



# Exploring Ancient Indian Entomological Wisdom: Pre-Colonial Understanding of Insects

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**Abstract:** Insects have played important roles in human culture, economy, and health, and human progress has been based on knowledge. In ancient India, contemporary people had a close relationship with nature. Throughout the history, especially in Indus Valley period, Vedic period even during Mauryan and Gupta civilization, the scenario remains quite same. Insects were used for medicine and health purposes mostly, whereas the religious of importance or symbolization of insects were very much prevalent. The main focus of the article will be discovering the growth and genesis of insects during ancient period. The medicinal or nutritional value of insects will also remain in focus in this article, but the spiritual value in Hinduism, Buddhism and Jainism will be discussed briefly.

**Index Terms - Insect, Knowledge, medicine, religious, literature**

## INTRODUCTION:

The relationship between insects and humans throughout history has always been complex and multifaceted. Insects are both a source of fascination and fear for humans and have played important roles in human culture, economy and health. On the other hand, human progress is based on knowledge, which has also been a major factor in the historical development of society. From the invention of the wheel and fire to the most recent advancements in artificial intelligence and contemporary technology, it has propelled civilization forward. Whether it comes from schooling, personal experiences, or in-depth scientific research, knowledge can have an impact on human civilization and help it make sense of and understand the world around them. In order to solve problems and make wise decisions, humanity needs a fair allocation of resources due to its numerous problems and difficulties.<sup>1</sup> From the prehistoric period onwards, early humans had a positive relationship with nature and participated in a variety of activities. As they progressively became aware of their potential, they started to incorporate the knowledge they had gained from these activities into their daily lives. They often had setbacks, if not complete catastrophes, during that application. However, early people only learnt about social life, agriculture, fire, iron, and wheels as a result of these attempts. Given their limited resources, they tried their best to use every facet of nature. They thus learnt a great deal about the world of birds, animals, and plants. But because Homo sapiens understood them so well, they also paid equal attention to lesser-known animals and insects. For a number of reasons, ancient Indians investigated the world of insects, and they had enough knowledge in the particular field. Scholars have discovered several allusions to the little animals in the oldest texts. Insects and the weaving business have had a strong relationship since ancient times. Pesticides were also widely used in the agricultural sector to keep insects away from crops. Numerous therapy procedures for illnesses brought on by insects or insect bites are described in ancient medical texts including the Atharvaveda and the Shusruta Samhita, among many others. They also recommend different medications for specific illnesses where it was common practice to employ insect juices. Therefore, using insects as medicine or a remedy for any ailment was not unusual in ancient India.

The oldest example of insect existence becomes important whenever that topic is being discussed. Bhimbetka is regarded as the oldest cemetery of extinct animals in terms of fossils. Researchers have found almost every type of animal fossil here, including a 550 million-year-old Indian Dickinsonia fossil that is still regarded as one of India's oldest fossil discoveries. However, new studies have turned up fossils of dragonflies from Jharkhand's Latehar area that date back about 2.5 million years, making them the oldest insect fossils in India.<sup>2</sup> There are numerous more locations in India, such as Barmer, Rajasthan, and others, where various insect fossils have been found; however, researchers have only recently acquired a fragmentary understanding of the region in question. Indian archaeology has advanced quickly in recent years, finding evidence of rock art in a variety of locations. The sequences of gathering honey from a wild bee's nest were portrayed in the Mahadeo Hills in Central India.<sup>3</sup> In the Bhimbetka's Rock Shelter No. III, Dr. Mathpal found the site of a rock bee colony hunting operation. He claims that such images, which primarily date from the Mesolithic era between 10,000 and 15,000 BC, demonstrate how frequent honey hunting and gathering were among Stone Age humans.<sup>4</sup> However, pottery is regarded as one of the most significant sources of information about the prehistoric era. Researchers discovered evidence of scorpions painted on pottery from the Malwa era site at Dangwad (M.P.) and the Chalcolithic site of Navdatoli (M.P.).<sup>5</sup>

