

Dealing with weeds on a CSA farm

Weighing which commercial-grade tool, implement or mulch to employ

If you've kept a garden or raised vegetables commercially, the primary reasons to place emphasis on weed control are surely obvious:

- Weeds and perennial grasses, especially in borders and paths of fields, harbor many insects, especially Japanese Beetles, which are becoming more and more of a problem in northern states as winters are less severe.
- Weed control can greatly affect cost of production and actual net returns of your operation.
- Weeds grow 3 to 4 times faster than most vegetables, competing with them for light, moisture and nutrients and limiting size, quality and yields.

As organic growers engaged in Community Supported Agriculture for 18 years, however, there are some additional reasons Dela and I believe every vegetable crop producer should consider fitting use of prairie grass mulch (especially switch grass) into your overall strategy for controlling weeds with hand tools, implements and on a limited basis, black plastic mulch.

Your Pocketbook

USDA Economic Research Service forecasts for specialty crop growers (fruits, vegetables, nursery/greenhouse, hay, silage, trees) in recent years projected average net cash income would decline. Receipts in these forecasts were rising, but expenses were rising, too, outpacing those increase returns by more than 2 to 1.

Your sustainability

Regular gas in Janesville, Wis., was 78 cents a gallon before 2001. Global oil production has peaked. Fuel prices – and everything dependent on fossil fuel – are only going to rise. Farm fuel and fertilizer costs in 2011 rose 24 percent each.

Your legacy

Rolled plastic from polyethylene film to mulch vegetables and fruits has helped control weeds since the 1950s. By 1999, it had spread globally to more than 30 million acres. Much of it ends up in landfills, which are filling up and closing. Consumers worry about black plastic mulch leaching chemicals into soil, during and after production.

Your model

More than 69,000 U.S. farms grow vegetables and melons. More than ¼ of them – about 18,000 – sell directly to consumers. That number reflects a 97 percent increase between 1997 and 2007. The number of CSA vegetable growers has risen from 2 in the 1980s to more than 6,000 today. Local food production is a permanent trend, and these growers are going to need sustainable methods and means of controlling weeds that do not depend on non-renewable sources of energy, especially fossil fuels.

Factors Affecting Weed Control Methods and Selection

We started producing vegetables for direct market sale in 1994, with no tools or greenhouse, no tractor or equipment, 5 subscribers and a 15-week season in the first year. We worked other jobs to acquire livestock, equipment and resources. Over our first 15 years, we grew to more than 200 subscribers, with a winter share and some year-round production, in addition to a 20-week regular season.

We grow more than 100 varieties of vegetables, including sweet corn, on 10 to 12 acres each year. On another 39 acres, we've grown oats, wheat, hay, rye, millet, high oil sunflowers and now switch grass. We've used both black plastic and

straw mulch to cut labor expenses for weeding and weeding/cultivation time. We've been certified organic for 4 years. From our experience, we see ***five considerations*** that any grower should make in selecting a particular method of weed control for overall sustainability of the soil, the farm and the enterprise:

1) Climate and Weather Influences on Planting and Ground Preparations

- Black plastic is good for warming soil, which transplanted vegetables like eggplant and peppers sometimes need in a cool, early spring
- Black plastic mulch can be difficult to apply in muddy soil conditions during a wet spring
- Good fall chopping and winter deterioration of stalks is essential for spring ground preparation in advance of laying black plastic over a seed bed.

2) Financial ability to acquire tools or equipment necessary for the weeding method

- Organic straw mulches require small grains or organic prairie grass plantings and rotation, and the equipment to harvest the straw, OR accessibility to someone's organic production that you can purchase.
- We bought a used mulch layer (in working condition) from an Amish neighbor for about \$400 and fixed its flat tire for about \$25; new mulch laying implements vary in size and accessories and can cost as much as \$4,500
- ❖ Paper mulch standard 4 foot x 500 feet costs \$83.50 a roll; in crepe for a machine, 4 foot x 500 feet runs \$94.95
- ❖ Black plastic mulch by comparison (60 inches x 4,000 feet) costs \$119.95 from Farm Tech in Iowa; \$126.45 (4 feet x 4,000 feet) a roll from Ag Resources in Minnesota
 - Functioning used tractors geared to scale can cost between \$5,500 and \$8,000
 - Hand tools can be bought at auction and sometimes from farm equipment salvage yards, such as Lakeside Implement near Portage north of Madison and Jaeckel Bros. outside Fort Atkinson. Johnny's Seeds and FEDCO in Maine and Ag Resources in Detroit Lakes, MN, have been good sources of organic and heirloom seeds and hand tools for us. We recommend the following commercial-grade hand tools for specific tasks:
- ❖ Stirrup Hoe (average \$50) (3 sizes 3.75, 5, 7 inches)
- ❖ Co-linear hoe (under \$40) can come with replaceable blade
- ❖ Cobra hoe – short-handled (average \$25); long-handled (\$60)
- ❖ Rogue hoe – from re-cycled farm implements, such as disks – very strong! (average \$30)
- ❖ Wheel hoe – you can buy them used for around \$150, but Johnny's Glasser model is worth the \$350, \$399 with a stirrup style oscillating hoe attachment; attachments abound, such as the \$200 seeder conversion kit, which should beat the Earthway Seeder to death

3) Growing characteristics and planting requirements of the particular vegetable crop variety

