

ORGANIC STRAWBERRIES AT PLEASANT VALLEY FARM – DEC 2007

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We have been growing seven acres of highly diversified organic vegetables, tree fruits and small fruits on our farm since 1989. Everything we produce on the farm is grown according to the organic standards and is certified through “Certified Naturally Grown.” We direct market all of our crops at three local farmers' markets each week May 1st to about November 20th, and to two winter markets that operate all winter. Our farming business has given our family of four our sole source of income for 15 years. Located about one hour north of Albany, our frost-free period on the farm is approximately May 31 to September 30 in Zone 4.

Annual Bed vs. Matted Row Systems:

Since 1997, we have been experimenting with the annual bed system of strawberry production, patterned after the California plasticulture system. We got our start by working with Dr. Joe Fiola of Rutgers University in New Jersey. At that time, it was unknown whether this system would work as far North as we are. The matted row system had been our dominant system for our first 11 years of farming; however the comparison of the two systems shows that the annual bed system is superior for our situation for several reasons:

1. Fall Planted – The strawberry plugs are planted the first or second week of September in our area, which allows efficient use of our land. A cover crop or even two cash crops (such as spinach and beans) can be grown on the same land before the strawberries are planted. In the matted row system, the strawberries are planted in the spring and the land is tied up for a whole year without any income generated from it. In addition, money is spent on labor to pick blossoms, weed, and control runners for that entire first year with the matted row system.
2. Annual System – The entire bed is turned under after harvest, leaving a richer soil high in organic matter due to the addition of straw and grass mulch.
3. Another cash crop can then be planted on this ground such as fall lettuce (or an early cover crop), that could provide additional income that same year, thus increasing the overall efficiency of that acreage.
4. The annual system also allows for good rotations to keep strawberry insect and disease cycles in check.
5. Gray Mold – The open nature of this type of planting allows for good air circulation and keeps gray mold to an absolute minimum with no fungicides necessary even during a wet year like we experienced in 2000.
6. Ease of Picking – The open nature also allows for fast, labor-efficient picking of the crop, since the berries are highly visible. The Chandler variety, which we have experience with, produces larger berries throughout the picking season.
7. High Yielding – The annual bed system gives consistent high yields per acre over a 3-4 week picking season.

Production Procedures for the Annual Bed System:

This system utilizes strawberry plugs or tips, and spring is the best time to order them to obtain the best selection of varieties and quantities. Rooted plugs are what we worked with for the first 9 years and we found them to be quite reliable in the early years, mostly getting high quality plants from the supplier. However, we have come to realize that a high quality plug makes a remarkable difference in production and several years when the summer temperatures were very hot in August greenhouses in New Jersey (where we got them from), then the plugs came very stressed and many did not survive or were not as vigorous. When we ordered plugs, we asked for a shipping date for the first week of September. One year we experimented with a planting date during the last week of August, and we found it to be a problem. The strawberry plants sent runners out from the main plant and since the plants' main focus is to establish bushy plants with multiple crowns in the fall, the runners would take energy away from the plants. This experimentation of planting earlier was a result of some concern for the strawberry plants not having sufficient time in the fall to make enough crowns in our region (zone 4); as time has gone by this concern was unfounded. Due to weather conditions many years ago, the plugs were not planted until the third week of September and the production was not quite as high, but recent autumns have been exceptionally warm, so planting later has not caused any problems.

In 2006, we experimented with growing our own tips, both from our own plants cut in July and also using some purchased from a grower in North Carolina. All the tips in 2006 did very well, no matter the source. In 2007, we again purchased about ½ our tips from the same grower and cut the other ½ from our own plants. The shipped tips came to us in relatively poor condition due to very hot weather during shipping and the grower replaced many of them. We were amazed at the higher quality and faster rooting of the tips from our own plants, however, we want to be cautious concerning possible disease issues when using our own plants.

The tips are taken from the ends of the runners about July 25th and should have little or no roots on them; we like to leave about ½ to 1 inch of the stem on each tip which helps secure the tip into the soil. After clipping the tips, they are immediately dipped in T-22 (a biological fungicide we purchase from Johnny's Selected Seeds) and stuck into the 50 cell trays which have been filled with our standard potting soil mix. The trays are placed on our benches in the greenhouse and we have a misting system over them. The mister is timed to run for 10 seconds every 20 minutes for approximately 2 to 3 weeks. The misters are shut off during the nights and on cloudy days. We did grow some trial tips in 2006 without the misting system, and had a worker mist them by hand every hour for days, but the results were not as good, and the mister was a great investment for quality and labor savings. After the tips are rooted well, normal watering (only mornings) is continued until the tips are 5-6 weeks old and ready to plant outside.

To prepare the ground for our berries, we deviate from the norm and do not apply black plastic to the ground, even though the experts say it is necessary for the success with this system. Instead we hill rows 4 feet apart with our potato hilling equipment (16" disks) and apply a generous amount (4-6") of weed-free straw or hay to cover the whole area. The straw, grown by a local farmer for us, is cut prior to pollination to assure it is clean. If we use hay, we chop our own hay fields (second cutting) when there are no seeds at all. The equipment we use is a Gehl flail

chopper and a self-unloading forage wagon or regular wagon we unload by hand. The mulch helps to suppress weeds, conserve moisture, add organic matter, and produce clean fruit for the customers. We hand plant the plugs on these hills directly through the straw. Each hill has a staggered double row with in-row spacing 12" apart, with the resulting double row being 8-10" apart. Based on soil tests, nutrients are added as necessary at pre-plant and we put about one cup of a disease-suppressive compost in the hole for each plug as we plant. Many of our fields have high levels of soil organic matter and nutrients, and Nitrogen in the form of organic soybean meal is usually the only amendment necessary (except for compost). Fall irrigation is essential during dry conditions to establish the plugs and give optimum growth for formation of multiple crowns.

