The basics of biological weed control

Gary Zimmer, author of The Biological Farmer, laid out the ABCs of controlling weeds through building soil, rotating crops and cultivation before a standing room only crowd at the Upper Midwest Organic Conference in late February.

By Darcy Maulsby

Coming soon:
More from the UMOC
Darcy Maulsby attended a variety of workshops at the Upper Midwest Organic Conference, and will be reporting back to New Farm™ readers what she learned during the next several weeks.

Available Now:
• The basics of biological weed control

To come in the near future:
• Week of March 24: Profitability through season extension
• Week of March 31: Building soils and maintaining fertility
• Week of April 6: Organic grain marketing options, plus a little on producing top quality food grade beans and grain.

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Effective weed control involves more than good timing or having the right tools.

The key to success revolves around soil management, according to Gary Zimmer, a Wisconsin farmer who has authored the book "The Biological Farmer."

"Controlling weeds is all about soil building. Loose, crumbly soil structures help control weeds, but hard, compacted soil is ideal for weed seeds," said Zimmer, who presented the seminar "Biological Weed Control Strategies" at the Upper Midwest Organic Farming Conference. The Feb. 28 seminar was standing room only, as more than 100 people gathered to hear Zimmer's insights.

Weeds are indicators of soil health, according to Zimmer. "If you've got hard, tight soil that's low on calcium or sulfur and low in biological activity, foxtail thrives in this. But weeds are nature's tools to fix the soil. If you left those foxtails there, they'd repair the land in 50 or 100 years."

But don't misunderstand—Zimmer won't leave those foxtails alone.

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management. It takes three to five years to improve soil structure," said Zimmer, who serves as president of Midwestern Bio-Ag (www.midwesternbioag.com), an ag consulting business that focuses on biological solutions.

**Improving soil conditions**

So what can you do to start controlling weeds better? Weed control strategies can be grouped into four types—improving soil conditions, rotating crops, growing smother crops and using mechanical control.

“Success usually isn’t just about doing one thing right. I’m a big believer in shallow incorporating residues and subsoiling. I also mineralize my soils, adding what is short and feeding the crop a mineral balance for its specific needs,” said Zimmer, who operates a Wisconsin dairy farm with his family and grows row crops on 400 of their 700 acres.

Adjusting these minerals involves a soil-balance approach, Zimmer explained. “We start balancing with calcium and phosphorus but also add sulfur and all the trace elements. Calcium and sulfur do improve soil structure. Having lots of organic matter shallowly incorporated does make the soil surface loose and crumbly. This allows rain water to soak in better and reduce weed pressure.”

When soil structure improves, conditions will allow crops to grow vigorously and develop huge root systems that help the crops shade out the weeds.

“Weakening and killing weeds are two different things. Weed control is about competition. You can do a lot of things to slow down weed growth and give your crop an advantage,” Zimmer said.

To improve soil conditions, recycle organic matter like animal manure, crop residues and green manures. But don’t add too much at once, Zimmer said. When you spread livestock manure on your land, make sure you follow some basic tips to control weed growth.

“You obviously don’t want to fertilize weeds, but that’s what soluble nutrients do—they boost both your crops and your weeds. If you apply manure, do it on grass fields or on a high mature residue crop like corn stalks. Composting manure also stabilizes nutrients, and this will control weeds.”

After a soluble manure application, plant a crop like oats, Zimmer said. “These will grow and suck up a lot of the soluble nutrients that really make weeds grow. They will also stop leaching and erosion, and they provide green manure.”

Zimmer cited the example of an Iowa farmer who farmed conventionally and developed a five-year soil management plan that included oats. “He planted oats and then followed this with corn and soybeans. He says this has made a

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tremendous difference in his soil. It’s true that oats aren’t as cheap as they used to be, but they’re still a good value."

**Include crop rotations**

Growing a variety of crops on the same field will also keep weeds off balance, because certain weeds grow best with certain crops, Zimmer said.

“In a rotation, every crop does something different and each provides some advantage. Crop yields are also better in a rotation,” he noted.

In addition, a good rotation sequence can help improve soil structure and fertility, which boosts weed control. Livestock farms with rotations including two or more years in hay will have easier weed control, because in two out of the five years, no fresh weed seeds are added to the soil, Zimmer said.

“Without livestock, taking a year off in the rotation really does break weed cycles. It also builds soil organic matter and gives a way to build up mineral and soil biological levels, setting the stage for a few years of excellent crops. Even if you can’t take the whole field, maybe have a full crop on 80 percent of the ground and don’t harvest anything from the other 20 percent. It’s okay to let land go fallow.”

**Smother crops improve weed control**

Farmers can also try growing smother crops, which control weeds by shading them out and releasing natural chemicals that kill weeds.

“My favorite smother crops are buckwheat and Sudan grass. Rye, clovers, hairy vetch, alfalfa, barley, and oats also work well to control weeds. Smother crops also improve soil structure, prevent erosion and provide crop nutrients when they are turned under as a green manure,” Zimmer said.

If you don’t grow these as a main crop, the smother crops can be interseeded or overseeded into an existing crop, Zimmer added. “Try to keep the soil covered all year round. Every chance I get, I’ll be growing something green.”

**Machines add power to weed control methods**

Finally, don’t overlook mechanical weed control. “If you have trouble with weeds, the last thing you want to do is quit cultivating or rotary hoeing. Rotary hoeing can give excellent control, provided the weather allows it and it’s done early, usually two to three days after planting and again when the crop is three to four inches tall,” Zimmer said.
Using more than one kind of tool for different conditions can be helpful, Zimmer added. “The Buffalo cultivator has worked really well on our farm. With the cut-away disks, long ridged shield and huge sweeps, we can clean up most fields. Disking, rotavating, harrowing and plowing can kill deep-rooted or perennial weeds.”

Zimmer said he and his family also like the Howard rotavator. “It can leave the field in better condition and can kill almost any crop in one pass, which minimizes trips over the field. It also leaves residues on the surface, protecting the soil.”

Burning or flame cultivation provides another physical method of weed control. “A set of propane burners can give good in-row early weed control without harming crops. The per-acre costs are low,” Zimmer noted.

Most mechanical weed control methods should be used early in the season, when weeds are just sprouting. Keeping the top inch or so of soil dry and loose will reduce the chance of new weeds getting established, Zimmer added.

**What about chemicals?**

If herbicides are necessary for a biological farmer (of course this isn’t allow if you are an organic producer), try to reduce the rate and the amount you use per acre, Zimmer said.

“Maybe just spot-spray the worst areas of a field, or only spray when weather conditions prevent non-toxic control. Herbicide rates can often be cut by about half while still getting effective weed control. Only banding the herbicide in the row and using mechanical control between rows can reduce rates even more,” he said.

Remember, weed control is all about improving soil structure. Zimmer concluded, “Weed control really isn’t a battle. It’s about learning to understand soil structure and soil health. But remember that this isn’t formula farming.”

*To each his own:* Gary Zimmer gave the basics but explained that each farmer would have to decide what works best for his farm.
There's no one right way. Find out what works on your farm."