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Dr. Bharati Goswami

Associate Professor, B. Borooah
College, Guwahati, Assam, India

Dimpi Deka

Ph. D Research Scholar Gauhati
University, Guwahati, Assam,
India

The science of the treatment of flora as depicted in the Brhatsamhitā

Dr. Bharati Goswami and Dimpi Deka

Abstract:

The term 'flora' indicates all the plants growing in a particular area. Therefore, flora refers various types of plants. It is a known fact that plants have played a crucial role in the existence of human beings. In ancient India, people depended on plants to fulfill almost the requirements. The ancient works such as the Vedas, the Upaniṣads, the Epics, the Purāṇas, the *Caraka-Samhitā*, the *Suśruta-Samhitā* and such other works containing materials show that Botanical Science developed in ancient India through the knowledge of plants and trees. The ancient Indian Science of plant life was known as *Vṛkṣāyurveda*. The different aspects of the science of the treatment of the plants as revealed in the *Brhatsamhitā*. The *Vṛkṣāyurveda* chapter of the *Brhatsamhitā* describes very beautifully about the science of the treatment of the plants. In this chapter the author Varāhamihira enumerates the different aspects regarding the plant treatment, such as, treatment of seeds, method of planting trees, method of nourishment, diseases and treatment of diseased plants. This paper is an attempt to reflect the science of the treatment of flora as depicted in the *Brhatsamhitā* of Varāhamihira.

Keyword: Brhatsamhitā, flora, Vṛkṣāyurveda, treatment, botanical science

Introduction

Flora is the naturally occurring native plant life in a particular region or time. The term *flora* comes from the Latin name of flora, the goddess of plant, flowers and fertility in Roman mythology. The dictionary meaning of flora is the plants of a particular region, geological period or environment ^[1]. So, the term flora includes various types of plants. From time immemorial, plants have played a vital role in the existence of human beings. The plants alone are the reasons for survival of men and animals alike. Life cannot run smoothly without plants. They are also the source of food, medicines, clothes, dwellings etc. In ancient Sanskrit literature, descriptions of innumerable varieties of plants are found in the context of religious rituals, descriptions of hermitage, gardens, king's fort, modes of worship, medicinal treatment and so on and so forth. All these descriptions reflect the truth that plants contributed a lot to the growth and development of ancient civilization and culture.

In ancient India, people depended on plants for meeting their day-to-day requirements like food and drinks, housing, clothing etc. and also for curing their ailments. It has been observed that owing to their close association to plants, the ancient Indian people learned varied aspects of plant science such as the plant morphology, plant physiology, plant ecology, plant taxonomy etc. The ancient works such as the Vedas, the Upaniṣads, the Epics, the Purāṇas, the *Caraka-Samhitā*, the *Suśruta-Samhitā* and such other works containing materials show that Botanical Science developed in ancient India through the knowledge of plants and trees. The knowledge of the rich plant kingdom as reflected in these ancient works reveal that dependence on plants for food and other requirements necessitated pre-Vedic Indians to study the plants in a scientific way. The ancient Indian Science of plant life was known as *Vṛkṣāyurveda*. The significant works on Botany which dealt with plants and their treatment include the *Brhatsamhitā* of Varāhamihira, the *Vṛkṣāyurveda* of Surapāla, the *Kṛṣiparāśara* of Parāśara, the *Mānasollāsa* or *Abhilaṣitārthacintāmaṇi* of Somesvara, the *Vṛkṣāyurveda* section of the *Agnipurāṇa*² and the *Viṣṇudharmottarapurāṇa*^[3], the *Upavanavinoda* etc.

Corresponding Author:

Dr. Bharati Goswami

Associate Professor, B. Borooah
College, Guwahati, Assam, India

The present write-up is an attempt to throw some light on the science of the treatment of flora as depicted in the *Bṛhatsamhitā* of Varāhamihira.

