



# Charak Samhita In The Context of Plant Invasion In India

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**Abstract:** Richness of biodiversity in India has been documented in various ancient heritage literary sources. One such treatise in Charaka Samhita, Acharya Charaka being its exponent. It contains Sanskrit plant names of medicinal significance. The present author critically deciphered their botanical identity with the recent Latin names and assigned to their respective families. Their exotic status along with their nativities, habit, status regarding wildness or cultivated are provided. As many as 76 exotic plant species are revealed belonging to 68 genera and 42 angiospermic families. These are discussed in the light of plant invasion in India in ancient period. The information so adduced is hoped helpful while embarking upon management and conservation of Indian biodiversity.

**Key Words:** Charak Samhita, Exotic Plants, Plant Invasion, India.

## Introduction

Charak Samhita is the compendium compiled by the sage Agnivesa by the preaching of expounder Punarvasu Atreya. It is redacted by Acharya Charaka and thus became popular as Charak Samhita in Ayurvedic fraternity. The ancient medical treatise Charak Samhita was developed by Acharya Charak (A.D. 150-200). He is responsible for mainly emphasizing illness diagnosis and recognizing Ayurveda as a holistic system of health. This system thus addressed both preventive and curative elements. He put impetus on three 'doshas' (principles) of vata (movement), pitta (transformation) and kapha (lubrication and stability). This Samhita is written in Sanskrit and organized into eight sections (Ashtanga Sthanas). The text, apart from ancient medical practices, is also a source information on ecological, social and economic elements in India. The present author thought worthwhile to study its medicinal biodiversity with a particular emphasis on exotic natural sources. The names of plant species coined are in Sanskrit. They are analysed on botanical ground searching out their recent equivalent scientific (Latin) names and respective families. The data so accrued is interpreted in the perspective of plant invasion (bioinvasion) in India in ancient period.

## Methodology Adapted

The literary sources for Charak Samhita has been studied tapping down especially Sanskrit plant names are *viz.* (i) Charaka Samhita (Vol.1-5) (Shashireka & Bargale, 2020) and (ii) The Charaka Samhita of Agnivesa (Pandeya & Chaturvedi, 1962). These names are equated with the recent botanical (Latin) names and assigned to their respective families. The exotic status is pointed out by consulting relevant taxonomic sources as mentioned against each species in Table-I along with their nativities, habit and status w.r.t. wildness and cultigens. The data so gathered is discussed in the light of plant invasion in ancient period in India.

## Results & Discussion

It is needles to state that we are better informed regarding the concepts and practice of medicinal herbs during the Vedic period. Ancient scriptures replete with mention of Sanskrit names of medicinal plant species are on record. They are christened especially in Samhita period. Charak Samhita is one of them written by one of the first exponents *viz.*, Charak. The present author critically examined the floral elements in it particularly finding out exotic plant species to shed more light on plant invasion (bioinvasion) on the then Indian subcontinent. As many as 76 exotic plant species are diagnosed pertaining to 68 genera and 42 families of angiosperms. Of these, the dicotyledons shared maximum invading this land (65 species, 57 genera and 38 families). However, the monocotyledons have comparatively less representation (11 species, 11 genera and 04 families). These can be further grouped on habital basis as: trees (18), shrubs (10), climbers (09) and herbs (39). The figures in parenthesis denote number of species. Thus herbaceous taxa appear more successful invading India as compared to other habital categories. These taxa are wild (36 species), cultivated (37 species) and both wild or cultigens (03 species). The former ones invaded naturally or unintentionally by the negligence of mankind during migration, communication or their activities in the said period. The cultivated taxa are obviously brought in India intentionally for additional sources of human sustenance or as a seer necessity of life. All these taxa are investigated for their native home.

As many as 46 different geographical regions, continents, countries, mountains, islands, etc. are sources of origin of these 76 plants species. They belong to Africa (29), Asia (Excl. India) (21), America (20), Europe (09) and China (08) contributing fair number of exotic species. Apart from these, other regions or countries are represented by fewer number of species such as: Mediterranean region (06), Malaya, Malaysia, Afghanistan and Pantropical by 03 species each. Few others *viz.*, Persian Gulf, Persia, Mexico, Indonesia, Japan, Brazil, West Indies contributed 02 exotic species each. There are still few other geographical regions which shared just a single exotic species each e.g. Turkestan, Asia Minor, Siberia, Tropic and Subtropics, Argentina, North Temperate Region, Pakistan, Greece, Mongolia, Baluchistan, Indo-China, Philippines, Ceylon (Sri Lanka), Java and Cochin China. This resume indicated nearly all regions are the sources of plant invasion intentionally or negligently *vis-à-vis* naturally. It is interesting that distant continent America also found as a major source of origin of exotic plans in the ancient period of India. The cultigens obviously have added economic sources, while the wild species are presently an integral segment of Indian biodiversity, some of which have assumed invasive status. The data obtained can be considered on scientific basis while applying measures for management and conservation of Indian bioinvasion.