However, the custom persisted into later times, even throughout the Indus Valley Civilisation. The inhabitants of the Indus Valley were sufficiently knowledgeable about insects as well. Numerous bug traces from Indus valley sites were discovered during a series of recent excavations. At least two examples of silk's existence in Harappa were found during these digs. Even though the first one was found inside the hollow part of a copper bangle, the second one, which resembled a necklace, was found among household trash.<sup>6</sup> A recent investigation at Chanhudaro unearthed a variety of artifacts, including bowls and Jewelry, along with a silk thread specimen. According to a micro morphological analysis, the silk came from a kind of wild silk moth rather than Bombyx Mori.<sup>7</sup> The discovery of silkworm in IVC causes the oldest date of silk's appearance outside of China to be pushed back by a thousand years. Numerous artifacts, particularly cutlery, ceramics, and jewelry from the Indus Valley Period, as well as documented motifs of famous animals, birds, and insects from the Harappan period that have been found up to this point. From Indus valley settlements, numerous painted ceramics featuring the scorpion (Kalibangan, Chanhudaro), water boatman (Chanhudaro), and cockroach (Daimabad) were found.<sup>8</sup> However, contemporary study has uncovered a number of novel facets of historical studies. In addition to the political and economic lives of modern people, the emphasis has now moved to their writing abilities, weight measurements, and agricultural practices. Up until the early 20th century, locust attacks were a regular problem in agriculture because they were so successful, yet humans used a variety of strategies like sling-balls to protect their fields. Similar issues were confronted by humans in the Indus Valley civilization; in particular, Kalibangan had numerous indications of locust attacks in agricultural fields. In addition to this, scientists have discovered evidence of insects even contributing to the abrupt collapse of civilization. Many new possibilities, including climate change, droughts and floods brought on by changing river courses, and diseases like malaria, were uncovered by a recent study on the fall of the Indus Valley Civilisation.<sup>9</sup> According to skeletal evidence found in Harappa, Rakhigarhi, and Kalibangan, malaria—which is primarily transmitted by mosquitoes—was very prevalent and deadly throughout the IVC era.

The oldest and most detailed book in human history, the Vedas, includes in-depth information on important subjects like ancient Indian metallurgy, astronomy, medicine, and science. Given its thorough descriptions of various regions, our ancestors were already familiar with the modern flora and animals. Because Vedic society was centered on agriculture, the Aryans were well aware of the animals, birds, and insects that were detrimental to agricultural produce. Insect pests have been a biotic limitation throughout the lengthy history of agricultural production. On the field, crops were attacked by invisible adversaries like bacteria and fungi as well as apparent pests like beetles, bugs and caterpillars. In Rigveda, it is mentioned that several insects and pests used to destroy the standing crops. A hymn in Atharvaveda refers to the destruction of corns by vermins, such as the tarda(borer), jabhya(snapper), upakavasa, vyadvara(rodent), samanka(hook).<sup>10</sup> In another procedure, the worms accumulated on trees can be treated quickly by smoking the tree with the mixture of white mustard, Ramatha, Vidanga, Vaca, Usana and water mixed with beef, horn of buffalo, flesh of pigeon and the powder of Billata.

सिद्धार्थरामठविडङ्गवचोष्णैगमासाम्बुसैरिभविषाणकपोतमांसैः।  
मिल्लातचूर्णसहितैर्विटपे प्रधूपः सद्योजये कुमिचयं किल भूरुहाणाम्।<sup>11</sup>

Ayurveda was a prominent tradition among the Aryans for treating illnesses. It had a clear understanding of the animals, plants, and insects that could pose a health risk to humans because many of them were also utilized by the Aryans as part of their cures or healing processes. The talk will now mostly centre on insects and diseases associated with them. Since ancient times, mosquitoes have been regarded as one of the most harmful insects to human health. Both Makka and Masaka were utilised and described as the causes of fever in the Atharvaveda. Insects including bugs, louses, and mosquitoes are maintained in the Svedaja category in Manusmrti. In his writings, Susruta discussed the history of Keet and its 67 varieties.

सर्पाणांशुक्रविष्मूत्रशवपूत्यण्डसंभवाः ।

वाय्वग्नयम्बुप्रकृतयःकीटास्तुविविधाः स्मृताः ॥<sup>13</sup>

सर्वदोषाप्रकृतिभिर्युक्तास्तेपरिणामतः ।

कीटत्वेऽपिसुघोराःस्युःसर्वएवचतुर्विधाः ॥ (सु.क.8/3-4)

