



## Hastividyarnava sarasamgraha in the perspective of plant invasion in India

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### Abstract

Tracing man-plant relationships in the context of animals particularly gleaned from ancient written scripts has been largely overlooked. This negligence is more severe when the scripts are written in local languages. The present is an attempt to investigate 'Hastividyarnava Sarasamgraha' written in old Assamese (Kamrupi) vocabularies in Assamese characters by Barkaith in 1734 (or Saka 1656). The script exclusively contained medicament extended for healthcare of elephants. The present authors particularly paid attention to plant invasion tracing biogeographical regions of the 19 exotic plant species belonging to 18 genera 17 angiospermic families. The importance of tapping the literary source in ethnomedicinal investigation coupled with a focus on plant invasion in India is clearly spelt out.

**Keywords:** hastividyarnava, exotic plants, plant invasion, India

### Introduction

Since the beginning of life on Blue Planet, mankind and animals are associated with the plants obviously. Primitive mankind obviously utilized wild sources from vegetable kingdom. After food, medicine is the first discovery for man's healthcare. However, veterinary medicines are searched out only after domestication of some animals during his sedentary life-style and agricultural activity. Use of plants as medicine for animals is man's endeavour and love for them. Codified knowledge on uses, particularly medicine, we usually trace back to Vedic period (Patil and Patil, 2020) [26, 29]. The ancient literature in India have now proved to be very informative sources of use-reports. India is bestowed with richness in biodiversity and ethnicity. Medicinal treatises have been put on record in historic time e.g. Hortus Indicus Malabaricus (Van Rheede, 1678-1693) [38], Yog Chintamani (Suri, 1981) [36] Madhava Chikitsa (Krishnamurthy, 2012), Amarkosa (Amarsimha, Sardesai and Padhy, 1940) [34]. North-Eastern Indians were not also aloof from this trend. They have developed their own traditional curative system in verbal form particularly for domestic animals. One such invaluable treatise is 'Hastividyarnava' written during Tai Ahom regime in Assam (1228-1818) AD) by Barkath Sukumara. The said

manuscript is housed in Department of Historical and Antiquarian Studies, Guwahati, Assam (India). It contains 195 folios (each of 58x16 cm size) made of bark pertaining to *Aquillaria malaccensis* Lam., locally called 'Sashi' (Choudhari, 1976). It is originally written in old Assamese (Kamrupi) vocabularies in Assamese characters. Subsequently, it has been translated into English by Choudhury (1976) [7], which is accessible easily for readers. The present author studied ancient sources in the perspective of plant invasion in India (Patil, 2019, 2020a, b) [23, 27, 28]. The aforesaid treatise viz., 'Hastividyarnava' is investigated on similar line to disclose alien floral elements invaded in India by comparing relevant floristic literature.

### Methodology

The manuscript contains Assamese plant names. These are equated with the recent botanical names consulting various Indian treatises and dictionaries (Anonymous, 1948-1976; Jain, 1991; Kirtikar and Basu, 1981; Watt, 1889-1893) [1, 11, 13, 39]. Their alien status is verified by using relevant taxonomic literature as mentioned against each species in Table-I, besides botanical name, family, habit, status regarding wild or cultigen, etc. These are discussed in the perspective of plant invasion in India.

