Look, Ma! No Weeds: Early Season Weed Control

Part 1: The basics of effective tillage techniques

Knowing just when to use just the right tool for just the right weed is critical to early season weed control.

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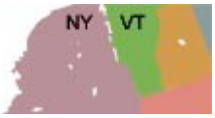
Missed one?

Part 1: The basics of effective tillage techniques
Knowing just when to use just the right tool for just the right weed is critical to early season weed control.

Part 2: Blind cultivation
Get weeds before they become established and the battle is nearly won.

Part 3: In-row cultivation
It's as much about the technique—and being able to adapt to fickle weather—as it is about the tools.

Farm-at-a-Glance



Welcome to the first installment in this three-part series--a basic primmer about weeds, tools, and techniques--which will be followed by a more in-depth look at equipment and cultivation techniques.

Organic weed control is not rocket science, but it does take understanding the anatomy and physiology of the crop plants, the weeds and the soil, as well as a cultivated anticipation of how each will respond to the implement used. Weed control strategies must consider the prevailing weed species; their size, condition and age; the soil condition; the available equipment; the species of crop; crop plant size; and the weather.

There are three main ways to kill weeds by cultivation:

1. Burying them
2. Uprooting them so that they desiccate (dry up)
3. Severing or damaging the weed enough so that neither part can regenerate

Weeders and cultivators generally do a combination of these three. It is important to be aware of exactly what the cultivator is doing to the weed seedlings while it is operating in order to time the operation correctly and make proper adjustments effectively.

Weed species vary widely in their susceptibility to cultivation equipment and in the length of time after germinating during which they are most easily controlled. Ragweed sends down a taproot very quickly, making it difficult to uproot almost as soon

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ACTION ALERTS

•Free the meat markets! End packer ownership and stop closed-door deals

• Support Saskatchewan farmers in efforts to block GM

The Martens' Farm

Location: about 60 miles southeast of Rochester, NY, on the western shore of Seneca Lake
Important people: Klaas and Mary-Howell Martens, Peter, Elizabeth, and Daniel. Plus Robert Hall (employee/asst farm manager)
Years farming: We've farmed this farm together since 1991. Klaas has farmed all his life.
Total acreage: 1500
Tillable acres: 1300
Soil type: Honeoye Lima silt loam
Crops: corn, soybeans, spelt, wheat, barley, oats, triticale, red kidney beans, sweet corn, snap beans, cabbage, edamame soybeans
Livestock: sheep, pigs, chickens for our own use
Regenerative farm practices: diverse long term crop rotations that incorporate legumes and small grains, under seeding all small grains with red clover, actively increasing soil organic matter
Marketing: corn & small grains are sold to Lakeview Organic Grain LLC, our organic feed business. Soybeans, red kidney beans, and spelt sold to brokers and processors. Some spelt is sold as kosher organic spelt. Sweet corn, snap beans and edamame are sold to processors who freeze them under brand name labels. Cabbage is made into sauerkraut and packed under the Cascadian Farms label. Some of the oats, wheat and barley are being grown from Foundation Seed to produce Certified Organic Certified Seed.

as it comes up. Mustard has very shallow roots at first and is easily plucked out until it is quite large. Summer annual grasses form small seedlings with few reserves that are easily destroyed by burying or uprooting them. Large-seeded weeds like velvetleaf that can emerge from deep in the soil are very resistant to shallow cultivation with weeders. Redroot pigweed is very difficult to kill by burying or uprooting once it gets a few inches tall, because it can push up out of fairly deep soil when buried and can re-root. Pigweed can also grow even if pulled all the way out and left lying on top.

Dessication

High humidity, cool temperatures, cloudy skies, and rain reduce the effectiveness of desiccation. The easiest time to kill weeds by desiccation is on a sunny, windy, hot afternoon. Weeds will often wilt and die under these conditions even if they are only partially uprooted.