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**Table-I: Exotic Plant Species In Charak Samhita**

Sr. No. (1)	Sanskrit Plant Name (2)	Botanical Name & Family (3)	Cultivated (C)/ Wild (W) (4)	Habit (5)	Nativity & Reference (6)
1.	Mashaparni	<i>Teramnus labialis</i> (L.f.) Spreng. Papilionaceae	W	Herb	Pantropical: Singh & Srivastava, 2000.
2.	Madhuka, Vashtimadhu	<i>Glycyrrhiza glabra</i> Linn. Papilionaceae	C	Herb	(i) Arabia, Persian Gulf, Afghanistan, Turkestan, Asia Minor & Siberia: Sawant <i>et al.</i> , 2016. (ii) Mediterranean Region & Europe: Katya <i>et al.</i> , 2014. (iii) Pakistan & Afghanistan: Negi & Hajra, 2007.
3.	Kshirini	<i>Manilkara hexandra</i> Roxb. (Syn. <i>Mimusops hexandra</i> Roxb.) Sapotaceae	C	Tree	South America: Sainkhedia, 2006.
4.	Bhadraudani Bala	<i>Sida cordifolia</i> Linn. Malvaceae	W	Herb	Tropical & Subtropical Regions of Both Hemispheres: Bhandari, 1978.
5.	Musta	<i>Cyperus rotundus</i> L. Cyperaceae	W	Herb	(i) Tropical Africa: Debnath & Debnath, 2017. (ii) Europe: Kaul, 1986.
6.	Vacha, Golomi	<i>Acorus calamus</i> (Linn.) Araceae	C	Herb	(i) South Asia, Central Western North America: Novak, 1966. (ii) Europe: Almeida, 2009b.
7.	Chitraka	<i>Plumbago zeylanica</i> L. Plumbasinaceae	W	Shrub	(i) Africa: Rajagopal & Panigrahi, 1965. (ii) Tropics & Subtropics: Matthew, 1991.

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8.	Arko	<i>Calotropis procera</i> (Ait.) R.Br. Asclepiadaceae	W	Shrub	(i) Tropical Africa: Reddy, 2008; Chandra Sekar, 2012. (ii) Persia & Africa: Almeida, 2001a.
9.	Swarnakshiri	<i>Aregemone medicana</i> L. Papaveraceae	W	Herb	(i) Tropical America: Shetty & Singh, 1987. (ii) South America: Patil, 2017b. (iii) Mexico: Lesley, 2020. (iv) America: Sorenson, 2005.
10.	Ambasta, Patha	<i>Cissampelos pareira</i> L. Menispermaceae	W	Climber	South America: Rajagopal & Panigrahi, 1965.
11.	Chavya	<i>Piper retrofactum</i> Vahl. (Syn. <i>P.chaba</i> Hunter) Piperaceae	W	Climber	Southern China, Malaysia, Indonesia, Philippines & Indo-China: Tropical Plant Database, 2019.
12.	Ajamoda	<i>Apium graneolens</i> L. Apiaceae	C	Herb	Europe: Debnath & Debnath, 2017.
13.	Bhallataka	<i>Semecarpus anacardium</i> L. Anacardiaceae	C	Tree	West Indies: Sainkhedia, 2016
14.	Rishyaproka Atibala	<i>Abutilon indicum</i> (L.) Sweet Malvaceae	W	Shrub	Africa: Thakur & Ambrish, 2023.
15.	Tunga	<i>Calophyllum inophyllum</i> L. Clusiaceae	W,C	Tree	(i) East Africa: Pullaiaha & Rao, 2002. (ii) Tropical Asia: Mukhopadhyay & Chakraverty, 2008.

