OPTIMIZING STRAWBERRY PRODUCTION WITH A REDUCED TILLAGE SYSTEM

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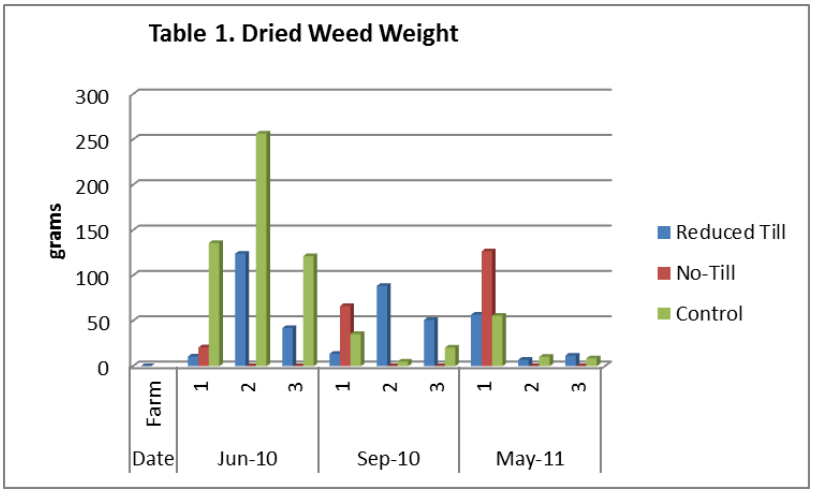
This project, supported by a NESARE Partnership grant, sought to improve weed control during the establishment year of a perennial matted row strawberry system while also reducing cultivation and herbicide inputs and improving soil health.

A recently completed (Nov. 2009), Cornell University project that focused on controlling weeds in strawberries during the establishment year by transplanting dormant berry plants into a killed cover crop showed great promise, but revealed a barrier. Most growers had difficulty planting through the cover crop. This resulted in slower establishment during the first month and possibly caused skips. Additionally, research has shown that control of weeds during the first weeks of the growing season makes the most difference to yield in a matted row system. There have also been studies that support the use of cover crops as a way to decrease incidence of plant disease.

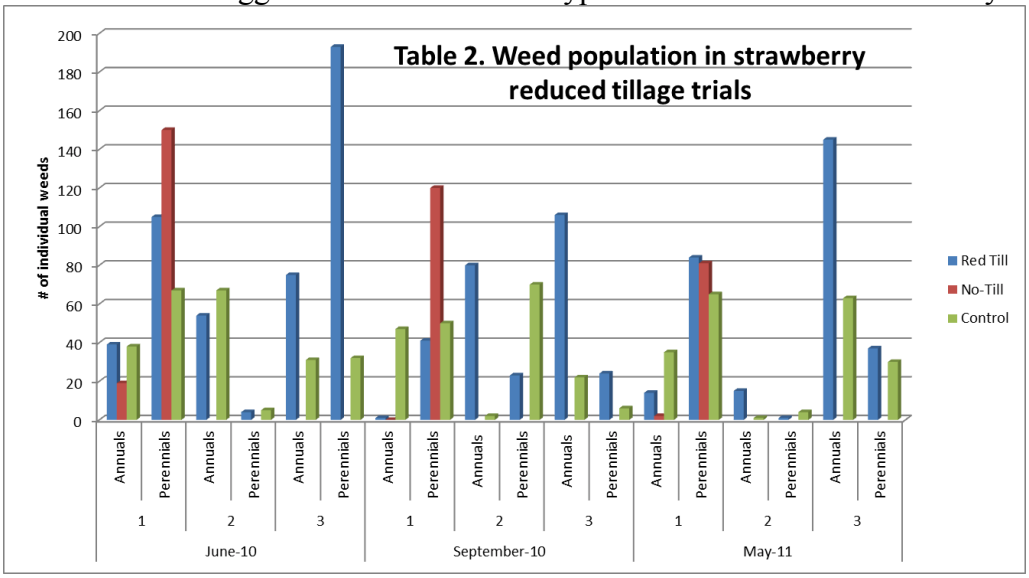
The reduced-till system uses a sub-soiler to loosen soil deeply followed by coulters and a rolling basket that prepare a 6-10" wide seedbed. This technique allows the longer rooted strawberry plant to be correctly planted while still having minimum soil disturbance between the rows. By only tilling this narrow area, the chance of new weed seeds being brought to the surface for germination is reduced. Because the strawberry plants will get off to a good start, they should out-compete weed competitors in the tilled zone. The addition of the shank allows for improved water drainage therefore reducing disease pressure from soil borne diseases like Phytophthora fruit rot. The use of reduced tillage tools usually requires a single trip across a field for it to be fitted for planting – an important advantage that translates into less labor, reduced fuel consumption and a decreased risk of soil compaction.



