

ANCIENT INDIAN FLORA IN THE ASHṬĀDHYĀYI OF PĀṆINI

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ABSTRACT

Pāṇini, the greatest grammarian of the Sanskrit language is the author of a work called the *Ashṭādhyāyī*, comprising about four thousand rules. His date is about 500 B.C. The cultural data in Pāṇini's work are considered by Indian historians as authoritative as those from epigraphical and numismatic sources. The study of Pāṇinian 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 infectoria*, *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.

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 Pāṇini as a source of Indian cultural history brought me to the study of Pāṇinian flora, which is presented here as a chapter in the general history of Indian plants. The date of Pāṇini 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 Pāṇini's great work, the *Ashṭādhyāyī*. Pāṇini 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.

Pāṇini refers to forests classified on the basis of their produce, e.g. *oshadhivana*, forest tracts producing herbs and fodder as illustrated by *dūrvāvana*, *mūrvāvana* and *vanaspativana*; forests producing big trees, specially those producing timber, as *sirishavana* and *devadāruvana* (VIII, 4, 6). The word *vana* seems to be used in a double sense, viz. natural forests such as *Puragāvana*, *Misrahāvana*, 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 *āmraṇa*, *khadiravaṇa*, *ikshuvaṇa* (groves of mango, catechu and sugarcane) which were used as common names (*asam-jñayāmapī*, VIII, 4, 5) and almost synonymous with *vāṭikā* planted as part of a village settlement. A large forest comprising several jungle tracts was called *araṇya* (IV, 1, 49) or *araṇyāni* according to Kātyāyana (*Bhāshya*, 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 *sūtra* VIII, 4, 6 (*Vibhāsh-oshadhi-vanaspatibhyah*). The *Ashṭādhyāyī* treats of *vriksha* as synonymous with *vanaspati*, as in *sūtra* IV, 3, 135 (*Avayave cha prāny-oshadhi-vrikshebhyah*). Kātyāyana also paraphrases the word *vriksha* of *sūtra* II, 4, 12 (which prescribes optionally singular number for compounds of tree names) as *vanaspati* in his *vārttika* on it (*Bhās.* 1, 475). *Triṇa* and *Dhānya* (grasses and cereals) are mentioned separately from *vriksha* in *sūtra* II, 4, 12, which shows that the former were included under the category of *oshadhi*. The question arises why Pāṇini did not prefer to read the single word *oshadhi* instead of the two words *triṇa* and *dhānya* 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 *sūtra*, 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-palāsavān*, I, 219). Pāṇini 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 *sāṅkhaṇḍī* (*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. Pāṇini also uses the word to signify the time when the tree bears fruit-berries (*yasmin kāle asvatthāḥ phalanti*, *Kāśikā*).

2. *Nyagrodha* (VII, 3, 5), *Ficus bengalensis*—A mighty tree used primarily for shade (cf. Asoka, P.E. VII, *matesu pime nigohāni lopapitāni chhayogāni hosamti*). Pāṇini also mentions its other name *vaṭa* (VI, 2, 82) which must have been a new word in the *Bhāshā* of his time since the *Saṁhitās*, *Brāhmaṇas* and *Āraṇyakas* do not know it.

3. *Plaksha* (IV, 3, 164), *Ficus infectoria*—A beautiful tree with small white berries referred to in the *sūtra*. *Plakshavana* 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 *gaṇa* which contains the names of seven other trees.

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

7. *Khadīra* (VIII, 4, 5), *Acacia catechu*—Pāṇini refers to *Khadīravāṇa* both as proper name and a name applied to any grove containing catechu trees. As proper name it occurs in the *Āṅguttara Nikāya* (XIV, 1), where it is mentioned that Revata, the foremost of the forest recluses, belonged to

Khadīravāṇa (see *Journal of the Department of Letters*, Calcutta University, 1920, p. 233). Patañjali describes *khadīra* as *gaurakāṇḍa*, *sūkshmaparṇa* and *kaṅkaṭavān* (I, 113).

8. *Sīmsapā* (VII, 3, 1), *Dalbergia Sissoo*—Also included in the *Palāsādi* group, (IV, 3, 141).