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16.	Manjistha	<i>Rubia cordifolia</i> L. Rubiaceae	W	Clumber	Asia (Excl. India) & Africa: Kaul, 1986.
17.	Lata, Shatavirya	<i>Cynodon dactylon</i> (L.) Pers. Poaceae	W	Herb	Tropical Africa: Debnath & Debnath, 2017; Panda <i>et al.</i> , 2018.
18.	Draksha, Mridvika	<i>Vitis vinifera</i> L. Vitaceae	C	Climber	(i) West Indies: Gaikwad & Garad, 2015. (ii) West Asia: Singh <i>et al.</i> , 2000. (iii) Asia (Excl. India) & Europe: Stewart, 1972.
19.	Bruhati	<i>Solanum anguivi</i> Lam. (Syn.S.indicum auct. non.L.) Solanaceae	W	Herb	Africa: Pulliaha & Rao, 2001.
20.	Amrataka	<i>Spondias pinnata</i> (L.f.) Kurz. Anacardiaceae	C	Tree	Tropical Asia: Martin <i>et al.</i> , 1987.
21.	Karamarda	<i>Carissa carandas</i> L. Apocynaceae	W	Shrub	(i) South Africa: Sainkhedia, 2016. (ii) Malasiya: Medakkar & Sharma, 2016a,c.
22.	Badera	<i>Ziziphus jujuba</i> Mill. Rhamnaceae	C	Tree	Subtropics & Warm Temperate Zone: Martin <i>et al.</i> , 1987.
23.	Dadima	<i>Punica granatum</i> Puniceae	C	Tree	(i) South Asia: Gaikwad & Garad, 2015. (ii) Afghanistan, Baluchistan & Persia: Patil, 2003; De Candolle, 1959; Shetty & Singh, 1987.

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24.	Jatripravala	<i>Jasminum officinale</i> L. Oleaceae	C	Climber	China: Patil, 2003; Yadav & Sardesai, 2002.
25.	Shigru, Akshiva	<i>Moringa oleifera</i> Lam. Moringaceae	C	Tree	America: Singh & Srivastava, 2000.
26.	Gandira	<i>Eurphobia antiquorum</i> L. Euphorbiaceae	W	Shrub	Africa: Naik, 1998.
27.	Sindhuvara, Nirgundi	<i>Vitex negundo</i> Linn. Verbenaceae	W	Shrub	North China & Mongolia: Bailey, 1949.
28.	Kinihi, pratyakpushpa	<i>Achyranthes aspera</i> L. Amaranthaceae	W	Herb	Tropics: Patil, 2021.
29.	Shwadenashtra	<i>Tribulus terrestris</i> L. Zygophyllaceae	W	Herb	(i) Tropical America: Reddy, 2008; Chandra Sekar, 2012. (ii) Africa & Asia (Excl. India): Kaul, 1986.
30.	Akhuparni	<i>Merremia gangetica</i> (L.) Cufod. (Syn. <i>M.emarginata</i> Burm. f. & Hall. f.) Pomoeareniformis Convolvulaceae	W	Climber	(i) Afro-Asian: Naik, 1998, Patil, 2003. (ii) Tropical Africa: Jadhav, 2012. (iii) Tropical America: Medakkar & Sharma, 2016a.
31.	Shirisha, Kapitana	<i>Albizia lebbeck</i> (L.) Bth. Mimosaceae	C	Tree	(i) Pantropical Africa & Tropical Asia: Bhandari, 1978. (ii) North Australia & Tropical Asia: Patil, 2017a.

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32.	Virana, Ushira, Abhayam	<i>Vetiveria zizanoides</i> (L.) Nash. Poaceae	C	Herb	China: Medakkar & Sharma, 2016d.
33.	Kasha	<i>Saccharum spontaneum</i> L. Poaceae	H	Herb	Tropical West Asia: Reddy, 2008; Chandra Sekar, 2012.
34.	Katrana	<i>Cymbopogon martini</i> (Roxb.) Wats. [Syn.C.choenanthus L. var. martini (Roxb.) Hook.f.] Poaceae	W	Herb	(i) Afro-Asian: Naik, 1998. (ii) Africa: Yadav & Sardesai, 2002.
35.	Eranda, Urubuka	<i>Ricinus communis</i> L. Euphorbiaceae	C	Tree	(i) Tropical Africa: Lesley, 2017. (ii) Africa: Purseglove, 1968. (iii) Greece & North Africa: Almeida, 2003b. (iv) North-East Tropical Africa: Matthew, 1991.
36.	Vrushchira, Punarnawa	<i>Boerhavia repens</i> var. <i>diffusa</i> (L.) Hook.f. Nyctaginaceae	W	Herb	(i) South Africa: Struwig & Siebert, 2013 (ii) Tropical Africa: Panda <i>et al.</i> , 2018.
37.	Yava	<i>Hordeum vulgare</i> Linn. Poaceae	C	Herb	Europe & North America: Dar <i>et al.</i> , 2002
38.	Tila	<i>Sesamum orientale</i> L. (Syn.s.indicum L.) Pedaliaceae	C	Herb	Africa; Dogra, 2011.

