



## Bio-Indicators and Agricultural Forecasting: A Study Based on Varāhamihira's Kusumalatādhyāya

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### Abstract

The *Bṛhatsaṃhitā* of Varāhamihira, a 6<sup>th</sup> century polymath, is an important work that represents the integration of celestial observations with terrestrial ecology. The 29<sup>th</sup> chapter, *Kusumalatādhyāya*, offers a sophisticated pattern of biological phenology, where the flowering and fruiting cycles of flora serve as diagnostic tools for predicting agricultural productivity. This research paper provides a thorough analysis of the fourteen verses of this chapter, categorizing them as a traditional system of Bio-indicators. By correlating specific botanical events such as the blooming of *Śāla*, *Jambū*, and *Āmra* with the success of varied crops and socio-economic fluctuations, Varāhamihira established a natural forecasting model essential for an agrarian civilization. This study explores the scientific temperament behind these verses, their alignment with modern phenological studies, and their critical importance in the contemporary discourse on sustainable agriculture and climate resilience.

**Keywords:** *Varāhamihira, Bṛhatsaṃhitā, Kusumalatādhyāya, Bio-indicators, Agro-meteorology, Traditional Ecological Knowledge (TEK), Phenology.*

## Introduction

The relationship between nature and agriculture has been an essential aspect of human civilization since ancient times. Early societies depended heavily on environmental signs and natural patterns to predict climatic conditions and agricultural productivity. Long before the development of modern meteorology or agricultural science, scholars and farmers relied on the observation of plants, animals, and seasonal cycles to understand future outcomes in agriculture and society. Classical Indian scientific literature contains numerous examples of such ecological observations that functioned as practical tools for environmental forecasting.

One of the most remarkable works that reflects this deep ecological awareness is the *Bṛhatsaṃhitā* composed by the celebrated scholar Varāhamihira. This text is an encyclopaedic compendium covering a wide range of subjects including astronomy, meteorology, architecture, astrology, agriculture, geography, and natural sciences. Within this comprehensive work, Chapter 29, known as *Kusumalatādhyāya*, provides a unique system of environmental forecasting based on the flowering and growth of plants.

The term *Kusumalatā* literally means “flowers and creepers.” In this chapter, Varāhamihira explains how the flowering, growth, and condition of various plants, trees, and creepers serve as indicators of agricultural productivity, climatic conditions, economic prosperity, and social circumstances. These observations demonstrate that natural vegetation was considered an important source of environmental information. By examining the condition of plants, it was believed that one could anticipate the success or failure of crops, the prosperity of animals, the availability of precious materials, and even the occurrence of social or political changes.

The knowledge presented in this chapter represents an early form of ecological forecasting. Modern environmental science recognizes similar phenomena through the concept of bio-indicators, which are living organisms used to assess environmental conditions. The observations recorded by Varāhamihira thus reflect an ancient understanding of ecological relationships between vegetation, climate, and agricultural productivity. This article examines the bio-indicator system described in the *Kusumalatādhyāya*, focusing on the fourteen verses that explain how specific plants correspond to particular agricultural or environmental outcomes. By analysing these verses, the study highlights the importance of

plant observation in traditional agricultural forecasting and demonstrates how classical Indian knowledge systems contributed to environmental science.

### **Observation of Plant Growth as a General Indicator**

The *Kusumalatādhyāya* begins with a general principle explaining how vegetation can be used to predict agricultural prosperity. Varāhamihira states that the growth of trees and plants should be carefully observed in order to understand the future abundance of crops and other natural products. According to him, the flourishing of vegetation serves as a sign of the availability and productivity of agricultural resources.<sup>1</sup> The author emphasizes the relationship between plant growth and agricultural yield. When trees produce abundant flowers and fruits, it indicates favourable environmental conditions such as adequate rainfall, fertile soil, and balanced climate. These conditions naturally support the growth of agricultural crops. Conversely, poor flowering or weak vegetation may indicate unfavourable environmental factors that could reduce crop production.

This principle reveals the empirical method used in ancient agricultural forecasting. Instead of relying solely on abstract theories, scholars observed natural patterns in plant development. The timing of flowering, the abundance of blossoms, and the vigour of plant growth were considered meaningful signals about environmental stability. Such observations allowed farmers and scholars to anticipate agricultural conditions before the actual harvesting season.