9. *Varaṇa* (IV, 2, 82), *Crataeva religiosa*—Pāṇini refers to the town of *Varaṇa* situated not far from the thickets of this tree (for Hindi name *barana*, see WATT, Vol. 2, p. 583).

10. *Samī* (V, 3, 88 and IV, 3, 142), *Prosopis spicigera*—Found in the arid dry zones of the Panjab, Sindh, Rajputana (WATT, Vol. 6, Pt. 1, p. 340; Hindi name *chhokarā* and *janā*).

11. *Pīlu* (V, 2, 24 and VI, 3, 121), *Salvadora indica*—A large evergreen tree having the same habitat as *Samī*. In a *ganapāṭha* we find reference to money transfers and actions performed under the *Pīlu* trees specially noted as *ṣailumūla* (V, 1, 97). According to the *Karṇaparvan* 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 *Karṇa's* diatribe against *Salya* (*Karṇaparvan*, 44, 20-22). The ripening of the *Pīlu* berries presented a spectacle worthy of special notice as *ṣilukūna* (V, 2, 24), a word still used in the Panjabi dialect for the ripe fruits of the *Pīlu* tree.

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

13. *Pīyūṅkshā* (VIII, 4, 5) is a variety of *Plaksha* also mentioned in the *Tālādi* (IV, 3, 152) and *Kāsādi* (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* (*Tālād-dhanushi*) and the *Mahābhārata* refer to them.

15. *Jambū* (IV, 3, 165), *Eugenia jambolana*—A popular tree, the fruits of which are mentioned by Pāṇini as *Jāmbava* and *Jambū*.

16. *Harītakī* (IV, 3, 167), *Terminalia chebula* — Noted especially for its fruits also called *harītakī* (yellow myrobalan).

17. *Vamśa* (V, 1, 50) bamboo, which is also known as *venu* or *maskara* (VI, 1, 154), the latter also known to the *Ṛik-tantra* (*maskaro venuh*, *sūtra* 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. *Sidhrikā* (VIII, 4, 4) — Mentioned as the proper name of a forest. The *Sāma-vidhāna Brāhmaṇa* refers to *samidhas* of *Saidhrika* tree (III, 6, 9) which *Sāyaṇa* explains as *sāravriksha*, a tree with sap, or catechu tree; and so also the *Taittirīya Brāhmaṇa* (III, 4, 10). *Sidhrikā* and *Saidhrika* must refer to the same tree.

20. *Viṣṭara* (VIII, 3, 93) — Name of an unidentified tree.

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

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

2. *Kuṭaja* (V, 1, 50), *Holarrhena anti-dysenterica*.

3. *Pāṭalī* (IV, 3, 136), *Stereospermum suaveolens* — The tree has become immortalized in the name *Pāṭaliputra*. *Pāṭalī* is included in the *Bilvādi* group. That *Pāṇini* himself read it there is inferred from *Patāñjali*'s example *pāṭalāni mūlāni* on *vārttika* 2, *sūtra* IV, 3, 166 (II, 328). *Patāñjali* implies that *Pāṭalī* takes *aṅ* by IV, 3, 136 to denote "the roots thereof", and since the *aṅ* suffix is not elided as a case of exception to the *vārttika* *Pushpa-mūleshu cha bahulam*, the *ī* termination of *Pāṭalī* is dropped in the word-form *pāṭala*.

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

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

6. *Sālmalī* (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 *u*, may have been implied in the

sūtra IV, 3, 139. The antiquity of *Pitādāru* is shown by a *Phīṣṭ sūtra* (No. 37) and *Patāñjali* refers to *Sarala*, a name of *Devadāru* (*Cedrus deodara*, II, 81).

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

11. *Vibhītaka* (IV, 3, 152), *Terminalia bellerica*.

12. *Sirīsha* (IV, 2, 80), *Mimosa sirisa* (*Albizzia Lebbeck*) — It occurs thrice in the *ganās* 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).

14. *Kaṅṭakāra* (IV, 3, 152), *Solanum jaquini*.

