Plantae Scientia – An International Research Journal in Botany Publishing Bimonthly Open Access Journal

Plantae Scientia : Volume 03, Issue 04, July 2020

ISSN 2581-589X

REVIEW ARTICLE

# Unfolding of Yog Chintamani in the Perspective of Plant Invasion in India

**D. A. Patil**

P. G. Department of Botany, L. K. Dr. P. R. Ghogrey Science College, Dhule-424005 (M.S.), India.

Corresponding Author: dapatil_10aug@yahoo.com

Manuscript Details

Manuscript Submitted : 06/06/2020
Manuscript Revised : 10/07/2020
Manuscript Accepted : 12/07/2020
Manuscript Published : 15/07/2020

Available On

https://plantaescientia.com/ojs

Cite This Article As

Patil D. A. (2020) Unfolding of Yog Chintamani in the perspective of plant invasion in India. *Pla. Sci.* 2020; Vol. 03 Iss. 04:48-55.



Indexed In

Crossref, Index Copernicus International (ICI), Directory of Research Journal Indexing (DRJI),Scientific Indexing Services (SIS), CiteFactor,

ABSTRACT

Yog Chintamani is an ancient Sanskrit-based medicinal hand-written manuscript authored by a Jain Muni (Sedge) Harshkirti Suri. It deals with medicinal utilities exclusively. The recipes advised are polyherbal and has great impact of Ayurvedic system of medicine. This manuscript has not yet been studied from any point of view. The present author studied it intensively with particular emphasis on plant invasion in the ancient past of India. The plant names are Sanskrit, Prakrit and a few Marathi plant names. These have been equated with recent botanical (Latin) names and assigned to their respective families. Total 60 alien plant species belonging to various parts of the New and Old Worlds are revealed consulting relevant taxonomic literature. They belong 57 genera 38 families of angiosperms. These alien floral elements are evaluated for their role in Indian economy, invasion and culture.

**Keywords:** Yog Chintamani, Alien Plants, Plant Invasion, India.

## INTRODUCTION

Prior to Indian independence, many men of learning unfolded biodiversity of Indian sub-continent. They probed different regions and their efforts culminated in the publication of a monumental work 'Flora of British India' (Hooker, 1872-1897). We are also acknowledged with Vedic literature which divulged traditional, mythological and rational scientific treasure-trove. Most of the Sanskrit scripts contain, directly and indirectly, reckonable quantum of information about plant wealth of the bygone days. The ancient works inspired many Indians to write on utility of plants in different times. Their works are/were hand-written and have remained untouched.

The present author extended analytical studies to reveal the plant-wealth incorporated in them. The author has engaged particularly in divulging alien flora in India from various ancient scripts and epics (Patil, 2017a; 2018a,b; 2019a,b,c,d; 2020; Patil and Patil, 2019). On such treatise dealing with medicinal plants and their applications to better human-health is 'Yog Chintamani'. This hand-written script, to my knowledge, has yet remained in dark and has not been studied for any aspect embodied in it. The details of this hand-written manuscript (called 'Pothi') are: (i) Manuscript: It contains total 167 pages written on both sides on brown paper. It is 4.5 inch wide and 9.5 inch in length and wrapped in brown paper. 'Sanskrit Prakrit Vaidyak Yog Chinatamani' is a title on brown paper. The original script is deposited in Bhandarkar Oriental Research Institute, Pune (Maharashtra: India). It is now also available in offset print form published by Itihasacharya V.K.Rajwade Sanshodhan Mandal, Dhule (Maharashtra: India). It is numbered as 731-31. Preface for this form is given by Shivaji N. Bhave dated 04.05.1980. (ii) Author of Manuscript: It is authored by Harshakirti Suri. He was honoured for this contribution by the then ruler of Delhi (India), Selim Shah (1545-1553). It is written in Sanskrit as well as in Prakrit Languge. Prakrit is regarded earlier form of Marathi language. He was a Jain Muni (Sedge), a resident of Nagpur (Maharashtra). The author in preface stated that 'Yog Chintamani' is abstracted from earlier Ayurvedic texts *viz*., Charak and Susruta Samhita, and also incorporated his own wisdom. The title of manuscript contains two words, first 'Yog' and secondly 'Chintamani'. The first word is meant for purity of mind, however, the manuscript do not deal with 'Yoga'. The word 'Chintamani' means victory, victory over diseases. The treaty is thus an account on medicine. It contains Sanskrit, Prakrit and even some Marathi plant names, besides medicinal recipes, its administration and avoidances. Total 167 sub-titles are mentioned in the first nine pages indicative of subject-matter dealt in the main body of the manuscript. Interestingly, these 167 subtitled are completed only in 167 pages only.