### **Indicators of Rice and Grain Production**

The second verse in *Kusumalatādhyāya* provides specific examples linking certain trees with particular varieties of rice and grains. Varāhamihira states that the flourishing of the *śāla* tree indicates the abundance of the *kalamaśāli* variety of rice. Similarly, the flowering of the *rakta-aśoka* tree indicates the prosperity of the red rice known as *raktaśāli*. The growth of the *kṣīrika* plant indicates the production of the grain called *pāṇḍuka*, while the flourishing of *nīlāśoka* suggests the prosperity of another crop known as *sūkaraka*.<sup>2</sup>

These associations demonstrate that different plant species were believed to correspond to specific crops. The relationship may have been derived from long-term observation of environmental patterns. Certain plants may flourish under particular climatic or soil conditions that also favour specific agricultural crops. Therefore, the health of these plants could serve as an early sign of future agricultural success.

The connection between trees and rice varieties also highlights the importance of rice cultivation in ancient Indian agriculture. Rice was one of the primary staple crops, and its successful harvest was essential for food security. By observing natural vegetation, farmers could obtain valuable insights into the expected rice production of a given year.

### Indicators of Barley and Other Crops

The third verse in *Kusumalatādhyāya* continues this system of plant-based forecasting by mentioning additional examples. According to Varāhamihira, the flourishing of the *nyagrodha* (banyan) tree indicates the abundance of *yavaka* grains, while the growth of the *tinduka* tree suggests the prosperity of *ṣaṣṭika* rice. Furthermore, the flourishing of the *aśvattha* tree is said to indicate the general prosperity of all crops. The banyan and the sacred fig tree are large and long-living species that respond strongly to environmental conditions. Their vigorous growth may indicate favourable ecological factors such as soil fertility and adequate moisture. Therefore, their flourishing was interpreted as a positive sign for agricultural productivity. The idea that the growth of the *aśvattha* tree indicates the success of all crops reflects its symbolic and ecological significance in Indian tradition. The tree is known for its resilience and adaptability, and its healthy development may suggest balanced environmental conditions suitable for diverse crops.<sup>3</sup>

### Indicators of Pulses and Cereals

In the fourth verse, Varāhamihira describes indicators related to pulses and cereals. The flourishing of *jambū* trees is said to indicate the abundance of sesame and black gram crops. Similarly, the growth of *śirīṣa* trees predicts the yield of *kañgu* grains. The flowering of *madhūka* trees indicates a good harvest of wheat, while the flourishing of *saptaparṇa* trees suggests prosperity in barley production.<sup>4</sup> These associations illustrate the diversity of agricultural crops considered in the text. Pulses and cereals formed an essential part of the diet in ancient India, providing both nutritional value and agricultural stability. The ability to predict their production would have been highly valuable for farmers and communities. The correlation between plant flowering and crop yield may reflect shared environmental requirements. If certain trees and crops thrive under similar climatic conditions, the flourishing of the trees can serve as an early signal for the crops. This ecological reasoning forms the basis of the bio-indicator system described in the text.

## Indicators of Cotton and Legumes

The fifth verse expands the list of plant indicators. Varāhamihira states that the flowering of *atimuktaka* and *kunda* plants indicates the prosperity of cotton crops. The flourishing of *badarī* trees suggests the abundance of horse gram, while the growth of *cirabilva* plants indicates the yield of green gram.<sup>5</sup> Cotton was an economically important crop in ancient India due to its use in textile production. Predicting its success would have been valuable for both agricultural and economic planning. Similarly, legumes such as horse gram and green gram were important sources of protein and played a vital role in crop rotation systems. The inclusion of these crops in the forecasting system demonstrates the practical agricultural focus of the text. The observations recorded by Varāhamihira likely reflect traditional knowledge accumulated through generations of farming experience.

## Indicators of Flax and Other Crops

The sixth verse describes indicators related to additional agricultural products. The flowering of *atasī* and *vetasa* plants is said to indicate the growth of flax. The blossoming of *palāśa* flowers suggests the prosperity of *kodrava* grains. The flourishing of *tilaka* plants indicates the availability of conch, pearls, and silver, while the growth of *ceṅguda* plants indicates the production of hemp.<sup>6</sup>

These associations demonstrate that the system of indicators extends beyond food crops to include materials used in industry and trade. Flax and hemp were important fibres used in textile production, while conch shells, pearls, and silver were valuable commodities. The connection between plant growth and the availability of such materials suggests a broader ecological understanding. Environmental conditions that favour certain plants may also influence marine or mineral resources through climatic patterns or regional ecological interactions.