The *Bṛhatsamhitā* of Varāhamihira is one of the most well-known works on astrology and astronomy. It contains one hundred and six chapters. It is an encyclopedia of wide-ranging subjects of human interest, including astrology, astronomy, geography, meteorology, planetary movements, eclipses, architecture, treatment of plants, growth of crops, omens and auguries, gems, pearls, rituals etc. The book is composed in verses with varied meters. This great Sanskrit work was published in *Bibliotheca Indica* by the German Indologist, Dr. H. Kern, who has also published an English translation in the *Journal of Royal Asiatic Society* of Great Britain and Ireland (1870 AD to 1874) as a series of articles. Varāhamihira (505 A.D.-587 A.D.), the author of this work, is considered to be one of the “Nine-Jewels” adorning the court of the legendary king Vikramāditya of Ujjain. Bhaṭṭotpala (10th century A.D) wrote a commentary on the *Bṛhatsamhitā*, named *Vivṛti*. Bhaṭṭotpala, in explaining the prescriptions in the section on *Vṛkṣāyurveda*, has elucidated the points by certain quotations from three ancient authors, Kāśyapa, Parāśara, and Sārasvata. It seems probable that the treatises ascribed to these authors were primarily concerned with the art of cultivation.

The earliest reference of the term *vṛkṣāyurveda* is found in the *Arthaśāstra* of Kauṭilya. It is said that the Director of Agriculture, must himself be conversant with practice of agriculture (*kṛṣitantra*), water-divining (*śulba*), treatments of plants (*vṛkṣāyurveda*), and collection of seeds of all kinds in the proper season.⁴ The materials found in these valuable works show that the Botanical Science developed in the remote past through the knowledge of plants.

In the *Bṛhatsamhitā*, the fifty-fifth chapter is entitled as *vṛkṣāyurveda* i.e. the science of the treatment of plants. It has thirty-one verses. Varāhamihira mentions the topics included in the *vṛkṣāyurveda* chapter as being choice of proper soil, gardening, grafting, watering, nursing, manuring, treatment of plants in diseased condition, different method for germination of different seeds etc. Varāhamihira presents a summarized account, within the limits of a chapter. He has covered the major topics only and has mentioned only some of the important practices and methods. Within limited space, the author covers the aspects of health and longevity of plants. In other chapters of the book, there are also some information recorded by the author which are related to this topic.

The different aspects of the science of the treatment of the plants as revealed in the *Bṛhatsamhitā* can be considered under the following heads:

- i. Treatment of Soil
- ii. Treatment of Seeds
- iii. Method of Planting Trees
- iv. Method of Nourishment
- v. Diseases and Treatment of Diseased Plants

i) Treatment of Soil: In the beginning of the *vṛkṣāyurveda* chapter of the *Bṛhatsamhitā*, Varāhamihira advises the establishment of gardens. The subject of treatment of trees has been ably dealt with by the author in the text, as it forms part of the topic of gardening. Further gardening is closely connected with town-planning, house-building and construction of tanks. For gardening, soft soil is very helpful. Soft soil is congenial to the growth of all varieties of trees. Corresponding to the green manure employed in modern agriculture the author speaks of the sesamum treatment for the

soil. First of all, one should sow the sesamum, which must be crushed when in bloom. When the blooming sesamum plants are crushed and allowed to mingle with the soil, these would become an excellent green manure for preparing the soil for further cultivation^[5]. This is the first treatment to be done for the soil. Actually, during that period people maintained the soil properties with the help of green manure without damaging soil. It is also held that if the sesamum crops do not flourish in soil, nothing can be grown there with advantage. According to the ancient agriculturalist if sesamum, black-gram and green-gram grow luxuriantly, that soil is ideal for flower and fruit cultivation.

ii) Treatment of Seeds: To promote inflorescence and fructification, any seed before being sown should be treated first. Pre-treatment of seeds is highly essential to prevent infections, pest attacks and for quicker germination. This will further help to provide adequate nutritional supplements for healthy growth of trees. Varāhamihira mentions some of the methods of pre-treatments of seeds in his text.

