



Weed Management in Vegetable Crops to Reduce the Yield Losses

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Weeds are ubiquitous. The vegetable fields are usually infested by a wide spectrum of broad and grassy weeds. Weeds compete with the crops for water, soil; nutrients, light and space thus reduce crop yields up to 37 per cent (Varshney, 2007). The vegetable as well as agricultural crops are infested with a variety of weeds. Out of over 800 weeds documented in India, 80 are considered as serious and nearly have a variety of methods for weed control and their choice of control measures is closely controlled by economics. Although, herbicides were introduced to horticultural crops in India in 1960, hand tools and animal drawn equipment still remain important methods of weed control in vegetable crops. Conventional methods of weed control have become an expensive input in the cultivation of vegetable crops. Owing to high cost and non-availability of labour in time and no single method of weed control is adequate or cost effective. Integrated weed management is a systematic approach to minimize weed impacts and optimize the land use by the different weed management practices.

Keywords-Characteristics of weeds, Harmful aspects of weeds, culture practices, chemical practices, biological practices

Characteristics of weeds

Weeds have rapid seedling growth and ability to reproduce when young. Redroot pigweed can flower and reproduce seed when less than 8 inches tall. Have quick maturation or only a short time in vegetative phase. Weeds have environmental plasticity. Many weed are capable of tolerating and growing under a wide range of climatic and edaphic conditions. Resist detrimental environmental factors. Weed seeds resist decay for long periods in soil and remain dormant. Often produce seed the same size and shape as crop seed, making physical separation difficult and facilitating spread by man. Some annual weeds produce more than one seed crop per year and seed is produced as long as growing conditions permits. Many weeds have specially adapted long and short range seed dispersal mechanisms. Roots of some weeds are able to penetrate and emerge from deep in soil Many weeds have adaptations that repel grazing, such as spines, taste or odour. Weeds have great competitive ability for nutrients, light and water and can compete by special means (e.g. rosette formation, climbing growth, allelopathy) Weeds resist control, including herbicides.

Harmful aspects of weeds

Plant competition. Weeds compete with crop plant for nutrients, water and light. Weeds increase protection costs because they harbor other pests. Increased production and processing costs. Any weed control operation from hand hoeing to herbicide application, cost money. Decreased land value and reduced crop choice. Reduced quality of farm products. Most seed in vegetable crops perpetuate the problem when the crop seed is replanted. Some weeds causes cattle death because cattle like it and often eat it selectively e.g. larkspur,

locoweeds, crazyweeds etc. It may cause some allergic problem to human also such as runny nose, sneezing etc.

Approaches for integrated weed management

Cultural, Chemical and Biological

Cultural practices

Stale seed beds- Stale („false“) seed beds are sometimes used for vegetables when other selective weed-control practices are limited or unavailable. Success depends on controlling the first flush of emerged weeds before crop emergence, and on minimal disturbance, which reduces subsequent weed flushes. Basically, this technique consists of the following: Preparation of a seedbed 2-3 weeks before planting to achieve maximum weed-seed germination near the soil surface. Planting the crop with minimum soil disturbance to avoid exposing new weed seed to favourable germination conditions. Treating the field with a non-residual herbicide to kill all germinated weeds (William et al., 2000) just before or after planting, but before crop emergence.

Crop rotation -Crop rotation is the programmed succession of crops during a period of time in the same plot or field. It is a key control method to reduce weed infestation in vegetables. Crop rotation was considered for a long time to be a basic practice for obtaining healthy crops and good yields.

Mixed cropping -Growing two or more crops at the same time and adjacent to one another is called mixed cropping, or intercropping. Crop cycles must coincide totally or partially (relay-cropping). The advantages are a better use of space, light and other resources, a physical protection, a favourable thermal balance, better plant defense against some pests and fewer weed problems because the soil is better covered.

Soil solarization -Soil solarization is a preventive method that exploits solar heating to kill weed seeds and therefore reduce weed emergence. Solarization can be defined as a soil disinfection method that exploits the solar energy available during the warmest period of the year.

Land preparation and tillage -suitable land preparation depends on a good knowledge of the weed species prevalent in the field. When annual weeds are predominant (Crucifers, *Solanum*, grass weeds) the objectives are unearthing and fragmentation.

Mulching- It excluded light and prevents shoot growth. Thick, wide mulches are required to control perennials that creep to the edge of a mulch and emerge. Mulches increase soil temperature and many promote better plant growth. Several different materials have been used to mulch, including straw, hay, manure, paper and black plastic. Mulches are used in high value crops.

Irrigation -Different methods of irrigation are used in vegetables. Drip irrigation is most efficient results in minimum weed population and maximum yield than the other methods (furrow, flood etc.).

Chemical weed control -The first attempt was made to control the weeds by herbicide in Punjab during 1937, For controlling *Carthamus oxycantha* by using Sodium arsenate Pre-emergence herbicides provide early season weed control when competition results in the greatest yield reduction and when other methods are less efficient. Herbicide reduces the destruction of soil structure by decreasing the need for tillage. They reduce fertilizers and irrigation requirements by eliminating competing weeds

Disadvantages -Some herbicide persist in the environment ,Undeniable mammalian toxicity, Selective herbicides control some weed only , are often inconsistent in weed control ,Have phytotoxicity effect

Biocontrol agents

Classical or inoculative -It has been used for many years. The earliest record of biological weed control was the release of cochineal insect *Dactylopius ceylonicus* from Brazil to north India in 1795 to control prickly pear cactus.

Conclusion

Vegetables are a substantial part of our lives and possess great commercial and nutritional value. Weed management is an important aspect in the successful production of these crops. Weeds reduce crop yields by 45%–95% in the case of weed– vegetable competition, lower their quality and increase costs of production.

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