**Table 1:** Exotic Species Gleaned From Hastividyarnava

Sr. No. (1)	Plant Species & Family (2)	Native Name in Assam (3)	Habit (4)	Status Wild (W)/ Cultivated (C) (5)	Plant parts used Disease Treated (6)	Nativity (7)
1.	<i>Allium cepa</i> L. Liliaceae	Pyaj	Herb	C	Bulbs Appetizer	West Asia: Patil, 2003; Yadav & Sardesai, 2002. Western Temperate Asia: De Candolle; 1959. Persia: Bailey, 1928
2.	<i>Allium sativum</i> L. Liliaceae	Naharu	Herb	C	Cloves Round Worms	Europe: Bailey, 1949; Patil, 2003.
3.	<i>Alocasia marcrorhiza</i> (L.) Don Araceae	Man Kachu	Shrub	C	Tubers Gout	Tropical Asia: Gaikwad & Garad, 2015.
4.	<i>Aloe barbadensis</i> Mill. Liliaceae	Chal-Kuwari	Herb	C	Roots Boils, itches and ringworms	Cape Verde Islands: Backer & Brink, 1968. Mediterranean Region: Bailey, 1949.
5.	<i>Amaranthus spinosus</i> L.	Hati-Khutaria	Herb	W	Shoots To control temperament	Tropical America: Patil, 1995; Chandra Sekar, 2012.

	Amaranthaceae					
6.	<i>Boerhavia diffusa</i> L. Nyctaginaceae	Punarnava	Herb	W	Roots Boils, itches and ringworms	Tropical Africa: Panda <i>et al.</i> , 2018.
7.	<i>Cassia fistula</i> L. Caesalpiniaceae	Sonaru	Tree	C	Roots Sores of nails and soles Bark Sores and wounds	North America: Debnath & Debnath, 2017.
8.	<i>Citrus medica</i> L. Rutaceae	Kaji Nemu	Tree	C	Roots Diarrhoea	China: Roxburgh, 1814.
9.	<i>Eleusine indica</i> (L.) Gaertn. Poaceae	Bobosaban	Herb	C	Roots Diarrhoea	Africa, Temperate & Tropical Asia: USDA-ARS, 2014.
10.	<i>Euphorbia neriifolia</i> L. (Syn. <i>E. ligularia</i> Roxb.) Euphorbiaceae	Siju	Shrub	C	Latex Sores and wounds	Africa: Naik, 1998.
11.	<i>Gmelina arborea</i> Roxb. Verbenaceae	Gamari	Tree	C	Roots Sores of nails and soles Bark Sores and wounds, to control rutting stage	Malaya: Madakkar & Sharma, 2016b.
12.	<i>Ipomoea aquatica</i> Forst. Convolvulaceae	Kalmau	Climber	W	Entire plant Constipation, blood red urine, painful discharge of excreta, not willing to eat and drink, etc.	China: Debnath & Debnath, 2017.
13.	<i>Lagerstroemia speciosa</i> (L.) Pers. Lythraceae	Ajar	Tree	C	Bark Roundworms	China: Shetty & Singh, 1987.
14.	<i>Ludwigia adscendens</i> (L.) Hara Onagraceae	Pani-Khutaria	Herb	W	Shoots To control temperament	Tropical America: Reddy, 2008. Central America: Panda <i>et al.</i> , 2018.
15.	<i>Ottelia alismoides</i> (L.) Pers. Hydrocharitaceae	Panico	Herb	W	Leaves Diseases of temples	Austro-Asian: Naik, 1998.
16.	<i>Spondius pinnata</i> Kurz. Anacardiaceae	Amora	Tree	C	Roots Diarrhoea, Boils, Itches and ringworms	Tropical Asia: Martin <i>et al.</i> , 1987.
17.	<i>Syzygium aquem</i> (Burm.f.) Alston Myrtaceae	Jamu	Tree	C	Bark Sores and wounds	Java, Sumatra & Peninsular Malaysia: Santhi & Shreeja, 2019.
18.	<i>Trachyspermum ammi</i> (L.) Sprague Apiaceae	Yani	Herb	C	Fruits Appetizer	South Europe: Yadav & Sardesai, 2002. Africa: Patil, 1995; Shetty & Singh, 1987.
19.	<i>Vernonia anthelmintica</i> (L.) Willd. Asteraceae	Somrai	Herb	W	Seeds Appetizer	Malay Archipelago: Mitra & Mukherjee, 2012.

