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RESEARCH ARTICLE

Origins of Alien Species and Plant Invasion in India as Tapped from Kurma Purana

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ABSTRACT

Ancient Sanskrit Puranas are literary heritage of India. They are studied from different perspectives but appeared largely neglected from the viewpoint of plant invasion in Indian territory. The present attempt dealt with the alien plant species as encoded in Sanskrit plant names in various verses of Kurma Purana. As many as 24 alien plant species belong to 23 genera of 16 families of angiosperms. They are analysed carefully floristically, habital categories and status regarding cultivation or naturalization. They are also studied for their nativity consulting relevant taxonomic literature. The data indirectly also indicated about utilities and awareness about classification of plants based on habits. Such investigations are warranted for better understanding of the development of natural wealth in past.

Keywords: Kurma Purana, Plant Invasion, India, Etymology.

INTRODUCTION

Man of learning worldwide endeavoured to unfold the wonders of ancient Indian society on different grounds. The epics like Ramayana and Mahabharata, the Vedas and Upanishadas have been investigated in different disciplines of study. Even Sanskrit scripts e.g., Kautilyas Arthashastra, Vrkshayurveda of Parasara attracted attentions of many scholars even in abroad. The Puranas is another compartment in ancient Sanskrit literature, which are being studied (Sensarma, 1984, 1987, 1988, 1992) particularly for wealth embodied in them in ethnobotanical perspective.

Schultes (1960) rightly remarked that the survey of the literature constitutes an important path of research. The present author, also paid some attention to such literary sources, however, on different perspective *viz*., plant invasion on Indian territory in different periods of time (Patil, 2017, 2018 a,b; 2019; Patil and Patil, 2019). Kurma Purana also attracted his attention. The exotic plant species mentioned in it are exhumed to shed more light on plant invasion in the then India. At the same, the paper highlights human contacts for different purposes in those days, besides what importance is attached to plants in such ancient scripts.

METHODOLOGY

The text is named after the tortoise incarnation (avatar) of Vishnu. Kurma Purana by Gupta (1972) is analysed. It contains 'Slokas' in Sanskrit. It is divided into two divisions *viz*., Purba Bhaga and Uttara Bhaga. Sanskrit plant names are noted in some Slokas and Chapters. These are equated with Latin plant names and their identity is confirmed consulting literature. The scientific nomenclature has been updated through various floras (Hooker, 1872-1897; Cooke, 1958; Sharma *et al*., 1996; Singh *et al*., 2000, 2001; Naik, 1998; Patil, 2003; Kshirsagar and Patil, 2008; Yadav and Sardesai, 2002). The exotic status is deciphered by consulting relevant taxonomic literary sources as mentioned against each taxon in the Table-I. Their category regarding habit and status (wild or cultivated) is pointed out to reveal their role in human substance.

RESULTS AND DISCUSSION

The data on elements of plant-wealth contained in the Kurma 'Purana exhibit as many as eighty plant species. The present author, however, considered alien species only. Of these, 24 angiospermic alien species belong to 23 genera and 16 families. They can be further categorised as: (i) dicotyledons with 19 species, 19 genera and 14 families, (ii) monocotyledons with 05 species, 04 genera and 02 families. Twenty species are generally found under cultivation for various material use by mankind and only four species appear naturalised and are an integral part of Indian biodiversity. Their habital categorisation is as such: herbs 12 species, climbers 05 species, trees and shrubs 03 species each.

The plant species have been confirmed for their nativity by consulting modern taxonomic literary sources as mentioned against each taxon in the Table-I. On critical analysis, they appeared belonging to different continents, countries and geographical region of both the Old and New Worlds. Maximum alien species which invaded in the then Indian territory are from various parts of Asia (Excl. India) with 08 species and America with 07 species. Europe is fairly represented by 05 species, whereas Africa contributed for 03 species. There are some countries and regions that contributed 02 species each such as Persia, East Indies, China and Mediterranean region. There are some others which are represented by a single species each like West Indies, Java, Japan, Bali, Afghanistan, Baluchistan, Arabia, tropics and Fertile Crescent. These obviously indicate contacts of the ancient Indians with other parts of the World. These taxa, besides indigenous have been found useful for various purposes as mentioned in Kurma Purana e.g., weapon making, furniture, garments, medicine, religious rituals and gardening. This fact indicates that the alien species not only enriched Indian biodiversity but also integrated with bioculture of India.

If we go through the taxonomic literature, it has been explained that it was Theophrastus (C.350 BC- C 287 BC) who, for the first time, classified plants on the basis of habits in his 10-volume work 'Historia Plantarum: The author of Kurma Purana was also aware about this categorisation. This appears when we come across the words in this Purana like Osadhi (annuals), Vriksa (trees), Virudha (herbs). This method of classification is not claimed in the Purana but it appears that there were some early attempts to classify in those days in Indian society.

