



Healthy Food, Diverse Farms, Vibrant Communities

Cooperators

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Project Timeline

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Assessing Tillage Radish for Weed Control in Vegetable Production

Written by Tim Landgraf

In the fall of 2009, a trial to observe the effects of a cover crop planting of tillage radish was conducted at One Step at a Time Gardens (OSTG), near Kanawha, Iowa. The observation was conducted to examine residual effects of weed suppression in the spring following tillage radish. A secondary observation of tillage radish planting density was also conducted.

Tillage radish is used as a cover crop to provide several benefits. One benefit is to provide penetration of the hardpan layer in the soil. When allowed sufficient time to mature, tillage radish can grow to a size of 1-2 inches in diameter, and 18-24 inches in length. A second potential use is to suppress weed germination by shading the soil. The plant is also an effective nutrient scavenger and will then release those nutrients back to the soil in the spring making them available

to early seeded vegetable crops. Another side benefit that has been observed in other trials is the tillage radish's ability to inhibit weed growth. This inhibition is suggested to occur because of the release of allelopathic chemicals from the tuber of the radish. These chemicals reduce the germination rate of the weed seeds in the soil. The goal of this trial was to observe if fall planted tillage radish would result in reduced weed growth the next spring on early season lettuce and spinach plantings.

The field selected for this observation had been a production field of broccoli in 2009. The field was selected because it would be planted to lettuce and spinach in 2010. After the broccoli harvest was complete, the remaining plant residue was chopped (mowed), and tilled using a tractor mounted



Tim Landgraf and Jan Libbey, Kanawha, One Step at a Time Gardens assessed tillage radish for weed control in vegetable production.

rototiller. A grid system was set-up using flags to create two sets of eight field plots each. See the complete grid on page 2. Each set of eight plots was identified as "radish" or "not radish" to provide side-by-side comparisons of the effects of the tillage radish. The bed closest to the field edge was planted with OSTG's normal overwintering cover crop of winter

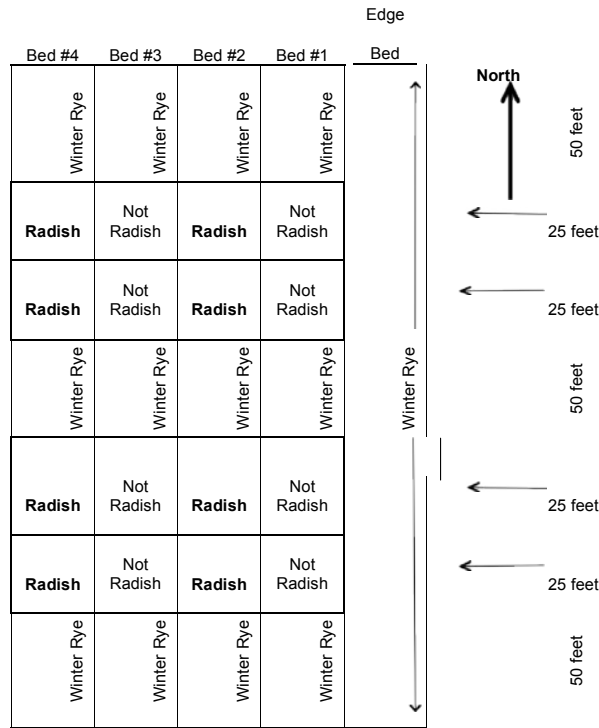
rye. Similarly, the alleys and ends of each of the beds were planted to winter rye.

On August 27, 2009, the tillage radish was planted at two different seeding rates. The South set of plots was seeded at a rate of 10 pounds per acre. The North set of plots was seeded at a rate of 30 pounds per acre. Seeding was by hand with a hand crank seed spreader, followed by a light tilling with the rototiller set on the shallowest setting. Measurements of the diameter of the tillage radish were taken on October 16. In the South planting with the lower seeding rate, the radishes were approximately 3/4 inch in diameter and 9 inches long. In the North planting with the higher seeding rate, they were approximately 3/16 inch in diameter and 6 inches long. For the entire trial, the late planting

date (due to seed availability) combined with the arrival of an early winter resulted in smaller than desired radish size.

In the spring of 2010, after the winter snows had melted, all that remained of the tillage radish was a few of the dried leaf clusters. The radish roots were completely gone, and the soil was dotted with the holes made by the roots. The radish plots had a clear suppression of perennial and annual weeds, as documented with the photos on the following page. The cause of the weed suppression is not known.

On April 29, 2010, the beds were rototilled in preparation for planting. The same afternoon, lettuce and spinach were direct-seeded into the test plots. Observations were made to determine if any residual effects from the tillage radish remained in the soil, affecting either the lettuce/



Summary of Observations

The planting date of the tillage radish (August 27), combined with the early onset of winter prevented the tillage radish from growing to the target size. An earlier planting date, such as the first week in August, would allow the radishes to grow to the target size.

The heavier planting density on the North sideplots resulted in crowding of the tillage radish plants, likely affecting their size and penetration depth in the soil. The planting density in the South plots (i.e. 10 pounds per acre) seemed adequate to get complete soil coverage by the leaf clusters and larger tubers.

spinach plantings or weed germination and growth. Throughout the growing season, no difference was observed between the “tillage radish” and the “no tillage radish” plots.

There does appear to be a suppression of perennial and annual weeds in the planting of the tillage radish. However, this effect appears to be gone by the time the beds are tilled and planted to the next year’s crop.



Early April 2010 | Tillage radish planting Dried leaf clusters from the tillage radish are shown, along with emerging Canada thistle.



Close-up photo | Tillage radish plots, showing holes remaining after the breakdown of the tillage radish and dried leaf clusters.



April 29, 2010 | prior to tilling the bed in preparation of planting lettuce and spinach. The photo is of a tillage radish bed in the South planting. The bed on each side clearly shows a higher density of both perennial and annual weeds. The height of the winter rye plantings around the edges of the plots can be seen in the back of the photo and on the top, left edge.



April 29, 2010 | centered on a “no tillage radish” bed. Note the size and frequency of the Canada thistle as compared to the previous picture.