

1. Planting Strawberries & Blueberries Into Oats/White Clover
FNE01-392

2. The goals of Green Heron Farm's project included using winterkill oats to nurse a substantial planting of dutch white clover. Overall, this allowed us to prepare our plots as desired, with living/non-living mulch. In early May 2001, we planted a total of 1/2 acre strawberries and 1 1/2 acres blueberries. The purpose in choosing strawberries was in order to establish a bond with the surrounding community, through PYO production. This has become increasingly important as to date we have no interaction with the public, due to the fact that we currently sell our vegetables wholesale, mainly to the Boston area. Strawberries seemed like a good choice - they are perennial and can do well on hilly terrain as well as prevent erosion. Similarly, our decision to grow blueberries seemed strong, as they are a popular permaculture, sure to draw people to PYO. In terms of organic production, they are grown with relative ease and effect. To state it simply, Green Heron is a 100% organic farm looking to supplement our marginal existence. Planting strawberries & blueberries into oats/white clover is an experiment specific to our farm. The use of oats/white clover is to eliminate, or greatly reduce weed populations. This is vital, as we are commercial farmers with no time to spare during the growing season. The planting of these berries seems a natural step towards successful diversification.
3. Since receiving a SARE grower grant in February 2001, Green Heron farm has undergone little physical change. To recall our place on the earth, the farm consists of a total 98 acres (8 acres rented.) 38 acres prime river bottom, 15 acres stone-free upland, and 45 acres forest/wetland. During the 2001 growing season, as in years past, we continued growing primarily on the river bottom. The singularly noteworthy difference of this past season was that we did not employ any laborers. In spite of our efforts, annual gross sales remained in the 70,000-dollar range. Even with this sizable figure our profit by years end remained meager. Given our economic results, I plan to hire help again next year, (in order to produce larger volume.) Establishing an organic vegetable farm from the ground up has proven to be a great challenge.
4. Outside of Kate Ritz and myself, we had no collaborators.
5. The premise of my project was to see if strawberries & blueberries would thrive when planted into oats/white clover. My proposal and the actual course of events did in fact vary, however, I am confident that the core of my ideas were accurately tested. As detailed in my grant proposal, on August 5, 2000 winterkill oats were sowed at 100-150lbs/ acre on two plots totaling 12/3 acre. Ten days later, on August 15 dutch white clover was broadcast with an "earthway" hand seeder at 10-15lbs/ acre among the existing 4-inch oats. By winter the oats had reached a height of two feet. At this point, we had only to wait for spring's arrival, assuming to find a vigorous stand of clover mixed in a non-living cover of oats. This assumption presented our project with its first unforeseen problem. Unlike our hypothesis predicted, in April of 2001, we

observed variable oat coverage on our blueberry site and sparse white clover on both the strawberry & blueberry sites. With this and a sense of urgency, on April 16 we purchased a 25lb bag of dutch white clover. That same day we replanted our strawberry site, specifically, 15lbs/ acre. Again we used the "earthway" hand seeder set to broadcast light, and applied while jogging up and down the plot. Fortunately, our late amendment turned out and by late April a strong stand of white clover had begun growing. We picked up our strawberries & blueberries on May 1, from Nourse Farm, located in South Deerfield, Ma.

On May 4th we began planting the strawberries. Save our late site amendments, the course of executing the strawberry portion of our project closely followed its designs according to our grant proposal. We defined 30 rows parallel to Magoon Road with the use of our cultivating tractor and a pair of 's' tines set at 36 inches apart. We selected three varieties of strawberry; from the road we planted early mid-season Honeoye, mid-season Allstar, and later season Sparkle. Of each variety we planted 1000 roots, consuming 10 rows apiece. In the row, the strawberries were planted at 1 1/2-2 foot intervals. Managing our strawberry field throughout the season quickly became evident as unforeseen. Although we had expected the need to implement a lawnmower between the rows, we had not expected the battle that ensued. By late May, it became clear the clover was thriving, thereby demanding our attention. After a futile attempt using our gas push mower, we opted to employ our neighbor and his riding lawnmower. This was essentially our only choice, as we were now engaged headlong in vegetable production. This service was performed weekly throughout the season, at a cost of 17 dollars/hour. In conclusion to the actual events of our project, we met with unexpected site preparedness, as well as unforeseen mowing.

