



Ethnobotany of exotic plants in Khandesh region of Maharashtra (India)

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Abstract

Sacred and religious places in Khandesh region of Maharashtra (India) are botanised from status of floral elements and ethnobotanical standpoint. This paper particularly emphasized exotic plant species in these places. Total 53 exotic plant species pertaining to 41 genera and 32 families of angiosperms are documented. Their importance in view of native utilities such as ethnomedicine, ornamental, edibles, cosmetics and other miscellaneous use-reports is limelighted. The exotic elements belong to both Old and New Worlds and substantially added sources for human sustenance. These sacred and religious places help conserve the alien plant species and even enrich our traditional knowledge.

Keywords: exotic plants, ethnobotany, khandesh, bioculture

Introduction

Khandesh region of Maharashtra state is comprised of three districts *viz.*, Jalgaon, Dhule and Nandurbar. It occupies north-western part of the state bordering the state of Gujarat and Madhya Pradesh. The ranges of Western Ghats (Sahyadri) extended in the western part, whereas Satpura mountain borders on the north in a wall-like manner in between Maharashtra, Gujarat and Madhya Pradesh. A considerable tribal population, besides rural folks and urban people reside in the region. The region has been investigated floristically (Patil, 2003; Kshirsagar and Patil, 2008) ^[15, 11] and ethnobotanically (Pawar and Patil, 2008) ^[17]. Pawar and Patil (2010) ^[18] paid cursory attention on this aspect as a part of general ethnobotany. The region is presently studied for its sacred places as an exclusive topic of research revealing biodiversity elements and ethnobotany, a hitherto neglected aspect. The results of this study are being published (Khare, *et al.*, 2020) ^[9]. Khare *et al.* (*loc.cit.*) focussed earlier only plants in bioculture.

Methodology

The authors botanised religious places and temples, worships and festivals of various tribes and Hindus in the districts *viz.*, Jalgaon, Dhule and Nandurbar. Investigation was conducted during 2013 to 2017 interviewing trustees, worshippers and persons intimately concerned with the sacred places. Plant determination was completed consulting various regional, state and district floras (Cooke, 1958; Sharma *et al.*, 1996; Singh *et al.*, 2000, 2001; Patil, 2003; Kshirsagar and Patil, 2008) ^[6, 22, 26, 27, 15, 11]. Inquiries were made w.r.t. local plant names, part used, medicinal recipes, doses, diseases treated, etc. Region of origin of the exotic species is deciphered consulting relevant literary sources as mentioned against each plant species. The data obtained is presented in the Table-I.

Results

Exotic plant species growing naturally or planted intentionally in sacred and religious places and temples were tapped ethnobotanically. Temples have generally definite borders. However, deities are sometimes found in open spaces without certainty of boundaries. Plant species in all such places, whether cultigen, wild or even escapes from cultivation, are conceived sacred by the concerned devotees or people. (I) Floristic analysis: As many as 53 exotic species of ethnobotanical importance pertaining to 41 genera and 32 families of angiosperms form part of this communication. (II) Habitual categories: These aliens can be categorised on the basis of habits such as: trees (10), shrubs (21), lianas (02), climbers (05), herbs (17) and geophytes (05). The figures in parenthesis belong to number of exotic species in the sacred places. (III) Parts employed: Various parts of the species are found useful e.g. leaves (06), stem (02), bark (02), roots (03), flowers (13), fruits (11) and seeds (08), besides plant products like latex and gum. (IV) Supplementary species: Apart from principal 53 exotic species, some other few plant species are also added in the medicinal recipes *viz.*, *Citrus aurantifolia*, *Ocimum tenuiflorum* and *Zingiber officinale*. (V) Medicinal recipes: The aforesaid species and their plants or products are used to prepare recipes to be administered. They are advised in the form of decoction, extract, juice, oil, paste and powder. During their preparations, certain domestic substances are also added such as turmeric powder, sugar, jaggery, honey, coconut-oil, besides multani soil.

