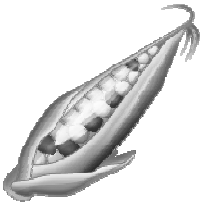

Advanced Organic Horticulture
Southeastern Extension Agent Training
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Sunflower Organic Farm
(a fictitious farm based on the real Perry-winkle Farm)
Northern Chatham County, North Carolina

Overview

Sunflower Organic Farm is a twelve acre certified organic farm selling vegetables, herbs, cut flowers, and fresh eggs from pastured hens. Merri Thompson and Marc Olson, the owners, have been farming in northern Chatham County since 1992. They have always farmed organically but were not certified until two years ago. Use of sustainable practices such as cover crops, crop rotation, and biodiversity helps keep pests and diseases in check and enhance crop quality. They have recently acquired an additional five acres adjacent to the existing farm.

Crops

At Sunflower Organic Farm, diversity is the name of the game. Every bed is planted in a different crop - flowers often alternate with vegetables, herbs, and cover crops. Such intense diversity helps enhance the effectiveness of beneficial insects and keeps a check on diseases. They grow about 240 different varieties of vegetables and cut flowers, plus warm- and cool-season cover crops. They sell at the local farmers' markets from March through December and aim to have a diversity of crops to harvest 9-10 months of the year!

Cut flowers are one of the most profitable crops grown at the farm and they grow about 120 different varieties. They sell both growers' bunches (all of the same variety) and mixed bouquets. They sell their flowers at the farmers' markets, to restaurants, and for many special events, including weddings. Proper postharvest handling of cut flowers is extremely important and for some flowers it starts right in the field with the stripping of their lower leaves. They do 5-6 plantings of zinnias from mid-April until mid-August. The flowers are taken to the shed where they are given a couple of hours to "condition", taking up the flower solution/water until fully hydrated. Depending on the variety of flower, a specific "recipe" is used that enhances their vase life. After they are conditioned they are put into the walk-in cooler. Buckets of flowers are then taken from the cooler to the postharvest area where they are bunched, made into bouquets, and transported to market.

In early April there are beds of mulched cool-season vegetable crops including collards, broccoli, garlic, broccoli, and lettuce. The lettuce is the most valuable of these crops. Many different varieties are grown and succession planted to have lettuce on the market for as many weeks as possible before it gets too hot to grow. Composted chicken manure is the primary fertilizer source for the lettuce.

They plant nine varieties of potatoes, and some farmers' market customers have been known to brag about their red, white, and blue potato salad! They plant only double-certified (disease-free and organic) seed potatoes. Seed pieces are set in mid-March. Potatoes are a cool-season crop that need at least 3 months to mature. The potatoes are planted 9" apart with drip irrigation tape to the side. Merri hills the potatoes with a tobacco bedder in late April. Hilling is done to ensure there is enough soil above the developing potatoes that they don't push out of the hill and get exposed to light.

Spring lettuce is grown under a floating row cover. Row covers can be used to protect crops from frost and insects. They have also been used to "hide" crops from groundhogs and deer! Sugar snap peas are always a huge hit at the market! The first planting is seeded around February 1 and the second planting is seeded the first week of March. The second planting quickly catches up with the first one and can be harvested before it gets hot.

Garlic is planted in November and harvested in June-July. The field is left fallow the summer before planted. Cloves are planted in raised beds with four rows per bed. Spacing is six inches by six inches. A bareground system is used to make hoeing easier. Overhead irrigation is used. Most of the bulbs are sold as green garlic, which has a wonderful mild flavor.

Winter squash is a big favorite with their customers because they store so well. Every year they grow the varieties Waltham butternut, Table Ace acorn squash, and Delicata JS. They always use the fields located next to the woods because they take up so much space and by placing them there, they can just let them run. The plants are grown on bareground in hills planted 18 inches apart to optimize yields. All the winter squash are over-head irrigated.

About 19 different varieties of peppers are grown. They are trellised for support and top-dressed with compost. The trellis stakes are placed soon after the peppers are transplanted, then the compost is applied. As the pepper plants get larger they add the "spreaders" and string wire between them to support the plants.