We planted our blueberries on May 3rd & 4th. Our site had less oats/white clover than desired, and we had not yet reseeded the white clover. To describe our site, it had 50% matted oats and 25% white clover. In any event, upon considering the amount of time hand planting 1000 blueberries would consume, necessity prompted us to implement a device in order to eliminate digging 1000 holes. On the morning of May 3rd I altered a three-bottom plow to suit our needs. Removing the plow plate and eliminating two shanks left us with one shank capable of deeply scoring the earth in set rows. With this, we quickly prepared seven rows twelve feet apart. In alternating rows, at intervals of 4 feet we planted two varieties of blueberry: Blueray and Patriot. The actual dormant bare root plants looked strong and healthy, each one having at least an 8-inch root ball, with one or more shoots of at least 2-foot height. Both Blueray and Patriot are renown for their winter hardiness and both grow to 4-6 feet, producing powder blue sweet berries and large, dark blue berries respectively. Returning to the course of our project, we next happened upon a new miscalculation. It became evident half way through planting our blueberry plot that we had received more plants than our given plot could accept. Fortunately, we had an additional piece of land

characteristically similar to our original - plot A. Let this previously unmentioned area be known as plot B. Located 500 yards from plot A on the upland, plot B was cover cropped in 1999 with oats/white clover, and unused up to this time. Plot B, in early May 2001, was an established clover field, having 100% living ground cover. We planted the remainder of our blueberries here in six rows, using the same methods and dimensions described for plot A. The additional blueberry plot increased our total / foreseen acreage to 11/2 acres at completion. The next unexpected surprise came in mid-May, effecting plot A. As if overnight, a menacing population of brassica weeds (not wild radish) had invaded our blueberry plot. These weeds grew quickly, and quickly our site looked less like a blueberry patch and more like a sea of the brassica's yellow flowers. At this, I opted to do what I have always done in such predicaments - on May 10 I tilled the ground between the rows. After this, dutch white clover was sowed at 10-lbs/ acre. Having described the unexpected events we came to, I have elected to include the following list detailing the course of our project.

<u>DATE</u>	<u>ACTIVITY</u>	man hrs.	tractor Hrs.	mower hrs.
8/5, 8/15/00	planting oats/white clover on plots	2	2	
4/16/01	reseed Clover on strawberry plot	½		
5/1/01	pick up berries	12		
5/3/01	plant blueberries (w/one hired helper) + plow altering	16	1	
5/4/01	finish planting blueberries, begin strawberries	16	1/2	
5/5/01	finish planting strawberries	16		
5/6/01	hand water/drip irrigation on blueberry plot A	6		
5/10/01	attempt mowing strawberries shallow rotovation between blueberries and reseeded clover on plot A	1		1
5/14/01	compost/mulch on blueberry plot A	12	6	
5/26/01	neighbor/riding mower service begin	1		1
6/3-9/18	total riding mower hours on strawberry plot throughout summer	14		14
5/27/01	compost/mulch on blueberry plot B	12	6	
6/27/01	riding mower between rows- blueberry plot B	2		2
7/12/01	" " " " " plot A	2		2
7/27/01	" " " " " plot B	2		2
7/26-7/28	hand mow between blueberry plants in plot B	10		10
8/1-8/3	" " " " " plot A	10		10
8/2/01	brush-hog ragweeds on strawberries	45 min.	45min.	
8/15-8/19	handmow between blueberry plants			

	in plot B	10	10
8/25-8/29	" " " " " plot B	10	10
8/25/01	brush-hog ragweeds on strawberries	45 min.	45min.

Total man-hours: 164

Total tractor hrs: 18

Total mower hrs: 62

6. Our observations, accomplishments and results in planting strawberries & blueberries into Oats/white clover were flanked with both success and failure. To begin with the strawberry field, initial observations in mid May were positive, the berries were putting forth their leaves and the white clover was thriving. As previously mentioned, by late may mowing was necessary in order to keep the clover at bay. In mid-June we observed annual weeds (predominantly ragweed) growing vigorously in row. This growing problem became a folly in our experiment. Lacking the time, energy, and help required to hand weed the rows; we took no action and simply grimaced when passing by. By late July our strawberry field resembled a nice cover crop of mowed clover supporting skinny rows of thick ragweed. Fearing the uncountable amounts of weed-seed to befall our plot along with failure across the board, drastic measures were in order. On August 2nd I employed my brush-hog, driving over the rows and cutting the massive weeds in my path. This action was certainly positive, eliminating the invasive's without destroying our strawberry plants. I repeated this practice again as needed, on august 25th. By mid-September we observed that the strawberries had put out their runners. We noticed some uncertainty in this matter, as some of the out growth seemed to be fighting the clover in order to put out roots. Also at this point it became evident that our berry plants were one quarter the size a clean cultivated one would be. With these observations we are given to conclude (for the time being) that the stand of white clover had out competed the strawberries. Hence, the clover acted as an effective barrier to weeds and hampered the growth of the strawberries.