The information gleaned from the text of Kurma Purana also indirectly conveys plant invasion in India and these alien taxa were well established under cultivation or as naturalised ones. The invasion is both, deliberate and accidental. The ancient Sanskrit scripts like Puranas of Indian origin are replete with reference to the floral elements. They are sources of information about the changing pattern of vegetation in India, besides the economy and then environment. Considerable attention has been given to the studies on alien taxa (Maheshwari, 1960, 1979; Nayar, 1977; Reddy, 2008). However, the ancient evidences from Sanskrit scripts have been relatively remained neglected. It is, therefore, essential to tap down information from ancient literary heritage of Indian which help understand for environmental management and biota on Indian landmass.

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Table-I: Exotic Plant Species in Kurma Purana.

Sr. No.	Plant Name & Family	Sanskrit Name	Habit	Wild (W)/ Cultivated (C)	Nativity
1.	*Achyranthes aspera* L. Amaranthaceae	Apamarga	Herb	W	Tropics: Medakkar & Sharma, 2016.
2.	*Allium cepa* L. Liliaceae	Palandu	Herb	C	West Asia: Yadav & Sardesai, 2002; Patil, 2003. Persia: Bailey, 1928. West Temperate Asia: De Candolle, 1959.
3.	*Allium sativum* L. Liliaceae	Lasuna	Herb	C	Europe: Bailey, 1949; Yadav & Sardesai, 2002; Patil, 2003.
4.	*Amaranthus tricolor* L. Amaranthaceae	Tanduliya	Herb	W	Tropical Asia: Yadav & Sardesai, 2002. Asia (Excl. India) & Africa: Stewart, 1972.
5.	*Benincasa hispida* (Thunb.) Cogn. (Syn.*B.cerifera* Savi.) Cucurbitaceae	Kusmanda	Climber	C	Java: Patil, 1995; Cooke, 1958.
6.	*Capsicum frutescens* L. Solanaceae	Marica	Shrub	C	Tropical America: Singh, *et al*., 1991.
7.	*Carthamus tinctorius* L. Asteraceae	Kusumbha	Herb	C	South-West Asia: Cooke, 1958; Gaikwad & Garad, 2015; Singh *et al*., 2001; Patil, 2003.

Table-I: Exotic Plant Species in Kurma Purana. (Contd.)

8.	*Cissampelos pareira* L. Menispermaceae	Pato	Climber	W	South America: Rajagopal & Panigrahi, 1965; Panda *et al.*, 2018.
9.	*Citrus medica* L. Rutaceae	Matulunga	Tree	C	China: Roxburgh, 1814.
10.	*Gossypium herbaceum* L. Malvaceae	Karpasa	Herb	C	Arabia & Asia Minor: Bailey, 1949. Africa & Asia: Purseglove, 1968.
11.	*Hordeum vulgare* L. Poaceae	Yava	Herb	C	Europe & North America: Dar *et al.*, 2002.
12.	*Lagenaria sicerario* (Mol.) Standl. Cucurbitaceae	Alavu	Climber	C	Africa: Singh & Nigam, 2017.
13.	*Lens culinaris* Medik. (Syn.*L.esculentum Moench.*) Papilionaceae	Masura	Herb	C	Mediterranean Region & West Asia: Shetty & Singh, 1987.
14.	*Nerium indicum* Mill. (Syn. *N. oleander* L.) Apocynaceae	Karavira	Shrub	C	Mediterranean Region: Purseglove, 1968; Singh *et al.*, 1991. China & Cochin China, Voight, 1845.

Table-I: Exotic Plant Species in Kurma Purana. (Contd.)

15.	*Oxilis corniculata* L. Oxalidaceae	Asmantaka	Herb	W	Europe: Reddy, 2008; Patil, 2017; Chandra Sekar, 2012. North America: Bailey, 1949; Babu, 1977. Asia (Excl. India) & Europe: Kaul, 1986.
16.	*Paspalum scrobiculatum* L. Poaceae	Kodrava	Herb	C	Tropical Africa: Singh & Nigam, 2017.
17.	*Phaseolus vulgaris* L. Papilionaceae	Rajamasa	Herb	C	America: Singh & Nigam, 2017.
18.	*Piper betle* L. Piperaceae	Tambula	Climber	C	Bali & East Indies: Graf, 1980.
19.	*Plumeria alba* L. Apocynaceae	Ksrivrksa	Tree	C	Tropical America: Singh *et al*., 2001; Yadav & Sardesai, 2002. West Indies: Bailey, 1929; Patil, 1995.
20.	*Punica granatum* L. Punicaceae	Dadima	Tree	C	South Asia: Gaikwad & Garad, 2015. Afghanistan, Baluchistan & Persia: Shetty & Singh, 1987; Patil, 2003.
21.	*Raphanus sativus* L. Brassicaceae	Mulasaka	Herb	C	Western Asia: Purseglove, 1968. China, Japan & West Asia: Voight, 1845. Europe & Temperate Asia: Singh *et al*., 1991; Patil, 1995. Europe: John, 1891.
22.	*Solanum melongena* L. Solanaceae	Vartaka	Shrub	C	East Indies: Singh *et al*., 2001. America: Gaikwad & Garad, 2015.
23.	*Vitis vinifera* L. Vitaceae	Mrdvika	Climber	C	South-East Europe To West Indies: Singh *et al*., 2000. West Asia: Gaikwad & Garad, 2015. Asia (Excl. India) & Europe: Stewart, 1972.