Various human sufferings have been documented benefited by applications of these exotic taxa as occurring in sacred and religious places. The different recipes are administered to combat a wide array of afflictions such as: (i) Digestive system complaints e.g. stomach-ache, dysentery, diarrhoea, constipation, digestive problem, (ii) Respiratory system complaints e.g. asthma, cough, bronchitis, (iii) Oral problems e.g. tooth-ache, (iv) Skin problems e.g. wounds,

cuts, redness of skin, itching, boils, scabies, burns, herpes, skin infection, (v) Swollen parts, joint pains, swollen knees, general swelling, rheumatism, (vi) Urinary problems e.g. kidney-stone, regulation of urination, (vii) Eye infection, (viii) Malaria, (ix) Fever, (x) Obesity, (xi) Bites: dog-bite, snake-bite, (xii) Abortion, (xiii) Muscle pains, (xiv) Ulcer, (xv) Diabetes, (xvi) Head-ache, (xvii) Ear complaints, (xviii) Other complaints e.g. immunity, inflammation, body weakness, tumours, white blood cells, unconsciousness, nervous disorder, body tonic, etc. A broad spectrum of human diseases or afflictions can be treated by readily available plant species in these surroundings. Apart from medicinal significance, these exotic taxa have been found useful for e.g. (i) hair-fall, hair conditioning, hair-dye, pimples, (ii) insect repellent, as insecticide, mosquito repellent, (iii) ornamental, (iv) edibles, (v) hedging, etc.

Discussion

The above resume indicates that the exotic plants found in sacred or religious places have not only ornamental role. Their importance is thus brought out in various compartment of human well-being. Khare *et al.* (2020) ^[9] also earmarked their role in worships, rituals, rites, etc. They thus find an important place in Indian bioculture. Exotic species have an omnipresent role in society and wider socio-religious value, besides material culture.

It is interesting to note that exotic taxa from both Old and New Worlds play a considerable in the welfare of mankind in Khandesh region. Whenever biodiversity surveys are extended, the temples and religious places are easily ignored by the investigators. This attempt clearly brings out that such areas should not be ignored. These places also help conserve the exotic species.

Table 1: Ethnobotany of Exotic Sacred Plants in Khandesh Region of Maharashtra

Sr. No.	Plant Name	Family	Vernacular Name	Nativity (with References)	Proposes and parts used
1.	<i>Abelmoschus esculentus</i> (L.) Moench	Malvaceae	Bhendi	Africa: Negi & Hajra, 2007.	(i) A cup of decoction of roots is topically used as antiseptic on wounds and cuts. (ii) A spoonful of fruit powder is used as abortifacient for three consecutive days.
2.	<i>Adansonia digitata</i> L.	Bombacaceae	Gorakh chinch	Tropical Africa: Yadav & Sardesai, 2002.	It is planted for its curious look at common places and gardens
3.	<i>Albizia lebbek</i> (L.) Willd.	Mimosaceae	Shirish	Pantropical Africa and Tropical Asia: Bhandari, 1978	(i) Residue of boiled leaves is applied on the wounds and swellings. (ii) Gum powder, about half spoon, is given once a day to cure ulcer.
4.	<i>Allium cepa</i> L.	Liliaceae	Kanda	Western Asia: Gaikwad & Garad, 2015; Persia: Bailey, 1928.	(i) Constant smelling stops unconsciousness. (ii) Paste of turmeric powder (<i>Curcuma longa</i> L.), about teaspoon, and a bulb is applied every night on swollen knees until cure. (iii) Half cup of decoction of bulb is used in the treatment of asthma once a day for nine weeks.
5.	<i>Allium sativum</i> L.	Liliaceae	Lasun	Europe: Patil, 2003.	(i) Few drops of decoction of bulblets are dropped in ears for ear problems. (ii) Juice of bulblets, about teaspoon, is given regularly to increase fertility. (iii) Juice of bulblets, about teaspoon, is given once a day in the treatment of nervous disorder.
6.	<i>Aloe vera</i> L.	Liliaceae	Korphad	North America: Patil, 2003	(i) Latex is used as mosquito repellent in the tribal region. (ii) Latex is locally applied regularly on skin for softness and fairness.
7.	<i>Amarantus spinosus</i> L.	Amaranthaceae	Kate – math	Tropical America: Chandra Sekar, 2012.	(i) Leaf paste is locally applied topically for skin problems. (ii) A glass of decoction of leaves is added with two teaspoon sugar and a teaspoon lemon [<i>Citrus aurantifolia</i> (Christm.)Sw.] juice. It is administered thrice or twice a day to regulate urination.
8.	<i>Anethum graveolens</i> L.	Apiaceae	Balant shepu	Mediterranean Region: Patil & Dhale, 2013.	A cup of decoction of whole plant is mixed in a cup of water. Two teaspoon sugar is added in it. Two teaspoon twice in a day is advised for children for better immunity and stomach problems
9.	<i>Annona reticulata</i> L.	Annonaceae	Ramphal	Tropical America: Patil, 2003.	This is generally cultivated for edible fruits.
10.	<i>Annona squamosa</i> L.	Annonaceae	Sitaphal	Tropical America: Patil, 2003.	This is generally cultivated for edible fruits.
11.	<i>Argemone mexicana</i> L.	Papaveraceae	Pivla Dhotra	South America: Chandra Sekar, 2012.	(i) Leaf paste is applied locally on the wound of dog bite.

