

A Brief Overview of Insect Pests of Ornamental Crops and their Management

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SUMMARY

Ornamental plants play a crucial role in enhancing the aesthetic appeal of landscapes and gardens making them highly valued in both residential and commercial settings. However, these plants are vulnerable to a multitude of pest infestations, which can have detrimental effects on their health and appearance like Rose Aphid, Sunflower lace wing bug, Banded Blister beetle, Gerbera leaf minor etc. Effective management of pests in ornamental plants is essential to maintain their beauty and vitality while minimizing environmental impacts. Integrated Pest Management (IPM) is a holistic approach that integrates various strategies to control pests in a sustainable and environmentally friendly manner.

INTRODUCTION

In developed and developing countries from two decades' people have changed their lifestyle which also increases the demand of flower products. Increase in demand of flowers has increased uses of flowers in different ceremonies like birthdays and weddings (Somerville and Briscoe, 2001). Similarly, ornamental plants are grown in home for aesthetic beauty. They improve surroundings of our lives in several aspects (Day, 2015). Ornamental plants are grown for embellishment purpose in gardens and landscape designs, as house plants and specimen display, and are associated with the mankind from time immemorial. Approximately, 406,700 species of plants are available on Earth, and out of these plants, 85,000–99,000 species of plants have ornamental value. The broader classification with example are enlisted in Table 1.

Table: 1 List of ornamental crops

Categories	Examples
Herbaceous Ornamental Plants	
Annuals	Winter season: Dahlia, Poppy, Dianthus, Calendula, Marigold, Cosmos, Aster Summer season: Balsam, Cock's comb Year round: Sunflower, Zinnia etc
Biennial	Holly hock, Sweet William
Perennial	Flox, Gladiolus
Lilies	Three families: Amaryllidaceae: Tuberose, Daffodils Scitaminae: Dolon Chapa, Canna etc Liliacea: Day lily, Lilium
Aquatic Ornamental Flower	Lotus, Water lily, Red water lily etc
Cactus, Orchid, Ferns	Cactus: Star cactus, Rose cactus, Prickly pear, Orchid cactus, etc. Orchids: Vanda, Dendrobium, Vanilla, etc. Ferns: Bird nest ferns, Sword fern, etc.
Woody Ornamental Plants	
Flowering shrubs	Rose, Jui, Beli, Mollika, Jasmine, Kamini, China rose, etc.
Non-flowering ornamental shrubs	Croton, Musanda
Flowering tree	a. Magnoliaceae: Magnolia, Iron wood tree, etc. b. Leguminoseae: Pea cock, Ashok
Foliage ornamental trees	Rubber, Ashok, Banyan trees, Eucalyptus, etc
The palms	Bottle palm, Fishtail palm, Toddy palm, Butterfly palm, Oil palm, Chinese palm, etc.

Ornamental hedge plants	Duranta, Justicia, Iroxa, etc
The conifers	Pine, Thuja, Juniper, etc.
The creepers and climbers	Madhobi lata, Jhumka lata, Bougainvillea, etc.

Status of Ornamental Plants in India: Global ornamental plant exports have grown steadily over the past five years, at a compound annual growth rate of 3.9 per cent. All subcategories (cut flowers, potted plants, bedding/patio plants, bulbs, perennials, shrubs, and trees) experienced growth. (Vision 2050: Directorate of Floriculture Research, ICAR). About 283 thousand hectares of the area were under Cultivation for floriculture in 2021-22 (3rd Advance Estimate). Production of flowers is estimated to be 2295.07 thousand tonnes of loose flowers and 833.16 thousand tonnes of cut flowers in 2021-22 (3rd Advance Estimate). (Source:apeda.gov.in)

