ANCIENT INDIAN FLORA IN THE ASHTADHYAYI OF PÂÑINI

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ABSTRACT

Pâñini, the greatest grammarian of the Sanskrit language is the author of a work called the Ashtâdhyâyi, comprising about four thousand rules. His date is about 500 B.C. The cultural data in Pâñini's work are considered by Indian historians as authoritative as those from epigraphical and numismatic sources. The study of Pâninian flora furnishes an important chapter in the general history of Indian plants, which still remains to be written on the basis of literary and archaeological sources. The author refers to the systematic cultivation of forests and groves of trees and plants. He also shows acquaintance with early attempts at nomenclature of plants on the basis of their flowers, leaves, fruits and roots. He is acquainted with the principal trees of north India like Ficus religiosa, Ficus bengalensis, Ficus indica, Mangifera indica, Butea frondosa, Aegle Marmelos, Acacia catechu, Dalbergia Sissoo, Shorea robusta and Salvadora indica. A good many of these are referred to by him for the first time, which offers a proof of their antiquity on Indian soil in the 5th century B.C.

I CONSIDER it an honour to be associated with the inaugural number of The Palaeobotanist which is appearing as a commemoration volume for my late friend Dr. Birbal Sahni. During the course of our many interesting talks, I had once suggested to him the preparation of a comprehensive history of Indian plants from literary and archaeological sources. The great scientist welcomed the idea as a necessary step towards reconstructing the history of Indian plants from the earliest times. My work on Pânini as a source of Indian cultural history brought me to the study of Pâninian flora, which is presented here as a chapter in the general history of Indian plants. The date of Pânini is a vexed problem of Indian history, but the consensus of opinion favours 5th century B.C., and this agrees well with the varied cultural data embodied in Pânini's great work, the Ashtâdhyâyi. Pânini was dealing primarily with the grammar of the Sanskrit language and incidentally was required to take note of a number of word formations based on the names of trees, plants, fruits, forests, etc. This is the raison d'être of the material presented there.

Pânini refers to forests classified on the basis of their produce, e.g. oshadhi-vana, forest tracts producing herbs and fodder as illustrated by dâravâna, mûravâna and vanaspâtvana; forests producing big trees, specially those producing timber, as sirishâvana and devadâravana (VIII, 4, 6). The word vana seems to be used in a double sense, viz. natural forests such as Purâgâvana, Misrâkâvana, identified with Misrikh forest in Sitapur district (VIII, 4, 4), which were names of forest areas well known at that time; and secondly in the sense of a cultivated grove of trees or fruit-bearing plants such as âmravâna, khadiravâna, Íshkuvâna (groves of mango, catechu and sugarcane) which were used as common names (asamjñayamapi, VIII, 4, 5) and almost synonymous with vâlîkâ planted as part of a village settlement. A large forest comprising several jungle tracts was called aranyâna (Bhâshya, II, 220).

OSHADHI AND VANASPATI

The plant kingdom is usually classified into two convenient divisions, e.g. oshadhi (plants) and vanaspati (trees) as implied in sûtra VIII, 4, 6 (Vibhâsh-aushadhi-vanaspatibhyah). The Ashtâdhyâyi treats of vrihsha as synonymous with vanaspati, as in sûtra IV, 3, 135 (Avayave cha prâny-oşadhi-vrihshrebhyyah). Kâtyâyana also paraphrases the word vrihsha of sûtra II, 4, 12 (which prescribes optionally singular number for compounds of tree names) as vanaspâti in his vârttika on it (Bhâs. I, 475). Trîna and Dhânya (grasses and cereals) are mentioned separately from vrihsha in sûtra II, 4, 12, which shows that the former were included under the category of oshadhi. The question arises why Pânini did not prefer to read the single word oshadhi instead of the two words trîna and dhânya and can be answered by saying that oshadhi included, besides grasses and cereals, other divisions of annual plants as creepers, and hence the scope of the sûtra, if oshadhi were used in
place of trīṇa and dhānya, would become wider than was intended.

Patañjali defines a tree to consist of roots, trunk, fruits and leaves (mūla-skandha-phala-palasāvān, I, 219). Panini mentions these parts in various rules. He is also acquainted with an important principle of nomenclature operating in Indian medical works, viz. that plants derived their names usually from the peculiarity of their leaves, flowers, fruits and roots (parṇa, pushpa, phala, and mūla, IV, 1, 64). These words are generally prefixed by a word specifying some peculiarity and always end in a long ī as sankhāpushpi (Andropogon aciculatus) having white conch-like flowers. He is also of opinion that the name of a fruit generally follows the name of that tree without adding any suffix (IV, 3, 163).