					(ii) Half cup leaf extract is mixed with honey or sugar and spoonful ginger paste (<i>Zingiber officinale</i> Rosc.). This is advised twice a day in the treatment of cough. (iii) Latex and seed oil is topically used on itching and redness of skin.
12.	<i>Benincasa hispida</i> (Thunb.) Cogn.	Cucurbitaceae	Kohla	Java: Patil, 1995.	(i) Glass of fruit juice daily is used to decrease weight and to check obesity. (ii) Cup of extract of fruit is mixed with some jaggery. A teaspoon of it is advised twice a day in the treatment of cough and fever.
13.	<i>Borassus flabellifer</i> L.	Arecaceae	Tad	Tropical Africa: Reddy, 2008.	Juice collected from the tree before the sunrise (called Neera) is recommended for good immunity
14.	<i>Bougainvillea spectabilis</i> Willd.	Nyctaginaceae	Bogan-wel	Brazil: Bailey, 1949.	It is a good live hedge plant and also planted around the border of the temples
15.	<i>Caesalpinia pulcherrima</i> (L.) Sw.	Caesalpiniaceae	Shankasur	South America: Singh <i>et al.</i> , 2000.	Seed powder paste is smeared topically for ringworm.
16.	<i>Canna indica</i> L.	Cannaceae	Kardali.	Tropical America: Yadav & Sardesai, 2002.	It is generally planted as ornamental in garden of temples.
17.	<i>Carica papaya</i> L.	Caricaceae	Papai	Tropical America: Singh <i>et al.</i> , 2001.	(i) Daily fruit consumption is useful for digestive problems. (ii) Latex is used to treat ringworm.
18.	<i>Cascabella thevetia</i> (L.) Lippold.	Apocynaceae	Pivli Kanher	Tropical America: Singh <i>et al.</i> , 1991	(i) Seed powder paste is used in the treatment of skin infections (ii) Dry fruits are crushed and powdered. It is sprayed around the farm for avoiding the pest and other unwanted organisms.
19.	<i>Cassia occidentalis</i> L.	Caesalpiniaceae	Dukkar sheng; Ran-takla	South America: Chandra Sekar, 2012.	(i) Half cup of root extract is used in the treatment of malaria. Extract is administrated orally, two teaspoon twice a day, to a patient for a fortnight. (ii) A cup of root extract is diluted in a cup warm water. It is used twice in a day in the treatment of diabetics to control sugar. (iii) Flower paste is topically applied against scabies
20.	<i>Cassia tora</i> L.	Caesalpiniaceae	Takla; Tarota; Powadya	South America: Reddy, 2008.	(i) Powder of leaves is topically used in skin infections. (ii) Half cup of seed extract is diluted in a glass water. Three teaspoon honey is added and administrated. It is advised twice a day in the treatment of fever for 7-8 days.
21.	<i>Catharanthus roseus</i> (L.) G. Don.	Apocynaceae	Sadafuli	West Indies: Singh <i>et al.</i> , 2001.	Three teaspoon extract of whole plant is diluted in a cup of water and a cup of it at every morning and evening is given to control blood sugar.
22.	<i>Chamaesyce hirta</i> (L.) Millsp. (Syn. <i>Euphorbia hirta</i> L.)	Euphorbiaceae	Dudhi	Tropical America: Reddy, 2008.	(i) A cup of decoction of the whole plant is taken orally to treat scabies. (ii) A cup of extract of whole plant is prescribed two teaspoon twice a day to control bronchitis and cough. (iii) A cup of decoction of whole plant diluted with a glass water and honey is prescribed at morning and evening to treat kidney stone.
23.	<i>Chrysanthemum indicum</i> L.	Asteraceae	Shevanti	China and Japan: Jadhav, 2012.	It is cultivated for its fragrant flowering heads.
24.	<i>Cicer arietinum</i> L.	Papilionaceae	Harbhara	South Europe: Patil, 1990; Mediterranean Region: Shetty & Singh, 1987.	(i) Seeds with jaggery are recommended for regular consumption as tonic. (ii) Seed paste is applied on face at night for smoothening and fairness of skin.
25.	<i>Citrullus lanatus</i> (Thunb.) Matura &	Cucurbitaceae	Tarbuj	Tropical Africa: Purseglove, 1968.	It is cultivated for edible fruits.

