



Evidence of Bioinvasion As Derived From Sodhala Nighantu

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Abstract:

Indian subcontinent is rich in biodiversity, ethnicity and culture. A huge fund of data in ancient Sanskrit scriptures is available. It is being studied from various points of interest. Biological information is obviously entwined in these heritage lexicons. Sodhala Nighantu is a rich repository of knowledge about medicinal plants. Plant names coined in Sanskrit are ascertained for botanical (Latin binomial) by the present authors. Some of these species are earmarked for their exotic status. A total of 90 plant species are screened for their exotic status which belong to 77 genera and 40 angiospermic families. Of these, the dicotyledons have a major share (78 species, 66 genera and 36 families) in bioinvasion in Indian subcontinent. However, the monocotyledons played a minor role (12 species, 11 genera and 04 families) in the said phenomenon. They are either exclusively cultivated (48 species) or exclusively running wild in nature (41 species) and forming an integral part of Indian biodiversity. A single species exhibited both status. Herbaceous floral elements are more successful in invading in Indian landmass as compared to other habital categories. This sum total of evidence will be of particular use while embarking upon biodiversity management and conservation.

Key Words: Sodhala Nighantu, Exotic Plants, Bioinvasion, India.

Introduction:

Sodhala Nighantu is authored by Sodhala in 12th century AD. He belonged to Brahmins of Vatsa Gotra of Gujarat. He opined that students of Ayurveda in his period experienced difficulty due to lack of list of drugs, proper classification, nomenclature, etc. He, therefore, composed Sodhala Nighantu consulting past contributions by Agnivesa, Sushruta and especially the author of Ashtang-Vagabhattacharya. He attempted at solving controversies in the earlier works. His Sodhala Nighantu consists of two major divisions. He is specially credited for highlighting taxonomic and pharmacological importance of drugs individually. He also added some new groups of drugs. The taxonomic approach is thus independent from the facet of medicinal properties of drugs. He also emphasized regional terminology while describing drugs more suitability and understandable.

His presentation style is thought quite simple, natural and applied. This helped a common man to identify a source plant growing and available for particular drug. His first division of Sodhala Nighantu is named as 'Nama Sangraha' and containing total nine chapters. His second division is named as 'Guna Sangraha'. The nomenclature is itself self-explanatory.

Methodology:

To analyse equivalent recent botanical (Latin binomial) names, the literary source used is those of Gyanandra Pandey's Acharya Sodhala's Nighantu (2009). The names after identify are evaluated for their plant families. Notations about habit and status (wild or cultivated) are mentioned in the Table-I. Each species is also assessed for their nativities (exotic status) and the taxonomic relevant sources are mentioned against each plant species. The information is dilated to discuss plant invasion in India.

Results & Discussion:

Sodhala Nighantu is the 12th century AD lexicon which is thought refinement over earlier controversies of Materia Medica. It is a treasure of the ancient traditional science in India and well defined. It divided synonyms and properties of drugs exclusively. It also gave recent discipline of medical science in present time. It throws more light on identification of drugs. The knowledge of Nighantu is thought of significance in the present era as they aid determination of correct identity of the possible therapeutic substance.

The Sodhala Nighantu is authored by Acharya Sodhala of present-day Gujarat state in 12th century. He tried to solve difficulties of classification, nomenclature and list of drugs which unavailable to the students of the erstwhile period. At the same, he endeavoured to separate taxonomic aspect from the facet of medicinal properties of drugs. He also gave regional terminology to render drug description more understandable and practicable. Present author analysed Sanskrit names and equated them with the botanical (Latin binomial) names. They are assigned to their respective plant families. As many as 90 plant species turned out to be alien in origin. Their alien status is deciphered on the basis of in-depth studies of the relevant taxonomic literature. They pertain to total 77 genera and 40 families of angiosperms. These are either dicotyledons or monocotyledons. The former ones found to be 78 species belonging to 66 genera and 36 families, whereas the latter ones pertain to 12 species, 11 genera and 04 families. The latter ones have rather meagre role in bioinvasion in Indian territory. Obviously, the dicotyledonous taxa played a major role invading Indian landmass. All these invaded plant species are either exclusively wild (41 species) or cultivated ones (48 species). Only a single species is both, wild as well as cultivated. Their habital categorization is thus: trees (21 species), shrubs (14 species) and herbs (46 species). The arborescent taxa *viz.* trees and shrubs are perennial sources of drugs, whereas the herbaceous ones are seasonally available.