Indian subcontinent has a rich heritage of biodiversity due to its variable geo-climate. However, some aliens have been introduced in this landmass intentionally and also reached negligently because of biotic interference (Patil, 2017a,b; 2019a,b,c,d). During the course of time, these have been appropriated from utilitarian viewpoint and are also incorporated in ancient texts and literature. These texts are also sources of information about plant invasion.It is, therefore, this ancient script 'Yog Chintamani' is being presented from point of biological invasion.

## METHODOLOGY

The offset print copy of Yog Chintamani (Suri Harshkirti, 1981) published by Itihasacharya V. K. Rajwade Sanshodhan Mandal, Dhule (Maharashtra) is consulted. The plant names in Sanskrit, Prakrit and Marathi have been carefully noted. Their equivalent botanised (latin) names have been deciphered through various botanical works or floras such as: (i) The Flora of Presidency of Bombay Vol.I-III (Coke, 1958) (ii) Flora of British India Vol.I-VII (Hooker, 1872-1897). (iii) Flora of Marathwada Vol.I-II (Naik, 1998). (iv) Flora of Maharashtra: Monocotyledons (Sharma *et al*., 1996). (v) Flora of Maharashtra; Dicotyledons Vol.I (Singh *et al*., 2000). (vi) Flora of Maharashtra: Dicotyledons Vol.II (Singh, *et al*., 2001). (vii) Traditional Herbal Drugs (Wali and Bachulkar, 2016). (viii) Aushadhisangrah (Desai, 1975). The exotic status is inferred by consulting relevant taxonomic literature cited against each species in Table-I. The data accrued is critically assessed from the standpoint of plant invasion in Indian territory, besides their bearing on Indian bioculture and economy.

## RESULTS AND DISCUSSION

### Background and earlier study

The term 'Biodiversity' gained currency more after the 'Earth Summit' (1992) held at Riode Janeiro (Brazil). World's biodiversity is being investigated at three levels *viz*., (i) Ecosystem, (ii) Species and (iii) Genetic/Genic. The composition and status of biodiversity of a region is not static. It goes on changing with time obviously due to biological invasions that take place, apart from the reason of abiotic factors. The biological invasions although are operated by introductions of certain species, it but affects biodiversity at the three different levels stated above. Biological invasions and dispersals of plant, animals or microbes usually go hand-in-hand depending upon the adaptive features of various organisms. Studies on Indian biodiversity were initiated before Indian independence by workers in various universities and Botanical Survey of India. There have been also special attention on alien flora elements. Nayar (1977), Maheshwari (1960, 1979) and Reddy (2008) evaluated alien plant taxa in India, based on

research conducted in past. However, revealing alien plant species from ancient literary sources have largely remained untouched. The present author recently made a headway on this line as stated earlier.

**Present investigation**

The present attempt dealt with an ancient hand-written manuscript 'Yog Chintamani' authored by Harshkirti Suri, a Jain Muni (Sedge) and shed more light on this much neglected treatise. As many as 60 plant species are gleaned from this manuscript exotic in origin. They comprise total 57 genera and 38 angiospermic families. Of these, only seven species belong to monocotyledons from six genera and 03 families *viz*., Liliaceae, Arecaceae and Poaceae. Majority of alien species belong to dicotyledons (53 species, 51 genera and 35 families). Out of total 60 exotic species, herbaceous taxa play a major role (28 species) in medicine as documented by Harshkirti Suri(1981). Other taxa in descending order of medicinal utility are trees (15 species), shrubs (10 species) and lianas or climbers (07 species). It is to be noted that 36 species are found exclusively under cultivation on Indian landmass or even outside. Total 20 species run as wild exclusively, whereas few species (04) are either cultivated or even found naturalised in wild state e.g. *Albizia lebbeck*, *Aloe vera*, *Tamarindus indica* and *Melia azaderach*. The plant species which are recorded as cultivated are brought in India intentionally for various human needs as food grains, pulses, edible fruits, spices and condiments, ornamental or as live hedge, oil-yielders, shade trees, cosmetics, vegetable, narcotic or even used for religious purpose. All these cultigens and the wild ones invaded unintentionally, as a result of plant dispersal, find place in medicine.