	Nakai.				
26.	<i>Clitoria ternatea</i> L.	Papilionaceae	Gokarna	Tropical America: Purselglove, 1968.	(i) A cup of root decoction is prescribed in the treatment of stomach ache. (ii) Leaf paste is applied on swellings. (iii) Root decoction, about half cup, is taken orally for a week for abortion.
27.	<i>Datura metel</i> L.	Solanaceae	Kala dhotra	Tropical America: Chandra Sekar, 2012.	(i) Paste of boiled leaves is applied on joint and muscle pains regularly. (ii) Half cup of decoction of root is advised in the treatment of fever. (iii) Paste of fruit and roots is topically applied on the boils, scabies and ringworm. (iv) Seed oil is applied to reduce tumours in body.
28.	<i>Daucus carota</i> L.	Apiaceae	Gajar	Europe, North Africa: Shetty & Singh, 1987	Leaf paste is applied on gums in case of tooth problems.
29.	<i>Delonix regia</i> (Boj. ex Hook.) Raf.	Caesalpiniaceae	Gulmohar	Madagascar: Bailey, 1949.	Bark paste is placed in corners of abodes as insect repellent.
30.	<i>Eleusine coracana</i> (Retz.) P. Beauv.	Poaceae	Nagli	Tropical Africa: Gaikwad & Garad, 2015.	It is cultivated as food grain crops in this region.
31.	<i>Hibiscus rosa-sinensis</i> L.	Malvaceae	Jasvand	China: Patil, 2003.	(i) Decoction of flowers also is used as hair conditioner. (ii) Root extract is diluted with a cup of water. Teaspoon of sugar is added in it. It is prescribed, two teaspoon twice a day, in the treatment of cough. (iii) A cup of decoction of flowers is recommended, a teaspoon twice a day, in the treatment of cough until cure.
32.	<i>Jatropha curcas</i> L.	Euphorbiaceae	Moghli errand	Tropical America: Gaikwad & Garad, 2015.	(i) Latex of the plant is topically applied on ringworm. (ii) Seed oil is topically applied in the treatment of rheumatism. (iii) The twig is used as toothbrush for better oral health.
33.	<i>Lantana camara</i> L.	Verbenaceae	Ghaneri, Gangubai.	Tropical America: Bailey, 1949.	(i) Leaf paste is applied especially on ringworm until cure. (ii) Leaf paste is also topically applied on wounds.
34.	<i>Lawsonia inermis</i> L.	Lythraceae	Mehandi	Middle East: Gaikwad & Garad, 2015.	(i) Paste is applied as coolant on the head and also used as hair dye. (ii) Two teaspoon seed powder is diluted in a glass of boiled water and administrated to overcome to general body weakness.
35.	<i>Martynia annua</i> L.	Martyniaceae	Winchu.	Mexico & Brazil: Singh, <i>et al.</i> , 1991.	(i) Fruit pulp is topically applied on rheumatism. (ii) Leaf paste is applied on cuts and wounds topically. (iii) Seed oil is applied to stop hairfall.
36.	<i>Melia azedarach</i> L.	Meliaceae	Bakana neem	Asia (Excl. India): Ara <i>et al.</i> , 1995.	(i) Leaf extract is sprayed as insecticide around abodes. (ii) Leaf paste is applied on cuts and wounds as an antiseptic.
37.	<i>Mirabilis jalapa</i> L.	Nyctaginaceae	Gulbakshi	Tropical America: Bailey, 1949.	(i) Leaf paste is applied on cuts and boils. (ii) Leaf paste is topically used to reduce inflammation.
38.	<i>Nerium indicum</i> Mill.	Apocynaceae	Kanher	Mediterranean region: Purselglove, 1968.	(i) Latex is topically used on the treatment on boils. (ii) Leaf paste is applied on swellings. (iii) Extract of flowers is used as a eye drop in eye infection.
39.	<i>Opuntia elatior</i> Mill.	Cactaceae	Nivdung	South America: Patil, 2003.	(i) Stem extract is applied on burns and boils until cure. (ii) Stem extract is also recommended topically on cuts and wounds until cure.
40.	<i>Passiflora edulis</i>	Passifloraceae	Krishna Kamal	Brazil: Patil, 2003.	It is cultivated in gardens as an ornamental