15. *Karīra* (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 (*trīṇa*, 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. *Patāñjali* mentions a compound consisting of the names of two grasses, *Sara-Sīryam* (*sūtra*, II, 4, 12, *Bhāshya*, I, 476). *Sara* is the well-known species, but *sīrya* must be identified with *sairya* which is once mentioned in the *Rigveda*, I, 191, 3. The proper reading in the *Bhāshya* should be *sarasairyam*.

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. *Patāñjali* mentions *kusā kāsam* as names of grasses occurring together (I, 475).

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

5. *Naḍa* (reed) IV, 2, 87 *nadvān*; IV, 2, 88 *naḍvala*; IV, 2, 91 *naḍakiya* — meaning place abounding in reeds.

6. *Sādu* (IV, 2, 88) — Grass; a grassy land was called *sādvala*.

7. *Vetasa* (IV, 2, 87) — cane or *Calamus rotang*.

8. *Katṭrina* (VI, 3, 103) — Explained by Amara as a fragrant grass, *saugandhika*, probably synonymous with *sugandhitejana* of the *Saṁhitā* and Brāhmaṇa literature (*Vedic Index*, Vol. II, 453).

GRASSES MENTIONED IN THE GAṆAS

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

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

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

4. *Pātika* (II, 4, 11) — For early references, see *Vedic Index*, Vol. II, 11.

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 also as *Padma*, *Utpala*, *Bisa*, *Mriṇāla*. The *Haritakyādi* (IV, 3, 165) group contains the name *Sephālikā* (*Nyctanthes Arbor tristis*), 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* (*Bhāshya*, II, 413; V, 3, 55). Pāṇini tells us that the flowering plants or creepers derived their names from the name of their flowering season (*Kālāt pushyāt*, IV, 3, 43) on which the *Kāsikā* illustrates *vāsantī kunda-laṭā*, i.e. the creeper *Jasminum multiflorum* flowering in spring.

MINOR HERBS (OSHADHI)

The herb names are implied in *sūtra* IV, 1, 64, *Pāka-karṇa-parṇa-pushpa-mūlabāl-ottara-padāch-cha*. Individual names of herbs cannot be cited from Pāṇini, except a few on the basis of the four accessory (*antargaṇa*) *sūtras* to the *Ajādi* group IV, 1, 4, which also occur as *vārttikas* of

Kātyāyana. Haradatta takes them to have existed simultaneously as part of the *gaṇa* (cf. *Padamañjarī* proposing to correct *sat-prāk-kāṇḍa* as *sadach-kāṇḍa* on the basis of the *vārttika*). Thus *Triphalā*, the triad of Indian myrobalans, and *Amūlā* (*Methonica superba*, *Vedic Index*, Vol. 1, 31) appear to be old names. *Brāhmī*, a famous herb, *Herpestis Monnieria* (WATT, Vol. 4, p. 225) is known to Patañjali (*Bhāshya*, III, 233 on Pāṇini VI, 4, 171).

FRUITS (PHALA)

Pāṇini 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-sushāmuḥpasamkhyānam*, II, 327). This would rather agree with Manu who defines *oshadhi* as *phalapākānta* (1, 46). Pāṇini refers to fruit-bearing trees (*phalegrahi*, III, 2, 26) and has made rules for denoting the fruits of various *vanaspatīs* (*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 *jambū* are mentioned and berries of *plaksha* and *haritakī* are also named (IV, 3, 164, 167). The grape vine (*Drākshā*) and its fruits occur in the *ganapālha* of IV, 3, 167, which appear to have been read by Pāṇini himself as may be inferred from his reference to *Kāpisāyana* wine (IV, 2, 99) imported from *Kapisā* or *Kafristan* in Afghanistan. The word also occurs in the *Mālādi* and *Yavādi gaṇas* (VI, 2, 88; VIII, 2, 9) and in a *Phīṣsūtra* No. 57). For a history of Indian pomology it may be added that pomegranate occurs in the *Arđharchādi* group (II, 4, 31), although the reference is not very reliable. The first definite mention of the fruit is found in Patañjali (*Bhāshya*, 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).

PĪLUKUNA

In *sūtra* V, 2, 24, Pāṇini teaches the suffix *kuna* from *Pīlu*, *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 *pīlukuna* is the term used for the ripening of the *pīlu* 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.

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