The total 90 plant species belong to different continents, countries, mountains, islands or specific geographical regions. They are thus: America (25), Africa (24), Asia (Excl. India) (20), Europe (09) and Australia (03). Other geographical countries or regions are: Mediterranean Region and China (07 each), Persia and Afghanistan (04 each), Japan and Paleotropical (03 each), Pantropical, Malaysia and West Indies (02 each). Rest others shared a single species each e.g. Sino-Japanese, Pakistan, Malaya, Arabia, Persian Gulf, Turkistan,

Asia Minor, Java, Siberia, Indonesian Archipelago, Malaysian Archipelago, Afro-Asian, Mongolia, Abyssinia, Philippines, Indomalaya, New Guinea, Egypt, West Indies, Mexico, Tropics, Iran, England, Ireland, Taiwan, Moluccas, Borneo, Sumatra, Cochin China, Brazil, Ceylon (Sri Lanka), Caspian Sea Region and Caucasus Mountain, etc. The distant American continent have been a major source of bioinvasion in India. The figure in parenthesis stand for number of plant species invaded.

The present author extended investigations on plant invasions in India in different period of time (*cf.* Patil, 2018; 2021a,b,c; 2024, etc.) These inventories are helpful to arrive at some concrete conclusions which can be implemented in future to save indigenous biodiversity in India. Sodhala Nighantu is one of the classic lexicon of Ayurvedic knowledge. The information adduced from it will fill in lacuna, if any, in information regarding plant invasion in India.

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Table-I: Exotic Plant Species In Sodhala Nighantu

Sr. No. (1)	Sanskrit Plant Name (2)	Botanical Name & Family (3)	Cultivated (C)/ Wild (W) (4)	Habit (5)	Nativity & Reference (6)
1.	Sinduri	<i>Bixa orellana</i> L. Bixaceae	C	Tree	(i) Tropical America: Yadav & Sardesai, 2002; Purselove, 1968. (ii) America: Talbot 1909-1911; Sorenson, 2005.
2.	Agastya	<i>Sesbania grandiflora</i> (L.) Poir. Papilionaceae	C	Tree	Indonesia: Patil, 1995; Shetty & Singh, 1987.
3.	Japa	<i>Hibiscus rosasinensis</i> L. Malvaceae	C	Shub	(i) China: Patil, 1995, 2003; Shetty & Singh, 1987. (ii) Sino-Japanese: Singh & Srivastava, 2000.
4.	Mallika	<i>Jasminum sambac</i> (L.) Ait. Oleaceae	C	Shrub	Tropical Asia: John, 1891; Patil, 2021a.
5.	Mahanimba	<i>Melia azedarach</i> Linn. Meliaceae	C	Tree	(i) Myanmar: Patil, 2003. (ii) Burma: Kshirsagar & Patil, 2008.
6.	Parpata	<i>Fumaria indica</i> (Haussk.) Pugsley Fumariaceae	W	Herb	Pakistan & Afghanistan: Negi & Hajra, 2007.
7.	Bruhati	<i>Solanum anguivi</i> Lam. Solanaceae	W	Herb	Africa: Pullaiah <i>et al.</i> , 2011.
8.	Kantakari	<i>Solanum virginianum</i> L. Solanaceae	W	Herb	Paleotropical: Singh & Srivastava, 2000.
9.	Gikshura	<i>Tribulus terrestris</i> Linn. Zygophyllaceae	W	Herb	(i) Tropical America: Reddy, 2008; Patil, 2017b. (ii) Africa & Asia (Excl. India): Kaul, 1986.
10.	Kashmarya	<i>Gmelina arborea</i> inn. Verbenaceae	C	Tree	Malaya: Medakkar & Sharma, 2016c.