Spiders are used in Vedic philosophy to represent how illusion conceals ultimate reality. The Brihadaranyaka Upanishad likewise uses the spider as an example to describe God's immanence. According to the comparison, God, like a spider, makes the world out of nothing, cares for it, and then carries the entire creation inside of it.<sup>14</sup> The spider is used in the Vedas to represent how the veil of illusion conceals the true reality. Brahman is like a spider, they say, with the entire universe as its web, which it emits from itself, made of its own substance, and weaves into a vast and complex creation of its own making, all interconnected. Its creator, the spider, resides at its centre, aware of every vibration of every strand, having created the entire thing for its own purposes under the guidance of an incredibly complex intelligence that is far beyond the comprehension of the ignorant web itself.<sup>15</sup> As a result, a spider is used in Hinduism to represent the Goddess Maya. In the Vedic story of Indra's Net, or Indrajala, the metaphorical analogy to a spider web is used. Indra spreads this net throughout the realms, and where two strands meet, a diamond of illusion emerges, reflecting every other gem in the net.<sup>16</sup> On the one hand, this represents the connections and interdependencies that bind everything in the universe together and are woven into the fabric of reality. The entire macrocosm of the cosmos is reflected in the microcosm of each component. Indra also creates and enforces the Veil between the Worlds, which keeps creatures from seeing or moving between them when they are not permitted to. They only see their own world reflected back to them, rather than the real reality.<sup>17</sup> The practice of beekeeping and the existence of bees in India are very common in modern India, but it seems to have roots in the Vedic period. References of honey and honey bees were also very common in ancient Indian literature. Mention of those insects has been profusely made in these scriptures like Rigveda, Atharvaveda and Upanishads, to explain the philosophy and inner meaning of life by giving several analogies. Honey basically was a very common word in Vedic literatures, in Rigveda alone, the word 'madhu' meaning 'honey', has been used for 300 times. A few of them are as follows-

मध्वासंपृक्ताः सारघेणधेनवः<sup>18</sup>

There were numerous references to honey in the Atharvaveda, which is regarded as a compilation of mantras pertaining to magic and medicine. The product is actually used for a variety of purposes by ancient people. It is well known that honey can be used as food and medication in Ayurveda. Makshikam, Bhraamaram, Kshoudram, Pauthikam, Chathram, Aardhyam, Ouddalakam, and Dalam were among the almost eight varieties of honey. Cough, eye disease, blood in vomit, leprosy, diabetes, obesity, worm infestation, asthma, diarrhoea, and wound healing were just a few of the ailments that could be effectively treated with those many types, both internally and externally.<sup>19</sup> Honey is a great way to improve medications and lessen their negative effects. However, excessive honey usage was also prohibited for a number of reasons. As the ancient Ayurvedic sage Charaka once stated, "Nothing is as troublesome as the Ama caused by improper intake of honey."<sup>20</sup> However, the Chandogya and Pranopanishad, two Upanishads that explain many abstract ideas in Indian philosophy, also provide a wealth of knowledge regarding bees and other aspects of their social structure. The attitude of bees during desertion, the existence of a regal caste among bees, and the dominance of a hive by a single member (queen-bee) were all characteristics that were strikingly comparable to ancient Indian civilisation.<sup>21</sup>

Another significant element in the discussion of ancient Indian knowledge about insects is their significance in Hindu mythology. Our ancient literatures contain numerous references to insects for various purposes, but the significance of insects as religious symbols was a very different matter. According to a recent study, insects have been employed as symbols in Hinduism for a variety of purposes. In general, insects were given very minor roles with gods, whereas vertebrates were given all major ones. The majority of these religious scriptures teach that ants are divine beings, the world's original living things, and that the earth is symbolized by anthills in rituals. Kali is the ferocious female goddess, who leaves death and destruction in her wake and is sometimes described with the epithet 'The Bee.'<sup>22</sup> There are so many examples in Hindu religious texts, as Goddess Parvati was summoned by the gods to kill the demon, Arunasura in the form of Brahmari Devi. She kills the demon with large number of bees emerging from her body which stung him to death. From then, Goddess Brahmari Devi has been called as 'Queen of Black Bees.'<sup>23</sup> The Gods like Vishnu, Krishna and Indra were called Madhava. Vishnu is represented as a blue bee upon a lotus flower, the symbol of life, resurrection and nature. Krishna, an incarnation of Vishnu, is often depicted with a blue bee on his forehead.<sup>24</sup> There was an incident in the Mahabharata where Parshuram was sleeping in his disciple Karna's lap. At that moment, Karna is stung to cause bleeding by Lord Indra, who is a bee. Karna endures the discomfort and maintains her composure despite this. Parshuram discovered that Karna had deceived him and that only a Kshatriya could endure suffering in silence. Then, when he needed his Brahmastra the most, he curses Karna for it not working. When his Brahmastra failed him, Karna ultimately perished at the hands of Arjuna during Kurukshetra.<sup>25</sup> In addition to these instances of insects being directly involved, insect products also played a significant role in Hindu mythology. For instance, honey made by honey bees is utilized as sustenance, in numerous ceremonies, to bring about rain, and as a vehicle for ingesting various medications. Furthermore, it is thought that wearing silk strands around the wrist will counteract the effects of an evil eye.