There are a few exotic species which are referred by a common name which point out to different species e.g. Rui (*Calotropis procera* and *Calotropis gigantea*), Patha [(*Cissampelos pareira* and *Cyclea paltata* (Lam.) Hook*f*. & Thoms.] and different of *Gossyipium* as Kapasi or Kapus. Probably, these would have been used in ancient past for similar medicinal treatments.

**Nativity**

Interestingly, these exotic species are native of various continents, countries or certain geographical regions. They have been found belonging to different 28 native places. They are originally denizen nearly all regions of the world. Majority of species are from various parts of Asia (Excluding India) (18 species), Africa (15 species), Europe (13 species) and America (10 species). These are followed by Persia and Mediterranean region (05 species each), Afghanistan, Arabia and China (03 species). Other countries or regions represented are Baluchistan, Pakistan, Iran, Ceylon (Sri Lanka), Turkestan, Siberia, Java, Bali, Borneo, Sumatra, Johore, Labua, Japan, Fertile Crescent, middle east, East and West Indies (mostly one or two species each). These are indicative of plant migration in India *vis-a-vis* Indian past contacts with other world directly or indirectly.

**Significance**

Ancient scripts are the means of reaching out to our historical past and human practices. It is, therefore, essential to pass this part of our rich culture, our heritage to our future generation. Plant invasion, plant dispersal and natural instinct of identifying medicine have always gone simultaneously in past and may continue so even in future. We must be aware of these for the sake of biodiversity management and conservation. The present biodiversity is the result of these natural forces and past human activities concerned with contemporaneous utilities. Our age is one of information explosion and hence we should also derive it from such ancient scripts for our welfare. Such scripts act as a mirror.

## CONCLUSION

International Union for Conservation of Nature And Natural Resources (IUCN, 2002) defines 'Alien Invasive Species' as an alien species which becomes established, in natural or semi-natural ecosystems or habitat, an agent of change, and threatens native biological diversity (Raghubanshi *et al*., 2005). However, this is not always a fact. Local people carry on bio-prospecting and absorb potential valuable exotic plant species. The exotic species, numbering 60 of the present account, are renderedas an integral part of Indian system of medicine.

## REFERENCES

**Ara, S. Naqshi, A.R. and M.Y. Baba (1995)** Indigenous and exotic trees and shrubs of Kashmir Valley. Ind.J.Forest 8:233-272.

**Bailey, L.H. (1928)** The Standard Cyclopedia or Horticulture (England Edition) Vol. I. Macmillan, New York, USA.

**Bailey, L.H. (1929)** The Standard Cyclopedia of Horticulture (England Edition) Vol.II. MacMillan, New York, USA.

**Bailey, L.H. (1949)** Manual of Cultivated Plants. MacMillan Co., New York, USA.

**Bhandari, M.M. (1978)** Flora of The Indian Desert. Scientific Publishers, Jodhpur, India.

**Caraway_Wikipedia** https://en.wikipedia.org/wiki/Caraway

**Chandra Sekar K. (2012)** Invasive alien plants of Indian Himalayan region: Diversity and implication. American Journal of Plant Sciences. 3:177-184. https://doi.org/10.4236/ajps.2012.32021

**Cooke, T. (1958)** The Flora of The Presidency of Bombay. Vol.I-III. Bot.Surv.India, Calcutta, India.

**Dar, G.H., Bhagat, R.C. and M.A. Khan (2002)** Biodiversity of The Kashmir Himalaya. Valley Book House, Srinagar, India.

**De Candolle A.P. (1886)** Origin of Cultivated Plants (Translated from 2nd Ed. In French, 1959). Hafner, New York, USA.

**Debnath, A. and B.Dehnath (2017)** Diversity, invasion status and uses of alien plant species in North Eastern Hilly States of Tripura: A confluence of Indo-Barman hotspot. American Journal of Plant Sciences 8:212-235. https://doi.org/10.4236/ajps.2017.82017

**Desai, V.G. (1975)** Aushadhisangrah (Marathi). Sri Gajanan Book Depo Prakashan, Dadar (Mumbai) (M.S.) India.

**Earth Summit (1992)** The United Nations Conference on 'Environmental And Sustainable Developent', 3-14 June, 1992, Rio de Janeiro (Brazil) https://doi.org/10.1016/0959-3780(94)90027-2

**Gaikwad, S.P. and Garad, K.U. (2015)** Flora of Solapur District. Laxmi Book Publications, Solapur, Maharashtra, India. https://doi.org/10.3897/bdj.3.e4282

**Graf, A.B. (1980)** Exotica: Pictorial Cyclopedia of Exotic Plants From Tropical And Near-Tropic Regions. Rohers Company INC, USA (10th Ed.)