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11.	Vijaya, Bhang	<i>Cannabis sativa</i> Linn. Cannabinaceae	W	Herb	(i) Central Asia: Chandra Sekar, 2012. (ii) Caspian Sea Region & Caucasus Mountains: Watt, 1908; Patil, 2019a.
12.	Mashaparni	<i>Teramnus labialis</i> Spreng. Papilionaceae	W	Herb	Pantropical : Singh & Srivastava, 2000.
13.	Madhuyasthi	<i>Glycyrrhiza glabra</i> Linn. Papilionaceae	W	Herb	(i) Arabia, Persian Gulf, Afghanistan, Turkestan, Asia Minor & Siberia: Sawant <i>et al.</i> , 2016. (ii) Pakistan & Afghanistan: Negi & Hajra, 2007.
14.	Kapikacchu	<i>Mucuma prurens</i> DC. Papilionaceae	W	Climber	America: Singh & Nigam, 2017.
15.	Sheetavara	<i>Celosia argentea</i> Linn. Amaranthaceae	W	Herb	(i) Tropical Africa: Reddy, 2008; Chandra Sekar, 2012. (ii) Sough America: Singh & Inam, 2015.
16.	Shravani	<i>Sphaeranthus senegalensis</i> DC. Asteraceae	W	Herb	Africa: Kshirsagar, 2005.
17.	Iksvaku	<i>Lagenaria siceraria</i> (Molina) Standl. Cucurbitaceae	C	Climber	Africa: Singh & Nigam, 2017; Patil, 2019a.
18.	Kushamandika	<i>Benincasa cerifera</i> Savi Cucurbitaceae	C	Climber	(i) Java: Patil, 1995, 2003. (ii) Japan & Java: De Candolle, 1959.
19.	Dhamagrava	<i>Luffa cylindrica</i> (L.) M.J.Roem. Cucurbitaceae	C	Climber	Egypt: John, 1891.
20.	Koshataki	<i>Luffa acutangula</i> Linn. Cucurbitaceae	C	Climber	Tropical Asia: John, 1891.

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21.	Bimbi	<i>Coccinia indica</i> W. & A. Cucurbitaceae	W,C	Climber	Africa: Medakkar & Sharma, 2016c.
22.	Aragvadha	<i>Cassia fistula</i> Linn. Caesalpinaceae	C	Tree	(i) North America: Debnath & Debnath, 2017. (ii) Tropical Asia: Mukhopadhyay & Chakraverty, 2008. (iii) West Indies: Sinigh <i>et al.</i> , 2015.
23.	Snuhi	<i>Euphorbia ligularia</i> Roxb. Euphorbiaceae	W	Shrub	Africa: Naik, 1998.
24.	Swama-ksheeri	<i>Argemone mexicana</i> Linn. Papaveraceae	W	Herb	(i) Central America, Mexico & West Indies: Reddy, 2008. (ii) Tropical America: Shetty & Singh, 1987; Ugemuge, 1986. (iii) South America: Chandra Sekar, 2012. (iv) Mexico: Lesley, 2020. (v) America: Sorenson, 2005.
25.	Indravaruni	<i>Citrullus colocynthis</i> Schrad. Cucurbitaceae	W	Climber	West Africa: Sainkhedia, 2016; Patil, 2021b.
26.	Apamarga	<i>Achyranthes aspera</i> Linn. Amaranthaceae	W	Herb	(i) Tropics: Medakkar & Sharma 2016a. (ii) South East Africa and/or Africa: Singh <i>et al.</i> , 2015.
27.	Punarnava	<i>Trianthema portulacastrum</i> Linn. Aizoaceae	W	Herb	Tropical America: Quereshi <i>et al.</i> , 2014.
28.	Punarnava	<i>Boerhavia repens</i> var. <i>diffusa</i> L. Hook. f. Nyctaginaceae	W	Herb	(i) South Africa: Stuwig & Siebert, 2013. (ii) Tropical Africa: Panda <i>et al.</i> , 2018.