	Sims.				plant
41.	<i>Pedaliium murex</i> L.	Pedaliaceae	Mothi-Gokhru, Ubha Gokharu	Tropical America: Reddy, 2008.	(i) Two teaspoonful powder of fruits is diluted in two cups of water. It is boiled adding two teaspoon of honey. Two teaspoon, thrice a day, is advised in the treatment of diarrhoea. (ii) A teaspoon fruit powder is diluted in two cups of boiled water. A teaspoon honey and decoction of tulsi leaves (<i>Ocimum tenuiflorum</i> L.) are prescribed to check stomach ache.
42.	<i>Pennisetum americanum</i> L.	Poaceae	Bajaras, Bajari	Central Tropical America: Naik, 1998.	It is cultivated for food grains.
43.	<i>Phyllanthus acidus</i> (L.) K. Skeels.	Euphorbiaceae	Rai Awla	Malaya Islands and Madagascar: Singh <i>et al.</i> , 2001.	(i) Root extract is topically applied for scabies and herpes. (ii) Leaf juice is recommended at every morning to reduce weight. (iii) A cup of decoction of leaves and roots is diluted with a cup of boiled water. It is administered, about a cup, in snake bite treatment.
44.	<i>Plumeria rubra</i> L.	Apocynaceae	Chapha	Tropical America: Singh <i>et al.</i> , 1991.	(i) A teaspoon powder of bark is mixed with a cup of boiled water. It is prescribed in the treatment of malarial fever. (ii) Leaf paste is topically applied on swellings, wound as well as cuts.
45.	<i>Psidium guajava</i> L.	Myrtaceae	Peru	Tropical America: Singh <i>et al.</i> , 2001	(i) Consumption of fruit is recommended to increase immunity. (ii) Decoction of leaves is diluted with two cups of water. Three teaspoon honey and a pinch of common salt are added. It is recommended, a teaspoon thrice a day, in the treatment of fever until cure (iii) Leaf decoction, a lemon [<i>Citrus aurantifolia</i> (Christm.)Sw.] extract, a pinch of common salt and three teaspoon honey is recommended in the treatment of dysentery and diarrhoea.
46.	<i>Punica granatum</i> L.	Punicaceae	Dalimb	Afghanistan, Baluchistan & Persia: Patil, 2003.	(i) Consumption of fruit is recommended to increase white blood cells. (ii) Leaf paste is applied on boils as a coolant. (iii) Dry seed powder is mixed with milk cream. It is topically applied on pimples.
47.	<i>Quisqualis indica</i> L.	Combretaceae	Madhumalti	Tropical Asia: Yadav & Sardesai, 2002.	(i) Leaf paste is topically applied on insect bites. (ii) Juice of flowers is, daily a glass at night, is given to control blood sugar.
48.	<i>Raphanus sativus</i> L.	Brassicaceae	Mula	Europe & Temperate Asia: Singh <i>et al.</i> , 1991.	(i) Radish is recommended in daily diet for treating constipation. (ii) Leaves and pods are cooked as vegetable.
49.	<i>Ricinus communis</i> L.	Euphorbiaceae	Erand	Tropical Africa: Yadav & Sardesai, 2002.	(i) Seed oil is topically applied on the forehead against headache. (ii) Leaf paste diluted with coconut (<i>Cocos nucifera</i> L.) oil and a pinch of cumin seeds (<i>Cuminum cyminum</i> L.) applied in case of ringworm.
50.	<i>Rosa damascena</i> Mill.	Rosaceae	Gulab	East Asia: Patil, 2003.	Decoction of flowers mixed with Multani soil is used topically on the face for fairness.
51.	<i>Sesbania grandiflora</i> (L.) Poir.	Papilionaceae	Hadga	Indonesia: Patil, 1995	Flowers are edible and used as vegetable.
52.	<i>Triticum aestivum</i> L.	Poaceae	Gahu	Fertile Crescent: Singh & Nigam, 2017.	It is cultivated for food grains
53.	<i>Zea mays</i> L.	Poaceae	Maka, Makki, Makai	Central America: Purseglove, 1972.	It is cultivated as grain crop in this region

Conclusions

Khuroo and Reshi (2012) ^[10] pointed out a total 1599 species under 842 genera and 161 families alien to India. Singh and Nigam (2017) studied plant introductions from other foreign region which become an integral part of Indian agriculture. Singh (2016) ^[24] also earmarked exotic plants introduced in Indian 'Ayurveda' medicinal plants for welfare of mankind. The people of Khandesh similarly also accepted exotic plants in material use and bioculture.

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