

Organic Systems Vegetable Trial 2011 Plot Treatments and Yields

Entry Point 1: Main crop was early potatoes

Potatoes were planted by hand after marking rows at 30" apart with two small "furrower" shovels mounted on a toolbar. They were cut by hand and placed 9-10" apart. They were then covered with hilling discs mounted on an Allis Chalmers G tractor. Potato rows were furrowed, planted, and covered from 5/10-5/13. First cultivation was 6/6-7, second 6/10. The potatoes were irrigated four times, on 6/21, 7/12, 7/21, and 8/2. They were sprayed for Colorado potato beetles on 6/20 with Entrust (2 oz/ A). Potato leafhopper adults were first noted on 6/24. By 7/7, high numbers of nymphs were counted on all treatments. By 8/4 nearly all plants were dead. Data harvest was on 8/15-16, and potatoes were harvested with a two-row digger and removed from the field by 8/22.

Yields were low for all systems. On the north end of the experiment (rep 4) yields were higher, probably due to better water-holding capacity of the finer textured soil there. At Freeville there was only 0.72" of rain in July, about 3" less than normal. After a wet April and May, June rainfall was also below average. July temperatures were above normal and averaged 73.6 degrees F. With this hot and dry weather, apparently the four irrigations were not enough for good yields. Potato leafhopper damage, fairly uniform across systems and reps, undoubtedly also reduced yields.

A side experiment was done to see if planting buckwheat near the plots would enhance beneficial insect numbers and reduce Colorado Potato Beetle damage. Buckwheat was planted in 1/2 of the aisles on both sides of each potato plot on 5/31, and it emerged by 6/6. Potatoes had emerged a few days before 5/30. CPB were present in low numbers on 6/10. Predator numbers were also low and CPB populations increased above threshold by 6/16, so a spray was applied on 6/20. CPB numbers decreased strongly by 6/24 and stayed fairly low. Buckwheat flowering, thought to be most supportive of beneficials, began around 7/4. Buckwheat was mowed and tilled under on 7/26.

Crop Yields for entry point 1:

System	Crop Type	Variety	Total Yield (lb/acre)*	Marketable Yield (lb/acre)
1	Potato	Dark Red Norland	13,010	8,320
2	Potato	Dark Red Norland	10,950	6,920
4	Potato	Dark Red Norland	10,350	7,440
2	Spring cover crop	Red Clover	202	
2	Spring cover crop	Crimson Clover	440	
3	Spring cover crop	Rye	1100	
1	Fall cover crop	Rye	-	
2	Fall cover crop	Rye	-	
3	Fall cover crop	Buckwheat	2990	
3	Fall cover crop	Red clover	368	
3	Fall cover crop	Crimson clover	1724	
4	Fall cover crop	Esker oats	-	
4	Fall cover crop	Hairy vetch	-	

*Cover crops are dry weight

1.1 System 1 (early potatoes followed by rye)

Plots were moldboard plowed on 5/5. Cornell Farm Services (0.65-0.69-0.28) compost was spread at 9.5 tons/acre (fresh weight) on 5/9; the plots were harrowed to incorporate the compost on 5/10. The rest of the potato management was as above. Plots were disced on 8/23, then drilled to rye on 8/31 @ 120 lb/A.

1.2 System 2 (early potatoes followed by rye)

There was a mixed clover cover crop over winter before planting potatoes. This was moldboard plowed on 5/5. Cornell Farm Services compost was spread at 4.75 tons/acre on 5/9; the plots were harrowed to incorporate the compost on 5/10. The rest of the potato management was as above. Plots were disced on 8/23, then drilled to rye on 8/31 # 30#/acre. The next day, inoculated Purple Prosperity hairy vetch was drilled @ 40 lb/acre.

1.3 System 3 (cover crops and fallow)

These plots were in rye, planted late the previous fall. The rye was flail mowed on 6/7, then disced on 6/15. It was mowed on July 11th and rotovated on 7/15. On 7/20 the plots were springtooth harrowed and buckwheat (@ 100 lb/A), red clover (10#/A) and crimson clover (10#/A) were broadcast with a hand-spinner and rolled in with a cultimulcher with its tines up. The buckwheat was flail mowed on 9/2, and the clover allowed to grow.

1.4 System 4 (ridge till potato, then oats and hairy vetch)

A layer of dead field peas and soybeans covered the ridged plots all winter. These were scraped off the ridges on 5/10, and 4.75 tons/A of Cornell Farm Services compost was spread the same day. The rest of the potato management was as above. The ridges were destroyed during harvest, but remade on 9/1 in the same locations by ridging up with a potato hiller, after drilling Esker oats @ 75 lb/A and inoculated Purple Prosperity hairy vetch @ 40 lb/A.