In periods of drought, weeds may go into a semi-dormancy, leading farmers to stop cultivating or to set cultivators less aggressively. Soil often becomes hard under these conditions, making it difficult for equipment to penetrate to the proper depth. In a drought, deep-rooted weeds are tightly held in the soil and have large root systems relative to the size of the tops. A cultivator that is run too shallow can bury these weeds without disturbing the roots significantly. Such fields may look very clean at first but, if drought persists, the weeds will push back out of the dry soil ready to grow rapidly from a large well-developed root system. It is important to uproot and desiccate these weeds thoroughly, because burying them in the loose dry soil is not very effective (unless they are buried quite deeply).

Burying Weeds

During wet weather, burying weeds becomes the more effective approach, particularly if rain follows shortly after the cultivation. A rain on freshly cultivated soil will make it stick together and become tight. Often the soil surface will crust slightly as it dries. Under these conditions, weeds that are buried will die quickly and will seldom manage to push back out. It is important to note that any crop plants that are buried by weeders or cultivators just before a rain are usually lost, as well.

Tillage

Organic mechanical weed control consists of 4 distinct phases, each one very important to the overall success of your weed control program. These phases are:

1. **Tillage**
2. **Planting**
3. **Blind cultivation**
4. **Row cultivation**

The goal of early mechanical weed control is to eliminate the bulk of the weed population before it competes with the crop and to create as large a crop-to-weed size differential as early as possible. When crop plants are bigger and more vigorous than the weeds, the weed pressure will usually not jeopardize the crop. Therefore, effective early weed control, before weeds present a visible threat to the crop, is absolutely essential.

Appropriate tillage of fields is critical to:

- Create a good seed bed for uniform, vigorous crop emergence
- Prepare the ground adequately for successful subsequent mechanical weed control operations

In efforts to block GM wheat

• Stop budget cuts to conservation programs--the one's that help you pay for environmentally sound farming practices!

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- Kill weeds that have already emerged, including tearing up and burying perennial weeds with large underground root systems

The sun on the soil surface brings the shallower weed seeds out of dormancy in the spring, preparing them to sprout. The warm soil, full of weed seed ready to grow, responds to tillage quickly with a new flush of weeds. Moldboard plowing inverts the soil, bringing deeply buried dormant weed seeds to the surface and burying germinated weeds down below where they can't grow. When this surface soil is turned under cleanly with a load of germinating weeds, deeper soil is brought to the surface. The newly surfaced weed seeds that had been laying dormant deep in the soil will often not begin to grow until after the crop gets started. Chisel plowing does not invert the soil and can result in a heavy flush of weeds that will compete with the crop early in the season.

Another approach, called the stale seedbed technique, works well if there is enough time before planting. The soil is plowed early, encouraging as many weeds to sprout as possible; then they are killed as the ground is tilled again. If several cycles of weed emergence and tillage occur before planting, we will have greatly reduced the weed seed bank, thus eliminating most of the weeds that were likely to germinate to compete with crops.

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There are many microbial species in a biologically active soil that attack weed seeds and the rhizomes of perennial weed species. Tillage adds air to the soil and stimulates biological activity as microbes feed on organic materials and break them down. This accelerated decomposition is often said to be burning organic matter. This is not neccessarily bad. Destroying weed seeds and helping crop residues break down are important benefits of tillage. Tillage helps mineralize nitrogen and phosphorus, cycling it from less available forms into ones that crops can readily use. It is only when tillage is excessive or poorly timed, or combined with poor rotations, lack of cover crops, high usage of nitrogen fertilizer, and other related poor farm-management practices that tillage actually damages the soil. When this happens, more organic matter is used up each year than is replaced, and soil degradation results.

In seedbed preparation, the goal is to prepare an environment that helps the crop to emerge as quickly and uniformly as possible without encouraging weeds. The seedbed should be smooth and level to allow for effective weeding and cultivation latter in the season. Large clods, rough spots, sod clumps and debris at planting will interfere with subsequent cultivating and weeding.

All perennial weeds need to be plowed under completely when the field is prepared. Rhizomous weeds such as quackgrass can often be killed by pulling the rhizomes to the surface with a spring-tooth harrow to dry out on a sunny day.

