

VRKṢĀYURVĒDA OF PARĀŚARA - AN ANCIENT TREATISE ON PLANT SCIENCE

G. P. Prasad*, G. Neelima, G. P. Pratap*** & G.K. Swamy******

ABSTRACT

Vrkṣāyurvēda Of *Parāśara* is a great contribution to the Botany in ancient India. N.N. Sircar and Roma sarkar edited this text with English translation. Notes with comparative references of modern botany were added. This book can be placed in all probability in between 1st century B.C to 4th century A.D by its linguistic style. Many scientific branches of Botany including origin of life, ecology, distribution of forests, morphology, classification, nomenclature, histology and physiology were dealt in this ancient work. Though it is presumed that this book was written by *Parāśara* to teach Botany to preparatory to *Āyurvēda* studies to ancient *Āyurvēda* students, it is true to the *Āyurvēda* personals and other disciplines related to Botany of present day as well. Aim of this article is to attract the attention of all scholars who are related to *Āyurvēda* and Botany and to feel the depth of the knowledge of ancient Indian botany.

Introduction

Literally *Vrkṣāyurvēda* means “the science of plant life”. There exists another text on the *Vrkṣāyurvēda* attributed to *Sūrapāla* (12th century A.D). As such, present text of Parasara is presumed to be the older¹.

Shree Jogendranath Sircar discovered the original manuscript. The hand written copy of it is in possession of Romasarcar. It is written in *Sūtra* (aphoristic) style. The text is divided into six parts (*Khaṇḍas*) viz., *Bijōtpatti Khaṇḍa*, *Vanaspati Khaṇḍa*,

* Research Officer (Ay), Regional Research Institute (Ay), Vijayawada, A.P.,

** M.Sc(Botany)Scholar, Flat No.202, Abhyudaya Apartments, Paidaya Street, Vijayawada, *** M.Sc (Botany) Student, S.V. University, Tirupati, **** Assistant Director-in-charge, Regional Research Institute (Ay), Indira Gandhi Muncpal Stadium Complex, Labbipet, Vijayawada - 520 010

Vanaspatya khaṇḍa, *Gulma kṣupakhaṇḍa*, *Vīrudha vallīkhaṇḍa* and *cikitsā khaṇḍa*. *Cikitsākhaṇḍa* is now missing. Sanskrit text has been translated to English and provided with comparative references in modern Botany by N.N. Sircar and Romasarkar. In *Bijōtpattisūtrīyādhyāya* it was mentioned that *Parāśara* at Citravana of *Himālayas* has revealed the total text as the answers to the questions of sages. It was also mentioned that this *Vṛkṣāyurvēda* revealed by *Brahma* and embodied in the *Atharvavēda*.

IMPORTANT TOPICS IN THE TEXT MATERIAL OF *Vṛkṣāyurvēda*

I. *Bijōtpattī Khaṇḍa*: Contains eight chapters.

Chapter 1: *Bijōtpattisūtrīyādhyāya*

In this chapter the origin of life has been emphasized beautifully. Water transformed to jelly like substance (*Kalalam*), which eventually formed an organic mass and later to germ cell (*ādibījam*) (verse 6). Other scientific descriptions, narrated in this chapter were germination of seed, consciousness and sense of feeling of plants, broad classification of plants like *Vanaspatī*, *Vanaspatya*, *Vīrudha-Valli* and *Gulma*.

Chapter 2: *Bhūmivargasūtrīyādhyāya*

The earth or land is divided into 3 major groups like *Jāngala*, *Anupā* and *Mīśradēśa*. *Jāngala dēśa* is a desert like land with scanty vegetation and limited water sources. *Badara* (*Zizyphus jujuba*), *Khadira* (*Acacia catechu*) etc plants will grow in these lands. *ānūpadeśa* is an area with rivers, streams, lakes and seashores. This land is green grassy with clay soil. Large trees, dense forests appear in this land. *Misra dēśa* is with mixed features of *Jāngala* and *ānūpa*^{1,2,3}.