## Results and Discussion

The earliest information for caring animals in India obviously hails from Vedas. Atharveda (IV, 9, 2) mentioned a protective ointment for animals, besides human beings. Atharveda (VIII, 7, 23) also informed that the wild boar knows the medicinally useful plant which will cure it. The Vedic literature consists of liturgical chants and magical or sacrificial formulae in verses. However, during post-Vedic period, Indian medicine started rational elements and observations and thus produced a coherent system, called 'Ayurveda'. Some oldest veterinary treatises also existed in India e.g. (i) *Asvayurvedasiddhanta* (Salihotra, No date; Mukhopadhyaya, 1929) <sup>[18]</sup>, (ii) *Asvasastra* (Nakula, 1952) <sup>[20]</sup> around the year 1000. These are mainly text on their medicine *viz.*, *Hastyayurveda* is ascribed to a legendary author Palakapya, known as Dhanvantari (Palakapya, 1894) <sup>[21]</sup>. Even *Charak Samhita* contains ingredients to prepare enemas for elephants and other animals (Misra, 1966) <sup>[16]</sup>. Kautilya's *Anthashastra* (II, 32) describes veterinary treatments (Kangle, 1960-1963) <sup>[12]</sup>. Region of Assam also made progress on this line. The aforesaid text *viz.*, *Hastyayurveda* by Palkapya was developed in Assam in Ahom period. Bark with saka 1656 (or year 1734) composed 'Hastividyanava Sarasamgraha (*cf.* Choudhury, 1903). Information on it is as limelighted earlier.

Investigation of 'Hastividyanava' is extended mainly with an objective plant invasion by the exotic plant species on Indian landmass in long past. This Assamese script contained as many as 19 exotic species pertaining 18 genera under 17 families of angiosperms. Of these, the dicotyledonous taxa share major segment in plant invasion (13 species, 13 genera and 13 families), whereas monocotyledons are represented by relatively a lesser number of taxa (06 species, 05 genera and 04 families). Analysis of habitual categories brought forth total 10 herbs, 06 trees, 02 shrubs and a single species of climber. The herbaceous floral element played a dominant role numerically in plant invasion in India as revealed by this investigation. It is also worth to note that out of total 19 species, 13 species were appropriated for various purposes but only medicinal utilities are emphasized in this manuscript for the care of elephants. Other 06 exotic species run wild or have naturalised and form an integral part of Indian biodiversity.

Various plant parts or products from total 19 exotic plant species have been disclosed. The parts or products pertained to bulbs, cloves tubers, roots, shoots, entire plants, bark, leaves, fruits, seeds, apart from plant latex. Different diseases or afflictions of elephants are treated by these *viz.*, as appetizer, round worms, boils, itches, ringworms, to check temperament, sores of nails and soles, diarrhoea,

wounds, constipation, blood-red urine, painful discharge of excreta, unwillingness to consume fodder and drink, etc. Fairly broad spectrum of elephant diseases appear to have been attended by the Assamese in those days. This study reveals non-plant relationships in the context of elephants as well as plant invasion prior to the period of documentation of the said script.

An interesting fact about biographical revelations is also notable. As many as eleven biogeographic regions or countries or continents are represented by the 19 exotic species. The continents have shared some number of exotic species as such in descending order: Africa and Asia (Excl. India) 04 species each, America by 03 species and Europe by 02 species. The other countries or geographical regions have lesser representation as such: China (03), Cape of Vede Islands, Mediterranean region, Malaya, Austro-Asian, Java, Sumatra and Peninsular Malaysia, besides Malay Archipelago (01 each). Plant invasion in a particular land mass usually takes place by either man-engineered activities (intentionally) or by negligence. The latter ones after their negligent introduction, adapted for native environment and edaphic factors. It is also possible by natural plant dispersal between the geographical regions or countries and Indian landmass through various biotic and abiotic agencies (Patil, 2020) [26, 29]. They are also rendered useful for animal healthcare.

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