

## Role of Agro Ecological Approaches in pest Management

Simran Bhatia

Dr. Yashwant Singh Parmar University of Horticulture and Forestry, Nauni, Solan

ARTICLE ID: 016

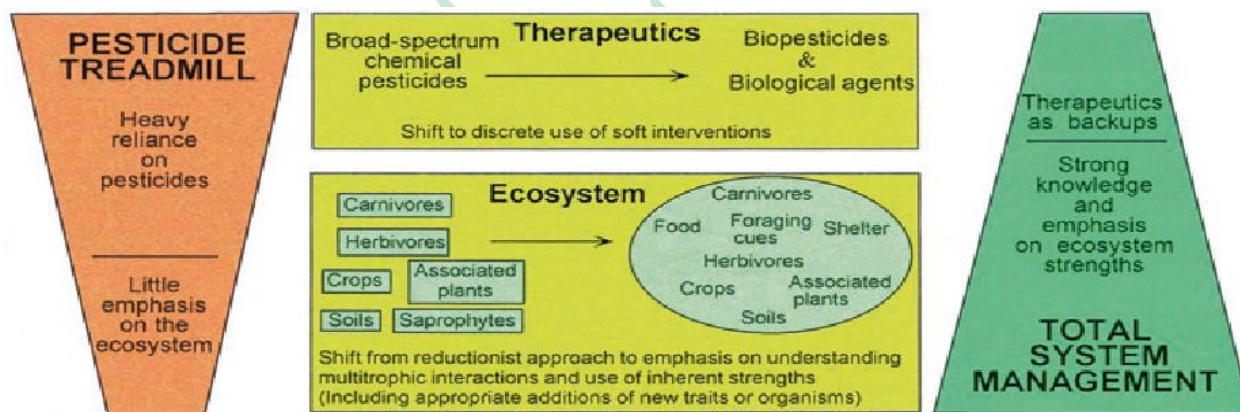
### Introduction

Agro-ecological approaches for pest management has recently emerged as a paradigm for considering pest management approaches that rely on the use of cultural techniques, physical methods, mechanical methods, biological methods for an effective pest control. Also due to continuous use pesticides there is pest resurgence due to killing of natural enemies too with pests. Other causes leading to pest resurgence is monoculture, susceptible varieties, high doses of fertilizers especially Nitrogenous. Hence due to imbalance between pest emergence is there. Thus, use of agro ecological measures should be adopted such that to avoid the violent fluctuations in pest population and to manage the for sustainable duration of time.

### Agro Ecological Manipulation

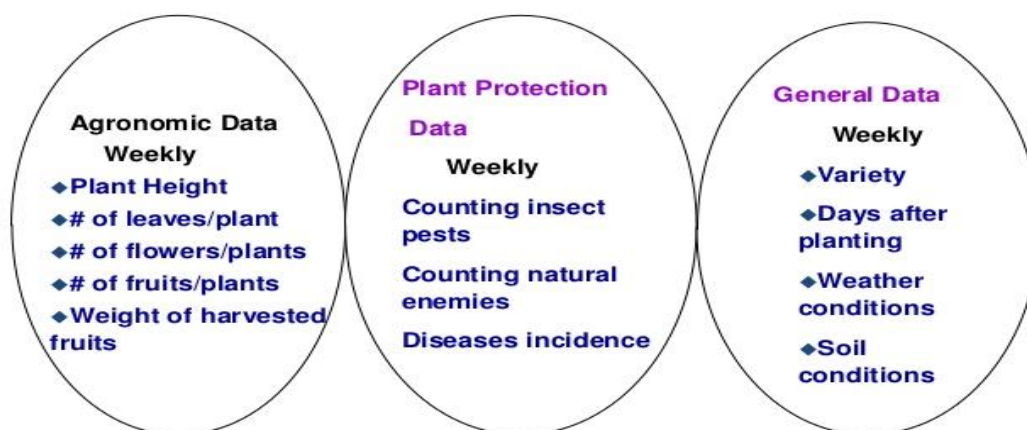
It is a planned environmental changes manipulated to produce change in behaviour of organism/pest.