Only those seeds from fruit-bearing trees, which have fallen on their own, need to be considered for planting. According to Varāhamihira, all seeds need to be soaked in cow milk for ten days. Every day they have to be taken out with palms greased with cow ghee. Then, the seeds are to be very carefully rubbed with cow-dung, and afterwards, fumigated with the flesh of deer and hog. Then the seeds are to be sown with the flesh, with the hog's marrow, planted in a soil previously prepared with the sesamum treatment^[6]. To ensure the sprouting and growth of luxuriant stems and foliage, Varāhamihira directs some methods in the *Bṛhatsamhitā*. He specially mentions about the tamarind (*tintiḍi*) seeds and wood-apple (*kapittha*) seeds. The tamarind seeds should be properly soaked in an infusion of powdered paddy, black-gram, sesamum and wheat particles along with the stale meat, and then steamed with turmeric powder.⁷ For the wood-apple, the seeds should be soaked for a period of time equal to that of a hundred rhythmic claps with the palm, in a decoction of eight roots: wild jasmine (*asphota*), amla (*āmalaka*), axlewood (*dhava*), malabar nut (*vāsika*), cane (*vetasa*), *sūryavallī*, japanese barnyard millet (*śyāma*), chrysanthemum (*atimuktaka*) boiled in milk. The seeds, then, should be dried in the sun and this process should be repeated for thirty days. The prepared hole should be filled up with the milky decoction. When the hole dries up, it should be burnt with fire, and then, pasted over with ashes mixed with ghee and honey. A height of four digits of soil should be thrown in, then to be filled with the flour of black-gram, sesamum and barley, and again put four digits of soil. Finally, water used in fish washings should be sprinkled and the mud should be beaten and reduced to a thick consistency, then the seeds, which are previously prepared, should be placed in the hole at a depth of four digits of the soil. Again, water used in fish and flesh washings should be poured^[8].

For fast growth and profuse production of fruits of trees another method for treating seeds before sowing is mentioned by Varāhamihira. Any seed being soaked a hundred times in a paste of sage leaved alangium (*aṅkola*) fruit, or in its oil, or in a paste or oil of glue berry (*śleṣātmaka*) fruit, will, when planted in a soil, sprinkled with hail water, sprout instantaneously, and grows with branches loaded with fruit.⁹ The special method in the case of *śleṣātmaka* seeds is described in the text. Before sowing the seeds of *śleṣātmaka* fruit the seeds should be soaked in the water of the ripe fruit of *aṅkola* after removing its outer cover. Then the seeds

should be dried in shade and the process is repeated seven times. The seeds are then rubbed with buffalo's dung and kept in the dung cakes prepared from the same dung for some time. Being planted thereafter in mud soaked with hail water, they will produce fruit in a day ^[10]. In this context Bhaṭṭopala says that seeds smeared with buffalo-dung should be kept inside a heap of dry buffalo-dung in a pot until the contents are drenched by hail-water.

From the methods regarding seed treatment mentioned by Varāhamihira, it can undoubtedly be said that he had vast knowledge in terms of it. He mentioned treatment of seeds systematically. Now-a-days, for keeping the seeds without spoiling and to protect the seeds from the destruction by the pests, some chemical products are used. But, Varāhamihira mentions some natural methods using natural elements to keep the seeds protected. Milk and cow-dung are still used as pesticide. The steamed process which is mentioned by Varāhamihira, can preserve the seeds for a long time. At the time of sowing the seeds, meat and fats are mixed with the seeds for which it is inferred that the pests get busy in meat and fats till the seeds get sprout, and thus the seeds are protected from the insects. The shell of the tamarind seeds is very hard. The seeds will sprout if they are softened. The above mentioned method for tamarind seeds is able to soften the shell of the seeds. From the ancient time, the wood-apple tree is considered to be a sacred one. So, for growing a wood-apple tree by stretching out its branches, from the seed treatment to seed transplantation everything is minutely described. Water used in fish-washing and meat-washing is a very effective method for growth and development of fruits etc. Water used in fish-washing is still poured to the root part of the gourds, mango trees etc.