Entry Point 2: Main crop was early lettuce

Optima and New Red Fire lettuce varieties were seeded in an organically-managed greenhouse on 4/19-21. Night temperatures were cooler than 2010, and the transplants grew more evenly although the red transplants were considerably larger than the greens. Plants were brought out to Freeville to harden off from 5/10-13 until transplanting on 5/25-26; seedlings were sprayed with 6 fluid oz/4 gallons of liquid fish emulsion (2.6-2.0-.26) on 5/21. The plots were irrigated once on 6/22. Plants were cultivated on 6/6 and hand hoed on 6/6-7. Harvest dates were 6/30-7/1 and 7/6. Lettuce was removed from the plots on 7/7-11. Plots were flail mowed on that day. Systems 1-3 were moldboard plowed on 7/21. Subsequent actions were handled differently for each system.

Crop yields for entry point 2:

System	Crop Type	Lettuce	Marketable Yield (heads/acre)	Percent Marketable
1	Lettuce	Optima	14,300	63
1	Lettuce	New Red Fire	4,800	22
2	Lettuce	Optima	16,940	
2	Lettuce	New Red Fire	9,438	
3	Lettuce	Optima	16,900	79
3	Lettuce	New Red Fire	9,400	39
4	Lettuce	Optima	3,900	18
4	Lettuce	New Red Fire	2,400	12
System	Crop Type	Lettuce	Marketable Yield (pounds/acre)	Percent Marketable
1	Spinach	Renegade	549	85
2	Fall cover crop	Red clover	224	-
2	Fall cover crop	Crimson clover	1025	-
2	Fall cover crop	Buckwheat	2977	-
3	Fall cover crop	Buckwheat	2008	-
3	Fall cover crop	Rye	-	-
4	Fall cover crop	Esker oats	1388	-
4	Fall cover crop	Peas	1623	-

1.1 System 1 (early lettuce followed by spinach)

Dead cabbage stumps and chickweed covered the plots over winter. These were moldboard plowed 5/5. 4.75 tons/acre of Cornell Farm Services compost (0.65-0.69-0.28) was applied on 5/20. They were harrowed on 5/24, and lettuce was transplanted from 5/25-26. The crop was grown and harvested as above. Krehers chicken compost (5.6-2.1-2.5) was spread at .27 tons/acre on 8/1 and harrowed in the same day. Organic Renegade spinach was seeded the same day @ 14 seeds/ft, 15" between rows, in 3 row beds on 5' centers. Germination was less than 10%; we rotovated again on 8/22, and replanted with fresh seed and the same parameters on 8/23. Again, germination was very low, and growth was poor. We did not cultivate or hoe the crop; data harvest and crop removal was on 11/7. There was so little spinach that we took it all home and shared it amongst lab members.

1.2 System 2 (early lettuce followed by buckwheat/red clover)

Dead cabbage stumps and chickweed covered the plots over winter. These were moldboard plowed 5/5. 2.38 tons/acre of Cornell Farm Services compost was applied on 5/20. Plots were harrowed on 5/24, and lettuce was transplanted from 5/25-26. The crop was grown and harvested as above. Plots were rotovated on 7/15, then springtooth harrowed and seeded with a hand spinner to buckwheat @100 lb/acre and red and crimson clover @ 10 lb/acre each on 7/20. The seed was rolled in with a cultimulcher with the tines lifted, and the fields were irrigated. The buckwheat was flail mowed on 9/2, and the clover allowed to grow.

1.3 System 3 (early lettuce followed by buckwheat, fallow, and rye)

Rye covered the plots over winter. This was moldboard plowed on 5/3 (replicate 4 plowed 5/5). 2.38 tons/acre of Cornell Farm Services compost was applied on 5/20, and plots were harrowed on 5/24. The crop was grown and harvested as above. Plots were shallowly rotovated on 7/15, then springtooth harrowed and seeded with a hand spinner to buckwheat @100 lb/acre on 7/20. The seed was rolled in with a cultimulcher with the tines lifted. The buckwheat was disced on 9/16. Plots were springtooth harrowed on 10/24 and 11/4, and seeded with rye on 11/7 with a hand seeder @ 240 lb/acre. The seed was rolled in with a cultimulcher with the tines lifted.

1.4 System 4 (ridge till early lettuce followed by oats and peas)

Dead cabbage and chickweed covered the plots over winter. The plot valleys were cultivated on 5/3, then plots were re-ridged with a potato hiller on 5/5. The ridges were scraped on 5/20 before the application of 2.38 tons/acre of Cornell Farm Services compost. The crop was grown and harvested as above. Plots were cultivated and re-ridged on 7/15. Ridges were scraped on 8/5, and Esker oats were drilled @75 lb/acre followed by a mix of Magnum and 4010 field peas @ 150 lb/acre, then plots were re-ridged with a potato hiller.