

Organic Strawberry Production

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As with any crop, producing strawberries organically entails a systems approach to the whole farm rather than just substituting approved organic materials for synthetic materials. Of course, many practices are the same in organic and conventional strawberry production, but the fundamental approach to soil husbandry and pest management may be quite different. Successful organic strawberry production depends on building a biologically active soil with good structure and reservoirs of nutrients, and ridding the site of weeds and soil borne pests BEFORE strawberries are planted. After that, managing a successful organic strawberry farm depends on crop rotation to distant fields, with cover crops maintaining soil health and fertility and preventing build-up of weeds and pests. Some conventional systems can maintain strawberry beds for five or more years, controlling weeds, diseases and insects with chemicals, but organic growers rely on crop rotation.

I will discuss the differences between organic and conventional farm-scale strawberry production of June-bearing varieties in a perennial matted row system. There are day-neutral varieties that produce strawberries in the fall, and many other production systems such as annual beds, raised bed plasticulture or ribbon row, but the matted row is still the most common system in the Northeast for early summer berries.

Preparing the Soil

Strawberries will grow on most soil types, but very sandy soil may lead to problems with drought, and heavy, clay soils with poor drainage may lead to disease problems, such as red stele. Strawberries do best in soil that is high in organic matter and fertility, well-drained yet able to hold a continuous supply of moisture; and has a pH of 5.7 to 6. Since in an organic system it is difficult to quickly correct crop nutrient deficiencies, soil amendments are added well before strawberries are planted. Organic growers create a farm system where soil structure, cation exchange capacity (CEC) and reservoirs of plant nutrients are built, and then the soil supports the crop. Growers should begin improving the soil at least a year before planting.

Preparing the field well in advance is also crucial to getting rid of pests and weeds for the same reason; in an organic system it is impossible to do this after planting. Once strawberry plants send out runners and form the matted row, organic growers can control weeds only by pulling them by hand. Since weeds can quickly outcompete and take over a strawberry field, a field must be free of weeds and have a reduced weed seed bank BEFORE crops are planted. Pests such as grubs (larvae of June beetles, Japanese beetles and others) that live happily under sod are another reason to prepare a field well before strawberry production. Organic growers starve grubs and other pests by getting rid of sod at least a year before planting strawberries.

Preparing New Land (Pastures, Fields, etc.) or Fields in Weedy Condition

One could prepare sod ground for berries by:

- 1) plowing in late summer (a year and a half before planting berry plants);
- 2) testing soil and applying the recommended amount of lime;
- 3) planting a winter cover crop in early September. Winter rye works well for growers with a tractor implement; annual ryegrass or oats, both of which are winterkilled, are recommended for growers working with a tiller or by hand.
- 4) The following spring, till in the fall cover crop and add recommended amounts of rock powders, such as Sul-Po-Mag for magnesium and potassium, and rock phosphate for phosphorus. (See MOFGA Fact Sheet #1 for details on reading soil test results and meeting nutrient needs with natural amendments; and MOFGA Fact Sheet # 11 for natural sources of crop nutrients. Fact sheets are available at www.mofga.org.) Also, this is an ideal time to add manure or compost. Common rates of manure applications are 5 to 8 tons per acre of poultry or rabbit manure, or 10 to 15 tons per acre of cow manure. If you use poultry manure, use less lime and rock phosphate; poultry manure will supply approximately 15 pounds of phosphorus per ton. Common rates of compost applications are 10-25 tons per acre and should not exceed 50 tons per acre because of environmental concerns.
- 5) Plant another green manure crop or series of crops the year before planting berries.

The choice of green manure depends on many factors, such as your major goal. Usually, when trying to condition sod ground for strawberry production, the primary concern is weed control.

The following is a good plan in most cases:

- a) In the spring, plant oats;
- b) Plow oats under in early summer. Plant sorghum-sudangrass if you use tractor implements, buckwheat if you use a tiller or turn by hand;
- c) Plow the summer crop under in late August or very early September and plant a cover crop of oats for the fall and winter.

