

Non-Chemical Weed Control in Vegetables

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Herbicides registered for use on vegetables in the southwestern U.S. have always been limited. This is especially true when compared to higher acreage field crops such as cotton, wheat and alfalfa. The development and use of selective herbicides began in the late 50's for all crops and has continued at a pace of about 5 new products every 5 years for cotton, alfalfa and wheat. The development of new herbicides for vegetables, however, has been negligible since about 1970. In head and leaf lettuce for instance, there are only 5 herbicides available and there has not been a new herbicide registered in almost 30 years. The loss of one of these products this year, Kerb on leaf lettuce, has created a situation where over half of the common weeds in this crop cannot be controlled chemically.

The primary reasons for the low number of herbicides available in vegetables are the relatively high value and low acreage of these crops. Additionally, vegetable growers expect high levels of weed control, low levels of crop injury and no potential carryover in the soil to subsequent crops. Many of the new herbicide registrations in vegetables have been for expanded uses of older products or new formulations of older products.

A survey conducted in Yuma, AZ in 2009 indicated that while 100% of the lettuce acreage was treated with herbicides, 93% was cultivated and 82% was hand hoed to control weeds. Non chemical control techniques have always been relied upon to achieve the levels of weed control desired by growers. These include cultural practices, mechanical cultivation, hand labor and other physical practices such as solarization and plastic mulches.

Cultural control techniques have always been used to control weeds in vegetables and include any practice that gives a competitive edge to the crop over the weeds. Most of these techniques have been developed by growers as good farming practices rather than by companies as something that can be sold. These practices are numerous, often only partially effective and used in combination with herbicides.

Hand labor is probably the oldest weed control practice and it is still widely used in the production of vegetables. People from other countries who have come here to work have historically made up the bulk of this labor force. The use of foreign workers has always been marred by conflict, litigation and legislation. One of the earliest groups was made up mostly of people from China (1850-1882). They were willing to work long hours for little money and eventually aspired to advance into farm management and ownership roles. This created much conflict that led to their replacement with people from Japan after about 1890. The same pattern ensued until this group was replaced in the first half of the 20th century by people from Mexico. This group can more easily enter the country illegally and this has added an additional source of conflict to an already contentious issue. Dependence upon cheap labor has always put vegetable growers in a precarious situation.

In addition to herbicides and hand labor, mechanical cultivation is relied upon to control weeds in vegetables. Precision planting facilitates the use of various mechanical cultivators to remove weeds everywhere but within the planted row. Robotic, vision guided cultivators are being developed and slowly gaining acceptance in Europe to remove weeds within the planted row. These machines will likely be utilized in the U.S. in the years ahead.

Another physical method of controlling weeds in vegetable that has been used effectively is soil solarization. When properly done, this technique has proven effective in controlling many annual weeds as well as other pests including many diseases. Some disadvantages are that the field must be out of production for 4 to 6 weeks, only weeds that are near the soil surface are controlled and some perennial weeds are not controlled.

The use of traditional plant breeding techniques that use methods like tissue culture or mutagenic substances to create herbicide resistant crops have been successful with some field crops and may be useful on vegetables. Crops modified using traditional techniques have a greater likelihood of public acceptance than do those created by genetic engineering.

It is concluded that: 1) because of the costs to develop and register pesticides new herbicides for vegetables are unlikely, 2) reliance on cheap labor has always put vegetable growers in a precarious position and 3) non-chemical cultural practices, automated cultivation equipment and old herbicides will likely continue to be relied upon.