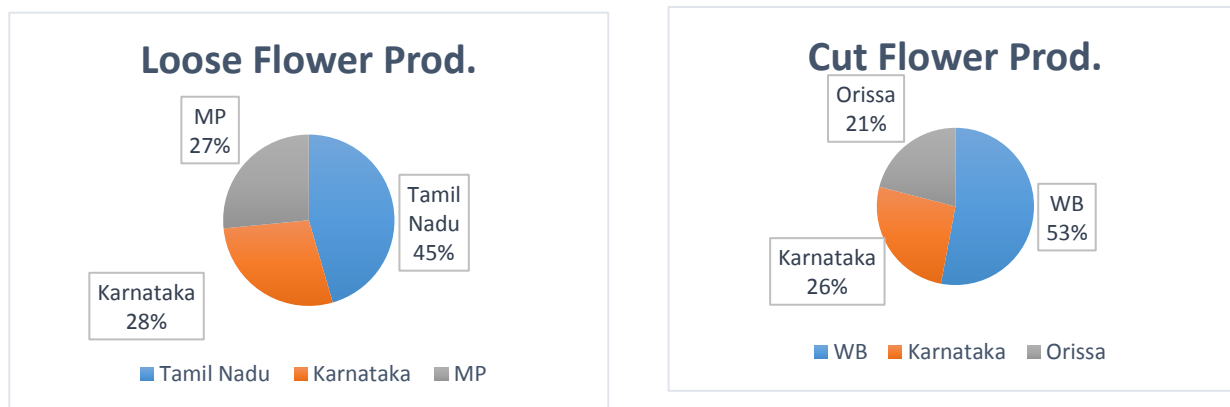
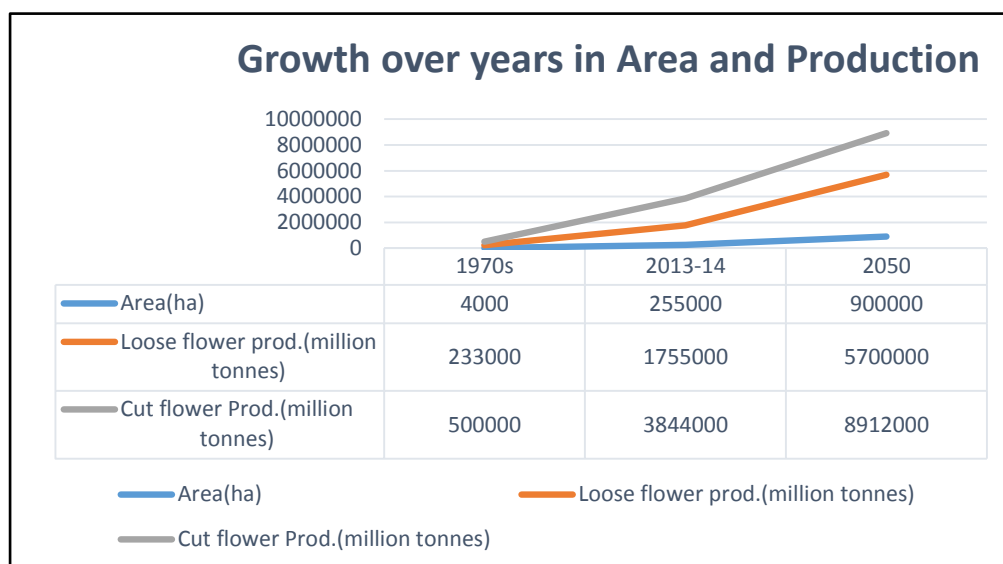


Fig1: Cut flower and loose flower production (State wise) (Source: Basic Agricultural Study) According to the estimates of National Horticultural Board (NHB), total area under flower crops in the country during 2013-14 was 255.0 thousand ha with production of 1754.0 and 543.0 thousand metric tonnes of loose and cut flowers, respectively. The area expansion during the same period was to the tune of 1.64 times. In India, nearly 98.5% of flowers are grown under open cultivation while hardly 1.5% are grown under greenhouse cultivation. The total monetary worth of both loose flowers and cut flowers is estimated to rise from 40840 million to 263784 million. (Vision 2050: Directorate of Floriculture Research, ICAR)