TREES

The following trees are mentioned in the sūtras:

1. Asvattha (IV, 3, 48), Ficus religiosa—One of India's foremost sacred trees. Panini also uses the word to signify the time when the tree bears fruit-berrries (yasmin kāle asvatthā phalanti, Kāśikā).

2. Nyagrodha (VII, 3, 5), Ficus bengalensis—a mighty tree used primarily for shade (cf. Asoka, P.E. VII, mugesu pime nigohāni lopapitāni chhayogāni hosamitī). Panini also mentions its other name vala (VI, 2, 82) which must have been a new word in the Bhāṣā of his time since the Sanshitās, Brāhmaṇas and Aranyakas do not know it.

3. Plaksha (IV, 3, 164), Ficus indicata—A beautiful tree with small white berries referred to in the sūtra. Plakshavāna is mentioned in VIII, 4, 5.

4. Āmra (VIII, 4, 5), Mangifera indica—This is one of the earliest references to the mango-fruit in Sanskrit literature.

5. Palāsa (IV, 3, 1, 41), Butea frondosa—It stands at the head of a gana which contains the names of seven other trees.

6. Bilva (IV, 3, 136), Aegle Marmelos, the wood-apple tree.

7. Khadirā (VIII, 4, 5), Acacia catechu—Panini refers to Khadiravāna both as proper name and a name applied to any grove containing catechu trees. As proper name it occurs in the Āṅgutara Nikāya (XIV, 1), where it is mentioned that Revata, the foremost of the forest recluses, belonged to Khadiravāna (see Journal of the Department of Letters, Calcutta University, 1920, p. 233). Patañjali describes khadirā as gaurakānda, sākhşmaṃparṇa and kaṅkṣaṅgāvā (I, 113).

8. Simșabā (VII, 3, 1), Dalbergia Sissoo—Also included in the Palāśādi group, (IV, 3, 141).

9. Varana (IV, 2, 82), Crataeva religiosa—Panini refers to the town of Varanā situated not far from the thickets of this tree (for Hindi name barana, see Watt, Vol. 2, p. 583).


11. Pīlu (V, 2, 24 and VI, 3, 121), Salvador indica—A large evergreen tree having the same habitat as Sami. In a ganapāṭha we find reference to money transfers and actions performed under the Pīlu trees specially noted as pātimāla (V, 1, 97). According to the Kangarpavarvan the Vāhika region abounded in large forests of Pīlu trees (Ch. 44, v. 31). Watt says (Vol. 6, Pt. 2, p. 448) that the thick groves of these trees are much used by the cattle thieves of the Panjab as places of concealment for stolen animals. Such depredatory tendencies of the people encouraged by the presence of large tracts of Samī and Pīlu forests are referred to in the Mahābhārata in Karna's diatribe against Salya (Karnaparvan, 44, 20-22). The ripening of the Pīlu berries presented a spectacle worthy of special notice as pilukuna (V, 2, 24), a word still used in the Panjabi dialect for the ripe fruits of the Pīlu tree.

12. Kārṣhya (VIII, 4, 5)—Explained by Amara as a synonym of Sāla, the tree Shorea robusta. Panini's mention of the forests of Sāla trees (Kārṣhya) is important as it points to the terai forests of stately Sāla growth in east India.

13. Piyūksha (VIII, 4, 5) is a variety of Plaksha also mentioned in the Tālādi (IV, 3, 152) and Kāśādi (IV, 2, 80) groups.

14. Tāla (IV, 3, 152), Borassus flabellifer—We find that bows of Tāla were popular in ancient India as both the Kāśikā (Tālā-dhanush) and the Mahābhārata refer to them.

15. Jambū (IV, 3, 165), Eugenia jambo­lana—A popular tree, the fruits of which are mentioned by Panini as Jāmbava and Jambu.
16. *Haritaki* (IV, 3, 167), *Terminalia chebula* — Noted especially for its fruits also called *haritaki* (yellow myrobolan).

17. *Vamsa* (V, 1, 50) bamboo, which is also known as *vennu* or *maskara* (VI, 1, 154), the latter also known to the *Rik-lantra* (*maskaro venuh, sûtra 210*).

18. *Kāraskara* (VI, 1, 156) — Definitely stated as the name of a tree. In the *Mahābhārata* the Kāraskaras occur as a people whom Jayaswal identified as living in the Punjab with the Āraṭṭas (*Jayaswal, 1933, p. 115*), but that word seems to be quite different.

19. *Sidhrakā* (VIII, 4, 4) — Mentioned as the proper name of a forest. The *Sāma-viśdhanā Brāhmaṇa* refers to *samidhaś* of Saidhrika tree (III, 6, 9) which Sāyaṇa explains as *sāravriksha*, a tree with sap, or catechu tree; and so also the *Taittiriya Brāhmaṇa* (III, 4, 10). Sidhrīka and Saidhrīka must refer to the same tree.