**Hooker, J.D. (1872-1897)** Flora of British India. Vol.I-VII. Reeves & Co., London, UK.

**IUCN, The World Conservation Union** (2002) IUCN Guidelines for The Prevention of Biodiversity Loss Caused By Alien invasive Species. Approved By The 51st Meeting of The IUCN Countil, Gland, Switzerland.

**John Cameron (1891)** Catalogue of Plants In The Botanical Garden, Bangalore And Its Vicinity (2nd Ed.). Mysore Government Central Press, Bangalore, India.

**Kak, A.M. (1990)** Aquatic and wetland vegetation of Kashmir Himalaya. J.Econ. Tax.Bot. 14:1-14.

**Kaul, M.K. (1986)** Weed Flora of Kashmir Valley. Scientific Publishers, Jodhpur, India.

**Lake, H. and Kalsall, H.J. (1894)** The Camphor tree and Camphor of Jahore. Journal of The Straits Branch of The Royale Asiatic Society 26:35-40.

**Maheshwari, J.K. (1960)** Studies on naturalised flora of India. Proc. Summer School Botany, Darjeeling, June 2, New Delhi, India. pp.156-170.

**Maheshwari, J.K. (1979)** Alien flora of India. In: Progress In Plant Research. Vol.I (Ed.Khoshoo & Nair). Silver Jubilee Publication. NBRI, Lucknow, India. pp.219-228.

**Martin, F.W., Campbell, C.W. and R.M. Ruberte (1987)** Perennial Edible Plants of The Tropics: An Inventory. U.S. Department of Agriculture, Agriculture Handbook No.642. 222p.illus.

**Naik V.N. (1998)** Flora of Marathwada. Vol.I-II. Amrut Prakashan, Aurangabad (Maharashtra), India.

**Nayar, M.P. (1977)** Changing patterns of the Indian flora. Nelumbo 19(1-4):145-155.

**Negi, P.S. and P.K.Hajra (2007)** Alien Flora of Doon Valley, North-West Himalaya. Current Science 92 (7):968-978.

**Panda, T., Mishra, N., Pradhan, B.K. and R.B.Mohanty (2018)** Expansive alien flora of Odisha, India. Journal of Agriculture And Environment For International Development 112(1):43-64.

**Patil, D.A. (1990)** Exotic elements in the flora of Dhule district (Maharashtra). J.Econ.Tax.Bot.14(3):721-724.

**Patil, D.A. (1995)** Exotic elements in the flora of Dhule district (Maharashtra)-II. Biojournal 7(1-2):1-8.

**Patil, D.A. (2003)** Flora of Dhule And Nandurbar Districts (Maharashtra). Bishen Singh Mahendra Pal Singh, Dehradun, India.

**Patil, D.A. (2017a)** Alien plant species recorded in Vedic and Post-Vedic period of India: An assessment. Sch.Acad.J.Biosci. 5(17):812-819.

**Patil, D.A.** (2017b) Invasive alien species in Khandesh region (Maharashtra, India): Diversity, implications and measures. Sch.Acad.J.Biosci. 5(12):867-876.

**Patil, D.A. (2018a)** On some alien plant species: Gleanings from Garuda Purana. Sch.Acad.J.Biosci. 6(2):ISS-2A:163-166.

**Patil, D.A. (2018b)** Some comments on exotic floral elements as hailed from epic Ramayana. Sch.Acad.J.Biosci. 6(2) ISS-2A:146-150.

**Patil, D.A. (2019a)** Amarsimha's Amarkosa in the perspective of plant invasion in India and implications. International Journal of Agricultural Inventions 4(2):163-169.

**Patil, D.A. (2019b)** Exotic Medicinal Plants As Gleaned From Ancient Sanskrit Literature. The Journal of Biodiversity. 119:573-590.

Patil, D.A. (2019c) Garcia da Orta's Coloquios dos Simples e Drogas: Plant invasion and implications.Plants and Environment 1(1): 55-59.

**Patil, D.A. (2019d)** Scientific history of some alien plants in India: Origin, implications and culture. Plantae Scientia 1(5):66-75. https://doi.org/10.32439/ps.v1i05.66-75

**Patil, D.A. (2020)** Plant invasion: Some gleanings from Madhava Chikitsa. Plants and Environment 2(1):1-5. https://doi.org/10.22271/2582-3744.2020.mar.1

**Patil, D.A. and A.M.Patil (2019)** Plant Invasion In India As Revealed From Tantrasarah. Journal of Emerging Technologies and Innovative Research 6(3):16-21.