Major Insect-Pests of Ornamental Crops: Ornamental plants are attacked by several insects, mites, nematodes, millipedes, molluscs, earthworms, and rodents. The insects eat away or bore into the leaves, flowers, buds, fruits and roots. They may suck the sap, making the plant look pale and unhealthy. The growth and the beauty of the ornamental plants receive a set-back. Various species of thrips, aphids, leafhoppers, scale insects, mealy-bugs, leaf-miners, caterpillars, and cutworm and chaffer beetles attack the common ornamental plants including rose, chrysanthemum, hibiscus, hollyhock, sunflower, iris, jasmine, etc. As many as 33 species of mites have been

recorded feeding on ornamental plants in India. The nematodes cause the swelling of stems, deformation of the leaves, and suppression of the blossoms and production of galls in roots.

Table: 2 List of major insect-pests in ornamental ((Source: ICAR e-courses online)

1.	Dusky cotton bug	<i>Oxycarenus laetus</i>	Lygaeidae	Hemiptera
2.	Hollyhock tinged bug	<i>Urentius euonymus</i>	Tingidae	Hemiptera
3.	Sunflower lace wing bug	<i>Cadmilos retarius</i>	Tingidae	Hemiptera
4.	Castor hairy caterpillar	<i>Euproctis lunata</i>	Lymantriidae	Lepidoptera
5.	Ak butterfly	<i>Danais chrysippus</i>	Nymphalidae	Lepidoptera
6.	Lily moth	<i>Polytela gloriosae</i>	Noctuidae	Lepidoptera
7.	Banded blister beetle	<i>Mylabris phalerata</i>	Meloidae	Coleoptera
8.	Gerbera leaf miner	<i>Liriomyza trifolii</i>	Agromyzidae	Diptera
9.	Snails and Slugs	<i>Helix, Achatina fulica</i>	Class Gastropoda	Phylum Mollusca
10.	Root-lesion Nematodes	<i>Pratylenchus spp</i>	Tylenchidae	Tylenchoid ea



Fig: a) Aphids b) Dusky cotton bug c) Lace wing bug d) Blister beetle

Rose Aphid, *Macrosiphum rosaeiformis* (Hemiptera: Aphididae): The rose aphid, *Macrosiphum rosae*, is a sap-sucking aphid found globally. Adults without wings exhibit a slender spindle-shaped body, measuring 1.7 to 3.6 mm in length, with colors ranging from green to pink and reddish-brown. The vigour of the plant is reduced and the quality of flowers deteriorates. This aphid has been recorded in Punjab, Delhi, Mysore, Andhra Pradesh and the Nilgiri Hills. In addition to this species, the cotton aphid, *Aphis gossypii* Glover, also infests rose plants from September to December in northern India.

Sunflower Lacewing Bug, *Cadmilos retarius* (Hemiptera: Tingidae): It is a tiny insect with translucent, glossy wings and a dark body. Nymphs and adults suck plant sap and the infested leaves turn yellowish brown and finally dry up.

Lily moth: *Polytela gloriosae* (Lepidoptera: Noctuidae) Lily caterpillar is a major and regular occurring pest of all lily growing areas. It is also called as Indian lily moth. The species was first described by Johan Christian Fabricius in 1781. Hampson (1894) first time recorded this pest throughout India and Ceylon. It feeds on leaves and defoliates the plants up to the ground level during monsoon (Patel et al., 1989). It is generally active during monsoon. Yield loss occur in lilies is mainly due to *P. gloriosae*. In case of heavy infestation, the plants are more or less completely defoliated.

Gerbera Leaf Miner: *Liriomyza trifolii* (Agromyzidae: Diptera). Small fly insect is polyphagous, capable of infesting various horticultural and floral plants as well as weeds. The principal damage is caused by the larvae that dig tunnels in the leaf mesophyll, also considerably reducing the plants' photosynthesis and thus the growth and production. In cases of strong infestation the leaf miner is also able to lay eggs inside the ligulate flowers.