- ❖ How long does the particular variety need to be tended, from germination to harvest?
- ❖ Organic mulches can shade out most weeds from 12 to 14 weeks
- ❖ Black plastic should provide cover for most weeds (barring dogs, deer, cats, children don't make holes in it) for full term
- ❖ Hand weeding can be required 4 and 5 times for many varieties over the course of a season in most weather conditions
- ❖ Direct-seeded crops, such as beds of greens or carrots, would be impossible to use with black plastic mulch, and sometimes complicate harvests when used with straw

- ❖ Transplanted crops from greenhouse starts, including peppers, melons, cucumbers, tomatoes, work nicely with either plastic or organic mulches
- ❖ We've used all three planting styles, direct seed, seeded into plastic mulch and transplanting, with fall squash; as a fledgling plant, it is fragile and requires care when transplanted

4) Labor available and resources to pay for labor, to either weed or apply mulch

As a rule of thumb, a vegetable crop grower should budget for at least one, strong adult person per acre to 1 ½ acres of production.

5) Cost and availability of fuel and fossil fuel requirements of the particular weeding method

This is one of the major reasons we've been turning more and more to switch grass mulch

**Mulch Field Trials, Comparison and Experience
at Scotch Hill Farm in Brodhead, Wis.**

Our SARE producer grants compared oat, wheat and switch grass straw mulch in 2009 and 2010 and are now exploring ways to efficiently employ these mulches in rolled round bales of different sizes. We are especially grateful to Dr. Jim Stute, UW Rock County Extension Service agent, and Brian Buenzow of the Wisconsin DNR in Rock County, for collaborating with us in these projects. Following are our some findings from our work together, as well as observations we've made about weeding as CSA growers of 18 years.

Black Plastic Mulch Drawbacks

- Contributes nothing to the soil during use.
- Difficult and time-consuming to completely remove from fields after use.
- May leach chemicals into the environment.
- May eventually have no place for disposal.
- Adds landfill fees to other production costs.

Biodegradable Mulch Alternative

Research stations in the South, Midwest and West are experimenting with many types of biodegradable mulches, including paper with vegetable oil coatings.

- Organic certifiers have been barring their use because of GMOs and chemical leaching concerns.
- They also breakdown (16 weeks or less) from weather before longer-term vegetable crops have matured.

Small Grains Straw Mulch Alternative Pros and Cons

- Contribute organic matter to the soil, breaking down as they impede weeds and returning minerals to the soil.
- Improve soil tilth and fertility.
- At right density, hold up longer than biodegradable manufactured mulches.
- Help diversify income and provide a break in vegetable crop rotations in an organic system.
- Volunteer seeds compete with vegetables for nutrients and moisture.
- May harbor rust and plant diseases and molds, especially in very wet conditions.
- May provide cover to rodents that consume vegetables and fruits.
- Planting and harvest schedules conflict somewhat with vegetable crop production.

Prairie Grass Straw Mulch Alternative Pros and Cons

- Requires no soil amendments or fertilizers to establish.
- Has even greater soil building potential than small grains straw.
- Holds up as well or better than small grains straw mulch under high foot traffic.
- In early trials, does not appear to host plant diseases.
- Can provide cover to chipmunks, field mice and moles that eat vegetables and fruits.
- As a perennial crop, takes 2 to 3 years to establish.
- With controlled burns and periodic mowing, can provide a source of straw for 10 years or more, reducing fuel costs of annual small grains establishment.

- Helps spread labor better than small grains, with a November harvest after regular vegetable season.
- As a perennial crop in an organic rotation (recommended minimum 6 years), it may tie up acreage needed to break plant disease and pest cycles in vegetable crops.

Other Income Streams from Prairie Grass Mulch

- Seed valued periodically for conservation and native species establishment.
- Being researched as bio-fuel and alternative, renewable energy sources.
- Attracts and provides cover for wildlife and hunting fees.
- Can be sold for livestock bedding and as mulch for urban gardens production.

Establishing Prairie Grass or Switch Grass Fields

- Wild, native species and more conventional seed types exist (an important consideration if the grower expects to have the seed harvested and marketed).
- Seeds are lighter than oats and wheat, requiring a special seed drill (Truax 812, for instance)
- Field preparation is otherwise very similar to small grains planting.
- Burning switch grass in fall cuts competition from other species, enhances vigor and cellulosic qualities of prairie grass, cutting need for herbicides.

2009 – 2010 Comparative Field Trial at Scotch Hill

- Used all three types of straw mulch (oat, wheat and switch grass) over the two years, noting differences, strengths and drawbacks in beds and plantings of garlic, broccoli, snow peas, cauliflower, tomatoes, cabbage, melons, cucumbers, squash, sweet potatoes and three varieties of beans.
- Conducted comparison field trial with UW Rock County Extension field crop agent and soil scientist Jim Stute with tomatoes and Brussels Sprouts.
- Switch grass' chemical composition made it more readily available to plants in subsequent plantings, after its incorporation into the soil, since it proved closer to the carbon – nitrogen ratio necessary for microbial breakdown.
- All three mulch types were equally effective in delaying the emergence of weeds.
- Switch grass seemed to host no plant disease, though some plant disease was detected in both the oat and wheat straw.

From SARE Producer Grant Project 2008 to 2010 (report and PowerPoint used in National Small Farm Conference held in Columbia, MO, in November 2011 should be still available on SARE's website)

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