iii) Method of Planting Trees: The science of planting is a very ancient science in India. A typically nice description about planting is contained in the *Brhatsamhitā*. The author advises the establishment of gardens on the bank of lakes, ponds etc. The sides of rivers and lakes and other water banks will not be pleasant and agreeable without shady trees. Hence, the author opines that it is necessary to form gardens on the bank of the lakes etc. Actually both the tanks and gardens are mutually beneficial. The banks of the tank should be shaded with arjuna, Indian oak (hijjal), banyan (vaṭa), mango (āmra), pipal (plakṣa), burflower tree (kadamba), rose-apple (jambū), cane (vetasa), philippine violet (kuravaka), palm tree (tāla), ashok tree, mahua tree (madhūka), bullet wood (bakula), neem (ariṣṭa), tamanu nut tree (punnāga), lebbek tree (śirīṣa) and beautyberry (priyaṅgu) ^[11]. These trees are regarded as auspicious. Among these, neem, aśoka tree, tamanu nut tree, lebbek tree, and beautyberry also can be planted in the garden of a house as pre-eminently conducive to the welfare of the house. In this regard, Kāśyapa also expresses the same view. He adds in addition campaka (campaka), cluster fig (udumbara) and Indian coral tree (pārijātaka) ^[12]. From time immemorial, special auspicious trees occupy a respected, ceremonial position and some are even worshipped. In other words it can be said that there is a relationship between trees and spiritual life in India. So, much importance is given in plantation of such type trees.

Essential preliminaries of planting trees are also directed by Varāhamihira in the *vrkṣāyurveda* chapter of the *Brhatsamhitā*. It is stated that one should plant the tree after worshipping the tree with a bath and anointment, and then, the tree will be graced with luxuriant growth of leaves. ^[13] As regarding the proper season for planting trees, Varāhamihira

clearly mentions the name of different seasons for planting different trees. He directs that in the *śiśira* season (*māgha* and *phālguna*), the trees whose branches and leaves are not developed; in the *hemanta* season (*mārgaśirṣa* and *pañca*), the plants with just-developed branches; in the rainy season (*śrāvāṇa* and *bhādra*), the plants with well-developed should be planted ^[14]. The particular direction of a tree that is uprooted from another place for planting in a new place should be kept up also in the new place. Kāśyapa states the same view regarding this method of tree plantation.

In addition to the ordinary method of propagation by seeds, the methods of propagation by cutting and grafting are stated by Varāhamihira in the *vrkṣāyurveda* chapter of the *Brhatsamhitā*. According to Varāhamihira grafting may be done in respect of jack tree (panasa), ashok tree, banana (kadalī), rose-apple (jambū), monkey jack (lakuca), pomegranate (dāḍima), grapevine (drākṣā), pālivata, citron (bījapūra), and chrysanthemum (atimuktaka) by smearing a branch with cow-dung and transplanting it on the branch of another tree. It may be done also by cutting off the stem of a tree and by transplanting it either inserted on the root of another plant or on the stem of another plant ^[15]. Regarding the methods of propagation by cutting and grafting, Bhaṭṭopala judges another meaning of this method. If a good tree is uprooted, its branch can be transplanted on the branch of another tree of the same group. Bhaṭṭopala opines that if transplantation can be done in respect of two trees of different groups, then, one will be able to get different fruits from different branches from the same tree. ^[16] This wonder is still prevalent in modern times also. The *Abhilaṣitārthacintāmaṇi* refers to many methods for turning sour or bitter fruits into sweet ones, a tree into a creeper etc. ^[17] For transplanting, the plants should be smeared from root to the top with ghee, sesamum, honey, false black pepper (viḍaṅga), milk, and cow-dung ^[18].