The results from the study were variable. In Table 1, the dried weed weight from all sampling dates on all farms is reflected. All 3 farms saw significantly larger weeds during the first month after planting in the conventionally prepared trials than for the reduced till or no-till trials. However, this does not mean that there were more weeds, rather the data in Table 2 suggests that specifically for Farm 1 and 3 that the weeds

were more numerous but much smaller in the reduced till treatment that in the conventional treatment. This may be explained because it took longer for the weeds to emerge through the killed cover crop.

Data in Table 2 suggests that numbers and types of weeds varied dramatically from farm to farm.

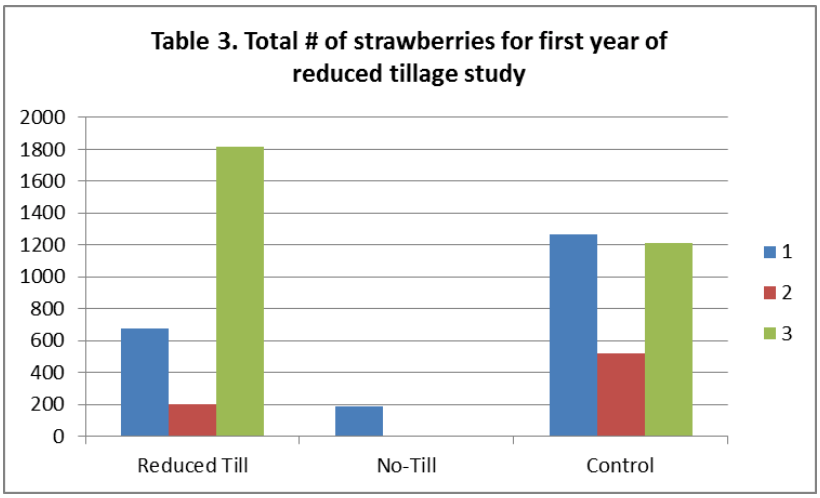


Farm 1 showed a higher number of perennial weeds than both other farms, due to the fact that this trial was installed into a killed sod on Farm 1. That high ratio of perennial weeds to annual weeds continued through the next 2 sampling periods. This tendency does not bode well for the productive life of the planting, as perennial weeds are difficult to eradicate once established in a matted row strawberry system.

Farm 2, whose data in Table 1 indicate that the weeds in the control treatment were larger one month after planting, still had higher numbers of weeds as illustrated in Table 2. This same trend was seen in the data from Farm 3 – larger weeds in the control treatment, but higher numbers of weeds in the reduced till treatment.

For all 3 farms, the differences in sizes of weeds in the three treatments diminished as time progressed and the farmer had more tools available to control weeds. The number of weeds however did not develop a clear pattern throughout the year of monitoring. This may be due to the individual farm weed pressure and the type of weeds existing on each farm.

Yield was measured by harvesting all the trusses from randomly selected areas within each treatment. The berries were counted, put in primary, secondary and tertiary categories and then weighed. For Farms 1 and 2 the control treatment yielded significantly more berries than did the reduced till or no-till treatments. Farm 3 however, which had the largest volume of berries of all 3 farms, yielded almost 1/3 more in the reduced till treatment than the control. This farmer will be installing 1 acre of reduced till June bearing strawberries this season.



Results of this study are inconclusive, but there appears to be promise in using reduced tillage in a matted row strawberry system. This system may be useful for organic growers or to growers that need to better utilize their equipment.

From a farm profitability perspective, labor savings just for tillage averaged 37% and fuel savings 40% for the reduced tillage system compared to primary tillage for field preparation. The range reported by growers for savings in fuel ranged from 27 to 60% and savings in labor costs ranged from 25 to 60% (Dr. Anu Rangarajan, Cornell University). These figures are estimates from agronomic crops and some larger scale vegetable crops, but similar savings could be found on strawberries.

The reduced tillage approach would be more attractive if we could prove that yield of this high value crop would not suffer. The results from this study imply that farmers should experiment with reduced till in their matted row strawberries in order to maximize production and minimize costs.


Reduced tillage prior to planting

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