If your land is really weedy, be much more aggressive in getting rid of perennials such as quackgrass, and depleting the seed bank of annual weeds. (See MOFGA Fact Sheet #10 on using a series of green manures alternating with fallow periods to get weeds under control. You must do this BEFORE you plant the berries, and again during crop rotations.)

- 6) Plow under oats as early as possible in the spring, wait a few weeks, cultivate and plant strawberries.

Varieties

The choice of strawberry varieties is based on factors including taste, use of berry, yield, winter hardiness, disease resistance, and ripening date. A few things to especially consider when choosing strawberry varieties for organic systems are competitiveness and taste. A variety that puts out lots of runners and creates a thick bed competes better with weeds and since in organic systems that is among the few tools you have it is important. Customers at PYO operations

whether they be organic or conventional are probably there for the freshness of the product and the experience, however consumers of organic food tend to value taste above many other features of fruit.

The University of Maine Cooperative Extension Bulletin #2184, "*Strawberry Varieties for Maine*," describes most of the varieties suitable for New England and is available from your local Extension office and at:

www.umext.maine.edu/onlinepubs/htmpubs/2184.htm.

Fertility

As mentioned, for the most part fertility is established before planting and is based on soil testing. The practices and materials used for building soil fertility for strawberry production is no different than for other crops. For a discussion of these see MOFGA fact sheets #1 and #11. However there is one characteristic somewhat unique to strawberries. Since June-bearing strawberries set buds for the following year's fruit in the fall, adequate available fertility, especially of nitrogen (N), is crucial then. In an organic system, to get good bud set N fertilizers are applied in mid summer before the bearing year, so that organic fertilizers have enough time to break down and become available by early fall. A common practice is to apply enough high-N materials (e.g. fish meals, seed meals or alfalfa meal) to supply 30 pounds of actual N per acre. Compost can be used as a supplement and serves well to condition the soil and balance nutrients but may not provide enough available N at the time needed. An inch of compost and the appropriate amount of a high-N organic material spread directly over the rows in mid August is recommended.

Renovate or Rotate?

Conventional growers renovate their fields after harvest. Within a week after harvest they mow the old foliage to 1 inch above the crown and narrow the rows to 10 to 12 inches with rotary tilling multiple head cultivators or tillers. This practice is questionable for organic growers, because without herbicides, weeds often compete better and take over when released from the shade of the strawberry foliage. Organic growers may be better off not mowing and just narrowing the rows and fertilizing at this time.

Better yet, growers with enough land may profit most when strawberries are picked for only one year and then the field is rotated. Growers have to decide what works best for them, but organic growers will probably never be able to harvest for more than two years from a field before weed and pest management is lost.

Crop Rotation

Crop rotation is the best tool organic growers have against insects, diseases and weeds. As soon as the crop is harvested, plow the land. Deciding what to do next depends on which problem is the worst. Learn the biology of the weeds and pests that have become major problems during strawberry production and practice a crop rotation that interrupts their success best. If no problem has gotten out of hand, then sow green manures that will best improve the soil and reduce the need for off-farm sources of fertility.

A rotation that works well on organic strawberry farms in New England is to plow under strawberries after harvest; then bare fallow land until late August; and then plant a winter rye/hairy vetch mix. Allow that to overwinter and grow into mid-May the following year and then plow it. Bare fallow the field for two to four weeks and then plant a summer cover crop (cow peas or soybeans if a legume is desired, sorghum-sudangrass or buckwheat if not). In late August take down the summer cover crop and plant an oat cover for the fall, then plant strawberries the following spring. Keep in mind that if year after year the same rotation is followed that the weeds and pests that are favored by that rotation may become prevalent. Be flexible and devious to keep ahead of pests and weeds. Also, if you have the land, the soil will benefit and pests will suffer more with a longer rotation out of strawberries.