

Weed control: The Achilles Heel of organic farming

At our meeting in November, Dr. Bill Liebhardt from the Rodale Institute was kind enough to come speak to us. Bill is the retired chair of the Sustainable Agriculture program at the University of California at Davis, and is currently on a one year assignment at Rodale, reinvigorating their research program. The NYCO farmers were captivated by the highly pertinent research that Rodale has done over the past 20 years. The long-term systems comparison trial between legume-based organic, manure-based organic and conventional grain farming systems showed many worthwhile things, particularly that the yields varied little and in dry years, the organic system shone. The organic soils were higher in organic matter, had greater water infiltration and water holding capacity, and were more microbially active. For those of us firm believers in the organic system, this was music to our ears!

Then Bill turned the mirror on us with straight talk about the Achilles Heel of organics -- weed control. There is plenty of evidence that organic farming improves the soil and is better for the environment, but unfortunately weed control on many organic farms is inconsistent. It can be very good, sometimes better than what can be obtained with a complex herbicide cocktail, or it can fail, and often the farmer does not really know what caused the difference. We don't like to hear this, but it is undeniably true. So, in response

to Bill's observation, here are some thoughts about what we, as organic farmers, can do to make organic weed control more consistent.

1. Input substitution does not work -- there are no silver bullets!

For those who switch to organics, thinking that all they have to do is eliminate chemicals and buy a cultivator, weed control is almost certain to fail. Organic farming is a totally different system of thinking and planning. Crop rotations, or lack thereof, that 'work' under heavy pesticides and synthetic fertilizers are often totally inappropriate under organic conditions. Conventional agriculture's inattention to soil health spells disaster in an organic system. If we don't change our way of thinking and planning, it is hardly a surprise that an organic farmer might have weed control success one year and failure the next, and have no idea why. Organic agriculture is a system where all parts are interrelated. Weed control is integrally linked to soil fertility and condition, which is integrally linked to crop rotation. We, and the scientists now studying organics, should not consider any one factor in isolation, or fail to take into account that whatever we do to one part of the system affects everything else.

2. The heart of organic weed control success is cultural, not mechanical.

A good cultivator may be needed to clean up residual weed problems, but it should be seen as only the last line of defense. Far more important are various cultural practices that limit the size and type of the weed population from the very start. The main point in cultural practices is to create as large a differential as possible between the size and vigor of the crop and the size and vigor of the weeds. A well-planned, diverse, crop rotation, active soil fertility management, attention to sanitation, using high quality seed of well adapted varieties, and well adjusted and appropriate equipment will go far in creating this differential. Wise use of allelopathic and deep shading crops can put existing weed problems at a disadvantage. Cultural weed control is a system of thinking and of planning approaches that use many interrelated factors to your advantage.

3. Define your reasonable weed control expectations.

Perfect scorched earth between the rows might not be necessary or even desirable. Indeed, don't forget that this isn't always the norm with chemical weed control either! We believe that rating weed control with a simple one to five scale, only recording how many weeds are killed, is not adequate to evaluate weed control holistically. A sound weed control program must meet the following criteria:

- 1. no yield loss from weed pressure,**
- 2. no quality loss from weed pressure,**
- 3. cost effective,**
- 4. safe for farmer, the crop, and the environment,**

5. sustainable over many years.

Each crop and even each field will require different approaches to meet these goals, but if your overall weed control program meets these criteria, then don't second-guess yourself.

When we farmed with chemicals, we found that our weed control program consistently failed on the last three points -- and all too often, it failed on all five. Today we are happy to report that our weed control is meeting all 5 criteria on most of our farm each year and on all of it in good years. We are still striving to constantly improve as we learn more about weeds and expect that we will continue to do so for as long as we farm.

4. Timing is critical.

It doesn't take much attention to control weeds in Roundup Ready soybeans, but it is not so simple in organic farming. Mechanical weed control must begin long before the weeds are visible. If you can see the weeds from your pickup truck window, there's a good chance that you are too late. Timing can be somewhat less precise if your cultural practices are sound. If you are relying solely on a cultivator for weed control and then it rains for days just when you must cultivate, you can have a real disaster. But if the weed population has already been reasonably controlled by cultural practices, you will have a little more flexibility with timing.

5. Intelligent observation and creativity are essential.

What your neighbor is doing might not work as well on your farm. Your crop and weed histories, soil conditions, weather, and your farm's economic needs are undoubtedly different. It is very useful to learn what works for others, but you and your farm are unique. You won't know what works on your farm unless you are out there, critically observing and learning from what you see. There are so many opportunities for creativity. The conventional mindset of doing the same thing every year is a real hindrance to organic success. One good example of this what Bill Liebhardt called relay cropping, an approach that may work some years in many places. He suggested drilling soybeans into a small grain in late spring. The small grain will be harvested in mid-summer, giving the soybean plants enough time to grow through the straw and produce a reasonable yield by October. Two harvests in one year, terrific weed control, and lots of organic biomass for the soil too! The soybean plants may not yield well in a dry year, but in 'normal' years, the payoff could be substantial. What a neat idea! It won't work for everyone all the time, but its worth a try!

6. Believe in what you are doing.

We must believe that the organic system will work; we cannot begin by expecting it to fail. When Bill Liebhardt presented recent scientific data showing serious environmental and health problems caused by the pervasive exposure to pesticides, we all sat up a little straighter and felt a little prouder. We farm organically for many reasons -- greater farm economic security, the health of our families and ourselves, the rewards of community

and cooperation, environmental concerns, and because this system works well for us. But we also have another role to play. This world can not survive continued assault with dangerous chemicals and poor agricultural practices much longer. Already we are seeing emasculated frogs, rising cancer rates, and sharply reduced human sperm counts in rural areas of Iowa, all linked to pesticide exposure. Antibiotics are losing their effectiveness because they have been so irresponsibly used as animal growth promoters. This is another legacy of the past 50 years of agricultural policy. We must actively show that there is another way that is productive, economical, environmentally friendly, healthy . . . and where weeds are consistently well controlled!