The practice of maintaining such close relationship with nature was an unbreakable tradition. Other religious literatures, mainly Jain and Buddhist texts also recorded several mention about animal and insects world. Buddha's teaching includes discourses on the preservation of animals and birds. It is interesting to note that the origin of Buddhism may be partially due to the insects. As like ants, Buddhists are encouraged to learn from the ants and to work together to create a more harmonious and compassionate world. Butterfly, considered as the symbol of transformation and rebirth and Dragonflies, who had very short life span, gave Buddhist a reminder that human life is very short and every human should cherish every moment of lives.<sup>26</sup> For such instances the Jataka Stories, which is basically a collection of stories of Buddha's previous lives, mainly considered as a watershed in that period. Buddha himself was born as animals, birds or insects on several occasions and performed warfare activities for their communities like saving life of both humans and living creatures. In another story, Brahmadata was the ruler of Benares and a carpenter's son killed his father when he tried to kill his a mosquito sitting on his scalp. Vessanta Jataka mentions a stupa of Goli (Andhra Pradesh) had a depiction of scorpion as a symbol of forest. In Ajanta Cave no. 17 had a painting of the famous story of Shadadanta Jataka, where a number of black ants showed in a row climbing on Palas (*Butea frondosa*) tree stem.<sup>27</sup> In Lotus Sutra, Mahayana Buddhist texts, where Buddha talk about all living beings including insects, have the potential to achieve enlightenment. In case of Jainism, Mahavira mainly focused on Ahimsa in his teaching. Every living creature including insects was getting equally importance in Jain texts. Jains believe that all living beings have the right to live, because Mahavira shifted his major focus to do no harm to any living organism. This is why Jain monks till the date often wear masks to prevent themselves from accidentally inhaling insects or they refused to drink water at night for fear of swallowing some unseen insects. Even Jains may walk with a broom to sweep clear the ground before they trend on it to avoid trending on insects. The followers of Jainism were divided between the sect of Shwetambaras or Digambara, where religious practices of Digambara are too strict; monks lived completely naked and carry only a peacock feather whisk to sweep insects from their path.<sup>28</sup> Moreover, vows may be taken limiting the number of steps taken every day, since every step endangers the life of insects or similar creatures. Not only that, the Jainist vow of non-violence against living things even limits them from pursuing many professions, such as agriculture. It may be one of the most important reasons behind the growth of Jainism into an Urban religion. These teaching emphasize the interconnectedness of all life and the importance of treating all beings with kindness and compassion. The Kalpa Sutra rerecorded a story about a Jain monk named Vasishtha who was saved from death by a swarm of ants.<sup>29</sup> The story is a reminder that even the smallest and most significant creatures can play an important role in our lives. In another book named Tattvartha Sutra, a disciple of Mahavira named Umasvati wrote "all living beings, including insects, have the potential to achieve liberation."<sup>30</sup>

In later Vedic period and the age of Epics like the Ramayana and the Mahabharata, is considered as a shadowy period of Indian history. Even though scholars have found a lot of religious texts and epics, there are still very few examples of the era's architecture or inscriptions found on the subcontinent. Even scholars found a wealth of information and specifics about ancient geography, science, medicine, and tradition in religious writings, but these were laced with many falsehoods and exaggerations. The Mauryan period, or more specifically Chandragupta Maurya, is regarded in ancient Indian history as the first person to establish an empire across the whole subcontinent. Several modern thinkers revived ancient customs during the Mauryan period, and philosophers like Megasthenes and Chanakya documented them. Megasthenes, a Greek historian, diplomat, Indian ethnographer, and explorer from the Hellenistic era, journeyed to the northern region during this time and documented a number of fascinating and little-known facts about modern-day India. Megasthenes described a particular type of ant that excavates dirt and gathers gold dust in his Indica, which is essentially Arrian's version of Indica. They were no smaller than wild foxes and lived in the highlands around the eastern boundaries. They dug with remarkable pace, mostly during the winter. However, the locals used some unique methods to gather the dust, even if ants posed a threat to their lives. Megasthenes also talks about India's giant winged scorpions, which were deadly to people and didn't come out in the daytime.<sup>31</sup>