As concerns the blueberry plots, our observations, accomplishments and results were relatively successful. After planting, watering, and applying compost and mulch, on blueberries in May, the duration of the season demanded exhausting mowing in the hot sun. Our ground coverage in the two plots consisted primarily of while clover, with other vegetation and grasses scattered in the rows. By mid-June both plots were brush-hogged between rows. Mowing in row was on quite another level. By using a large shank as the chosen method in planting, a sizable mound remained between the berries. It is ironic to think that we had created this problem out of our solution to avoid digging 1000 holes. Regardless, the task of mowing tall mixed vegetation on raised mounds in four-foot intervals with a standard push mower was trying. I suppose it is a small price to pay for a blueberry in the future. To continue along on the down side of the blueberries, in late May we observed scattered black (non-living) tips in plot A. We pruned the

affected 3-4 inch portions at the top of the plant. This same affliction was observed again recently in early winter. About 40% of the blueberries in both plots have assumed this condition. To date, we speculate the cause to be drought, a lack of supplemental sulphur, and or deer damage. This aside, the blueberry portion of our project demonstrated that it is beneficial to plant into oats/white clover. The oats/white clover is more suited to the blueberry plots than strawberry plot. The stature of the blueberry plants and their height (along with mulching) allow a strong stand of clover to flourish, without threatening the berries growth. The white clover in particular is effective for use in weed management as well as for providing the soil with added nitrogen. In addition, when compared to standard grass, it is far easier to mow.

7. The initial site conditions were different than we expected, but we were able to amend this by replanting dutch white clover. We can conclude from this site unprepared ness that dutch white clover does not germinate well when sowed August 15, but grows just fine when sowed April 16, (directly after snow melts.) However, this factor did not affect our results. In addition, conditions specific to our farm and this past growing season did not markedly affect our project.

8. The economic results of our project are non-existent to date, as we will not have PYO strawberries until this upcoming season, the blueberry plots will not be mature for at least four years.

9. The results of planting strawberries & blueberries into oats/white clover have indeed prompted us to form new ideas about our methods. To reflect first upon the strawberries, our bottom line conclusion was that the white clover had out competed the strawberry plant. With this in mind, the strawberry plot did not demonstrate a perfect solution to coincide with our theory. Much still remains to be seen with the strawberry field, and truly definitive results will come through yields and berry size this season. Even with this uncertainty, we have hope in the direction our project has gone.

The use of white clover turned out to be somewhat detrimental to our strawberries. However, we are reluctant to abandon clover altogether as it provides weed control, erosion control, and general soil conservation. New ideas in low-maintenance strawberries include modifications on our clover. Perhaps the clover should have been broadcast lighter. Maybe dutch white clover is not the best-suited variety when used among strawberry plants. We have speculated whether our chosen clover will grow closer to the ground in its second year. Also, we have not ruled out the possibility of seeing a natural dieback in the clover. The next step in our strawberry project would be to experiment with clover as our variable. However, should this lead to no satisfactory end, perhaps we might find success in altering our premise. I grew clean cultivated strawberries on river bottom soil in 1997-1999, but the weeds became unacceptable. With this prior experience and the current strawberry plot in mind, I have considered seeking a possible middle ground. Regardless, I will persist in finding a livable way to grow organic strawberries, as the future of my farm depends upon it.

The results of the blueberry portion of our project after their first season were predominantly positive. Growing blueberries in oats/white clover is an

effective, practical idea. As previously stated, white clover is beneficial to the soils and an effective weed control. Given these favorable results, nothing would be gained in changing the premise or the parts included therein. However, looking back at the course of the summer, one is left with ideas on improvement. Our site preparation was less than desirable; perhaps things would have gone more fluently had we complete oat/clover coverage from the get-go. In addition, especially given our strawberry results, I intend to mulch the blueberries heavier in the future. This will ensure the blueberries ample room to spread their roots, providing a barrier to the white clover.

10. I am certain to continue using the practice I have investigated. Growing organically means contending with a variety of factors. In the vast mix of these elements, weed management will be ever-present. The methods in which I farm aim to resolve and innovate cultivation. We will incorporate cover cropping in the future as an alternative weed control.
11. We did not participate in an outreach program, but please find a copy of an article written about our project that appeared in "The County Courier."

Dean Stockman

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