**Patil, D.A. and D.A. Dhale (2013)** Spices And Condiments: Origin, History and Applications. Daya Publishing House, New Delhi, India.

**Pereram, BPR (2014)** A study on the plants used as Chopachini. J.Homeop.Ayurv. Med. 3:170. Doi:10.4172/2167_1206.1000170. https://doi.org/10.4172/2167-1206.1000170

**Purseglove J.W. (1968)** Tropical Crops-Dicotyledons. 2 Vols. Longmans, London, UK.

**Raghubanshi, A.S., Rai, L.C., Gaur, J.P. and J.S.Singh (2005)** Invasive alien species and biodiversity in India. Current Science 88(4):539-540.

**Rajagopal, T. and G. Panigrahi (1965)** 'Aliens' naturalised in the flora of Allahabad. Proc.Nat.Acad.Sci.India. Sect.B. 35(4):411-422.

**Reddy C. Sudhakar (2008)** Catalogue of Invasive Alien Flora of India. Forestry And Ecology Division, National Remote Sensing Agency, Balanagar, Hyderabad-500037, India.

**Roxburgh, W. (1814)** Hortus Benghalensis (A Catalogue of The Plants In The Honourable East India Company Botanic Garden, Calcutta) Serampore, India.

**Sawant, B.S., Alawe, J.R. and K.V. Rasal (2016)** Pharmacognostic study of Glycyrrhiza glabra Linn.: A review. International Ayurvedic Medical Journal 4(10):3989-3993.

**Sharifnia, F., Hasan Barani, M. and M. Assadi (2013)** Notes on some species of the genus Delphinium (Ranunculaceae) in Iran. Iran.J.Bot. 19(2):202-210.

**Sharma, B.D., Karthikeyan, S. and B.D.Sharma (1996)** Flora of Maharashtra State: Monocotyledones. Bot.Surv.India, Calcutta, India.

**Shetty, B.V. and V. Singh (1987)** Flora of Rajasthan Vol.I. Bot.Surv.India, Calcutta, India.

**Singh, A.K. and S.N.Nigam (2017)** Ancient alien crop introductions integral to Indian agriculture. An overview. Proc.Indian Natn.Sci.Acad. 83(3):549-568.

**Singh, N.P., Lakshminarasimhan, P, Karthikeyan, S. and P.V. Prasanna (2001)** Flora of Maharashtra State: Dicotyledones. Vol.II. Bot.Surv.India, Calcutta, India.

**Singh, N.P., Lakshminarsimhan, P. and S. Karthikeyan (2000)** Flora of Maharashtra State: Dicotyledons. Vol.I. Bot. Surv. India, Calcutta, India.

**Singh, V., Parmar, P.J. and R.P. Pandey (1991)** Flora of Rajasthan. Vol.II. Bot.Surv.India, Calcutta, India.

**Stewart, R.R. (1972)** An Annotated Catalogue of The Vascular Plants of West Pakistan And Kashmir. Fakhri Press, Karachi, Pakistan.

**Suri, Harshakirti (1981)** Yog Chintamani (Ayurvedic Aushadhancha Granth). Itihasacharya V.K. Rajwade Sanshodhan Mandal, Dhule (Maharashtra) (Repr.Ed.), India.

**Voight, J.O. (1845)** Hortus suburbanus Calcuttensis, Calcutta, India.

**Wagh, V.V. and Jain, A.K. (2015)** Invasive alien flora of Jhabua district, Madhya Pradesh, India. International Journal of Biodiversity And Conservation 7(4):227-237. https://doi.org/10.5897/ijbc2015.0833

**Wali, A. and M.Bachulkar (2016)** Traditional Herbal Drugs. Ankur Publications, Kolhapur (M.S.) India.

**Yadav, S.R. and Sardesai M.M. (2002)** Flora of Kolhapur District. Shivaji University, Kolhapur, Maharashtra, India. https://doi.org/10.21272/jnep.12(2).02026.

