

Management weeds out high labor costs

by Chantal Foulds

As financial and environmental concerns have directed farmers towards reducing herbicide costs, mechanical weeding systems have been brought out of the closet and reevaluated. Much work has been done to evaluate different types of weeders and weeding strategies, and yet weed control continues to be a major concern on many farms.

Special Devices vs. Timing

A striking aspect of many organic vegetable farms is the diversity in the number and types of mechanical weeding devices they possess. This stands to reason when you consider that weed control is very difficult in vegetable systems and that organic producers spend many hours hand weeding.

They are willing to try any type of implement. But is the type of implement as important as the timing? This is not to imply that producers do not take the time factor into consideration, but it is easy to get carried away with the machinery and forget that cultivation at the critical stage, using less sophisticated equipment, may do an even better job.

"Time of weeding is critical for good weed control", according to Robert Beauchemin, a vegetable producer and miller from Milan, Quebec. Robert spoke at the REAP conference on Weed Control, which was held March 19 at Macdonald College. His production strategy consists of:

1. A well planned rotation.

Besides taking fertility and weed control into consideration when planning the rotation, Robert has chosen to grow only a few vegetables.

"Some of my colleagues plant 30 varieties of vegetables, but they are not efficient in the field. With that many types of cross. It is difficult to do the field operations on time."

2. Standard settings

Setting all the planting and field equipment for row widths of 36 cm (or a multiple of 36 cm) so that many hours are saved in adjusting the machinery.

3. Proper planning

Timing weed control operations so that they are done when the weeds are very small.

Beauchemin has experimented with different types of weeders, including a mechanical weeder he put together using S-tines, a spring hoe weeder, a spyder weeder, torsion weeder and basket weeder. He uses the S-tine cultivator most frequently.

Depending on the weed pressure in each field, other weeders are used as well. Run at high speeds, the S-tine cultivator throws soil over the crop row. "I figure I'm eliminating 90% of the weeds on the row," he says. The spyder weeder is excellent for controlling quackgrass because it lifts the rhizomes up and places them on the soil surface where they are dried out by the sun. Plugging, as would happen with a spring tooth harrow, is minimal. The tines of the spring hoe weeder are mounted so that the tips are placed practically on the crop row, but as the tractor advances, pressure from the soil pushes the tines back so that they pass just next to the crop row. The tines compress the soil and shatter it' killing shallow rooted weeds on the crop row.

Beauchemin rarely uses the torsion weeder because he says it takes a lot of time to adjust. In terms of durability, the basket weeders need the most maintenance; every 2 to 3 years, the tips on the S-tines have to be replaced, whereas the spyders need no maintenance at all.

Rotation Important

A complete rotation is done in five years. The crops and land base are shown in Table 1. One of the objectives of the rotation is to minimize high nitrogen levels in the soil that would favour weed growth, especially in crops that initially are not very competitive.

Manure is applied in the form of liquid slurry on a fall planted cereal in year 5, and as compost in the spring of year 1. As well, red clover plow"down in year 5 contributes to raising the fertility levels for the cole crops in year 1. Mustard is the most difficult weed to control on Beauchemin's farm, and he feels that the applications of liquid manure are not helping. We plan to reduce the application and eventually eliminate it on the farm, he says. As well, he has replaced winter rye with spring cereals as a ground cover in the 5th year because the rye became a weed problem the following year.

Another objective of the rotation is to place a crop such as carrots, in which weed control is difficult, after a crop in which good weed control is fairly easy to obtain. "Even though, fertility wise, carrots would be placed in the third year because they are the least nutrient demanding of the vegetable crops, I felt that having good weed control the previous year was more important in obtaining good carrot yields" he explains.

Beauchemin starts off with a high nutrient demanding crop, the cabbage family. Compost is applied before planting. Except for liquid manure which is applied the previous fall, no other crops in the rotation are fertilized and he notes that he is fortunate to have 8.5% to 9% organic matter in his soils.

"Including a hay crop in the rotation is responsible for our high levels of organic matter. When we first started farming, we had 4.5% to 5% organic matter levels" he says, which is likely the main reason that he can get away with minimal fertilization.

Transplants are used because they provide competition to the weeds very quickly. Within 5 weeks, the canopy is full. The spyder weeders can't be used after the canopy is fully developed because it causes too much damage. On average, weed control is carried out 3to4 times.

Difficult crop

Following the cabbage family, carrots are planted. This is one of the most difficult crops for weed control. Carrot seeds take anywhere from 8 to 15 days to germinate and do not provide any competition to the weeds until 6 weeks later.

"I have to get at least one cultivation done prior to carrot emergence to make sure that the weeds do not start controlling the carrots" Beauchemin says. In order to be able to cultivate prior to carrot emergence, radish seeds are placed with the carrot seed in the planter (he throws a handful in the planter) so that there is 1 radish plant every 1-1.5 m. Within 3 days the radish seeds have germinated, providing a faint green line, along which he can guide the cultivator.

Potentially the radish plants can compete with the carrots but soil thrown on the crop row during cultivation usually takes care of this problem Cultivation is done 4 to 5 times in the carrots.

"The last 1 or 2 cultivations are not really done for weed control purposes. Rather the objective is to break the soil crust after a rain and allow air to get in and mineralize the organic matter. I have left strips uncultivated and noticed a yield difference' and I think it is due to the increased availability of air and nutrients" he concludes.

But Beauchemin is still not satisfied with the weed control in the carrots. and this season he would like to try the stale seed bed technique. This technique was developed in Europe and consists of preparing the soil 10 days prior to seeding. The objective is to stimulate the first flush of weeds to germinate. After the carrots are seeded, a flame weeder is passed just prior to carrot emergence. One way of making sure the carrots are about to emerge is to seed a couple rows of carrots a few days earlier These rows will indicate when the main crop is ready to emerge.

Table 1 . Robert Beauchemin's rotation

Year and crop	Landbase
1. Cole crops - cabbage, cauliflower, broccoli	2 Ha
2. Carrots	2 ha

3. Beets, turnips, lettuce	2 ha
4. Cereals interseeded with red clover	22 ha
5. Red clover plowed after the first cut+cereal	
Total landbase	28 Ha

Third year

In the third year of the rotation, beets, turnips or lettuce are planted. The beets and lettuce germinate quickly and provide a competitive canopy within a short period of time. Beauchemin will cultivate an average of 3 times in the beets, 3 to 4 times in the turnips and 2 to 3 times in the lettuce.

Currently, no commercial organic vegetable grower gets away without doing any hand weeding and Beauchemin calculates that hand weeding on his farm takes 2.5 person hour/ha. This was the lowest figure in a survey of organic producers done by the Quebec Ministry of Agriculture (MAPAQ) in which the average time to weed organic carrots was 250 hours/ha. (In the same survey, the average time to hand weed cabbage was 55 hours/ha).

Beauchemin manages the 28 ha of cropped land with 2 other full time persons, and hires only part time help for the harvest. In addition, he is heavily involved in a milling operation. The fact that the operation only needs 3 persons to manage it is an indication of how efficiently he has been able to control weeds and cut down on field labour requirements.

Sources of Information: Spring hoe, spyder and torsion weeders: Bezzeride Brothers, P.O. Box 211, Orosi, CA 93647

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