## Indicators of Animal Prosperity

The seventh verse shifts the focus from crops to animals. According to Varāhamihira, the growth of *hastikarṇa* plants indicates the prosperity of elephants, while *aśvakarṇa* plants indicate the increase of horses. The flowering of *pāṭalā* plants indicates the prosperity of cattle, and the flourishing of *kadalī* plants suggests the increase of goats and sheep. Animals played an essential role in ancient agriculture and society. Elephants were used in warfare

and royal ceremonies, horses were important for transportation and military purposes, and cattle were vital for farming and dairy production. Goats and sheep provided meat, milk, and wool. By observing vegetation associated with these animals, communities believed they could anticipate changes in animal populations or prosperity. This reflects an integrated view of ecology in which plant life, animal life, and human activity are interconnected.<sup>7</sup>

### Indicators of Precious Materials

The eighth verse describes indicators related to valuable materials. The flowering of *campaka* flowers indicates the abundance of gold, while *bandhujīva* plants suggest the prosperity of coral. The flourishing of *kuravaka* plants indicates the availability of diamonds, and *nandikāvarta* flowers indicate the presence of precious stones such as *vaiḍūrya*.<sup>8</sup> Although these associations may appear symbolic, they likely reflect environmental or economic correlations observed in ancient times. Regions where certain plants flourished might also have been associated with mineral or trade resources. These verses show that the forecasting system was not limited to agriculture but extended to economic prosperity and trade.

### Indicators of Political and Social Prosperity

The ninth and tenth verses connect plant indicators with social and political conditions. The flourishing of *raktotpala* flowers indicates the prosperity of kings, while *nīlotpala* flowers indicate the prosperity of ministers.<sup>9</sup> Similarly, the flowering of *suvarṇapuṣpa* indicates the prosperity of merchants, while *padma* and *kumuda* flowers indicate the prosperity of priests and scholars.<sup>10</sup> These associations reflect the symbolic relationship between natural beauty and social stability. In traditional thought, the flourishing of nature often represented harmony and prosperity within society. Therefore, abundant flowering in the natural environment was interpreted as a sign of political stability and economic success.

### Indicators of Rainfall and Environmental Conditions

The eleventh and twelfth verses discuss environmental indicators. The flourishing of *āmra* trees indicates general well-being, while *bhallātaka* trees suggest possible danger. The

growth of *pīlu* trees indicates health, while *khadira* and *śamī* trees indicate the possibility of famine.<sup>11</sup> Similarly, the flowering of *nāga* and *picumanda* plants indicates abundance, while *kapittha* suggests strong winds, *nicula* indicates drought, and *kuṭaja* indicates disease.<sup>12</sup> These observations demonstrate a sophisticated understanding of environmental signals. Different plant species respond differently to climatic conditions such as rainfall, temperature, and soil moisture. By studying these responses, ancient scholars attempted to forecast environmental changes.

### **Indicators of Sugarcane, Fire, and Social Behavior**

The thirteenth verse states that the flowering of *dūrvā* and *kuśa* grasses indicates the growth of sugarcane, while the flourishing of *kovidāra* plants indicates the occurrence of fire. The growth of *śyāmālatā* creepers indicates the increase of courtesans.<sup>13</sup> These associations may reflect symbolic interpretations or social observations related to seasonal changes. Sugarcane growth is closely connected with favourable moisture conditions, which may also promote the growth of grasses such as *dūrvā* and *kuśa*.

### **Leaf Condition as an Indicator of Rainfall**

The final verse provides a general rule regarding rainfall prediction. Varāhamihira states that when trees, shrubs, and creepers display smooth and healthy leaves without holes, abundant rainfall can be expected. However, when the leaves appear dry, rough, or damaged, only limited rainfall is predicted.<sup>14</sup> This observation is consistent with modern ecological understanding. Healthy leaves often indicate favourable environmental conditions, including sufficient moisture and balanced climate. Conversely, damaged or dry leaves may result from drought, pests, or harsh environmental stress.

### **Conclusion**

The present study of the *Kusumalatādhyāya* of the *Bṛhatsaṃhitā* shows that ancient Indian scholars possessed a careful and practical understanding of nature and its relationship with agriculture. The verses discussed in this chapter explain how the flowering and growth of various trees, plants, and creepers can serve as indicators of agricultural productivity, environmental conditions, and social prosperity. Through these observations, Varāhamihira

presents a system of natural signs that can help people understand future agricultural and environmental conditions.