Three kinds of eggplant are grown. The classic Italian type, the slender Asian types, and the small Thai types. The eggplants are grown from transplants set in early spring. They are mulched with straw and drip irrigated.

Cover Crops

Cover crops play a vital role at Sunflower Organic Farm. They improve soil quality, provide nutrients, prevent erosion, moderate soil temperatures, conserve moisture, and help control insect, weed, and disease problems. Tomato crops benefit from a thick layer of mulch grown in place as a rye cover crop from fall to early spring. They do not import straw mulch from off-farm for fear of weed seeds. Rye is allelopathic - as it decomposes, it releases a compound into the soil that prevents small weed seeds from germinating. It also adds organic matter to the soil and acts as a windbreak for tender crops. Snap beans are direct seeded between the rows of rye in late April. Within a month, the cover crop has been mowed down and the beans have filled the row. Merri and Marc are partial to a rye, vetch, and crimson clover cover crop mix. This is a great mixture because the vetch is a legume that loves to climb and uses the rye for support.

Transplant Production

Most vegetables at Sunflower Organic Farm are transplanted except for beans, okra, carrots, beets, and salad greens which are direct-seeded. The majority of the flowers are also transplanted, except for zinnias and sunflowers. With the help of a compost tumbler, they mix their own special blend of potting mix. They augment a commercial soilless mix with vermicompost, rock phosphate, and bloodmeal for their transplant mix. All the transplants are grown in a passive solar greenhouse constructed from Hebel block - aerated autoclaved concrete that is very strong and lightweight with excellent insulating properties. No supplemental heat is needed, even during the winter when day-time interior temperatures can reach in the 80s on a sunny day. At night the greenhouse keeps temperatures above freezing. Summer interior temperatures can be kept comparable to the outdoors by opening vents in and over the doors and with a series of vents across the front of the house at bench height. The roof and glass sides of the greenhouse were oriented so that the low angle of the winter sun would fully penetrate the interior. In summer, the house is kept cooler since the high angle of the sun does not reach all the way into the interior. Winstrip

flats are used for growing seedlings such as these tomatoes and leeks because they are durable and last many years. Vermiculite is sprinkled on top of the seeded flats to cover the seed for germination. Vermiculite helps prevent the soil surface from staying too wet and helps combat algae growth and damping-off disease.

A cold frame on the south side of the greenhouse is used for hardening off transplants before going to the field. It provides a transition zone between the greenhouse and the "real world" conditions of the field. The plastic is rolled up in the daytime to give the plants maximum sun exposure and rolled down at night to protect the plants from the cold temperatures in spring. Plants normally spend at least a week in the cold frame before being planted in the field.

Flats of transplants are set into the sink to soak in a fish emulsion fertilizer prior to planting in the field. The fish emulsion provides a nice boost of nitrogen to the plants to give them a head-start after planting. Each flat soaks until fully saturated, ensuring that the transplants are well-watered before planting.

Fertilization

Every crop gets a customized nutrient management plan based on soil test recommendations. They do soil tests once a year in the fall for each different crop. Only natural fertilizers are used, including rock phosphate, K-mag, feathermeal, and gypsum.

Pest Control

Because no synthetic pesticides are used at Sunflower Organic Farm, they have a large and diverse population of beneficial insects, both in the field and in the greenhouse. For example, the parasitic *Aphidius* wasp is a natural enemy of pest aphids which damage crops. The adult wasp lays its egg inside the live aphid, then the wasp larva hatches and consumes the aphid. The wasp pupates inside the dead aphid, finally cutting an exit hole when it has completed its life cycle and emerges from the aphid's carcass. Pretty cool, huh?

Weed Control

Scuffle hoes are used to weed broccoli. They use several types of hoes at the farm, depending on the crop and the weeds.

Merri mulches leeks with leaves from the Carrboro municipal compost operation - a free source of great mulch! Leaf mulch is used on *Brassica* and *Allium* crops. Mulch helps control diseases, protects the soil, suppresses weeds, conserves moisture, and moderates soil temperatures.

