

## Study of insect pests on medicinal plants: Review

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### Abstract

Medicinal plants are the basic ingredient in medicines, so they have been cultivated and used in many healthcare products and cosmetics since time immemorial. In the modern era, most people are diverting towards herbal products because modern drugs have many side effects. According to WHO, nearly 21,000 plant species have medicinal properties. Medicinal plants are cultivated or found in wild areas throughout the world and used as primary treatments by local people. The quality of medicine or any drug derived from a medicinal plant depends upon the quality and the nutritional value of that plant. Many factors influence the properties of medicinal plants, including climatic conditions, inadequate nutrition, and pollution. One of the major factors responsible for reducing plants' medicinal properties is insect pests. Insects belonging to the phylum Arthropoda damage the plant body. Correct identification of insect species is important because it is key to finding the exact solution for the problem of infestation caused by the insect. Proper identification helps to know the life cycle, nature of the infestation, and its morphology, which will help to use exact pesticides. This review discusses entomofauna that damage the medicinal plants and reduce the quality of medicinal plants.

**Keywords:** Infestation, morphology, arthropoda, insect pests, herbal plants, life cycle

### Introduction

Plants have been used in medicine for 5000 years and codified into Ayurveda. It was developed in ancient times but is still practiced in the modern era, as it contains all-natural products with no or fewer side effects. Today's youngsters also prefer herbal products. Many synthetic drugs also use phytochemicals in their formulation. Considering all these things related to healthcare, maintaining the medicinal properties of medicinal plants is very necessary, and conserving these plants against pests and other climatic conditions. Insect pests are one of the most important factors that affect the quality of medicinal plants. Infestation in plants disturbs the ordinary functionality of a plant, and it alters the essential properties of a plant. [7] Plants are the primary nutritive contents of the food. These are good energy sources. Humans have been using plants for basic preventive and curative health care since immemorial times [17]. There is a need to study various insect pests that cause infestation on medicinal plants for their management and control. Phylum Arthropoda consists most diverse and worldwide distributed class of Insecta,

which includes various orders Coleoptera, Diptera, Hymenoptera, Lepidoptera, Orthoptera, and Odonata, in which a variety of insects are classified based on their habit and habitats. Mites, Planthoppers, hornworms, woolly aphids, Thrips, Bugs, semiloopers, and caterpillars are pests that infect medicinal plants, whether it is bushes, herbs, shrubs, or trees. Kolhapur, Sangli, and Satara districts of Maharashtra show a wide range of diversity of flora and fauna. Radhanagari Wildlife Sanctuary is a rainforest area that shows a huge amount of vegetation. [2] In the Sangli district of Maharashtra, Dandoba Hill forest area is a biodiversity-rich area. It is a dry deciduous forest and home to many insect pests that cause damage. A total of 113 tree taxa belonging to 35 families and 85 genera have been reported. The exact diversity of tree flora will be helpful for researchers, forest officers, conservationists, nature enthusiasts, and local people for the conservation and utilization of trees in that region. [8] Satara district of Maharashtra also shows a wide range of biodiversity, and many forest areas and conserved areas like Mahabaleshwar, Patan, Kas Plateau, and many other local sites.

### Observation

Sr. No.	Medicinal (Host) Plant	Insect Name	Damage Parts					
			Leaf	Root	Stem	Bark	Fruit	Flower
1	<i>Withania somnifera</i>	<i>Amrasca biguttula biguttula</i>	✓		✓			
2	<i>Withania somnifera</i>	<i>Anomis flava</i>	✓		✓		✓	
3	<i>Withania somnifera</i>	<i>Earias vitella</i>			✓		✓	
4	<i>Withania somnifera</i>	<i>Holotrichia serrata</i>	✓	✓	✓		✓	
5	<i>Withania somnifera</i>	<i>Coccidohystrix insolitus</i>						
6	<i>Rauwolfia serpentina</i>	<i>Psilogramma menephron</i>	✓					
7	<i>Withania somnifera</i>	<i>Henosepilachna vigintioctopunctata</i>	✓					
8	<i>Morinda citrifolia</i>	<i>Dulinius conchatus</i>	✓					
9	<i>Morinda citrifolia</i>	<i>Aleurocanthus terminaliae</i>	✓					
10	<i>Morinda citrifolia</i>	<i>Coccus viridis</i>	✓		✓			