2020| Published by © Plantae Scientia

## Table-I: Exotic species in Yog Chintamani

| Sr. No | Plant Species & Family | Common Name | Habit & Status | No. of Citations in Manuscript | Nativity |
|---|---|---|---|---|---|
| 1. | *Acacia nilotica* (L.) Willd. ex Del. ssp. *indica* (Bth.) Brenan Mimosaceae | Bhabul | Tree Wild | 1 | North Africa & Arab Rajagopal & Panigrahi (1965), Purseglove (1968). |
| 2. | *Albizia lebbeck* (L.) Bth. Mimosaceae | Shirish, Siras | Tree Wild & Cultivated | 10 | Pan-tropical Africa & Tropical Asia: Bhandari (1978). |
| 3. | *Allium cepa* L. Liliaceae | Kanda | Herb Cultivated | 1 | West Asia: Gaikwad & Garad (2015), Patil (2003). Persia: Bailey (1928). |
| 4. | *Allium sativum* L. Liliaceae | Lasun | Herb Cultivated | 8 | Europe: Bailey (1949), Yadav & Sardesai (2002), Patil (2003). |
| 5. | *Aloe vera* (L.) Burm. *f.* Liliaceae | Korphada, Kumari | Shrub Wild & Cultivated | 3 | North America: Yadav & Serdesai (2002), Gaikwad & Garad (2015), Patil (2003). |
| 6. | *Amaranthus tricolor* L. var. *tricolor* Amaranthaceae | Tandulja | Herb Wild | 1 | Asia (Excl.India) & Africa: Stewart (1972). Tropical Asia: Yadav & Sardesai (2002). |
| 7. | *Areca catechu* L. Arecaceae | Supari | Tree Cultivated | 7 | Tropical Asia: Gaikwad & Garad (2015). |
| 8. | *Benincasa hispida* (Thunb.) Cogn. Cucurbitaceae | Kohola, Kushmand | Climber Cultivated | 3 | Java: Patil (1995). |
| 9. | *Boerhavia repens* L. var.*diffusa* (L.) Hook *f.* (Syn.B.diffusa L.) Nyctaginaceae | Punarnava | Herb Wild | 16 | Tropical Africa: Panda *et al.* (2018). |
| 10. | *Calotropis procera* (Ait.) R. Br. Or *Calotropis gigantea* (L.) Ait. Asclepiadaceae | Rui | Shrub Wild | 12 | Tropical Africa: Reddy (2008), Chandra Sekar (2012). |
| 11. | *Cannabis sativa* L. Cannabaceae | Bhangi, Bhang | Herb Wild | 2 | Central Asia: Chandra Sekar (2012). Asia (Excl.India): Kaul (1986). |
| 12. | *Carvum carvi* Linn. Apiaceae | Shahajire | Herb Cultivated | 5 | Western Asia, Europe & North America: (*cf.*wikipedia) |
| 13. | *Cassia fistula* L. | Bahava | Tree | 12 | North America: Debnath & |