The proper method of sowing the seeds or saplings is also described in the *Brhatsamhitā*. It was observed that the trees planted irregularly lost their vigour and beauty and also did not grow and develop properly and remained fruitless. Actually, the root of the trees thereby becoming mingled together will interfere with each other function and will become ill at work, and fruits will not be produced. For this reason, proper distance between one tree and another in a garden must be maintained while sowing the saplings. It is mentioned in the *Brhatsamhitā* that if trees are planted at an interval of twenty cubits, they become well developed; an interval of sixteen cubits are also found to produce good plants, and twelve cubit interval is the minimum distance between two trees. ^[19] It means that a considerable space must be kept between one tree and another to avoid the mixing of different trees. Proper interval is allowed to have the best of plants.

iv) Method of Nourishment: For nourishment of plants most important factor is the soil – the principal source of sustenance. The fertile soil is capable of supplying the plants with their necessary food materials. Plants draw food materials from the soil in a state of solution. The ancient people had an excellent knowledge of the science of manuring the soils in agricultural works. An elaborate instruction in manuring is found in the *Brhatsamhitā*. To promote the yield of flowers and fruits of all kinds of plants, a mixture of two āḍhakas (6 kg 146 grams) of the powder of the dung of goats and sheep, one āḍhaka (3 kg 73 grams) of sesamum powder, one *prastha* (768 grams) of wheat particles, one *tulā* (4 kg

800 grams) of beef and a *droṇa* (12 kg 228 grams) of water kept for seven nights, should be poured round the roots of the plant ^[20]. It is worth mentioning that this measure is given for one plant. In this context Kāśyapa directs also the same measures for all kinds of plants.

The root is considered as the vital part in regard to plant nourishment. The ancient Indian thinkers in their own way came to realize the importance of solar energy and air in the digestion of food materials which is absorbed through the roots of the trees. That is why, in the text instructions are provided regarding the process of planting tree saplings while maintaining a specific distance for each of them so that the trees can procure enough sunlight and no difficulty arises in wind movement, which is already described in the section “Method of Planting Trees”.

In the *Brhatsamhitā*, water is also described as the principal element of growth of the plants. To keep to soil fit for the growth of plants, watering should be done differently in different season. It is stated that after the trees are planted in the soil, the trees should be watered both in the morning and evening everyday in summer. It is because during the summer season, the soil gets dried soon. In cold season, the soil needs to be watered in alternate days. During the rainy season, watering is needed when the soil gets dried.²¹ So, it can be said that during that period of time, people watered the trees on an observation of soil.

v) Diseases and Treatment of Diseased Plants: The ancient Indian people were very much concerned about the plant disease and formulation for their treatment. They have tried their level best to know the causes of the diseases and their treatment. Going by the Sanskrit literature, it comes to light that the plant diseases and pests were well recognized by the ancient Indian scholars. They developed eco-friendly ways of crop cultivation and organic agents as pesticides. Destruction of corns by various kinds of reptiles and vermin has been referred to in the *Atharvaveda*. Guṇaratna, in his commentary of the *Saḍdarśanasamuccaya*, mentions that just as the human body is subject to jaundice, dropsy, emaciation and defects of finger, nose etc., similarly, plants also suffer from similar diseases such as inception of disease, displacement of flower, fruits, leaves, bark ^[22]. In the *Brhadāranyakopaniṣad*, morphological division of plants, both external and internal, is mentioned in connection with the analogical description of the *puruṣa* (creator) ^[23]. From this description of *Brhadāranyakopaniṣad*, it can be assumed that plants might also fall prey to various diseases.