Chapter 3: *Vanavargasūtrīyādhyāya*

This chapter describes the forests located in different regions of ancient India. These are

- a. *Caitrarathavana*
- b. *Kirāta*
- c. *Pañcanāda Prācyā*
- d. *Prācyā*

- e. *Vedikaruṣaka*
- f. *Angirēya*
- g. *Kaliṅcēya*
- h. *Daśarṇaka*
- i. *Aparānta*
- j. *Saurāṣṭra vana*

Chapter 4: *Vṛkṣaṅga sūtrīyādhyāya*

This chapter deals with different parts of plant Viz *Patra* (leaf), *Puṣpa* (flower) *Phala* (fruit), *Mūla* (root), *Twak* (Bark), *Kāṇḍa* (stem), *Sāra* (Heart wood), *Swarasa* (sap), *Niryāsa* (Exudation), *Snēha* (Oleaginous matter), *Kaṇṭaka* (Spine or prickle), *Bīja* (seed), *Prarōha* (Seedling) etc. Influence of pancha *mahābhūtas*, (earth, water, fire, air and space) on plant life was explained. Many morphological terms related to leaf parts were described. The editors have mentioned the probable modern terminology.

They are as follows.

<i>Patrapakṣam</i> (leaf blade)	<i>Vṛntam</i> (Petiole)
<i>Patrasira</i> (veins)	<i>Rasakōśa</i> (may be cells)
<i>Marhi</i> (Rachis),	<i>Vistāra</i> (tendrils)
<i>Pathika</i> (leaf sheath)	<i>Upakaṣam</i> (stipule)

Explanation has also been added to other terms. Different types of attachments of petioles (*Vṛntabandhanam*) were explained. Scientific nomenclature of different types of leaves was given. Basing on the Sanskrit descriptions on this nomenclature, the editors have suggested examples. Some of those are as follows

- a. *Ārghyapatram*: which is a receptacle used for offering flowers (verse 37)
eg: *Stephania hernandifolia*.
- b. *Juhū patram*: *Juhu* is a kind of ladle used to offer ghee in sacred fire.
- c. *Sṛva patram*: *Sṛva* is a Vedic sacrificial instrument.
- d. *Vṛttavarha*: circular leaf eg. *Nelumbo nucifera*.

- e. *Mandalāgra*: leaf with round apex eg. *Artocarpus heterophyllus*
 f. *Dīrgadala*: leaf with long lamina eg. *Musa paradisiaca*.
 g. *Vīrapatra*: sword shaped leaf eg. *Lillium sp.*
 h. *Yugmapatra*: leaf is deeply notched and appears as two eg. *Bauhinia sp.*
 i. *Madūkapaṛṇa*: frog shaped leaf eg. *Centella asiatica*

Similarly *Śankuvaha*, *Gucchapatra*, *Śimbiparṇa*, *Kacapatra*, *Aśwakaṛṇa*, *Hastikaṛṇa*, *Hamsapādi*, *Paravatapādi*, *Nādīparṇa* etc were described.^{1,2,3}

Chapter 5: *Puṣpāṅgasūtrīyādhyāya*

This chapter deals with flowers and its different parts. Modern nomenclature is as under:

Vallari (inflorescence), *Vṛnta* (pedicel), *Jālaka* (calyx), *Dala* (corolla), *Kēsara* (stamens), *Parāga* (pollen), *Kinjalka* (anther), *Parimal* (fragrance), *Makaranda* (Nectar), *Bījadhāra* (ovary), *Varātaka* (style), *Sthālaka* (Thalamus), *Puṣpamāla Sannivēśa* (floral phyllotaxis), *Jālaka* (calyx), *Upajāla* (epi calyx), *Mocikam* (spathe), *Puṣpadalam* (corolla).