Poultry

Merri and Marc integrated pastured poultry onto their farm in 2004. The laying hens help control insect pests and weeds and provide valuable nutrients for crops. They recognized the value of animal manure but didn't want to import manure from off-farm. Fresh eggs are always in demand at the farmers' markets and provide supplemental income. They constructed two egg-mobiles, or moveable hen houses. The hens are closed inside at night for protection from predators and allowed to roam during the day inside a large fenced enclosure. Predators include (but aren't limited to!) stray dogs, foxes, possums, snakes, and raptors. The hens act as gleaners - they are pastured in an area that was recently harvested so they can forage for insects, seeds, and weeds. They can also be pastured on cover crops. Portable fencing keeps them confined to the area. They use electric poultry netting for their fence but they don't electrify it. The birds rarely attempt to get out, probably because they realize how good they have it! The chickens are rotated to new "pasture" every few weeks. It takes about 45 minutes to move the egg-mobile with the tractor and set up the new fencing. Marc gives the hens antibiotic-free feed from a local mill to supplement their diet. The hens lay about 5 eggs a week per hen. Eggs are harvested year-round, although production slows in winter. The eggs are cleaned before going to market. All the hens are

heirloom breeds such as Black Austrolope, Buff Orphington, Barred Rock, and Rhode Island Red. These breeds are well-suited for foraging outdoors.

Post Harvest Handling
Once vegetables and flowers are harvested, all efforts go towards preserving their quality through proper postharvest handling practices. Each crop has its own unique requirements, but the first step is usually to remove the field heat. They use an old refrigerated truck as their walk-in cooler.

Labor
The farm employs 3-5 part-time farm workers throughout the season. Several volunteer farm workers also assist throughout the season. These are usually people who want a rural farm experience. They get paid in veggies and flowers!

Marketing
Sunflower Organic Farm direct markets the majority of their farm products. They sell at three farmers' markets every week: Tuesdays at Fearrington, and Wednesdays and Saturdays at Carrboro. The markets are all under the umbrella of a local farmers' market association.

Networking
Sunflower Organic Farm has collaborated with Cooperative Extension on on-farm research projects as well as a cut flower farmer mentoring program. They often participate in farm tours, hosting various groups of both farmers and non-farmers who are interested in learning more about local agriculture.

The Assignment

The agents will be assigned to be in one of the following Topic Teams. Their job will be to work as a group to come up with a solution for the problem presented to each group. Throughout the training, individuals should keep their assigned problem in mind to try to come up with appropriate answers. There will be time periods scheduled when the teams can meet and compile a unified answer. A member of each team should be selected to present that answer within a 15 minute period at the end of the training.

Topic Teams and Their Assigned Problems:

Soil Fertility: There is something wrong with the lettuce fertility program. Initially, the plants looked stunted and nitrogen deficient. They came out of that, but now the plants have a purple cast to them. The plants are just two weeks from harvest. What can they do?

Weed Management: Profitability on garlic is marginal because of how much money is spent on labor to keep it weeded. If they let the weeds grow, bulb size is reduced and loss due to bulb rot increases. How can they reduce the amount of hoeing that must be done to keep bulb size up and rot rate down?

Insect Management: Flea beetles devastate the eggplant foliage almost every year. Sometimes it is so bad they have to replant. Other times the foliage is so damaged, yields are greatly reduced. What can they do to prevent this next year?

Disease Management : Downy and Powdery Mildew are having devastating effects on their winter squash. Is there anything they can do to stop or slow the progression of those diseases now? And what can they do to prevent the problems in future years?

Certification: The farm has just obtained an additional five acres of land, but it was in conventional tobacco production last year. Since the rest of the farm is certified organic, can they follow organic practices on the new land and call it organic? If not, do they have to keep the produce grown on that land separate from their other produce while the land goes through the transition phase?

Marketing: In the past year, many more farmers, especially "hobby farmers" have shown up at the farmers' markets. Although competition is good, these new people are bringing large volumes of produce on the market and selling them for prices that have to be below production costs. This is causing a big drop in income for Sunflower Organic Farm. They need to come up with some new plans for next year. Should they bring this issue up in front of the farmers' market association? Should they reduce their dependence on the farmers' markets and find other ways to sell?

Cover Crops: Merri and Marc have relied on the same cover crop mix, rye, crimson clover and vetch, for a very long time and think it is time to make some changes. Are there some other cover crop systems they can use to help with weed control and that would be more suitable for direct seeded small seeded crops?

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