

Lecture -8

INTEGRATED WEED MANAGEMENT

An integrated weed management may be defined as the combination of two or more weed-control methods at low input levels to reduce weed competition in a given cropping system below the economical threshold level. It has proved to be a valuable concept in a few cases, though much is still to be done to extend it to the small farmers' level.

Integrated Weed Management (IWM) approach aims at minimizing the residue problem in plant, soil, air and water. An IWM involves the utilization of a combination of mechanical, chemical and cultural practices of weed management in a planned sequence, so designed as not to affect the ecosystem. The nature and intensity of the species to be controlled, the sequence of crops that are raised in the rotation, the standard of crop husbandry, and the ready and timely availability of any method and the economics of different weed-management techniques are some of the potent considerations that determine the success for the exploitation of the IWM approach.

Why IWM

1. One method of weed control may be effective and economical in a situation and it may not be so in other situation.
2. No single herbicide is effective in controlling wide range of weed flora
3. Continuous use of same herbicide creates resistance in escaped weed flora or causes shift in the flora.
4. Continuous use of only one practice may result in some undesirable effects. Eg. Rice – wheat cropping system – *Phalaris minor*
5. Only one method of weed control may lead to increase in population of particular weed.
6. Indiscriminate herbicide use and its effects on the environment and human health.

Concept

- Uses a variety of technologies in a single weed management with the objective to produce optimum crop yield at a minimum cost taking in to consideration ecological and socio-economic constraints under a given agro-ecosystem.
- A system in which two or more methods are used to control a weed. These methods may include cultural practices, natural enemies and selective herbicides.

FAO Definition

It is a method whereby all economically, ecologically and toxicologically justifiable methods are employed to keep the harmful organisms below the threshold level of economic damage, keeping in the foreground the conscious employment of natural limiting factors.

IWM is the rational use of direct and indirect control methods to provide cost-effective weed control. Such an approach is the most attractive alternative from agronomic, economic and ecological point of view.

Among the commonly suggested indirect methods are land preparation, water management, plant spacing, seed rate, cultivar use, and fertilizer application. Direct methods include manual, cultural, mechanical and chemical methods of weed control.

The essential factor in any IWM programme is the number of indirect and direct methods that can be combined economically in a given situation. For example, increased frequency of ploughing and harrowing does not eliminate the need for direct weed control. It is, therefore, more cost-effective to use fewer pre-planting harrowing and combine them with direct weed control methods.

There is experimental evidence that illustrates that better weed control is achieved if different weed control practices are used in combination rather than if they are applied separately.

Good IWM should be

- a. Flexible enough to incorporate innovations and practical experiences of local farmers.
- b. Developed for the whole farm and not for just one or two fields and hence it should be extended to irrigation channels, road sides and other non-crop surroundings on the farm from where most weeds find their way in to the crop fields.
- c. Economically viable and practically feasible.

Advantages of IWM

- It shifts the crop-weed competition in favour of crop
- Prevents weed shift towards perennial nature
- Prevents resistance in weeds to herbicides
- No danger of herbicide residue in soil or plant
- No environmental pollution
- Gives higher net return
- Suitable for high cropping intensity



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IWM of *Cuscuta* in Lucerne

1. In fields with history of *Cuscuta* (dodder), adopt crop rotations with non-susceptible crops. Grow lucerne only once in three years in such fields.
2. Do not move animals and machinery from the dodder infested fields to the new ones.
3. Treat densely infested patches of lucerne with a non-residue herbicide like paraquat.
4. Do not feed the *Cuscuta* infested crop to the animals.
5. Do not collect the lucerne seeds from the crop infested with dodder.