

Physical & Cultural Weed Management Principles

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Introduction

The 2004-2005 version of the New England Vegetable Management Guide is available and all vegetable growers should have a copy of this publication. This publication contains specific herbicide recommendations, information on stale seedbeds, weed management in plasticulture, information on cultivation, etc. This publication also contains information on insects, diseases, plant nutrition, varieties, and many other topics. I expect that some copies will be available for sale at the Conference and copies are available from all 6 New England Extension services.

Physical Weed Management

Physical weed management strategies include hand weeding and cultivation. Hand weeding is, of course, time consuming and expensive; however, it is often necessary for many reasons. These reasons include in row weed control and rouging out new species which may appear in a field.

Cultivation is an important component of weed control in vegetable crops, especially when use of chemical control is not possible. The timing of cultivation, equipment used, and accuracy of use are all important factors to consider. Weeds are best controlled when they are small. While all cultivation equipment will provide control of weeds between crop rows, equipment should, in most cases, be chosen based on its ability to provide control of as many in-row weeds as possible with minimal crop damage. Minimizing soil movement, especially deep soil movement, is necessary to minimize movement of weeds seeds closer to the soil surface.

Several types of cultivation equipment are available. These include; rotovators, multivators, rolling cultivators, rotary hoes, sweep cultivators with discs, s-tine or Danish s-tine cultivators, basket weeders, finger weeders, spring-hoes or spyder weeders, spring-tine weeders, and wiggle hoes.

An excellent video describing each of these cultivators is available from the Vermont Extension System. Call Dr. Vern Grubinger at 802/257-7967.

Cultural Weed Management

Cultural weed management includes organic and inorganic mulches, soil preparation, stale beds with flaming, crop spacing, use of transplants, fallowing, and crop rotation.

Mulches shade the soil and act as a physical barrier and light barrier to weeds. Organic mulches such as bark mulch, grass clippings, straw, etc can delay soil warming which also slows weed germination. Inorganic mulches, such as plastic, warm soils and increase early germination of weeds. Plastic mulches act as a physical barrier to virtually all weeds except nutsedge, which can grow right through the plastic. With mulches in the row, it is still important to control weeds

between the strips. For plastic mulches, control of weeds in the planting holes is also necessary, especially for slow growing crops such as pepper.

Soil that has been finely worked and firmed will yield more weed seedlings than soil which are more cloddy and left loose.

Stale beds are often used to allow the crop reduced weed pressure. The stale seedbed technique is described fully in the New England Vegetable Management Guide. In brief, the stale bed technique has several parts. Land preparation that reduces clodding, good soil moisture, warm soils, time after preparation to allow weed seeds to germinate, desiccation of the weeds through flaming, very shallow cultivation, or herbicides, and minimal soil disturbance during the planting operation.

Closer crop spacing and use of transplants increases competition with the weeds. A crop that provides a complete canopy over the soil as fast as possible, shades the soil, depresses soil temperatures, and reduces both numbers and size of weeds. Use of transplants also allow the crop a competitive advantage over weeds, due simply to being there first.

Fallowing a field allows time for weed seed numbers to be lowered, thus reducing competition from weeds. If a field is left fallow, the best option to reduce weed numbers is to reduce the weed seed bank. The best way to accomplish this is to work the soil, allow weed seeds to germinate and emerge, work the soil to kill those weeds, allow weed seeds to germinate and emerge, work the soil to kill those weeds, etc. Over the course of a season, weed seed numbers can be drastically reduced. There is a myth that use of cover crops over a fallow season will reduce weed seed numbers. This is not the case. Both annual and perennial weed pressure will likely be worse the year after use of a cover crop for an entire growing season.

Crop rotation can be used to give the crop a competitive advantage over weeds. Weeds that tend to become problems over time tend to have similar growth habits as the crops they are competing with. For example, summer annual grasses are common problems in corn; cool season weeds, especially winter annuals, are common problems in cool season crops such as cabbage and potato; and summer annuals are more of a problem in later-planted fruiting vegetables. The weed seed bank, over time, is generally lower for other weeds so rotation to a crop with a different season can reduce weed pressure. This is especially true when the same crop or type of crop has been planted in the same field year after year.

OTHER OPTIONS

Other existing or future possibilities including allelopathy, biological control, biopesticides, and transgenic plants will also be discussed.