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FACULTY OF AGRICULTURAL SCIENCES & ALLIED INDUSTRIES

Weed Management in Orchards

- Weeds in orchards reduce crop yields by competing for moisture, nutrients, light and space.
- They also harbour insect pests and diseases.
- When they become large they interfere with orchard operations.
- Some of weeds climb on the trees and produce shade on the foliage.
- There are some weeds which are parasitic partially or completely on the host tree.

Examples : Striga on sorghum (add example of horticultural crop), loranthes on mango.

Commonly noticed weed species in fruit orchards

- There are more than 30,000 species of weeds distributed world over, out of which 18,000 are noxious and cause serious losses.

Note*: Around 250 species are causing serious economic losses.*

Monocots (Narrow leaf/Grasses): *Cyprus, Cynodon, Poagrass, Rye grass, Quackgrass* etc.

Dicot weeds (Broad leaf weeds):*Dandelion, Chenopodium spp., Parthenium, Solanum sp, Euphrobia spp.*, Ground ivy etc.

Losses Caused by Weeds (Harmful Effects)

- Weeds compete with fruit crops for nutrients, moisture, air and light.
- They increase the cost of production.
- Reduction in crop yield.
- They impair the quality of crop.
- Weeds harbour pests and diseases.
- They bring problems in irrigation, drainage etc.
- Weeds reduce human efficiency through allergism and poisoning.

Methods of Weed Control in Orchards

1. Cultural methods
2. Biological methods
3. Chemical methods
4. Integrated weed control
5. Soil solarisation

Cultural Methods

1. Hand weeding
2. Tillage operation
3. Growing of intercrops
4. Use of mulching

Biological Methods

- It involves the use of natural enemies of the weeds which includes fungus, bacteria, insects, fish, animals and plants (through competitive replacement eg: *Cassia spp*. replacing *Parthenium*).

Characters of successful bioagents

1. Host specific.

2. Easily adjustable to new environment.
3. Rapid destroyer of the target weed.
4. Easy to multiply.
5. Effective against several kinds of weeds.

Insects as a bioagents

Weed	Bioagent	Kind of bio-agent
Cyprus rotundus	*Bactra verutana*	Insect (shoot boring moth)
Echinochola spp.	*Emalocera* *Tripos spp.*	Insect (stem boring moth)
Parthenium	*Zygogramma bicollarata* *Epiblema strenerana* *Conotrachelus spp.*	Leaf eating insect Stem girdling insect
Orabanche	*Sclerotinia spp. (Fungus)*	Plant pathogen
Rumese spp.	*Uromycis rumicis (Fungus)*	Plant pathogen

Mycoherbicides products	Content	Weeds controlled
De-vine	Liquid suspension of *Phytopthora pamivora (*Root rot of weed)	*Merrenia odorata* in citrus plantations
Bipolaris	Suspension of fungal spores of *Biopolaris sorghicola*	*Sorghum halepense*
Biolophos	Microbial toxin produced as fermentation products of *Streptomyces hygroscopicus*	Non-specific can be used on general vegetation

Chemical Control

- It refers to use of herbicide to suppress or kill weeds.
- A herbicide is any chemical that has phytotoxic properties.
- Herbicides include wide variety of compounds classified on the basis of :

1. Chemical structure.
2. Selectivity (selective and non-selective). Contact or translocated (systemic).

- Selective herbicides are those which kill certain kind of specific weed without causing any significant injury to others. For example: 2, 4-D (controls herbaceous dicot weeds),

MCDA (controls cyperus rotundus, plantago spp. etc.), whereas non-selective herbicide will indiscriminately kill all the plants that come in contact. For example: Glyphosate, paraquat (destroy green tissue only).

Systemic herbicides

- They are also referred as translocated herbicides
- They are absorbed by leaves, stems or roots of treated plants.
- Translocated through either phloem or xylelm. For example: Atrazine, Simazine, Diuron, Alachlor.

Guidelines for use of herbicides

1. Use correct recommended concentration.
2. Sprayers should be properly calibrated; nozzles should be directed towards the target weeds away from the fruit tree trunk.
3. Young weeds are killed easily than older ones or established ones.
4. Application should be avoided during raining or windy situations.
5. Wetting agent should be added to facilitate spreading of herbicide more uniformly on leaf surface.
6. If the leaves of fruit trees are accidentally sprayed the sprayed portion should be immediately be cut off.

Note: The efficiency of weedicide is good, when it is used on weeds with new sprout/growth.

Integrated Weed Management

- This is a weed management system that suppresses weeds by combining two or more weed control methods.
- IWM seems to be best suited for control of weeds in tropics or in fruit orchards.

Practices

1. Deep ploughing during summer.
2. Repeated tillage and hand weeding/use of chemicals.
3. Intercultivation/cover cropping, intercropping etc.
4. Organic mulching in basins.
5. Use of herbicides—2-3 times per year.
6. Use of bioagents whenever possible.
7. Proper regulation of irrigation.
8. Use of drip irrigation.