11	<i>Morinda citrifolia</i>	<i>Bemisia tabaci</i>	✓		✓			
12	<i>Morinda citrifolia</i>	<i>Maconellicoccus hirsutus</i>	✓				✓	✓
13	<i>Morinda citrifolia</i>	<i>Macroglossum gyrans</i>	✓					
14	<i>Morinda citrifolia</i>	<i>Psara obscuralis</i>	✓					
15	<i>Morinda citrifolia</i>	<i>Schizonycha ruficollis</i>		✓				
16	<i>Ocimum tenuiflorum</i>	<i>Epilachna vigintioctopunctata</i>	✓					
17	<i>Ocimum tenuiflorum</i>	<i>Phenococcussolanopsis</i>	✓		✓			
18	<i>Andrographis paniculata</i>	<i>Parasaisettia nigra</i>	✓		✓			
19	<i>Phyllanthus emblica</i>	<i>Helicoverprtr Sp</i>	✓					
20	<i>Phyllanthus emblica</i>	<i>Aphis gossypii</i>	✓					

## Discussion

Various researchers have studied insect pests that cause damage to medicinal and aromatic plants worldwide to prevent them from contracting entomofauna. The major insect pests of *A. moschatus* are defoliators, *Anomis flava* (Fab.), shoot/fruit borer, *Earias vitella* (Fab.), sapsucker, *Dysdercus cingulatus* (Fab.) and their incidence varies from 50-62.5, 30-70, and 70-90 percent, respectively. While *W. somnifera* is damaged by insect pests like white grub, *Holotrichia serrata* (Fab.), mealy bug, *Coccidohystrix insolitus* (Green.), and spotted leaf beetle, *Epilachna vigintioctopunctata*.<sup>[10]</sup> Ashwagandha infestation is mainly done by the Spotted beetle, *Henosepilachna vigintioctopunctata* (F.) (Coleoptera: Coccinellidae) in the Charotur region of Gujarat.<sup>[4]</sup> Noni, *Morinda citrifolia* L. plant, which has high medicinal value, is affected by lacewing bug- *Dulinius conchatus*, black fly- *Aleurocanthus terminaliae*, Green Coffee Scale: *Coccus viridis*, White Fly: *Bemisia tabaci*, Mealy Bug: *Maconellicoccus hirsutus*, Humming Bird Moth: *i. Macroglossum gyrans*, Leaf-Folding Caterpillar: *Psara obscuralis*, Leaf Beetle: *Schizonycha ruficollis*.<sup>[9]</sup> In West Bengal, the study of medicinal plants is done to check the infestation. In this study, a total of ten parasitoid species belonging to 5 families from 2 orders were observed in the ecosystem. Many predatory mites are found on medicinal and aromatic plants in association with an array of phytophagous mites and insect species. Those predators need to be studied further in the field, to determine their natural role in the suppression of pest populations as well as the feasibility of using them in practical biocontrol activities.<sup>[6]</sup> Hadda beetle (*Epilachna vigintioctopunctata*) and mealy bug (*Phenococcus solanopsis*) were the predominant insects reported during September and September-February, respectively.<sup>[3]</sup> *Parasaisettia nigra* is the first recorded arthropod insect pest in India, which caused damage on Kalmegh from 2001 to 2002 in Bangalore.<sup>[15]</sup> The Holy medicinal plant, Tulasi, is affected by sucking insect pests that suck the cell sap and secrete sooty molds and affecting the photosynthesis.<sup>[18]</sup> In Saradar Krushinagar, Gujarat, infestation of aonla was studied for 52 standard meteorological weeks in 2021. They found gall farming black caterpillar, which infects twigs, leaf roller that damages the leaf, and bark-eating caterpillar, which infests on a branch of the plant. Sanjta and Chouhan studied the infestation of thrips on medicinal plants in Nouni, Himachal Pradesh. They selected randomly five medicinal plants, on which a total of eight species were found.<sup>[17]</sup>

## Result

This review reported 20 species of insect pests, most of which belong to various families and have already been studied and mentioned by the researchers. Out of these 20

species, most infestations were on the leaves of medicinal plants.

## Conclusion

Infestation of insect pests on medicinal plants decreases their medicinal value. Thus, to maintain the quality of medicine, there is a need to prevent infestation. Particular types of insect pests, their biology, and seasonal abundance are necessary to control and manage, so various studies are done to prevent infestation and maintain the quality of medicines.

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