The science of the treatment of plants in disease is depicted by Varāhamihira in his *Brhatsamhitā*. Varāhamihira states that by the application of proper drugs, diseases of plants can be cured. He makes notes on natural causes of diseases of plants in the *Brhatsamhitā*. Plant gets disease from cold weather, strong winds, and hot sun i.e. high temperature.²⁴ When the plants are diseased, the leaves become pale-white, buds do not develop, branches become dry, and the sap (rasa) exudes ^[25]. In this context, Kāśyapa is of the view that lack of the branches, stems, foliage, fruits, shade and leaves, losing lustre gradually are the diseases of plants caused by coldness, excessive heat, excessive rain, dry wind, and by the intermingling of roots of different plants and are to be treated accordingly.

The ancient scholars not only discussed the causes of the disease, they also came out with numbers of measures to cure the diseases. They started the treatment of diseased trees after examining the root causes of the diseases. It has been

observed that the methods of plant treatment in disease, prescribed by Varāhamihira, are both preventive and curative. After the trees show symptoms of any disease, the trees should be treated. At the outset, the trees suffering from above mentioned diseases are required to cut first with a knife. Then, a paste made of viḍaṅga, ghee and silt must be applied to those parts and they should be sprinkled with water and milk ^[26]. It is seen that on various occasions fruits get destroyed prematurely. Fruitlessness of plants is regarded as a disease in the *Brhatsamhitā*. As a remedy against barrenness a hot decoction should be made of horse-gram, black-gram, green-gram, sesamum and barely with milk, which when cooled should be poured round the roots of the diseased plants. So treated, it will have abundant of flowers and fruits ^[27].

Conclusion

From the above discussion, it can be assumed that the contemporaries of Varāhamihira or his precursors possessed adequate knowledge of plant treatment. During that era, the people used to build most of the important commodities for day-to-day use such as, building material, food, clothing, furniture, idol, medicines etc. from solely trees. Apart from this, various commodities were made from trees for commercial purposes during that era. Especially for the royal families, different types of perfumes, beds, decorative items were made. It was also customary to plant trees in public places and private residences for the purpose of beautification. The preservation of the environment was also related with this. Overall, the human beings were firmly connected to trees. Therefore, the people acquired the knowledge of plant treatment and practically applied those knowledge as well. Most of the methods of plant treatment from the era are still used in agriculture. Similar to those times, organic treatment is still preferred. In fact, it is being far more increased now. It can be presumed that the proper use of these methods can bring radical changes in the field of agriculture.

References

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5. mṛdvī bhūḥ sarvavṛkṣāṇāṃ hitā tasyāṃ tilān vapet / puṣpītāmstāmīca mṛdnyāt karmaitat prathamāṃ bhuvāḥ // Brhatsamhitā, 55.2 vāsarāṇi daśa dugdhabhāvitāṃ bījamājyayutahastayojitam / gomayena bahuśo virūkṣitāṃ krauḍamārgapiṣitaiśca dhūpitam // māṃsasūkaravasāsamanvitāṃropitāṃ ca parikarmītāvanau / kṣīrasamūyutajalāvasecitāṃ jāyate kusumayuktameva tat // Ibid.,55.19-20
6. tīṇīyapi karoti vallaṛīm vṛhīmāṣatila cūrṇasaktubhiḥ /
7. pūtimāṃsahitaiśca secitā dhūpitā ca satatāṃ haridrayā // Ibid.,55.21
8. kapitthavallikaraṇāya ūlānyāṣphotadhātṛdhavavāsikānām / palāśīnī vetasasūryavallī śyāmātimuktaiḥ sahitāṣtamūli // kṣīre śṛte cāpyanayā suśīte tālāsatām sthāpya kapitthyabījam / dine dine śoṣitamarkapādaimārsam vidhistveṣa tato'dhiropyam // hastāyatām tadviguṇām gaviraṃ khātāvāṣam proktajalāvapūrṇam / śuṣkām pradagdham madhusarpiṣā