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29.	Shweta-rakta	<i>Barleria cristata</i> Linn. Acanthaceae	C	Shrub	Paleotropical : Singh & Srivastava, 2000.
30.	Peeta	<i>Barleria prionitis</i> Linn. Acanthaceae	C	Shrub	Tropical Africa: Medakkar & Sharma, 2016c.
31.	Bala	<i>Sida cordifolia</i> Linn. Malvaceae	W	Herb	Tropical & Subtropical Regions of Both Hemispheres: Bhandari, 1978.
32.	Mahabala	<i>Sida rhombifolia</i> L. Malvaceae	W	Herb	America: Singh <i>et al.</i> , 2015.
33.	Mishreya	<i>Foenicium vulgare</i> Mill. Apiaceae	C	Herb	(i) South Europe: Gaikwad & Garad, 2015; Shetty and Singh, 1987. (ii) Mediterranean Region: Purselove, 1968. (iii) Europe: Dar <i>et al.</i> , 2002.
34.	Vacha	<i>Acorus calamus</i> Linn. Areceae	C	Herb	(i) Southern Asia, Central & Western North America: Novak, 1966. (ii) Europe: Almeida, 2009.
35.	Hingu	<i>Ferula foetida</i> Regel Apiaceae	W	Herb	Iran, Afghanistan & Pakistan: Choudhary <i>et al.</i> , 2021; Khare, 2008.
36.	Dhanyaka	<i>Cuminum cyminum</i> Linn. Apiaceae	C	Herb	(i) South Europe: Yadav & Sardesai: 2002. (ii) Mediterranean Region: Shetty & Singh, 1987; Patil, 1995.
37.	Yavani	<i>Trachyspermum ammi</i> Linn. Apiaceae	C	Herb	(i) South Europe: Gaikwad & Garad, 2015. (ii) Africa: Shetty & Singh, 1987; Patil, 1995.
38.	Yavani	<i>Hyoschymus niger</i> L. Solanaceae	C	Herb	Southern England & South-East Ireland: Novak, 1966.

Sr. No. (1)	Sanskrit Plant Name (2)	Botanical Name & Family (3)	Cultivated (C)/ Wild (W) (4)	Habit (5)	Nativity & Reference (6)
39.	Ushira	<i>Vetiveria zizanoides</i> Linn. Poaceae	C	Herb	China: Medakkar & Sharma, 2016b.
40.	Karpura	<i>Cinnamomum camphora</i> Nees & Eberm. Lauraceae	C	Tree	(i) China & Japan: Bailey, 19489. (ii) Japan: Mathew, 1991. (iii) South-East Asia: Novak, 1966. (iv) Taiwan: Gopalswamiengar, 1991. (v) China, Taiwan & Japan: Lesley, 2020.
41.	Jatipatri	<i>Myristica fragrans</i> Houtt. Myristicaceae	C	Tree	Moluccas: Singh <i>et al.</i> , 2001.
42.	Kankola	<i>Piper cubeba</i> Linn.f. Piperaceae	W	Climber	Borneo, Sumatra, Java & Indonesia: Dandasena <i>et al.</i> , 2023.
43.	Pusa	<i>Areca catechu</i> Linn. Avecaceae	C	Tree	(i) Tropical Asia: Gaikwad & Garad, 2015. (ii) Indonesia Archipelago: Ahuja & Ahuja, 2011. (iii) Malaysian Archipelago: Shah, 2015. (iv) Malaysia: Chaphekar <i>et al.</i> , 2009.
44.	Damana	<i>Artemisia nilagirica</i> (C.B.Cl.) Pamp. Asteraceae	W	Herb	(i) Mediterranean Region of Francis & Croatia: Singh <i>et al.</i> , 2015. (ii) America: Singh & Nigam, 2015.
45.	Bhallataka	<i>Semecarpus anacardium</i> Linn. Anacardiaceae	C	Tree	West Indies: Sainkhedia, 2016.
46.	Chakshuhya	<i>Cassia absus</i> Linn. Caesalpiniaceae	W	Herb	(i) Tropical America: Reddy, 2008; Wagh & Jain, 2018. (ii) Central America: Panda <i>et al.</i> , 2018.

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47.	Karaveera	<i>Nerium indicum</i> Mill. Apocynaceae	C	Shrub	(i) China, Cochin China: Voight, 1845. (ii) Mediterranean Region: Purseglove, 1968. (iii) China: Almeida, 2001a. (iv) Persia To Japan: Mathew, 1991.
48.	Dattura	<i>Datura stramonium</i> L. Solanaceae	W	Herb	(i) Tropical America: Lesley, 2020. (ii) Paleotropical: Singh & Srivastava, 2000. (iii) America: Patil, 2017a.
49.	Untakantalo	<i>Echinops echinatus</i> Roxb. Asteraceae	W	Herb	Afghanistan: Reddy, 2008; Patil, 2017b; Chandra Sekar, 2012.
50.	Bhringaraja	<i>Eclipta prostrata</i> (L.) Linn. Asteraceae	W	Herb	South & Tropical America: Reddy, 2008; Patil, 1990; 2017b; Rajagopal & Panigrahi, 1965.
51.	Arka	<i>Calotropis procera</i> (Ait.) R.Br. Asclepiadaceae	W	Shrub	(i) Tropical Africa: Reddy, 2008; Chandra Sekar, 2012. (ii) Persia & Africa: Almeida, 2001.
52.	Rajarka	<i>Calotropis gigantea</i> Linn. Asclepiadaceae	W	Shrub	Tropical Africa: Reddy, 2008; Chandra Sekar, 2012.
53.	Kakajangha	<i>Peristrophe paniculata</i> (Forssk.) Brummit. Acanthaceae	W	Herb	Tropical America: Reddy, 2008; Wagh & Jain, 2018.
54.	Shigru	<i>Moringa oleifera</i> Lam. Moringaceae	C	Tree	America: Singh & Srivastava, 2000.
55.	Sarshapa	<i>Brassica campestris</i> L. Brassicaceae	C	Herb	Mediterranean Region: Almeida, 1996.