Castor hairy caterpillar: *Euproctis fraterna* (Lymantriidae: Lepidoptera). Host range of this pest is very wide and diverse that includes Castor, linseed, groundnut pigeonpea, grapevine, cotton, pomegranate, mango, coffee,

pear and rose. Pupation occurs within a silken cocoon nestled in leaf folds, spanning from 9 to 25 days. Larvae endure the winter season for overwintering. Defoliation is the main symptom. The pest is active throughout the year but its activity is reduced in winter.

Dusky cotton bug: *Oxycarenus laetus* (Lygaeidae: Hemiptera). It is sometimes known as the Egyptian cotton stainer, and is found in southern Asia where it is a pest of cotton, okra and other crops. Both Nymph and adults sucks sap from vegetative parts of the plants.

Hollyhock tinged bug: *Urentius euonymus* (Tingidae: Hemiptera). Various hosts of this insect includes Holly hock, *Abutilon indicum*, *Sida cordifolia*. Adults and nymphs suck plant sap from the under surface of leaves. The infested leaves become pale yellow and turn brown. Ultimately, they shrivel and dry up.

Snails and Slugs: Slugs are soft, slimy, slender animals more closely related to octopi than insects. The spotted garden slug, *Limas maximus*, can reach lengths ranging from 3 to 5 inches or even longer. The tree slug, *Lehmannia poirieri*, typically grows to approximately 2 3/8 inches in length. Mature garden slugs, *Arion hortensis*, brown slugs, *Deroceras laeve*, and gray garden slugs, *Deroceras reticulatum*, typically grow between 1 to 2 inches long. Slugs exhibit a variety of spots and stripes. Snails will have a similar biology, but secrete and carry a shell (the shells of slugs are internal). Although we have more than 700 species of snails, they are of minor importance compared to the 40 or so pest species of slugs. The brown garden snail and the African garden snail are veritable plant pests that can consume seedlings and eat large ragged holes in foliage.

Root lesion Nematode: *Pratylenchus penetrans* Their feeding activity is primarily focused on the root cortex. While lesion nematodes may inhabit the roots of row crops, they typically do not reach population levels sufficient to significantly impact yields within a single growing season, making them more of a concern for perennial plants, both woody and herbaceous. Heavily infected plants experience diminished leaf size and a decrease in leaf count, resulting in substantial reductions in yields.

Important management Practice for Insect pest managements in ornamental plants

- Collection and destruction of pest and removal of weeds near garden
- Avoid monoculturing and diversification of crops can help in reducing inoculum load
- Rationalised use of fertiliser, Silver mulching and water soap spray can effectively controls aphids
- Use of natural enemy lady beetles, lacewing larvae (*Chrysoperla rufilabris*) and parasitic wasps (*Aphidius* sp) are effective in managing soft body sucking insects.
- Spray Malathion 50 EC, 0.03% Azadirachtin, 0.5% neem oil or 5% NSKE is effective to manage sucking pest
- Carbaryl and other carbamate baits become more toxic if slugs can access water.

CONCLUSION:

Research in the field of ornamental plant pest management has shown promising results highlighting the importance of early pest detection, regular monitoring, and education for growers and landscapers. Embracing biodiversity and promoting beneficial organisms in the garden can enhance the resilience of ornamental plants against pests. Furthermore, advancements in technology, such as remote sensing and data analytics, have empowered practitioners to make informed decisions regarding pest management. Collaboration among researchers, horticulturists, and policymakers is crucial to developing region-specific IPM strategies that account for the unique challenges posed by different ornamental plant species and geographical locations. The integration of IPM into ornamental plant cultivation practices not only safeguards the health and beauty of these plants but also contributes to a more sustainable and environmentally friendly horticultural industry. Continued research and adaptation of IPM principles are essential to ensure the long-term health and vitality of ornamental plants in our landscapes and gardens

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