Planting

Planting equipment must be adjusted carefully to insure that the seed is planted at the proper depth for the crop and that it is planted uniformly for even emergence. Planting when the soil is too damp can cause a large flush of weeds to germinate very quickly from the moist packed soil at the surface. A dry, crumbly or even slightly cloddy surface with moist, fine soil at seeding depth gives the crop a good head start over the weeds. Basket rollers can produce finer soil at seeding depth with a looser and

coarser surface than cultipackers or rollers.

It is important that planting equipment is in good repair. Disc openers worn past the point that the manufacturer recommends should be replaced. The gauge wheels must contact the disc openers exactly as the owners manual suggests, and the press wheels must follow straight behind the openers with the proper amount of down-pressure for the soil conditions.

"Clay soils are often worked slightly wet to get them fine. This can lead to crusting and a heavy early flush of weeds . . . . A dry, lumpy soil with just enough moisture to get a stand of soybeans started will often produce a perfectly clean crop with minimum effort."

Planters often plant seeds deeper when the soil is soft and slightly damp and shallower where it is dry and a little cloddy. The planting depth should be checked in lumpy spots as well as where the seed bed is ideal. Older John Deere 7000 planters sometimes put seeds almost on top in lumpy spots while dropping them in just right where the soil is softer. This can happen when there is a big enough gap between the disc opener and the gauge wheel for dry clods to push up in between and then drop into the seed trench ahead of the seed. The seeds are then placed into dry soil from the surface wherever the field is somewhat dry and lumpy. Replacing worn parts and proper adjustment of the planter can eliminate this problem. One after-market company builds replacement seed tubes that insure seed placement at the bottom of the seed trench while others sell attachments to better push seed down into the V left by the seed openers.

Corn and other crops with axillary roots must be planted deep enough to allow the plant to set roots above the seed. The tiny radicle on a corn seed only provides a small start for the plant. There has to be good soil contact with the stem to allow roots to form above the seed. Corn should usually be planted a minimum of 1.75” deep to allow for normal root formation. If corn is planted too shallow, it will have poor rooting and be prone to lodging. Soil hilled up around the corn plant as it grows stimulates further axillary root formation.

Clay soils are often worked slightly wet to get them fine. This can lead to crusting and a heavy early flush of weeds. A slightly rougher surface doesn’t look as nice, and care must be taken to avoid uneven emergence, but weed control is usually much better. Soybeans can germinate and emerge from much dryer soil than most weeds or even corn can. A dry, lumpy soil with just enough moisture to get a stand of soybeans started will often produce a perfectly clean crop with minimum effort. When a field gets too hard and lumpy at planting, running over it with a cultipacker or roller right after planting will often firm it enough to make soybeans emerge well but not the weeds.

Blind cultivation

Blind cultivation is the easiest and best opportunity to destroy the weeds that would be growing within the rows and presenting direct competition to the crop. In blind cultivation, the entire field is tilled shallowly with the implement, paying little attention to where the rows are.

The point of blind cultivation is to stir the top 1/2 to 1-1/2 inches of the soil, breaking the contact between the weed seedling roots and the soil and burrying the tiny weeds. This adds air to the soil, causing the millions of tiny germinating weed seeds to dry out and die. The larger crop seeds

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germinate below the level of the cultivation and are not usually damaged by this operation. Weed seedlings are very vulnerable to drying out and to burying at this stage. By doing an effective job of blind cultivation, you can achieve the biggest possible crop/weed size differential from the start. Blind cultivation also can break a soil crust, allowing crop seedlings to emerge.

start."

Usually, the first blind cultivation pass is done right before crop emergence, with a second pass done about a week later, depending on conditions. The most effective blind cultivation is done when the soil is fairly dry and the sun is shining. A wind also improves the effect.

Blind cultivation equipment includes rotary hoes, tine weeders, spike tooth harrows, springtooth harrows and chain link harrows. One resourceful farmer we know even drags a set of old tire chains over his fields for blind cultivation. NF

Part 2: Blind cultivation >>