Vallari (or) inflorescence has been classified into different types like *Palāśavallari*, *Pankti Mañjari* (arrangement in rows), *Arkamajari*, *Catramañjari* (like umbrella), *Guccvallari* (cluster inflorescence), *Śankulavallari*, *Oṭu Pucika* (cat tail like inflorescence) etc.

Different types of stamens (*Kēsara*), ovary (*Bījadhāra*), style (*Varātaka*) are also described;^{1,2,3,4}

Classification of flowers according to their location

1. *Kuṣi puṣpa* (on axil) *Kāṇḍa puṣpa* (on the stem), *Vallari puṣpa* (as inflorescence).
2. By nature
Saphala puṣpa (Fertile flowers), *Nīṣphala puṣpa* (Sterile flowers)
3. *Vyaktapuṣpa* (open flower), *Avyakta puṣpa* (closed flower).
4. *Ravikānta puṣpa* (Bloom during sunlight), *Candra Kāntapuṣpa* (Bloom during night times or moonlight).

5. *Rtu puṣpa* – Seasonal flowers, *Sadāpuṣpa* – All time available flowers.
6. *Muktadala puṣpa* (Polypetalous), *Yuktadala puṣpa* (Gamopetalous)

The plants were divided into groups (ganas). They are when equated to modern plant families are as under:

Cutagaṇīya puṣpa-Anacardiaceae, *śamīgaṇīya puṣpa*-Leguminaceae, *Puplikagaṇīya puṣpa*-Rutaceae, *Swastikagaṇīya puṣpa*-Cruciferae *Tṛpuṣagaṇīya puṣpa* - Cucurbitaceae, *Kuhapuṣpagaṇīya*-Rhamnaceae, *Oḍrapuṣpagaṇīya*-malvaceae, *Mallikāpuṣpagaṇīya*-Apocynaceae, *Vajrapuṣpagaṇīya*-Pedaliaceae, *Bhṛṅgapuṣpagaṇīya*-Verbenaceae, *Koṭarapuṣpagaṇīya*-Convolvulaceae, *Bhadrapuṣpagaṇīya*-Meliaceae, *Cūtapuṣpagaṇīya*-Anacordianaceae.

Chapter 6: Phalanga sūtriyādhyāya

This chapter deals with fruits. Different types of fruits and fruit parts have been mentioned.^{1,2,3,4}

Parts of fruits and their relevant modern terms:

Vṛnta (peduncle), *Jālaka* (calyx), *Valkalam* (Fruit wall), *Śalātu* (unripe portion), *Vartāka* (locule), *Bijapuplika* (septum), *Bijapuṣpa* (placenta), *Bija* (seed).

Based on consistency of fruit wall (*Phalavalkalam*) will be *Mṛdula* (soft), *Mālura* (hard), *Angśūla* (fibrous), *Śukācitam* (hairy), *Kaṇṭaka* (spiny), *Kīlaka* (with projections), *Arbuda* (irregular) *Sandhita* (Dehiscent) and *Asandhita* (Indihiscent) types.

Classification of fruits: based on shape, germination etc various classifications of fruits have been mentioned. Some of them are

1. *Phalgu phalam* : fruit developed on round thalamus.
2. *Kumbha phalam* : pitcher type fruit
3. *Tripuṣa phalam* : fruit with three placenta
4. *Śṛṅgi phalam* : Horn shaped fruit
5. *Tripuṭa phalam* : Fruit with three chambers
6. *Guccha phalam* : Aggregated fruit.
7. *Śamī phala* : Fruit with seeds in lateral rows.

Chapter 7: *Astānga sūtriyādhyāya*

This chapter deals with eight plant parts namely *Mūlam* (root), *Twak* (the bark), *kāṇḍa* (stem or trunk), *Sāra* (the heart wood), *Swarasa* (the sap), *Niryāsa* (exudates like oleresinous substance), *Snēha* (oleaginous substances or essential oils), *Kaṇṭaka* (spine or prickle). Different varieties of roots like *Kāṣṭhika* (woody), *Kāṇḍika* (fleshy), *Granthika* (with knots), *Pratānaka* (spreading etc. are described in this chapter.)