The names of trees that occur in the *ganas* are:

1. Karkandhū, Badara, Kuvala (V, 2, 24), *Zizyphus jujuba*; also fruit of the jujube tree.

2. Kuṭaja (V, 1, 50), *Holarrhena antidysenterica*.

3. Pāṭalī (IV, 3, 136), *Stereospermum suaveolens* — The tree has become immortalized in the name Pāṭaliputra. Pāṭalī is included in the *Biḷvādi* group. That Pāṇini himself read it there is inferred from Pāṭanjali’s example पातलाणि मालिनि on *vārttika* 2, *sūtra* IV, 3, 166 (II, 328). Pāṭanjali implies that *Pātalī* takes *an* by IV, 3, 136 to denote “the roots thereof”, and since the *an* suffix is not elided as a case of exception to the *vārttika* *Pushpā-mūleshu cha bahulam*, the *i* termination of Pāṭalī is dropped in the word-form *pāṭala*.

4. Vikaṅkata (IV, 3, 141), *Flacourtia sapida*.

5. *Iṅgūdī* (IV, 3, 164), *Ximenia aegyptiaca*.

6. Sālmali (IV, 2, 82), silk cotton tree, *Bombax malabaricum*.

7. Udumbara (IV, 3, 152), *Ficus glomerata*.

8. Nīpa (IV, 3, 152), *Nauclea kadamba*.

9. Dāru (IV, 3, 152) — Referring to *Pitādāru* or *Devadāru* which, as a tree name ending in *a*, may have been implied in the *sūtra* IV, 3, 139. The antiquity of *Pitādāru* is shown by a *Phit sūtra* (No. 37) and Pāṭanjali refers to Sarala, a name of *Deva-dāru* (*Cedrus deodora*, II, 81).

10. Rohitāka (IV, 3, 152), *Andersonia rohitaka*.

11. Vibhitaka (IV, 3, 152), *Terminalia heterophylla*.

12. *Sirisha* (IV, 2, 80), *Mimosa sirisa* (*Albizzia Lebbeck*) — It occurs thrice in the *ganas* of this *sūtra*.

13. Spandana (IV, 3, 141) — It occurs once in the *Rigveda* (III, 53, 19) where it certainly denotes a tree. Its variant is *syandana*. The botanical name may be *Ougeinia dalbergioides* denoting the tree called Sāndan in Hindi (*Watt, p. 657*).


15. Karira (IV, 3, 141), *Capparis aphylla* — It also occurs as the first part in a place name called Karira-prastha (VI, 2, 87).

**GRASSES AND WEEDS**

Pāṇini mentions the following grasses (त्रिन, II, 4, 12) in the *sūtras*:

1. *Sara* (VIII, 4, 5), *Saccharum arundinaceum* — The *sūtra* refers to Saravana. In VI, 3, 15, Sarāvati appears to be a proper name denoting a river. Pāṭanjali mentions a compound consisting of the names of two grasses, *Sara-Siryam* (*sūtra*, II, 4, 12, *Bhāshya*, I, 476). *Sara* is the well-known species, but *siryam* must be identified with *sairya* which is once mentioned in the *Rigveda*, I, 191, 3. The proper reading in the *Bhāshya* should be *sarasairya*.

2. *Kāsa* (IV, 2, 80 and VI, 2, 82), *Saccharum spontaneum*.

3. Kusa (*Poa cynosuroides*) occurs as the former member of such words as *kusāgra*, V, 3, 105, and *kusala*, V, 2, 63. Its feminine form *kusā* is found in the *sūtra* IV, 1, 42 when not denoting a ploughshare. Pāṭanjali mentions *kusā kāsam* as names of grasses occurring together (I, 475).

4. *Muniya* (III, 1, 117), *Saccharum munja* — Pāṇini mentions the purifying (विपध्या) of *Muniya* grass, probably by soaking in water for twisting to make ropes. Its reeds were called *ishūka* (VI, 3, 65) used for sweeping purposes.

5. *Nāda* (reed) IV, 2, 87 *nadvān*; IV, 2, 88 *nadvālā*; IV, 2, 91 *naddhiya* — meaning place abounding in reeds.
GRASSES MENTIONED IN THE GAÑAS

1. *Virana, Andropogon muricatus* — Also called *usira* (IV, 4, 53; IV, 2, 80), a fragrant grass in the Kisorādi group. The gathering of *virana* flowers was a favourite garden sport in east India called *virana-pushpa-prachāyikā*.

2. *Balvaja, Eleusine indica* (IV, 2, 80; IV, 3, 142).

