

Organic Systems Vegetable Trial 2006 Plot Treatments and Yields

Entry Point 1: Main crop was early lettuce.

Lettuce transplants for all systems were grown in an organically-managed plastic greenhouse at Cornell. They were seeded on April 5 and 7 into MacEnroe light potting soil mix in #72 flats. No fertilizer was applied. Plants were hardened off starting on May 1. Two varieties were grown, a green butterhead called Ermosa and a red leaf called New Red Fire (for which organic seed was used). Lettuce was harvested on June 20, June 28, and July 5.

1.1 Entry Point 1, System 1 (early lettuce main crop followed by spinach)

Lettuce	Marketable heads per acre	% Marketable yield
New Red Fire	21,400	85
Ermosa	21,800	83
Spinach	Marketable lb per acre	% Marketable yield
Melody	9,600	92

The soil had no cover crop over the winter, only residue from the previous year's late cabbage crop including overwintered chickweed. This was moldboard plowed under and disced on April 17. Three tons per acre of Fessenden compost was spread on May 4. A field cultivator was run over the plots on May 8. Transplanting began the next day and was finished on May 11 under dry conditions. The no-till transplanter delivered a good dose of water to the plants. Lettuce was planted in groups of three rows with 15" between rows and 30" between groups of rows. The middle row was set by hand using a ruler to center between the two outer rows and was not watered in. Plants were spaced 12" apart within rows. Lettuce was cultivated on May 30 with a custom toolbar on the Saukville tractor. The rows were hand-hoed with stirrup hoes afterwards.

Plots were chisel plowed on July 25, then disced. They were disced again on July 31. Melody spinach was seeded with 3-row Planet Jr. (15" between rows) setup on Allis Chalmers G tractor on Aug. 3. This planting had poor emergence, so the plots were disced again and re-seeded on Aug 13. This planting came up well. Spinach was cultivated on Sep 1. On Sep.12 it was sidedressed with 750#/acre of Fertrell 4-2-4 (~30-15-30 per acre) by hand, then this was cultivated in. Plots were harvested for data on Oct. 11; crop was removed on Oct 19. Plots were rotovated on Oct. 30, and then broadcast seeded to rye and rolled with a double cultipacker on Nov. 1.

1.2 EP 1, System 2 (early lettuce main crop followed by field pea/soybean cover crop)

Lettuce	Marketable heads per acre	% Marketable yield
New Red Fire	23,200	86
Ermosa	18,200	65

The plots had a cover of winterkilled bell (fava) beans as well as cabbage residue and chickweed over the winter. This was moldboard plowed under and disced on April 17. No compost was applied. Pre-plant tillage, planting, cultivation, and hoeing were carried out as in System 1.

Plots were harrowed with a Glenco field cultivator on July 25, then disced. On July 27, the plots were harrowed and then disced, but planting was rained out. Plots were disced again July 31, then seeded with inoculated soybeans and Maxim field peas with a Great Plains no-till grain drill. The stand was marginal with gaps where warm season weeds grew. The cover crops were mowed, then disced on Sep 21 to prevent seed set by these weeds. Plots were harrowed again on Oct. 11. Plots were shallowly plowed (3-5") on Oct. 31, and then broadcast seeded to rye and rolled on Nov. 1.

1.3 EP 1, System 3 (early lettuce main crop followed by a rye and vetch cover crop)

Lettuce	Marketable heads per acre	% Marketable yield
New Red Fire	19,100	82
Ermosa	16,200	70

Dead oats and field peas covered the soil surface on these plots in spring. Compost was applied at a rate of 3 fresh tons per acre on April 18. Plots were disced on April 19, April 27, and May 8. On the gravelly soil, the disc did not penetrate well and much residue remained on the soil surface. Transplants were set mechanically on May 8 and May 9, with hand-planting follow-up needed. Rows were 30" apart with about 9" between plants. The lettuce was cultivated on May 30 with a custom toolbar on the Saukville tractor. The rows were hand-hoed with stirrup hoes afterwards. Plots were harrowed with a Glenco field cultivator on July 25, then disced. A deep harrowing with the Glenco field cultivator on Aug 15 followed. On Aug. 23, plots were harrowed with the McKee field cultivator, then seeded to rye and inoculated hairy vetch with a Great Plains no-till drill. These cover crops grew well but some chickweed plants underneath were going to seed, so they were moldboard plowed under on October 31. Rye was broadcast the next day, then rolled with a double cultipacker.

1.4. EP 1, System 4 (early lettuce main crop followed by field pea/soybean cover crop)

Lettuce	Marketable heads per acre	% Marketable yield
New Red Fire	17,200	74
Ermosa	15,000	66

These plots started in the spring with low ridges covered by cabbage and bell bean residue with some chickweed plants. The chickweed between the ridges was flame weeded with a backpack unit on April 11. Then ridges were re-formed on April 19. The ridges were scraped on May 11 and lettuce transplanted on them with the no-till transplanter. Rows were 30" apart with about 9" between plants. The lettuce was cultivated on May 30 with a custom toolbar on a Saukville tractor. The rows were hand-hoed with stirrup hoes afterwards. Ridges were re-formed on July 25 and scraped on July 27 to kill weeds. Inoculated soybeans and field peas were seeded with a Great Plains no-till drill on Aug. 2, then ridges were re-formed. The stand of peas and soybeans was better than that in system 2 (which was not ridged) and grew well.