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39.	Kulattha	<i>Macrotyloma uniflorum</i> (Lam.) Verdc. (Syn. <i>Dolichos biflorus</i> auct.non L.) Papilionaceae	C	Herb	South-East Asia: Patil, 2019
40.	Kavidara Karbudara	<i>Bauhinia variegata</i> L. Caesalpiniaceae	C	Tree	China: Debnath & Debnath, 2017
41.	Vidula	<i>Barringtonia acutangula</i> L. Barringtoniaceae	W	Tree	Tropical America: Kalita <i>et al.</i> , 2019.
42.	Bimbi	<i>Coccinia grandis</i> (L.) Voight (Syn. <i>C.indica</i> Wight & Arn.) Cucurbitaceae	W,C	Climber	Africa: Medakkar & Sharma, 2016b.
43.	Kashmarya, Kashmari	<i>Gmelina arborea</i> Roxb. Verbenaceae	C	Tree	Malaya: Medakkar & Sharma, 2016b.
44.	Shatapushpa	<i>Anethum graveolens</i> L. (Syn. <i>A.sowa</i> Roxb. et Flem.)	C	Herb	Europe: Patil, 2003; Yadav & Sardesai, 2002.
45.	Shweta (white variety)	<i>Clitoria ternatea</i> L. var. <i>pilosules</i> Wall. ex Baker (Syn.) Papilionaceae	W,C	Climber	Tropical America: Purseglove, 1968

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	Mahashweta (Blue variety)	<i>Clitoria ternatea</i> L. Papilionaceae	W,C	Climber	Tropical America: Purseglove, 1968
46.	Parpataka	<i>Fumaria indica</i> (Haussk.) Pugsley Fumariaceae	W	Herb	(i) Pakistan & Afghanistan: Negi & Hajra: 2007. (ii) North Temperate Region: Rajagopal & Panigrahi, 1965.
47.	Dhanuaka	<i>Coriandrum sativum</i> L. Apiaceae	C	Herb	(i) South Europe: Yadav & Sardesai, 2002. (ii) Mediterranean Region: Shetty & Singh, 1987.
48.	Atmugupta, Kacchura	<i>Mucuna prurens</i> (L.) DC. Papilionaceae	W	Climber	America: Singh & Nivam, 2017.
49.	Shalmali	<i>Bombax ceiba</i> L. (Syn. <i>Salmalia malabaricum</i> DC.) Bombacaceae	W	Tree	(i) America & Australia: Mukhopadhyaya & Chakraverty, 2008. (ii) Africa: Gaikwad & Garad, 2001. (iii) Brazil & Argentina: Singh <i>et al.</i> , 2015.
50.	Bhutika	<i>Trachyspermum ammi</i> (L.) Sprague Apiaceae	C	Herb	(i) South Europe: Yadav & Sardesai, 2002. (ii) Africa: Patil, 1995; Shetty & Singh, 1987.
51.	Ajagandha	<i>Cleome gynandra</i> L. Capparidaceae	C	Herb	(i) Tropical America: Reddy, 2008; Patil, 2017a,b (ii) Africa: Hewsom & Thompson, 1993.
52.	Ajaji	<i>Cuminum cyminum</i> L. Apiaceae	C	Herb	(i) South Europe: Yadav & Sardesai, 2002. (ii) Mediterranean Region: Patil, 1995; Shetty & Singh, 1987.

Sr. No. (1)	Sanskrit Plant Name (2)	Botanical Name & Family (3)	Cultivated (C)/ Wild (W) (4)	Habit (5)	Nativity & Reference (6)
53.	Vatyapushpi	<i>Sida rhombifolia</i> L. Malvaceae	W	Herb	America: Singh & Das, 2015.
54.	Harenuka	<i>Pisum sativum</i> L. Papilionaceae	C	Herb	(i) Mediterranean Region: Novak, 1966. (ii) West Asia: Shetty & Singh, 1987.
55.	Nakha	<i>Ipomoea pes-tigridis</i> L. Convolvulaceae	W	Climber	(i) Tropical East Asia: Reddy, 2008; Debnath & Debnath, 2017. (ii) Paleotropical Region: Singh & Srivastava, 200.
56.	Hiberu	<i>Plectranthus scutellaroides</i> (L.) R.Br. [Syn. <i>Plectranthus scutellaroides</i> (L.) Benth] Lamiaceae	W	Herb	Java: Yadav & Sardesai, 2002
57.	Tvak	<i>Cinnamomum verum</i> J.S.Presl. Lauraceae	W	Tree	(i) Ceylone (Sri Lanka): Singh <i>et al.</i> , 2015. (ii) South-East Asia: Novak, 1966.
58.	Vyaghi, Kantakarika	<i>Solanum virginianum</i> L. Solanaceae	W	Herb	Paleotropical: Singh & Srivastava, 2000.
59.	Karavira	<i>Nerium indicum</i> Mill. Apocynaceae	C	Shrub	(i) China, Cochin China: Voight, 1945. (ii) Mediterranean Region: Purseglove, 1968. (iii) China: Almeida, 2001a. (iv) Tropical & Subtropical Asia: Gaikwad & Garad, 2015.

