



## Challenging Pests in Arid Horticulture: A Growing Threat to Sustainable Farming

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Arid regions, particularly in Rajasthan, are known for extreme temperatures, scanty rainfall, and sandy soils. Despite these limitations, horticulture has emerged as a vital livelihood option for farmers in these zones. With the introduction of improved irrigation techniques, high-yielding varieties, and government support, the horticultural area has significantly expanded in Rajasthan's arid belt. However, this progress is increasingly threatened by the rising incidence of insect pests that were once considered minor or sporadic. Climate change, changing cropping patterns, and intensified cultivation have led to the emergence and spread of challenging pests in arid horticulture. These pests not only reduce yields but also severely affect the quality and marketability of produce.

### Key Challenging Pests in Arid Horticulture

#### 1. Mites (*Tetranychus* spp., *Polyphagotarsonemus latus*)

- **Crops affected:** Ber, Guava, Kinnow, Chilli
- **Damage:** Leaf bronzing, curling, premature leaf drop
- **Why it's challenging:** Thrive in hot, dry climates typical of arid zones; resistant to many insecticides
- **Management:** Need for miticide rotation and acaricidal soaps; introduction of predatory mites

#### 2. Fruit Flies (*Bactrocera dorsalis*, *B. zonata*)

- **Crops affected:** Pomegranate, Ber, Guava, Mango
- **Damage:** Egg-laying in fruits, causing internal decay and premature fruit drop
- **Challenge:** High reproductive rate and multiple generations per season
- **Management:** Use of pheromone traps, sanitation, and biopesticides; male annihilation technique (MAT)

#### 3. Whiteflies (*Bemisia tabaci*)

- **Crops affected:** Tomato, Chilli, Pomegranate
- **Damage:** Sap-sucking, sooty mold due to honeydew, vector for viruses
- **Why it's a threat:** Highly adaptive, pesticide-resistant, rapid spread
- **Control Strategy:** Yellow sticky traps, neem oil, entomopathogenic fungi like *Beauveria bassiana*

#### 4. Mealybugs (*Planococcus citri*, *Ferrisia virgata*)

- **Crops affected:** Citrus, Pomegranate, Guava
- **Damage:** Honeydew excretion, leaf and fruit deformation, sooty mold
- **Concern:** Survive in soil and crop residues; infestation often unnoticed until severe

- **Best Practices:** Root-zone treatment, pruning, natural predators like *Cryptolaemus montrouzieri*
- 5. American Bollworm (*Helicoverpa armigera*)**
- **Crops affected:** Tomato, Brinjal, Chilli
  - **Damage:** Bores into fruits and flowers, reducing both yield and quality
  - **Challenge:** Polyphagous nature, resistance development
  - **IPM Tools:** Pheromone traps, *Nuclear Polyhedrosis Virus* (NPV), rotation of insecticides
- 6. Thrips (*Thrips tabaci*, *Scirtothrips dorsalis*)**
- **Crops affected:** Onion, Chilli, Cucurbits
  - **Symptoms:** Leaf curling, silvering, virus transmission (TOSPO group)
  - **Tough to control:** Due to minute size and rapid reproduction
  - **Control:** Blue sticky traps, neem-based sprays, and water sprays in early morning

### Why These Pests Are Emerging in Arid Zones

| Factors                              | Impact                                                        |
|--------------------------------------|---------------------------------------------------------------|
| Climate change                       | Warmer winters allow pests to survive year-round              |
| Monocropping and continuous cropping | Increases host availability for pests                         |
| Micro-irrigation and fertigation     | Creates localized humidity, favorable for sucking pests       |
| Lack of natural enemies              | Disrupted due to pesticide overuse                            |
| Inappropriate pesticide use          | Leads to resistance, resurgence, and secondary pest outbreaks |

### Sustainable Pest Management Strategies

To mitigate the threat posed by these challenging pests, the following integrated pest management (IPM) strategies should be adopted:

#### Cultural Practices

- Crop rotation and intercropping
- Sanitation: removal of infested plant parts and debris
- Use of resistant/tolerant varieties

#### Biological Control

- Conservation of natural enemies (e.g., ladybird beetles, parasitic wasps)
- Use of biopesticides like *Bacillus thuringiensis*, NPV, neem extracts

#### Mechanical and Physical Methods

- Installation of pheromone and sticky traps
- Light traps for nocturnal pests
- Regular monitoring and pest scouting

#### Chemical Control (As Last Resort)

- Judicious use of insecticides based on economic threshold levels (ETL)
- Rotation of chemicals to avoid resistance buildup
- Use of selective and environment-friendly pesticides

### Conclusion

Pests in arid horticulture are no longer seasonal or isolated problems; they have evolved into complex, year-round threats to food security and farm income in Rajasthan. Addressing these challenges requires a shift from chemical dependence to holistic, knowledge-based pest management strategies. Timely surveillance, farmer training, and adoption of eco-friendly control measures are crucial to protecting the gains of arid zone horticulture and ensuring sustainable farming in the face of climate uncertainties.