3. *Darbha* (IV, 3, 142) — Also in the Gavaśa group II, 4, 11 where it occurs in such compounds as *darbha-asarm*.


FLOWERS (PUSHPA, IV, 1, 64)

*Kumuda*, water lily (IV, 2, 80; IV, 2, 87), and *Pushkara*, lotus (V, 2, 135) are two important flowers mentioned in the sūtras. The *Pushkarādi* group, however, contains other synonyms as also *Padma, Utpala, Bisa, Mriśula*. The *Haritākyādi* (IV, 3, 165) group contains the name *Sephālikā* (*Nyctanthes Arbo-trisits*), a beautiful sweet-scented flower, which was undoubtedly known to Patañjali who refers to cloth dyed with the colour of this flower and called *saiphālika* (*Bhāṣya*, II, 413; V, 3, 55). Pānini tells us that the flowering plants or creepers derived their names from the name of their flowering season (*Kālā pūṣyālot*, IV, 3, 43) on which the Kāśikā illustrates vāsantā kunda-lalā, i.e. the creeper *Jasminum multiflorum* flowering in spring.

MINOR HERBS (OSHADHI)

The herb names are implied in sūtra IV, 1, 64, *Pāka-karna-parṇa-puṣhpa-mūlabāl-oṭara-pudāč-cha*. Individual names of herbs cannot be cited from Pānini, except a few on the basis of the four accessory (antargaṇa) sūtras to the Ajādi group IV, 1, 4, which also occur as vārātikas of Kātyāyana. Haradatta takes them to have existed simultaneously as part of the gana (cf. Padamaṇjari proposing to correct sat-prāk-kāṇḍa as sadach-kāṇḍa on the basis of the vārātikas). Thus *Triphalā*, the triad of Indian myrobalans, and *Amūllā* (*Methonica superba*, *Vedic Index*, Vol. I, 31) appear to be old names. *Brāhmaṇī*, a famous herb, *Herpestis Montneria* (*Watt*, Vol. 4, p. 225) is known to Patañjali (*Bhāṣya*, III, 233 on Pānini VI, 4, 171).

FRUITS (PHALA)

Pānini associates fruits with trees (cf. IV, 3, 163-167), but Kātyāyana and Patañjali treat *phala* as a wider term including such grains as rice, barley, pulses, sesamum, produced on annual plants which wither away after the ripening of crops (*phala-pāka-sushāmnapasamkhyaṇam*, II, 327). This would rather agree with Manu who defines oshadhī as phala-pākāntā (1, 46). Pānini refers to fruit-bearing trees (*phalegrahī, III, 2, 26*) and has made rules for denoting the fruits of various vanaspatis (*phale luk*, IV, 3, 163, etc.) stating that generally the name of the fruit is the same as the name of the tree.

Of important fruit-bearing trees mango, *bilva*, and *jambu* are mentioned and berries of *plaksha* and *haritaka* are also named (IV, 3, 164, 167). The grape vine (*Draḵshā*) and its fruits occur in the ganaṇapātha of IV, 3, 167, which appear to have been read by Pānini himself as may be inferred from his reference to Kāpisāya wine (IV, 2, 99) imported from Kapisā or Kafiristan in Afghanistan. The word also occurs in the Mata and Yavādi vanas (VI, 2, 88; VIII, 2, 9) and in a *Philṣūtsa No. 57*). For a history of Indian pomology it may be added that pomegranate occurs in the Ardharchādi group (II, 4, 31), although the reference is not very reliable. The first definite mention of the fruit is found in Patañjali (*Bhāṣya*, I, 38 and 217), but the fruit outside India is represented in the sculptures of Persepolis, Assyria and the ancient monuments of Egypt (*Watt*, op. cit., Vol. 6, Pt. 1, p. 370).

PīLUKUṆA

In sūtra V, 2, 24, Pānini teaches the suffix kūna from Pilu, *Salvadora indica*, and other trees to denote the ripening of their
fruits. The ending *kuna* in this special sense is still a peculiarity of the Punjabi dialect in the vicinity of the district of Shahpur in north-west Punjab where *kuna* means ripe, and *pilukuna* is the term used for the ripening of the *pilu* berries which are eaten with relish by the village people. The use of *kuna* in Sanskrit literature is rare, and it seems that the great grammarian has recorded here a word current in a dialect spoken and understood near his own home.

**REFERENCES**

Kātyāyana (ca. 400 B.C.). Vārttikas on the śūtras of Pāṇini. The references are to Pāṇini's śūtra on which the vārttika is based and then to the vārttika itself.

Patanjali (ca. 200-150 B.C.) *Mahābhāṣya*, Kielhorn's edition. 1 (1880); 2 (1906); 3 (1909).