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60.	Arka	<i>Calotropis gigantea</i> (L.) Ait. Asclepiadaceae	W	Shrub	Tropical Africa: Reddy, 2008; Chandra Sekar, 2012.
61.	Jati	<i>Myristica fragrans</i> Houtt. Myristicaceae	C	Tree	Moluccas: Singh <i>et al.</i> , 2001.
62.	Katuka	<i>Abelmoschus esculentus</i> (L.) Moench. Malvaceae	C	Herb	(i) Tropical Africa: Purseglove, 1968. (ii) Probably Africa: Almeida, 1996. (iii) Asia (Excl. India) & Africa: Naqshi <i>et al.</i> , 1988.
63.	Pusa	<i>Areca catechu</i> L. Arecaceae	C	Tree	(i) Tropical Asia: Gaikwad & Garad, 2015. (ii) Indonesian Archipelago: Ahuja & Ahuja, 2011. (iii) Malaysia: Chaphekar <i>et al.</i> , 2007. (iv) Malaysian Archipelago: Shah, 2015.
64.	Tambalu	<i>Piper bettle</i> L. Piperaceae	C	Climber	(i) Bali & East Indies: Graf, 1980. (ii) Malaysian Archipelago: Shah, 2015. (iii) Malaysia: Hewson & Thompson, 1993.
65.	Karpura	<i>Cinnamomum camphora</i> (L.) Nees & Eberm. Lauraceae	C	Tree	(i) Japan: Matthew, 1991. (ii) South-East Asia: Novak, 1966. (iii) Taiwan: Gopalswamiengar, 1991. (iv) China & Southern Japan: Wilson, 1994.
66.	Shravani	<i>Sphaeranthus indicus</i> Linn. Asteraceae	W	Herb	Africa: Sainkhedia, 2016.

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67.	Shahadera, Atibala	<i>Abutilon indicum</i> (L.) Sweet Malvaceae	W	Shrub	Africa: Thakur & Ambrish, 2023.
68.	Shweta-Punarnava	<i>Trianthema portulacasstrum</i> L. Aizoaceae	W	Herb	Tropical America: Quereshi <i>et al.</i> , 2014.
69.	Shatapushpa	<i>Foeniculum vulgare</i> Mill. Apiaceae	C	Herb	(i) South Europe: Gaikwad & Garad, 2015. (ii) Mediterranean Region: Purseglove, 1968. (iii) Europe: Dar <i>et al.</i> , 2002.
70.	Madhulika	<i>Eleusine coracana</i> (L.) Gaertn. Poaceae	C	Herb	(i) Africa: Singh & Nigam, 2017. (ii) Tropical Africa: Gaikwad & Garad, 2015. (iii) Western Uganda & Ethiopian Highland: Castillow <i>et al.</i> , 2016.
71.	Kharjura	<i>Phoenix dactylifera</i> L. Arecaceae	C	Tree	(i) Persian Gulk: Patil, 2019. (ii) Africa: Bailey, 1949.
72.	Tala-mastuka	<i>Borassus flabellifer</i> L. Arecaceae	C	Tree	Tropical Africa: Reddy, 2008; Cooke, 1958.
73.	Darbha	<i>Imperata cylindrica</i> (Linn.) Raeuschel Poaceae	W	Herb	(i) Africa: Almeida, 2009b. (ii) Asia (Excl. India) & Europe: Kaul, 1986. (iii) Tropical Asia: Titiek <i>et al.</i> , 2015.
74.	Itkata	<i>Sesbania bispinosa</i> (Jacq.) (W.F. Wight) Papilionaceae	W	Herb	Tropical America: Reddy, 2008; Chandra Sekar, 2012.

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75.	Rajakshavka	<i>Euphorbia hirta</i> L. Euphorbiaceae	W	Herb	(i) Tropical America: Reddy, 2008. (ii) Central America: Hewson & Thompson, 1993.
76.	Kakanasika	<i>Martynia annua</i> L. Martyniaceae	W	Herb	(i) Tropical America: Reddy, 2008. (ii) Mexico & Brazil: Rajagopal & Panigrahi, 1965. (iii) Mexico: Yadav & Sardesai, 2002.