| | | | | | |
|---|---|---|---|---|---|
| | Caesalpiniaceae | | Cultivated | | Debnath (2017). |
| **14.** | *Cassia tora* L. Caesalpiniaceae | Tarwata, Takala | Herb Wild | 3 | South America: Reddy (2008), Chandra Sekar (2012), Patil (2017a). |
| **15.** | *Cicer arietinum* L. Papilionaceae | Chana | Herb Cultivated | 2 | Mediterranean Region: Shetty & Singh (1987). South Europe: Patil (1990) |
| **16.** | *Cinnamomum zeylanicum* Blume (Syn. *C.verum*J.S.Presl.) Lauraceae | Dalchini | Tree Cultivated | 15 | Ceylon (Sri Lanka): John (1891). |
| **17.** | *Cissampelos pareira* L. Menispermaceae | Patha, Pata | Climber Wild | 9 | South America: Rajagopal & Panigrahi (1965), Panda *et al.* (2018). |
| **18.** | *Citrus medica* L. Rutaceae | Madhulunga | Tree Cultivated | 1 | China: Roxburgh (1814). |
| **19.** | *Coriandrum sativum* L. Apiaceae | Dhane, Dhanyakam | Herb Cultivated | 20 | South Europe: Bailey (1949), Gaikwad & Garad (2015), Yadav & Sardesai (2002). |
| **20.** | *Cuminum cyminum* L. Apiaceae | Jire, Jirak Jirakam | Herb Cultivated | 33 | South Europe; Gaikwad & Garad (2015). Mediterranean Region: Shetty & Singh (1987). |
| **21.** | *Cynodon dactylon* Pers. Poaceae | Durva | Herb Wild | 3 | Tropical Africa: Debnath & Debnath (2017), Wagh & Jain (2015), Panda *et al.* (2018). |
| **22.** | *Datura inoxia* Mill. Solanaceae | Dhatur, Dhotra | Shrub Wild | 7 | Tropical America: Reddy (2008), Patil (2017a). North & South America: Stewart (1872). |
| **23.** | *Datura metel* L. Solanaceae | Kala-Dhotra | Shrub Wild | 1 | Tropical America: Chandra Sekar (2012), Patil (2017a), Patil (1990). |
| **24.** | *Delphinium zalil* Aitch. and Hems. Ranunculaceae | Trayman, Trayanmana | Herb Wild | 10 | Iran: Sharifnia *et al.* (2013). |
| **25.** | *Dryobalanops aromatica* C.F.Gaertn. Dipterocarpaceae | Bhimseni-Kapur | Tree Wild | 12 | Borneo, Labuan, Sumatra & Jahore: Lake & Kalsall (1894). |
| **26.** | *Echinops echinatus* Roxb. Asteraceae | Uttaka Untkata | Herb Wild | 5 | Afghanistan: Reddy (2008), Chandra Sekar (2012), Patil (2017a). |
| **27.** | *Eclipta prostrata* (L.) L. Asteraceae | Maka, Bhrungraj | Herb Wild | 11 | South & Tropical America: Reddy (2008), Patil (1990), Rajagopal & Panigrahi (1965). |
| **28.** | *Ferulu asafoetida* Linn. Apiaceae | Hing, Hingu | Herb Cultivated | 18 | Persia: Roxburgh (1814). Central Asia, Europe & North Africa: Patil & Dhale (2013). |
| **29.** | *Foeniculum vulgare* Mill. Apiaceae | Badishop, Badishep Shatpushpa | Herb Cultivated | 12 | Europe: Dar *et al.* (2002). |
| **30.** | *Fumaria indica* (Hauskk.) Pugsley Fumariaceae | Pittpapda | Herb Wild | 12 | Pakistan & Afghanistan: Negi & Hajra (2007). |
| **31.** | *Glycyrrhiza glabra* Linn. Papilionceae | Jeshthamdh | Herb Cultivated | 23 | Arabia, Persian Gulf, Afghanistan, Turkestan, Asia Minor & Siberia: Sawant *et al.* |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | (2016). |
| **32.** | *Guizotia abyssica* (L.*f.*) Cass. Asteraceae | Khurasani | Herb Cultivated | 2 | Tropical Africa: Naik (1998), Yadav & Sardesai (2002). Abyssina: Patil (1995). |
| **33.** | *Lagenaria siceraria* (Mol.) Standl. Cucurbitaceae | Katu-Bhopala Kadu-Bhopala Pandhara-Bholapa, Tumbi | Climber Cultivated | 1 | Africa: Singh & Nigam (2017). |
| **34.** | *Lawsonia inermis* L. Lythraceae | Mehandi | Shrub Cultivated | 1 | Middle East: Gaikwad & Garad (2015). Arabia & Persia: Shetty & Singh (1987). |
| **35.** | *Lens culinaris* Medik. Paplionaceae | Masur | Herb Cultivated | 1 | Central Europe Mediterranean Region & West Asia: Patil (1995). |
| **36.** | *Linum usitatissimum* L. Linaceae | Jav, Javas, Atasi | Herb Cultivated | 5 | Mediterranean Region: De Candolle (1886). Europe: Dar *et al.* (2002), John (1891). |
| **37.** | *Martynia annua* L. Martyniaceae | Vyaghranakh i | Shrub Wild | 1 | Tropical America: Reddy (2008), Naik (1998), Chandra Sekar (2012). |
| **38.** | *Melia azaderach* L. Meliaceae | Bakan-limb | Tree Cultivated & Wild | 1 | Asia (Excl.India): Ara *et al.* (1995). |
| **39.** | *Myristica fragrans* Houtt. Myristicaceae | Jayphal, Jatiphal | Tree Cultivated | 22 | Moluccas: Singh *et al.* (2001). |
| **40.** | *Nerium indicum* Mill. Cucurbitaceae | Kanher Kaneri | Shrub Cultivated | 5 | West Asia: Yadav & Sardesai (2002), Gaikwad & Garad (2015), Patil (2003). Persia: Bailey (1928). |
| **41.** | *Opuntia elatior* Mill. Cactaceae | Nivdung | Shrub Cultivated | 7 | South America: Chandra Sekar (2012), Patil (2003). Tropical America: Shetty & Singh (1987). |
| **42.** | *Papaver somniferum* L. Papaveraceae | Aphu | Herb Cultivated | 2 | Mediterranean Countries & Middle East: Coats (1956), Shetty & Singh (1987). Europe: Stewart (1972). |
| **43.** | *Phoenix dactylifera* L. Arecaceae | Kharjur Kharjurika Kharik, Kharaka Khajur | Tree Cultivated | 6 | Arabia & North Africa: Graf (1980). |
| **44.** | *Piper betle* L. Piperaceae | Vidyache-pan Nagvalli, Tambul | Climber Cultivated | 6 | Bali & East Indies Graf (1980). |
| **45.** | *Plumbago zeylanica* L. Plumbaginaceae | Chitrak | Shrub Wild | 13 | Africa: Rajagopal and Panigrahi (1965), Panda *et al.* (2018). Tropical of Asia, Africa, Australia & Hawaii: Bailey (1929). |