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56.	Kakanasa	<i>Martynia annua</i> L. Martyniaceae	W	Shrub	(i) Mexico & Brazil: Patil, 2003; Rajagopal & Panigrahi, 1965. (ii) Tropical America: Reddy, 2008.
57.	Mulaka	<i>Raphanus sativus</i> Linn. Brassicaceae	C	Herb	(i) Western Asia: Purseglove, 1968. (ii) Europe: John, 1891. (iii) Europe & Temperate Asia: Patil, 1995.
58.	Surasa	<i>Ocimum tenuiflorum</i> L. (Syn. <i>O. sanctum</i> Linn.) Lamiaceae	C	Shrub	Northern Coastal Belt of Mediterranean Region: Swamy, 1973.
59.	Jambhira	<i>Cymbopogon citratus</i> (DC.) Staff Poaceae	C	Herb	(i) Malaysia or Ceylon (Shri Lanka): Purseglove, 1968. (ii) South-East Asia & Australia: Singh <i>et al.</i> , 2015.
60.	Kutheraka, Shaluka, Samukha	<i>Ocimum basilicum</i> L. Lamiaceae	C	Shrub	(i) Persia: Pullaiah <i>et al.</i> , 2011. (ii) Afro-Asian: Patil, 2003.
61.	Rasona	<i>Allium sativum</i> Linn. Liliaceae	C	Herb	(i) Europe: Naik, 1958; Patil, 2003. (ii) Central Asia: Shah, 2014.
62.	Gajar	<i>Daucus carota</i> L. Apiaceae	C	Herb	(i) Europe: Patil, 2003. (ii) Europe & North Africa: Shetty & Singh, 1987. (iii) Europe & Temperate Asia: De Candolle, 1959.
63.	Palandu	<i>Allium cepa</i> Linn. Liliaceae	C	Herb	(i) West Asia: Naik, 1998; Patil, 2003. (ii) Persia: Bailey, 1928. (iii) Central Asia: Shah, 2014. (iv) Western Temperate Asia: De Candolle, 1959.

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64.	Sindhuvara, Nirgundi	<i>Vitex negundo</i> Linn. Verbenaceae	W	Shrub	North China & Mongolia: Bailey, 1949.
65.	Atityankanta	<i>Cleome gynandra</i> L. Capparidaceae	W	Herb	(i) Tropical America: Reddy, 2008; Patil, 2017b. (ii) Africa: Hewson & Thompson, 1993
66.	Tandulya	<i>Amaranthus spinosus</i> L. Amaranthaceae	W	Herb	(i) Tropical America: Patil, 1995; Chandra Sekar, 2012.
67.	Kasamarda	<i>Cassia occidentalis</i> L. Caesalpinaceae	W	Herb	South America: Patil, 2003; Chandra Sekar, 2012; Rajagopal & Panigrahi, 1965.
68.	Kasha	<i>Saccharum spontaneum</i> L. Poaceae	W	Herb	Tropical West Asia: Reddy, 2008; Chandra Sekar, 2012.
69.	Darbha	<i>Imperata cylindrica</i> (L.) Raeuschel Poaceae	W	Herb	(i) Tropical America: Reddy, 2008. (ii) Asia (Excl. India) & Europe: Kaul, 1986. (iii) Tropical Asia: Titiek <i>et al.</i> , 2015. (iv) Africa: Almeida, 2009.
70.	Nala	<i>Phragmites vallatoria</i> (Pluk.) ex L. Veldk. Poaceae	W	Herb	(i) Africa: Quereschi <i>et al.</i> , 2014. (ii) North America: Garg, 2018-2019.
71.	Durva	<i>Cynodon dactylon</i> (L.) Pers. Poaceae	W	Herb	Tropical Africa: Debnath & Debnath, 2017; Wagh & Jain, 2015; Panda <i>et al.</i> , 2018.
72.	Jambira	<i>Citrus limon</i> (L.) Burm. f. Rutaceae	C	Tree	South-East Asia: Yadav & Sardesai, 2002.
73.	Ambrataka	<i>Spondias pinnata</i> (L.f.) Kurz. Anacardiaceae	C	Tree	Tropical Asia: Martin <i>et al.</i> , 1987
74.	Naranga	<i>Citrus reticulata</i> Blanco Rutaceae	C	Tree	(i) Philippines: Singh <i>et al.</i> , 2000a; Almeida, 1996. (ii) Asia (Excl. India): Stewart, 1972.