- ✚ Cultural control
- ✚ Ecological engineering
- ✚ Biological Control
- ✚ IPM: Integrated Pest Management
- ✚ Agro-Ecosystem Analysis



Practice or Trait	Results
<b>Physical traits</b>	Deter or impede mobility of insect pests and colonization of the plant pathogens (i.e., cuticle composition)• Canopy architecture can shade weeds, or alter environmental conditions (i.e., humidity) to slow pathogen growth.
<b>Chemical Trait</b>	Volatile deterrents for insect pests • Harmful or deterrent secondary metabolites for pathogen and insect pests and allelopathic compounds inhibit weed growth• Volatile cues for insect predators or parasitoids about location of prey •
<b>Tolerance</b>	Plants tolerant pest damage.
<b>Sanitation</b>	Planting material should be clean and clean equipment to stop inoculum from entering farm (pathogens, weeds and insects) [
<b>Crop Rotation</b>	Helps to disrupt pest lifecycles (pathogens, weeds and insects)
<b>Applying botanical diversity/CULTURAL CONTROL</b>	Use of trap crops or push-pull systems rely on differential plant attractiveness to lure and, or repel insect pests from main marketable crop • Provide habitat and alternate food sources for plant beneficial insects • To slow the spread of pathogens through crop rotations, intercropping, companion planting or growing a crop mixture. Good insectary plants belonging to Leguminaceae, Graminaceae, Brassicaceae, Asteraceae etc. families
<b>Biological control</b>	Beneficial insects that are predatory on pests, and nematodes and effective microbes can further suppress insect pest and pathogen populations ex lady bird beetle against aphids, <i>Trichogramma</i> against lepidoteran pests
<b>Mechanical control</b>	Cultivation, and mechanical measures to manage weeds or pathogens • Specific insects traps (like trenches) or active control like vacuuming to manage particular insect pests
<b>Naturally-derived product</b>	Naturally derived products like oils/extracts, can be used to supplement pest management efforts
<b>AESA:- Agro eco system analysis</b>	The health of a plant is determined by environment. This environment includes abiotic factors (sun, rain, wind and soil nutrients) and biotic factors (pests, diseases and weeds). This process is called the Agro Eco System Analysis.

## Agro-ecosystem Analysis (AESA)



### Agro Ecological approach for pest management – for above ground pests

Use of compatible cash crops along the orchard border to attract natural enemies as well as to avoid immigrating pest population. Plant flowering plants on internal bunds inside the orchard. Do not uproot naturally growing weeds like *Tridax procumbens*, *Alternanthera* etc. they act as nectar source for natural enemies (biological control agents). Do not use broad spectrum chemical pesticide, when P: D ratio is favourable. Agro Ecological approach for pest management – for below ground pests Keep soils covered with natural vegetation and crop residue. Addition of organic matter in the form of farm yard manure (FYM), Vermicompost, crop residue that enhance the below ground biodiversity.

Reduction in tillage intensity so that hibernating natural enemies (biological control agents) could be saved. Application of balanced dose of nutrients by use of biofertilizers. Application of mycorrhiza and plant growth promoting rhizobacteria (PGPR) Application of *Trichoderma* spp. and *Pseudomonas fluorescens* as seedling/planting material, nursery treatment and in soil application (if commercial products are used, check for label claim. Whereas, biopesticides produced by the farmers for own consumption in their fields, registration is not required).

## Conclusion

It is concluded that organic agro-ecological pest management is best characterized by an emphasis on preventive measures, not curative measures and the long term goal to “amplify agro-ecological system resilience” by developing on-farm management approaches rather than purchasing external products .Pest management techniques in organic systems share similar principles with integrated pest management (IPM) , but it is only in organic production that these practices are exclusively agro ecological. Thus organic agro ecological pest management can be summarized as a systematic approach that incorporates plant-based resistance, on farm-scale cultural practices and crop-targeted intervention with biological, mechanical or natural control agents. This sustainable and holistic approach mitigates the risks from synthetic pesticides and is the foundation of agricultural pest management.

