

Objectives of IPM in Fruit Crops

- Reduce crop losses caused by insect pests and diseases.
- Minimize excessive and indiscriminate use of chemical pesticides.
- Protect beneficial insects and natural enemies in orchards.
- Maintain ecological balance and environmental sustainability.
- Improve fruit quality, yield, and overall productivity.
- Lower production costs and increase profitability.
- Enhance farmers' income and ensure sustainable fruit production.

Components of IPM in Fruit Crops

1. Cultural Methods

These practices reduce pest population naturally by improving crop management.

- Selection of healthy and resistant varieties
- Proper spacing and pruning in orchards
- Timely irrigation and fertilization
- Removal of infected plant parts
- Crop rotation and sanitation



2. Mechanical and Physical Methods

These methods involve direct removal or trapping of pests.

- Handpicking of insects and larvae
- Use of light traps and sticky traps
- Installation of pheromone traps
- Netting and barriers in orchards

3. Biological Control Methods

These methods use natural enemies to control pests.

- Predators: Ladybird beetle, spiders, lacewings
- Parasitoids: Trichogramma spp.
- Microbial pesticides:
 - Bacillus thuringiensis (Bt)
 - Beauveria bassiana
 - Metarhizium anisopliae

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INTRODUCTION

Fruit crops are a major source of nutrition and income for farmers and play a significant role in strengthening rural livelihoods. However, insect pests and diseases cause substantial yield losses every year, leading to reduced productivity and profitability. To manage these problems, farmers often depend excessively on chemical pesticides, which increase production costs and pose serious threats to the environment and human health. Overuse of pesticides also destroys beneficial insects and disrupts ecological balance in orchards. Integrated Pest Management (IPM) provides a sustainable and scientific approach to address these challenges. It integrates cultural, mechanical, biological, and chemical methods for effective pest control. IPM emphasizes prevention, monitoring, and the judicious use of chemicals. By reducing chemical dependence, IPM ensures safer, economical, and eco-friendly pest management. Thus, IPM contributes to sustainable fruit production and long-term agricultural sustainability.

What is Integrated Pest Management (IPM)

Integrated Pest Management (IPM) is a holistic and sustainable approach to pest control in fruit crops. It involves the combined use of cultural, mechanical, biological, and chemical methods to manage pests effectively. IPM emphasizes prevention and monitoring of pest populations rather than excessive chemical use. Cultural practices improve crop health and reduce pest incidence naturally. Mechanical methods help in direct removal or trapping of pests. Biological control uses natural enemies and microbial agents to suppress pest populations. Chemical pesticides are used only when necessary and in a judicious manner. Thus, IPM ensures economical, safe, and environmentally friendly pest management.



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Integrated Pest Management (IPM) in Fruit Crops

संकलन

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4. Chemical Control Methods (Judicious Use)

Chemicals are used only when pest population crosses the Economic Threshold Level (ETL).

- Use of recommended pesticides
- Correct dose and timing
- Rotation of chemicals to avoid resistance
- Avoid indiscriminate spraying

Examples of IPM in Major Fruit Crops

Fruit Crop	Major Pest	IPM Strategy
Mango	Fruit fly	Pheromone traps, sanitation, bait traps
Citrus	Psylla	Biological control, neem-based sprays
Guava	Fruit fly	Bagging, traps, orchard sanitation
Banana	Stem borer	Clean planting material, traps
Apple	Codling moth	Pheromone traps, biological agents

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Benefits of IPM in Fruit Crops

- Integrated Pest Management (IPM) is an eco-friendly and sustainable approach that focuses on managing pests through a combination of biological, cultural, mechanical, and need-based chemical methods. It minimizes the excessive use of chemical pesticides, thereby reducing environmental pollution and maintaining ecological balance in fruit orchards. By encouraging the use of natural enemies such as predators, parasitoids, and beneficial microorganisms, IPM helps in preserving biodiversity and promoting a healthy orchard ecosystem.
- One of the major advantages of IPM is the reduction of pesticide residues in fruits. Since chemical pesticides are used only when necessary and in recommended doses, the harvested fruits remain safer for consumers and meet food safety standards required for domestic consumption and export markets. This improves consumer confidence and enhances the acceptability of fruits in high-value markets.
- IPM also helps in lowering the overall cost of production. Farmers can reduce expenses on costly chemical pesticides by relying more on preventive and biological control measures. Additionally, IPM practices improve pest control efficiency, prevent pest resistance, and reduce repeated pesticide applications, which ultimately save money and increase profit margins.
- Another important benefit of IPM is the protection of natural resources such as soil and water. Excessive pesticide use can contaminate soil and water bodies, harm beneficial organisms, and degrade soil health. IPM minimizes these risks and maintains soil fertility, ensuring better plant growth and productivity. It also conserves pollinators like bees, which are essential for fruit set and yield in many fruit crops.
- Furthermore, IPM improves fruit quality and enhances market value. Fruits produced under IPM practices are healthier, safer, and often preferred in premium and export markets due to low chemical residues. This helps farmers obtain better prices and increases their income. In the long term, IPM ensures sustainable and stable fruit production by maintaining ecological balance, preventing pest outbreaks, and preserving orchard health, thereby supporting long-term productivity and profitability.

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CONCLUSION

Integrated Pest Management is not merely a pest control technique but a comprehensive and sustainable approach to crop protection. It emphasizes the balanced and judicious use of cultural, mechanical, biological, and chemical methods for effective pest management. IPM ensures long-term productivity by reducing dependence on chemical pesticides and promoting ecological harmony. Its adoption in fruit crops helps farmers achieve higher yields and improved fruit quality. IPM also minimizes environmental pollution and safeguards beneficial organisms and natural enemies. Moreover, it supports eco-friendly and economically viable horticultural practices. Therefore, promoting IPM is crucial for sustainable fruit production. It also plays a vital role in ensuring future food security and environmental sustainability.

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