Basing on structure of bark (*Valkala*) it is differentiated like *Āngśuka* (fibrous), *Patraka* (paper like layers), *Pāṭala* (bark with several layers), *Mrdulagaṇīya* (soft), *Kharagaṇīya* (rough), *Kaṇṭakagaṇīya* (with spines) etc types.

Different types of stems (*kāṇḍa*) are classified as *Dārvika kāṇḍa* (woody stem), *Kilaka* (woody and spiny) *Aśraka kāṇḍa* (triangular), *Pārvika* (stem with numerous segments like bamboo) *Sausira* (hallow stem) etc.

Elaborative scientific description regarding *Sāra* (heart wood) *Swarasa* (sap), *Niryāsa* (exudation), *Snēha* (oleaginous substance) and *Kaṇṭaka* (spine or prickle) has been mentioned in this chapter.^{1,2,3}

Chapter 8: *Dwigaṇīya Adhyāya*

The author describes about seeds and seedlings. Seed or *Bija* is divided to *Kikhośa* (equated to seed coat) *Bijamāṭṛka* (Cotyledon of seed), *Bijaśayam* (Kernel), *Bijapatra* (First leaf with in the seed). Different shapes and colors of seeds are also described in this chapter.

Praroha, *Udbheda* and *Ankura* are synonymous and can be taken as sprout.

Scientific descriptions regarding development of seedling their nourishment, vascular system of seedlings and seedlings types and their parts are also described.^{1,2,3}

II *Vanaspati Khāṇḍa*

Chapter 1: *Vanaspati nirvarṇanādhyāya*

The plants in which the flowers are invisible (*Puspamvyaktam*, *Apuspavanta*)

were grouped as *Vanaspati*. It has been mentioned that majority of these plants produce latex (*Kṣīrivṛkṣa*). The invisible flower of this group is also termed as *Gūdhapuṣpa*. Majority of *Ficus* groups are included in this group. Many examples of plants of this group have been mentioned in this chapter.^{1,2,3}

Chapter 2: *Vṛkṣagana samgrahādhyāya*

In this chapter *Vanaspati* plants have been subdivided like plants with reticulate venation or parallel venation. Plants with or without latex, plants with proper floral numbers or improper floral number, with fertile or sterile flowers, with single seed fruit and many seeded fruit etc.^{1,2,3}

Chapter 3: *Tṛṇavargādhyāya*

Plants with parallel venation (*Mauñjaparṇa*), fibrous fruit wall (*Angśuka phalavalkal*) are grouped under this chapter. It can be taken as the group of *Palmae* family of modern era. The examples of this group quoted by *Parāśara* are *Borassus flabellifer* (*Tāla*), *Cocos nucifera* (*Nārikela*), *Phoenix doctylifera* (*Kharjur*), *Areca catachu* (*Kramuka*) etc. Other varieties grouped in this *Tṛṇavarga* belonging to *Graminae* family.^{1,2,3}

III *Vanaspatya Khāṇḍa*

Chapter 1: *Vanaspatya Vicāraṇādhyāya*

Plants in which flowers are visible and bear fruits are grouped as *Vanaspatya*.

