomoea nil* (L.) Roth	C	Convolvulaceae	North America: Wagh & Jain, 2015.
66	*Jasminum officinale* L.	C	Oleaceae	China: Patil, 2003
67	*Jasminum sambac* (L.) Ait.	S	Oleaceae	Tropical Asia: John, 1891.
68	*Jatropha curcas* L.	T	Euphorbiaceae	Tropical Africa: Yadav & Saidesai, 2003.
69	*Kalanchoe pinnata* (Lam.) Pers.	S	Crassulaceae	Tropical Africa: Patil, 2003.
70	*Lagenaria siceraria* (Mol.) Standl.	C	Cucurbitaceae	Africa: Singh & Nigam, 2017.
71	**Lantana camara* L.	S	Verbenaceae	Tropical America: Reddy, 2008.
72	**Leucas cephalotes* (Roth) Spr.	H	Labiatae	South Africa: Sheikh & Dixit, 2017.
73	*Luffa acutangula* (L.) Roxb.	C	Cucurbitaceae	Tropical Asia: John, 1891.
74	**Martynia annua* L.	H	Martyniaceae	Mexico: Yadav & Sardesai, 2002.
75	*Melia azedarach* L.	T	Meliaceae	Myanmar: Patil, 2003.
76	**Melilotus alba* Medik. ex Desr.	H	Fabaceae	Europe: Reddy, 2008.
77	**Merremia dissecta* (Jacq.) Hallier *f.*	C	Convolvulaceae	Tropical America: Srivastava *et al.*, 2014.
78	**Mimosa hamata* Willed.	T	Mimosaceae	South America: Pulliah & Ramamurthi, 2001.
79	*Mirabilis jalapa* L.	H	Nyctaginaceae	Tropical America: Bailey, 1949.
80	*Moringa oleifera* Lam.	T	Moringaceae	America: Singh & Srivastava, 200.
81	**Mucuna pruriens* (L.) DC.	C	Fabaceae	America: Singh & Nigam, 2017.
82	*Nerium indicum* Mill.	S	Apocynaceae	Mediterranean Region: Purseglove, 1968.

83	*Opuntia elatior* Mill.	S	Cactaceae	South America: Patil, 2003.
Sr.No.	**Botanical Name**	**Habit**	**Family**	**Nativity & Reference**
84	**Oxalis corniculata* L.	H	Oxalidaceae	Europe: Reddy, 2008.
85	*Passiflora edulis* Sims.	C	Passifloraceae	Brazil: Patil, 2003.
86	**Pedalium murex* L.	H	Pedaliaceae	Africa: Patil, 2003.
87	*Phoenix dactylifera* (L) Roxb.	T	Arecaceae	Persian Gulf: Patil, 2019.
88	**Phyla nodiflora* (L.) Greene	H	Verbenaceae	South America: Stewart, 1972.
89	*Phyllanthus acidus* (L.) K. Skeels	T	Euphorbiaceae	North-East Brazil: Mathew, 1991.
90	*Piper betle* L.	C	Piperaceae	Malaysian Archipelago: Shah, 2015.
91	**Plumbago zeylanica* L.	H	Plumbaginaceae	Africa: Panda *et al*., 2018.
92	*Plumeria acuminata* Ait. Santapaul & Iraniex Shah	T	Apocynaceae	Mexico: Bailey, 1949.
93	*Psidium guajava* L.	T	Myrtaceae	Tropical America: Patil, 2003.
94	*Punica granatum* L.	T	Punicaceae	Afghanistan, Baluchistan & Persia: Patil, 2003.
95	*Quisqualis indica* L.	C	Combretaceae	Tropical Asia: Yadav & Sardesai, 2002.
96	*Raphanus sativus* L.	H	Brassicaceae	Europe & Temperate Asia: Patil, 1995.
97	*Ricinus communis* L.	T	Euphorbiaceae	Tropical Africa: Lesley, 2020.
98	*Rosa damascena* Mill.	S	Rosaceae	East Asia: Patil, 2003.
99	*Sesbania grandiflora* (L.) Poir.	T	Fabaceae	Indonesia: Patil, 1995.
100	*Sesbania sesban* (L.) Merr.	T	Fabaceae	South America: Bor, 1973.
101	*Setaria italica* (L.) P. Beauv.	H	Poaceae	East Asia: Naik, 1998.
102	**Sida acuta* Burm. *f*.	H	Malvaceae	Tropical America: Reddy, 2008.
103	**Sida cordata* (Burm.*f*.) Borss.	H	Malvaceae	South America: Naqshi *et al*., 1988.
104	**Sida spinosa* L.	H	Malvaceae	Pantropical: Singh & Srivastava, 2000.
105	*Solanum melongena* L.	H	Solanaceae	America: Gaikwad & Garad, 2015.
106	**Solanum nigrum* L.	H	Solanaceae	Tropical America: Chandra Sekar, 2012.
107	**Solanum virginianum* L.	H	Solanaceae	Paleotropical: Singh & Srigastava, 2000.
108	*Sorghum bicolor* (L.) Moench.	H	Poaceae	Ethiopia: Singh & Nigam, 2017.
109	*Spondias pinnata* (L. *f*.) Kurz.	T	Anacardiaceae	Tropical Asia: Martine *et al*., 1987.
110	*Tagetes erecta* L.	H	Asteraceae	Mexico: Naik, 1998.
111	*Tamarindus indica* L.	T	Caesalpiniaceae	Africa: Pulliah & Ramamurthy, 2001.
Sr.No.	**Botanical Name**	**Habit**	**Family**	**Nativity & Reference**
112	**Tribulus terrestris* L.	H	Zygophyllaceae	Tropical America: Reddy, 2008.

113	*Tricticum aestivum* L.	H	Poaceae	Fertile Prescent: Singh & Nigam, 2017.
114	**Tridax procumbens* L.	H	Asteraceae	South America: Patil, 1990.
115	**Vitex negundo* L.	S	Verbenaceae	North China & Mongolia: Bailey, 1949.
116	*Vitis vinifera* L.	C	Vitaceae	West Indies: Gaikwad & Garad, 2015.
117	**Xanthium indicum* Koen.	H	Asteraceae	Tropical South America: Reddy, 2008.
118	*Zea mays* L.	H	Poaceae	Central America: Purseglove, 1972.
119	*Zizyphus mauritiana* Lam.	T	Rhamnaceae	Australia: Veerasamy & Arumugan, 2014.

N.B.: *=Wild, C=Climber, H=Herb, S=Shrub, T=Tree.