Entry Point 2: Main crop was late cabbage.

Cabbage transplants were grown in an organically-managed plastic greenhouse at Cornell. They were seeded on June 5 and 6 into MacEnroe light potting soil mix in #72 flats. No fertilizer was applied. Plants were hardened off starting on June 30. Flats were drenched with Phytamin 801 before transplanting began on July 10 because they were getting old. The variety grown was Farao. Cabbage yield data was collected on Oct. 2 and 3. Crop was fully removed by Oct 19. Cabbage was sprayed with Surround and Entrust on Aug. 2 and then with Bt on Sep 5. These sprays controlled flea beetles and caterpillars well. Cabbage yields were not statistically different.

2.1. EP 2, System 1 (snap peas followed by late cabbage)

Snap Peas	Marketable lb per acre	
Sugar Sprint	7,200	
Cabbage	Marketable lb per acre	% Marketable yield
Farao	37,000	94

These plots were in winter rye over winter. They were moldboard plowed and disced on April 17. They were then roller-harrowed and seeded with inoculated Sugar Sprint peas on April 20 with a two-row JD 71 seeder. A third row between the two was planted with a hand-push Earthway seeder on April 21. The peas were tineweeded with an 8' Rabewerk tineweeder on April 27, May 2, May 5, and May 15. They were cultivated on May 25, eliminating the middle row which had poor germination. They were cultivated again on June 6. Harvest began on June 29 and was repeated on July 3 and July 7. After application of 5 tons per acre of Fessenden compost, plots were rotovated twice on July 19. Cabbage was transplanted on that day and the next. This was about a week after the other systems. Plots were cultivated on Aug. 1 and Aug. 14, and also hand hoed on Aug. 14 with stirrup hoes. The final cultivation was on Sep. 1, with some hilling of the plants. The plants were almost too big to drive between.

2.2 EP2, System 2 (hairy vetch and wheat, then late cabbage)

Cabbage	Marketable lb per acre	% Marketable yield
Farao	36,200	88

Hairy vetch and wheat grew strongly, producing 5200 lb/acre and 1100 lb/acre, respectively, before they were flail mowed on June 12. This was plowed under on June 22, having been too thick to plow earlier. Plots were disced on July 3 and July 10, and cabbage was transplanted on July 10. The first cultivation was on July 20, then again on August 2 followed by hand hoeing with stirrup hoes on August 3. Plots were cultivated again on August 14. Large weeds (pigweed) were pulled by hand on August 31. The final cultivation was on Sep 1, with some hilling of the plants. The plants were almost too big to drive between. The same day, two rows of bell beans were seeded in between the cabbage rows with a push seeder. These established well.

2.3. EP 2, System 3 (rye + spelt, fallow, then oats and field peas on ridges)

These plots had a mix of rye and spelt over the winter. It was flail mowed on May 15 after it started to head out, and then again on June 12. Regrowth after the first mowing was not very strong. Plots were moldboard plowed on June 13, and disced on July 3 and July 25. Large weeds were pulled by hand on Aug. 3 to prevent seed production. Three tons per acre of compost was spread by hand on Aug. 15 after a deep harrowing with the Glenco field cultivator. The next day plots were broadcast seeded with oats and inoculated peas, then ridges were made in preparation for next year's lettuce. These cover crops grew well, but some chickweed plants underneath were going to seed, so they were moldboard plowed under on October 31. Rye was broadcast the next day, then rolled with a double cultipacker.

2.4 EP 2, System 4 (hairy vetch + oats, then late cabbage on ridges)

Cabbage	Marketable lb per acre	% Marketable yield
Farao	39,700	91

Hairy vetch grew strongly, producing 4200 lb/acre before it was flail mowed on June 12. Tractor wheels were driven over the valleys that were missed while mowing to kill the vetch. Ridges were scraped on June 22, throwing most of the residue into the valleys. Ridges were re-formed on July 3, then scraped again on July 14. The extra ridging and scraping were done to control weeds. Cabbage was transplanted onto the scraped ridge bases on July 14. The first cultivation was on July 21, then again on July 2 followed by hand hoeing on July 3. Plots were cultivated again on July 14. Large weeds (mostly pigweed) were pulled by hand on Aug. 31. The final cultivation was on Sep 1, with some hilling of the plants. The plants were almost too big to drive between. The same day, two rows of bell beans were seeded between the cabbage rows with a push seeder. These established well.

System	Ermosa Lettuce Marketable heads per acre	New Red Fire Lettuce Marketable Heads per acre	Melody Spinach Pounds per acre
1	21,800 a	21,400 a	9,600
2	18,200 a	23,200 a	-
3	16,200 a	19,100 ab	-
4	15,000 a	17,200 b	-

2006 Organic Vegetable System Trial Yields, Entry Point 1

System	Farao Cabbage Pounds per acre	Sugar Sprint Peas Pounds per acre
1	37,000 a	7,200
2	36,200 a	-
3	-	-
4	39,700 a	-

2006 Organic Vegetable System Yields, Entry Point 2