One of the important conclusions of this study is that the *Kusumalatādhyāya* reflects an early form of environmental observation similar to what is today known as bio-indicator studies. The chapter explains that the flourishing of particular plants indicates the prosperity of specific crops such as rice, barley, wheat, sesame, cotton, and several types of pulses. These relationships suggest that ancient scholars understood that plants respond to the same environmental factors that influence crop growth, such as rainfall, soil fertility, and seasonal climate. Therefore, by observing the condition of trees and plants, it was possible to anticipate the success or failure of agricultural production.

Another significant aspect of the chapter is its broader ecological perspective. The verses do not focus only on agricultural crops but also connect plant growth with the prosperity of animals, the availability of valuable materials, and the well-being of society. For instance, certain plants are associated with the prosperity of animals such as elephants, horses, cattle, and goats. In the same way, the flowering of some plants is related to the abundance of gold, gems, and other valuable materials. These associations reflect the traditional belief that natural conditions influence many aspects of human life, including economic and social prosperity.

The *Kusumalatādhyāya* also contains observations related to environmental and climatic conditions. Some verses explain how the growth of certain plants can indicate rainfall, drought, disease, famine, or strong winds. These observations demonstrate that ancient scholars paid close attention to the way vegetation reacts to environmental changes. A particularly important idea appears in the final verse, where it is stated that when trees, shrubs, and creepers have smooth and healthy leaves, good rainfall can be expected. On the other hand, when the leaves appear dry or damaged, the rainfall is likely to be limited. This observation shows a simple yet meaningful understanding of how plant health reflects climatic conditions.

Another conclusion that can be drawn from this study is that the knowledge preserved in the *Kusumalatādhyāya* is based on long-term observation of nature. Farmers and scholars in ancient India closely watched seasonal changes in vegetation and gradually recognized patterns that connected plant growth with agricultural results. Varāhamihira collected and organized these observations into a systematic form in the *Brhatsamhitā*. By doing so, he

preserved valuable traditional knowledge that reflects the practical experience of earlier generations.

From a modern perspective, these observations are still meaningful because they show similarities with present-day ecological studies. In contemporary environmental science, plants and other living organisms are often used as bio-indicators to understand environmental changes and ecosystem health. The ideas described in the *Kusumalatādhya* demonstrate that ancient scholars also recognized the importance of such natural indicators. Their approach highlights the value of observing nature carefully and learning from the patterns found in the natural world.

The *Kusumalatādhya* presents an important example of traditional environmental knowledge in classical Indian literature. The chapter shows how the observation of plant growth and flowering was used as a practical method for understanding agricultural conditions and environmental changes. The study of these verses helps us appreciate the ecological awareness of ancient scholars and their ability to connect natural phenomena with human life. Such knowledge not only contributes to the historical study of Indian scientific traditions but also reminds us of the importance of respecting and learning from nature in discussions of sustainable agriculture and environmental awareness today.

## Appendix

**Table 1:** The *Kusumalatādhya* of the *Bṛhatsaṃhitā* by Varāhamihira begins with the general rule that the flowering and growth of plants indicate agricultural prosperity (*Śloka 1*). Observing the flowering (*kusuma*) and fruiting (*phala*) of trees helps determine the availability of crops and natural resources.

| Śloka No | Plant / Tree Mentioned | Crop or Agricultural Result          |
|----------|------------------------|--------------------------------------|
| 2        | Śāla                   | Prosperity of <i>Kalamaśāli</i> rice |
| 2        | Rakta-aśoka            | Abundance of red rice                |
| 2        | Kṣīrika                | Growth of <i>Pāṇḍūka</i> grain       |
| 2        | Nīlāśoka               | Prosperity of <i>Sūkaraka</i> crop   |
| 3        | Nyagrodha              | Growth of <i>Yavaka</i> grain        |
| 3        | Tinduka                | Prosperity of <i>Ṣaṣṭika</i> rice    |
| 3        | Aśvattha               | Prosperity of all crops              |