| | | | | | |
|---|---|---|---|---|---|
| **46.** | *Punica granatum* L. Punicaceae | Dadim, Dalimb | Tree Cultivated | 22 | South Asia: Gaikwad & Garad (2015). Afghanistan, Baluchistan & Persia: Patil (2000), Shetty & Singh (1987). |
| **47.** | *Raphanus sativus* L. Brassicaceae | Mula | Herb Cultivated | 2 | Europe & Temperate Asia: Singh *et al*. (1991), John (1891). Western Asia: Purseglove 1568). China, Japan & West Asia: Voight (1845). |
| **48.** | *Ricinus communis* L. Euphorbiaceae | Aarandel Aarand | Tree Cultivated | 17 | Tropical Africa: Yadav & Srdesai (2002). Africa: Bailey (1949), Stewart (1972). |
| **49.** | *Rubia cordifolia* L. Rubiaceae | Manjistha | Climber Cultivated | 22 | Asia (Excl.India) & Africa: Kaul (1986). |
| **50.** | *Sesbania sesban* (L.) Merr. Papilionaceae | Shevari Sevari | Tree Cultivated | 2 | Tropical Africa: Martin *et al*. (1987). |
| **51.** | *Sida cordifolia* L. Malvaceae | Bala, Chikana | Herb Wild | 6 | Tropical & Subtropical Regions of Both Hemispheres: Bhandari (1978). |
| **52.** | *Smilax china* L. Liliaceae | Chopchini | Climber Wild | 1 | China & Japan: Perera (2014). |
| **53.** | *Syzggium aromaticum* (L.) Merr. [(Syn.Eugenia caryophyllus (Spregal) Bullok *et* Harrison] Myrtaceae | Lavang | Tree Cultivated | 27 | Moluccas Roxburgh (1814). |
| **54.** | *Tabernaemontana divaricata* (L.) R.Br. Apocynaceae | Tagar, Ananti | Shrub Cultivated | 13 | Tropical Asia: Singh *et al*. (1991). |
| **55.** | *Tamarindus indica* L. Caesalpiniaceae | Chinch | Tree Wild & Cultivated | 5 | Tropical America: Shetty & Singh (1987), Patil (1990). |
| **56.** | *Trachyspermum ammi* (L.) Sprague Apiaceae | Owa, Ajmoda | Herb Cultivated | 39 | South Europe: Gaikwad & Garad (2015). Africa: Shetty & Singh (1987). |
| **57.** | *Trapa natans* L. var.*bispinosa* (Roxb.) Makino Trapaceae | Sindhade | Herb Cultivated | 3 | Europe: Kak (1990). |
| **58.** | *Tribulus terrestris* L. Zygophyllaceae | Ghokharu, Gokhur Gokshur Gosur, Sarate | Herb Wild | 19 | Tropical America: Reddy (2008), Chandra Sekar (2012). Africa & Asia (Excl.India): Kaul (1986). |
| **59.** | *Trigonella foenum-graecum* L. Papilionaceae | Methi | Herb Cultivated | 2 | South Europe: Shetty & Singh (1987). Africa: Patil (2019). Asia (Excl.India) & Europe: Kaul (1986). |
| **60.** | *Triticum aestivum* L. Poaceae | Gahu | Herb Cultivated | 2 | Fertile Crescent: Singh & Nigam (2017). |
| **61** | *Vitis vinifera* L. Vitaceae | Drakshe | Liane Cultivated | 14 | South-East Europe To West Indies: Singh *et al*. (2000). Asia (Excl.India) & Europe: Stewart (1972). |