A, *Cūtapuṣpa gaṇa* : *Āmra* (*Magifera indica*) *Bhallātaka* (*Semecarpus anacardium*) etc plants with hypogynous (*Tundamaṇḍala*) flowers and single seed are grouped under this *Gaṇa*. This family can be compared with *Anacardiaceae*. In the same way characteristic feature of different families like *Puplik puṣpagāṇa* with examples of *Mātuluṅga* (*Citrus medica*) *Nimbūka* (*Citrus acida*) can be taken as *rutaceae*. *Dēva puṣpagāṇa* with example of *Jambūka* (*Sygygium cumini*) etc can be taken as *Myrtaceae* family, *Akṣa puṣpagāṇa* with example of *Haritaki* (*Terminalia chebula*) etc can be taken as *Combritaceae*, *Kuha puṣpagāṇa* with examples of *Kōla* and *Badara* (*Zyzyphus* species) can be taken as *Rhamnaceae* and *Mallika puṣpagāṇa* with example of *Kuṭaja* (*Holarrhena antidysentrica*) etc resembles *Apocynaceae* family.^{1,2,34}

Śamivarga : *Śami vrkṣa* bear *Śimbiphala* (the legumes). These legumes are sub divided into

1. *Vakra puṣpa* group with *Viśamaganīya* (Heteromerous) and *Tunda maṇḍala* (Hypogynous) flowers ex: *Pāribhadra* (*Erythrina indica*). This can be taken as Papipillianaceae.
2. In the same way *Vikarṇika puṣpam* can be taken as Caesalpiniaceae with the characteristic feature of the group and example like *Āragvadha* (*Cassia fistula*).
3. *Sūka puṣpam* can be taken as Mimosaceae with characteristic features like hairs on flowers etc and examples like *Śirīṣa* (*Albizzia lebbek*)

IV *Gulmakṣupa Khāṇḍa*

Chapter1: *Dalvajavargādhyāya*

These are the plants, which abound in a land that ever remains moist and clayey. These plants are Rhizomatous (*Kandarohakam*), with tortoise shaped leaves (*Kamathacchadam*) and causes itching (*Kaṇḍula*). This group will have spadix type of inflorescence (*Akṣa mañjarī*). It is again divided in to 4 types.

- a. *Mānaka* : *Alocacia indica*
- b. *Granthilā* : some *Colocacia* species
- c. *Kaṇḍula karṇa* : *Centella asiatica*
- d. *Vallī Kaṇḍula* : *Colocasia antiquorum*

In this chapter other varieties of *Kṣupas* (Shrubs) are also explained.^{1,2,3,4}

V *Vīrudha Valli Khāṇḍa*

This chapter mainly deals with climbers and creepers.^{1,2,3} Some of the plant names mentioned in this *Khāṇḍa* and the probable botanical names suggested by the editors are as follows:

Candravallī – *Hiptage madablata*.

<i>Bhadravallī</i>	–	<i>Paederia foetida</i> (<i>Prasāriṇī</i>)
<i>Kāndavallī</i>	–	<i>Ipomoea paniculata</i> (<i>Vidāri</i>)
<i>Kāṣṭhavallī</i>	–	<i>Berberis aristata</i> (<i>Dāruharidra</i>)
<i>Kaṇṭhavallī</i>	–	<i>Asparagus racemosus</i> (<i>Śatāvārī</i>)
<i>Cinnaruha vallī</i>	–	<i>Tinospora cardifolia</i> (<i>Gudūci</i>)
<i>Tripuṭa vallī</i>	–	<i>Opeculina turpethum</i> (<i>Trivr̥t</i>)
<i>Ākaśavallī</i>	–	<i>Carrytha filiformis</i>
<i>Kṣīravallī</i>	–	<i>Ipomoea paniculata</i>
<i>Gucchaphala vallī</i>	–	<i>Vitis vinifera</i> (<i>Drākṣa</i>)
<i>Manjuvallī</i>	–	<i>Rubia Cardifolia</i> (<i>Manjīṣṭha</i>)

Discussion

Some of the *Sūtras* of the original text provide information, which is most scientific to present era. The morphology, classification and nomenclature of plants, which has been described in this ancient book, amazes the scientific world regarding the traditional wisdom and command on plant science. Description of the origin of life shows ancient scholars close monitoring of the nature and their zeal regarding evolutionary theories.