| <b>Śloka No</b> | <b>Plant / Tree Mentioned</b>      | <b>Crop or Agricultural Result</b>  |
|-----------------|------------------------------------|-------------------------------------|
| 4               | <i>Jambū</i>                       | Production of sesame and black gram |
| 4               | <i>Śirīṣa</i>                      | Growth of <i>Kaṅgu</i> grain        |
| 4               | <i>Madhūka</i>                     | Prosperity of wheat                 |
| 4               | <i>Saptaparṇa</i>                  | Abundance of barley                 |
| 5               | <i>Atimuktaka</i> and <i>Kunda</i> | Prosperity of cotton                |
| 5               | <i>Badarī</i>                      | Growth of horse gram                |
| 5               | <i>Cirabilva</i>                   | Growth of green gram                |
| 6               | <i>Atasī</i> and <i>Vetasa</i>     | Growth of flax                      |
| 6               | <i>Palāśa</i>                      | Prosperity of <i>Kodrava</i> grain  |
| 6               | <i>Ceṅguda</i>                     | Production of hemp                  |

**Table 2:** The chapter also connects certain plants with the prosperity of animals. This indicates that ancient scholars viewed nature as an interconnected system in which plant growth could reflect changes in animal populations (*Śloka 7*).

| <b>Śloka No</b> | <b>Plant</b>      | <b>Indicated Animal Prosperity</b> |
|-----------------|-------------------|------------------------------------|
| 7               | <i>Hastikarṇa</i> | Increase of elephants              |
| 7               | <i>Aśvakarṇa</i>  | Increase of horses                 |
| 7               | <i>Pāṭalā</i>     | Prosperity of cattle               |
| 7               | <i>Kadalī</i>     | Increase of goats and sheep        |

**Table 3:** Certain flowers are also linked with the abundance of precious materials and economic prosperity (*Śloka 8–10*).

| <b>Śloka No</b> | <b>Plant / Flower</b> | <b>Predicted Result</b> |
|-----------------|-----------------------|-------------------------|
| 8               | <i>Campaka</i>        | Abundance of gold       |
| 8               | <i>Bandhujīva</i>     | Prosperity of coral     |

| <b>Śloka No</b> | <b>Plant / Flower</b> | <b>Predicted Result</b>          |
|-----------------|-----------------------|----------------------------------|
| 8               | <i>Kuravaka</i>       | Availability of diamonds         |
| 8               | <i>Nandikāvarta</i>   | Presence of <i>vaidūrya</i> gems |
| 9               | <i>Raktotpala</i>     | Prosperity of kings              |
| 9               | <i>Nīlotpala</i>      | Prosperity of ministers          |
| 10              | <i>Suvarṇapuṣpa</i>   | Prosperity of merchants          |
| 10              | <i>Padma</i>          | Prosperity of Brahmins           |
| 10              | <i>Kumuda</i>         | Prosperity of priests            |

**Table 4:** Some verses describe how vegetation reflects environmental conditions such as rainfall, famine, disease, or strong winds (*Śloka 11–14*).

| <b>Śloka No</b> | <b>Plant</b>                     | <b>Indicated Condition</b> |
|-----------------|----------------------------------|----------------------------|
| 11              | <i>Āmra</i>                      | General prosperity         |
| 11              | <i>Bhallātaka</i>                | Fear or danger             |
| 11              | <i>Pīlu</i>                      | Good health                |
| 11              | <i>Khadira</i> and <i>Śamī</i>   | Possibility of famine      |
| 11              | <i>Arjuna</i>                    | Good rainfall              |
| 12              | <i>Nāga</i> and <i>Picumanda</i> | Abundance                  |
| 12              | <i>Kapittha</i>                  | Strong winds               |
| 12              | <i>Nicula</i>                    | Drought                    |
| 12              | <i>Kuṭaja</i>                    | Disease                    |
| 13              | <i>Dūrvā</i> and <i>Kuśa</i>     | Growth of sugarcane        |
| 13              | <i>Kovidāra</i>                  | Occurrence of fire         |
| 13              | <i>Śyāmālatā</i>                 | Increase of courtesans     |
| 14              | Healthy leaves                   | Good rainfall              |
| 14              | Dry or damaged leaves            | Poor rainfall              |