When night temperatures start to go down to the 40's, a floating row cover (P19 weight) is applied over the field. In past years, we removed the rowcovers in late November before the first snows and applied 4 tons/acre of clean straw. Any material other than straw, such as hay or leaves, used for winter cover could smother the plants. In March, when the straw is no longer frozen to the plants, it is raked into the paths by hand and row cover is re-applied. Over the past five years, we have trialed leaving the rowcover on all winter and not applying straw. The yields with this trial system are equal to or higher than with our old system, however there could be some concern if there is a very cold winter with no snow cover.

Leaf tissue analysis in the early spring could be done to determine what nutrients should be applied for optimum production. Plants tend to flower about one week earlier in this system compared to matted row plants, so it is important to check for blossoms weekly in April. We take the row cover off when we see 10% bloom. Another benefit of rowcovers is the exclusion of any bugs until the last moment. We use overhead irrigation or row cover (sometimes multiple layers) to protect the buds and blossoms from frost, with row covers being our preference due to not wanting to add excess water. The strawberry picking season can sometimes begin a week earlier also, typically the last week of May.

Yields and Data:

Our simple records of harvest production show that the average yield over the past 11 years using the variety Chandler has been approximately 8,000 pounds per acre. Even with very adverse weather conditions and a very wet spring, the 2000 crop still produced about 3,000 pounds per acre more than the matted row during that year (we planted half of each system that year). The average yields in southern New Jersey are 12-15,000 lb. /acre, with the top growers achieving yields of 25-28,000 lb. /acre in an ideal situation. Direct marketing our organic berries at farmers' markets for \$3.00 per pint extrapolates out to a value of about \$36,000 per acre on an average year. With standard planting densities of 17,400 plugs/acre at an approximate cost of \$2600/acre for plugs, the return is well justified when considering the initial investment. Using tips, which are only 10 cents each, cuts the cost way down. In 2003, we planted about 3200 plants which took up an area that was 115' x 150', which is 6,900 square feet. Therefore, $6900/43560 = .158$ acre is the total acreage planted. Our gross income from the strawberries was \$5,367, which works out to \$1.68 per plug and the price of each plug was 22 cents. Also, using the calculation: $\$5367/.158\text{acre} = \$33,968$ shows that the extrapolated value that year per acre is almost \$34,000. Similarly, in 2004, we had .11 acre of strawberries, but due to clippers (new pest for us), yields were down to 7900#/acre with a value of \$28,700 per acre; they were still

quite profitable for us. In 2007, we had a great yield of almost 2000# on 1.3 acres, which extrapolated out to 15,200 pounds to the acre and almost \$43,000 per acre; we picked almost 2000 pints and sold them for \$3.00 to \$3.50 per pint and had a gross income of \$5536 on them!

Diversity of Systems and Supplier:

This strawberry production system can be utilized in many areas of the United States and due to the vast diversity of climates there are also numerous planting methods. Each grower can use his own unique style and equipment to customize for his individual growing conditions. It should be noted that in many areas, the plugs send runners out in the fall and they are typically clipped (by hand) to produce higher quality, multiple-crowned plants. Also, some growers renovate the beds after harvesting is completed by mowing the beds and trimming everything back to the original plants; therefore the original bed can produce for 2 or 3 years. Research needs to be continued for the various production methods to determine the techniques promoting optimum production. Now that there is reliable biodegradable black plastic mulch, we may experiment with that over the hills, leaving straw between the hills and see if yields increase. There are many different varieties now available and new ones are being produced each year. We are by no means experts in this strawberry system and we would suggest anyone wanting further information should contact a plug/tip producer. Jersey Asparagus Farms (Walker Farms) in Pittsgrove, NJ is the company we have been working with and our tips were purchased from McNeil Farms. Walker Farms can be reached by phone at 856-358-2548 or email at: jafarms@jnlk.com and McNeil Farms at 919-499-9706 or skmcneill@alltel.net (Steve is the contact). Many other sources are available and can be found through the internet.

Summary

The annual bed system has proved to work very well for us and has allowed us to utilize our land more efficiently and increase our per acre productivity. Our success with this system has been partly based on our attention to details and our soil management. Only healthy soil with a healthy soil food web can support multiple cropping like we do on several of our fields, and, at the same time, produce consistent, high-quality products. Some excellent information on the importance of organic matter and soil health can be found in the Spring 2000 issue of Northland Berry News in: "Growing Strawberries From the Ground Up" by D.M. Fulks. The record keeping system on harvest production used on our farm is uncomplicated yet is sufficient to provide the information needed to determine the viability of each crop and keep our farm profitable. Strawberries are only one of over 50 different crops we produce and we strive to have consistent production each year for our customers. This high-density production system gives us that ability as well as many other advantages. The popularity of this system is increasing and we will continue to take part in the research to obtain even higher profits on strawberries.