Classification of lands distribution of forests of this text shows the ecological knowledge. Minute observations on plant morphological structures, their naming in a scientific way like- leaf structures, flower types, leaf types, leaf parts, flower parts, cellular structure of leaf etc are still amazing.

The scientific world should think how they developed these techniques in early times. The total wisdom of this work shall enlighten the global scientific world for further research in plant science. It is country pride that India has its seeds for world developmental Botany in many facets.

Eight plant parts description, seed, seedlings, classification of plants, histology of leaf, physiological topics like transporting system etc. described in Sanskrit *Ślokas* satisfies many of the literary Palete.^{1,2,3,4,5}

Conclusion

There is a need of deep study of this text in multi disciplines including *Āyurvēda*. Every scientific description should be highlighted to global level in order to make Indian wisdom popular. Let the scientific world know that the origin of plant science lies in Indian traditional knowledge. It is worthy to make this *Vṛkṣāyurvēda* as a subject in Post Graduate and Under Graduate levels not only to Botany but also to *Āyurvēda* students.

REFERENCE

1. Carl Cappeller 1972 Sanskrit English Dictionary, 1st Indian edition, published by Chaukhamba Amarabhaarl Prakashan.
2. Frank P Faliabury and Claon & Rass 2004 Plane physialagy, 7th Reprint, published by CBS publishers and distributors, Darvyaganj, New Delhi.
3. Parasara 1994 *Ṛkṣāyurveda of Parāśara*, edited by N.N.Sircar and Romasarkar. Published by Sri Satguru publications.
4. Sharma, P.V 1996 *Dravyagūṇa Vijñāna*, 17th edition, published by Chaukamba Bharati Acadamy, Varanasi.
5. Sharma, P.V 1997 *Dravyagūṇa Kōśa*, dictionary of *Āyurvēda* terms, 1st edition published by Chaukhambha orientation.

सारांश

पराशर का वृक्षायुर्वेद-एक प्राचीन वृक्षशास्त्र का प्रबन्ध

गोलि पेंचल प्रसाद, जी. नीलिमा, जी.पी. प्रताप एवं जी.के. स्वामी

प्राचीन भारत में पराशर का वृक्षायुर्वेद वनस्पति शास्त्र के लिए महान योगदान है। एन.एन. सीरकर और रोमा सारकर ने इस ग्रन्थ का अंग्रेजी भाषा में अनुवाद और संपादन किया। इसमें आधुनिक वनस्पति शास्त्र के तुलनात्मक उदाहरण सहित विवरण भी संलग्न किया गया है। भाषा शैली के आधार पर इस पुस्तक का काल यथासंभव ईसा पूर्व पहली सदी से लेकर ईसा पश्चात् चौथी सदी के मध्य स्थापित किया जा सकता है। इसमें वनस्पति शास्त्र की बहुत सी वैज्ञानिक शाखाएँ जैसे जीवन का उद्भव, परिस्थिति विज्ञान, जंगलों का वर्गीकरण, आकृति विज्ञान, वर्गीकरण, पारिभाषिक शब्दावली, ऊतक विज्ञान और शरीर क्रिया विज्ञान पर विचार किया गया है। यद्यपि यह प्रमाणित है कि यह पुस्तक प्राचीन आयुर्वेद के स्नातकों को आयुर्वेद के प्रारम्भिक अध्ययन हेतु वनस्पति शास्त्र को पढ़ाने के लिए पराशर द्वारा लिखी गई थी। यह सत्य है कि आयुर्वेद के स्नातकों और वनस्पति शास्त्र से सम्बन्धित अन्य विद्यार्थियों के लिए भी यह पुस्तक उपयोगी है। इस पुस्तक की ओर आयुर्वेद और वनस्पति शास्त्र से सम्बन्धित स्नातकों का ध्यान आकर्षित करना एवं प्राचीन भारतीय वनस्पति शास्त्र के ज्ञान की गम्भीरता को अनुभव करना ही इस लेख को लिखने का प्रमुख उद्देश्य है।