The practice of displaying the natural world—including animals, birds, and insects—as a symbol in many contexts was always valued in post-Gupta society and the arts. In ancient cultures, large creatures like elephants, horses, and tigers, as well as birds like peacocks, crows, owls, and parrots, held special significance. However, insects, which are smaller and less well-known, also received adequate attention. The representation of the aforementioned species in archaeological finds may serve as a decorative element, a religious sign, a symbol of pure nature, a warning of danger, etc. It demonstrated close interaction with tiny creatures. These were not blind animals or dumb creatures, according to Indian culture. In post-Gupta period, the knowledge about insects was remained exactly among popular culture. People were very much aware about the harmful effects of insects in human life and agriculture. Contemporary scholars in their writings mentioned about various negative effects of those insects and solutions to cure those problems. From close studies of such ancient literatures, historians not only discovered many common insects of modern period, on the other hand traces of many extinct insects, disease caused by insects and their remedies also identified. Kalidasa, one of the greatest poet and dramatist of Gupta era, was famous in Indian history for his writing skills. His plays (Abhijnana Shakuntalam, Vikromorvasi, Malavikagnimitra), epic poems (Raghuvamsha, Kumarsambhava) and lyric (Meghaduta) are considered as important source to know ancient India especially Gupta period. These masterpieces not only had an interesting storyline, detail description of contemporary culture, society, food habit, social system, religion, natural calamities, animal or insect world are recorded here. His works are also rich in description of insects more than 16 species of insects are mentioned in his writing, whose detail descriptions are as follows- i) Ali, mentioned in Raghuvamsam (IX-44, 45, XII-102) Kumarsambhavam (IV-15), a black insect and produces sound when fly in swarms, stands for Bee. ii) Bhramara, mentioned in Raghuvamsam (III-8, V-43,68, X-57, XII-102), Kumarsambhavam (XIII-27), Malavikagnimitram (IV-2), like the eyes of a beautiful lady, emits sound, visits mango inflorescence, stands for *Xylocopa fenestrata*. iii) Dvirepha, Madhukara, Madhupa, Madhumaksita and Bhrnga, mentioned in Kumarsambhavam (I-27, VII-36, 56, 72), Malavikagnimitram (III-5), Raghuvamsam (IV-63, VI-7, 13), Abhijnana Shakuntalam (VI-19, 20), Rtusamahara (II-14, 15 VI-23, 26, 37), prefer mango inflorescence and nectar of lotus, identified as the Apis species of bees. iv) Damsa, mentioned in Raghuvamsam (II-5), annoys cattle and bites them, identified as Horse-fly. v) Khadyota, mentioned in Meghaduta, Uttar Megha (21), gregarious in nature and emits light in the field, stands for Coleoptera. vi) Laksa, mentioned in Raghuvamsam (XVI-15), Kumarsambhavam (V-34), Rtusamahara (I-5), produces red colour used by ladies in making them attractive, identified as *Dactylopius indica*. vii) Patanga, mentioned in Kumarsambhavam (III-64), which fall on fire flying, stands for Formicidae. viii) Pipilika and Satpada, mentioned in Malavikagnimitram (III-13,30), Raghuvamsam (VI-69) and Kumarsambhavam (VIII-33, 99) remains on mango tree and bites when disturbed, identified as Red-ant ix) Salabha, mentioned in Abhijnana Shakuntalam (I-30), is red coloured and fly in swarm, stands for locust. x) Silimukha, mentioned in Raghuvamsam (VIII-57), occurs in south India and attracted to ichor flowing from the temple of elephant, identified it as Bhramara. xi) Valmi, mentioned in Abhijnanashakuntalam (VII-11), Meghaduta (Purba Megha 15), can built termite hills which become habitat for other animals like lizards, snake, scorpions even birds, stands for termite.<sup>32</sup> In the post-Gupta era, popular culture continued to incorporate knowledge about insects. People were well aware of how detrimental insects were to agriculture and human life. In their papers, modern academics have discussed the different detrimental impacts of those

insects as well as ways to address those issues. One of the most well-known academics of the late Gupta era, Acharya Varahamhira, wrote a large number of astrological works. However, one of his most renowned writings, the Brihat Samhita, was an outstanding treatise on a number of other modern topics, ranging from dentistry to meteorology, from architecture to agriculture. Regarding entomology, there are numerous references to insects throughout the text. Varaha Mihira documented how insects might endanger agricultural products because the book contains a chapter on agriculture. In chapter number 29, he stated that crops are at risk from insects and reptiles while the sun is dark.<sup>33</sup>

**Conclusion:** The situation remained unchanged during early medieval and medieval period also. Even the political situation was unchanged and total control was under Muslim rulers, the close connection with nature represented in every aspect of their culture. In Mughal painting, these close connection even the presences of living creature including insects were very common. Soon, the arrival of Europeans in the political scene left a deep impact in the concerned field. Europeans, who reached early in Indian subcontinent, took keen interest in the natural history of India as well as in entomology. They explored every corner of India, discovered many unknown species and preserved them in personal as well as museum collections. In Eighteenth and Nineteenth century, the development picked a new momentum and organised research took place under the guidance of Asiatic Society, Bombay Natural History Society and Later Entomological Society of India.

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