- tat pralepayedbhasmasamanvitena //
 sūrñīkṛtairmāṣatilaīryavaiśva
 prapūrayenmrītrikayāntarasthaiḥ /
 matsyāmiśāmbhassahitam ca hanyādyāvad ghanatvaṁ
 samupāgatam tat // uṣtam ca bījam caturṅgulādho
 matsyāmbhasā māmsajaliśca siktam / valli bhavatyāśu
 subhapravālā vismāpanī muṇḍapamāvṛṇoti // Ibid., 55.22-26
9. śataśo'nkolasambhūtaphalakalkena bhāvitam / etatrailena
 vā bījam śleṣmātakaphalena vā // vāpitaṁ
 karakonmiśramṛdi tatkṣaṇajanmakam / phalabhārānvitā
 śākhā bhavati kimadbhutam // Ibid., 55.27-28
10. śleṣmātakasya bījāni niṣkulīkṛtya bhāvayet prājñāḥ /
 aṅkolavijjalādभिश्चāyāyām saptakṛtvāivam //
 māhiṣagomayagrṣṭānyasya karīṣe ca tāni nikṣipyā /
 karakājalāmṛdyoge nyuptānyahnā phalakarāṇi //
 Ibid., 55.29-30
11. Ibid., 55.3; 54.119
12. aśokacampakārīṣṭapunnāgāśca priyaṅgavaḥ /
 śirīśodumbarāḥ śreṣṭhāḥ pārijātakameva ca // ete vṛkṣāḥ
 śubhā jñeyāḥ prathamāṁ tāmśca ropayet/ devālaye
 tathodyāne grheṣūpavaneṣu ca // cf., M.Ramakrishna
 Bhat, Bṛhatsamhitā, Vol. p.528
13. śucirbhūtvā taroḥ pūjām kṛtvā snānānulepanaiḥ /
 ropayedropitaścaiva patraistaireva jāyate //
 Bṛhatsamhitā, 55.8
14. ajātaśākhān śīśire jātaśākhān himāgame / varṣāgame ca
 suskandhān yathādīksthān praropayet // Ibid., 55.6
15. panasāśokakadalījambūlakucadādimāḥ /
 drākṣāpālivatāścaiva bījapūrātimuktakāḥ // ete drumāḥ
 kāṇḍaropyā gomayena pralepitāḥ / mūlocchede'o'thavā
 skandhe ropanīyāḥ param tataḥ // Ibid., 55.4-5
16. Bhaṭṭotpalavivṛti, p.116
17. Vide, M.R.Bhat, Bṛhatsamhitā, Vol.1, p.529
18. ghr̥tośīratilakṣaudravidāṅgakṣīragomayaiḥ /
 āmūlaskandhaliptānām saṁkrāmaṇaviropanam //
 Bṛhatsamhitā, 55.7
19. uttamāṁ viṁśatirhastā madhyamāṁ ṣoḍaśāntaram /
 sthānāt sthānāntaram kāryam vṛkṣāṇām dvādaśāvaram //
 Ibid., 55.12
20. avikājaśakṛccūrṇasyāḍhake dve tilāḍhakam / saktuprastho
 jaladroṇo gomāmsatulayā saha // saptarātroṣitairetaiḥ
 sekaḥ kārya vanaspatē / vallīgulmalatānām ca
 phalapuṣpāya sarvadā // Ibid., 55.17-18
21. Ibid., 55.9
22. cf., Vanaspati, p.47
23. Bṛhadāraṇyaka Upaniṣad, 3.9.1-3
24. śītavātātapai rogo jāyate pāṇḍupatrātā / avṛddhiśca
 pravālānām śākhāśoṣo rasastrutiḥ // Bṛhatsamhitā, 55.14
25. Ibid., 55.14
26. cikitsitamathaitesām śastrenāḍau viśodhanam /
 viḍāṅgagr̥tapaṅkāktān secayet kṣīravāriṇā // Ibid., 55.15
27. phalanāśe kulatthaiśca māśairmudgaistilaīryavaiḥ /
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