## END NOTES

1. Varāhamihira's, *Bṛhatsaṃhitā*, *Kusumalatādhyāya* (Chapter 29), verse 1:  
*phalakusumasampravṛddhiṃ vanaspatīnāṃ vilokya vijñeyam ।*  
*sulabhatvaṃ dravyāṇāṃ niṣpattiścāpi sasyānām ॥*
2. Varāhamihira's, *Bṛhatsaṃhitā*, *Kusumalatādhyāya* (Chapter 29), verse 2:  
*śālena kalamaśālī raktāśokena raktaśālīśca ।*  
*pāṇḍūkaḥ kṣīrikayā nīlāśokena sūkarakaḥ ॥*
3. Varāhamihira's, *Bṛhatsaṃhitā*, *Kusumalatādhyāya* (Chapter 29), verse 3:  
*nyagrodhena tu yavakastindukavṛddhyā ca ṣaṣṭiko bhavati ।*  
*aśvatthena jñeyā niṣpattiḥ sarvasasyānām ॥*
4. Varāhamihira's, *Bṛhatsaṃhitā*, *Kusumalatādhyāya* (Chapter 29), verse 4:  
*jambūbhistilamāśāḥ śirīṣavṛddhyā ca kaṇḍuniṣpattiḥ ।*  
*godhūmāśca madhūkairiyavavṛddhiḥ saptaaparṇena ॥*
5. Varāhamihira's, *Bṛhatsaṃhitā*, *Kusumalatādhyāya* (Chapter 29), verse 5:  
*atimuktakakundābhyāṃ karpāsaṃ sarṣapānvadedaśanaiḥ ।*  
*badarībhiśca kulatthāṃściravilvenādiśetmudgān ॥*
6. Varāhamihira's, *Bṛhatsaṃhitā*, *Kusumalatādhyāya* (Chapter 29), verse 6:  
*atasī vetasapuṣpaiḥ palāśakusumaiśca kodravā jñeyāḥ ।*  
*tilakena śaṅkhamauktikarajatānyatha ceṅgudena śaṇāḥ ॥*
7. Varāhamihira's, *Bṛhatsaṃhitā*, *Kusumalatādhyāya* (Chapter 29), verse 7:  
*kariṇaśca hastikarṇairādeśyā vājino'śvakarṇena ।*  
*gāvaśca pāṭalābhiḥ kadalībhirajāvikaṃ bhavati ॥*
8. Varāhamihira's, *Bṛhatsaṃhitā*, *Kusumalatādhyāya* (Chapter 29), verse 8:  
*campakakusumaiḥ kanakaṃ vidrumasampacca bandhujīvena ।*  
*kuravakavṛddhyā vajraṃ vaidūryaṃ nandikāvartaiḥ ॥*
9. Varāhamihira's, *Bṛhatsaṃhitā*, *Kusumalatādhyāya* (Chapter 29), verse 9:  
*vindyācca sindhuvāreṇa mauktikaṃ kārūkāḥ kusumbhena ।*  
*raktotpalena rājā mantrī nīlotpalenoktaḥ ॥*
10. Varāhamihira's, *Bṛhatsaṃhitā*, *Kusumalatādhyāya* (Chapter 29), verse 10:  
*śreṣṭhī suvarṇapuṣpātpadmairviprāḥ purohitāḥ kumudaiḥ ।*

*saugandhikena balapatirarkenā hiraṇyaparivṛddhiḥ ॥*

11. Varāhamihira's, *Bṛhatsaṃhitā*, *Kusumalatādhyāya* (Chapter 29), verse 11:

*āmraiḥ kṣemaṃ bhallātakairbhayaṃ pīlubhistathārogyam ।*

*khadiraśamībhyāṃ durbhikṣamarjunaiḥ śobhanā vṛṣṭiḥ ॥*

12. Varāhamihira's, *Bṛhatsaṃhitā*, *Kusumalatādhyāya* (Chapter 29), verse 12:

*picumandanāgakusumaiḥ subhikṣamatha mārutaḥ kapitthena ।*

*niculenāvṛṣṭibhayaṃ vyādhibhayaṃ bhavati kuṭajena ॥*

13. Varāhamihira's, *Bṛhatsaṃhitā*, *Kusumalatādhyāya* (Chapter 29), verse 13:

*dūrvākuśakusumābhyāmikṣurvahniśca kovidāreṇa ।*

*śyāmālatābhivṛddhyā bandhakyo vṛddhimāyānti ॥*

14. Varāhamihira's, *Bṛhatsaṃhitā*, *Kusumalatādhyāya* (Chapter 29), verse 14:

*yasmin kāle snigdhaniśchidrapatrāḥ saṃdṛśyante vṛkṣagulmā latāśca ।*

*tasminvṛṣṭiḥ śobhanā sapradiṣṭā rūkṣaiśchidrairalpamambhaḥ pradiṣṭam ॥*

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