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75.	Bijapuraka	<i>Citrus medica</i> L. Rutaceae	C	Tree	China: Roxburgh, 1814; Patil, 2019b.
76.	Amlika	<i>Tamarindus indica</i> L. Caesalpiaceae	C	Tree	(i) Tropical America: Patil, 1990. (ii) Tropical Africa: Pullaiah & Ramamurthy, 2001. (iii) Abyssinia: Chaphekar <i>et al.</i> , 2007.
77.	Pinda-Kharjura	<i>Phoenix dactylifera</i> Linn. Arecaceae	C	Tree	(i) Persian Gulf: Patil, 2019a. (ii) Africa: Bailey, 1949.
78.	Draksha	<i>Vitis vinifera</i> Linn. Vitaceae	C	Climber	(i) West Indies: Gaikwad & Garad, 2015. (ii) West Asia: Singh <i>et al.</i> , 2006.
79.	Tala	<i>Borassus flabellifer</i> L. Arecaceae	C	Tree	Tropical Africa: Reddy, 2008; Cooke, 1958; Chandra Sekar, 2012.
80.	Badara	<i>Ziziphus mauritiana</i> Lam. Rhamnaceae	C	Tree	(i) Tropics & Subtropics: Martin <i>et al.</i> , 1987. (ii) Australia: Veerasamy & Arumugan, 2014.
81.	Kola	<i>Ziziphus jujuba</i> Mill. Rhamnaceae	C	Tree	Subtropics & Warm Temperate Zone: Martin <i>et al.</i> , 1987
82.	Karamarda	<i>Carissa carandas</i> L. Apocynaceae	W	Shrub	South Africa: Sainkhedia, 2016
83.	Shirsha	<i>Albizia lebeck</i> (L.) Bth. Mimosaceae	C	Tree	(i) Pantropical Africa & Tropical Asia: Bhandari, 1978. (ii) Indomalaya, New Guinea & Northern Australia: Singh <i>et al.</i> , 2015.
84.	Varuna	<i>Crataeva magna</i> (Lour.) DC. Capparidaceae	C	Tree	Tropical America: Medkkar & Sharma, 2016.

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85.	Irimeda	<i>Vachellia farnesiana</i> (L.) Wight & Arn. (Syn. <i>Acacia farnesiana</i> Willd.) Mimosaceae	W	Tree	(i) Tropical South Africa: Reddy, 2008; Purseglove, 1968. (ii) Australia: Chandra Sekar, 2012. (iii) Central America: Rania & Rim, 2021.
86.	Mallika	<i>Jasminum sambac</i> (L.) Ait. Oleaceae	C	Shrub	Tropical Asia: John, 1891; Patil, 2021a.
87.	Kaccaka	<i>Xanthium strumarium</i> Linn. Asteraceae	W	Herb	Tropical South America: Patil, 1990, 2003; Reddy, 2008; Chandra Sekar, 2012.
88.	Siddesvari	<i>Delonix elata</i> (L.) Gamble Caesalpiniaceae	C	Tree	Tropical Africa: Naik, 1998; Patil, 2003; Yadav & Sardesai, 2002.
89.	Sarapunka	<i>Tephrosia purpurea</i> Linn. Papilionaceae	W	Shrub	Pantropical: Singh & Srivastava, 2000.
90.	Tulsi, Surasa, Gramya, Bahumanjari, Gowri, Bhutaghi	<i>Ocimum tenuiflorum</i> L. (Syn. <i>O. sanctum</i> L.) Lamiaceae	C	Herb	Northern Coastal Belt of Mediterranean Region: Swamy, 1973.

