

"Final Project Report to the NYS IPM Program, Agricultural IPM 2006"

1. Title: Floating Row Cover for Leafhopper Control and Increased Yield in Potatoes

2. Project Leader(s): John Mishanec, IPM Program and Teresa Rusinek, CCE Ulster County

3. Cooperator(s): Jean-Paul Cortens, Roxbury Farm, Kinderhook, Kiera Kinny, Kinny Farm New Paltz and Professor Don Halseth, Cornell.

4. Abstract:

For organic potato growers, the most serious problem preventing acceptable yields is leafhopper. Once the leafhopper arrives, it is only a matter of time before the crop is down and yields greatly decreased. The goal of this trial is to gain acceptable yields without pesticides. Two varieties, Superior and Red Norland, were used in a split-field trial. Floating row cover was applied over half the trial at planting. The row cover was removed and replaced after the two hilling operations and was removed the third week of June. For the variety Superior, yields under row cover were a little more than three times greater than bare ground. For Red Norland, yields were roughly double under row cover.

5. Background and Justification:

In 2002, leafhopper arrived on upstate farms much earlier and heavier than normal. Since there are few, if any, effective organic products that can use to control leafhopper, the organic potato crop was devastated. Potatoes are an important crop for organic and direct market growers. Since 2002, a number of Extension Educators have been working with growers to help reduce or eliminate the leafhopper problem. Potato variety trials to find resistant varieties have resulted in some interested information but there is still no potato that is complete immune to leafhopper damage and reduced yield.

The only option organic growers have for leafhopper control is the Pyrethrum Pyganic. This product is very expensive and most organic growers do not use this method of pest control.

Floating row cover is a well-known tool for giving crops a jump-start to maturity. Floating row cover can also act as a barrier to insects. While row cover has its advantages, using it on potatoes presents some challenges. The crop grows quickly and is relatively tall. Row cover will also push weed growth. The potatoes need to be hilled. Too much heat can limit yield much the same as leafhoppers. Managing for these challenges will be the essence of this project.

6. Objectives:

- One – Evaluate management considerations to enable row cover to be used in organic potato production
- Two – Increase potato yields in an organic system
- Three -Project Evaluation will clearly demonstrate the effectiveness of the technique.

7. Procedures:

One - Evaluate management considerations to enable row cover to be used in organic potato production.

The trial took place at two farms, one in Kinderhook and the second farm in New Paltz. The two farms served as replication. Since the potatoes needed to be hilled before the leafhopper arrived, the seed was plated as early as possible. The goal for planting was May 7. In Kinderhook, we planted the potatoes, May 4th. In New Paltz, we planted May 9.

Each of the varieties, Superior and Red Norland, were planted in 60 foot long, single row beds. The plantings were replicated for the two treatments (row cover versus bare ground). The seed was warmed before planting to speed germination. In Kinderhook, the grower requested we cut the seed to hopefully increase yield. While we waited for the seed to dry out we should have waited longer. After planting in Kinderhook, it rained for three solid weeks and the potato seed rotted in the ground and came up very uneven. Also, at the Kinderhook location, the weeds got ahead of the grower so it was decided to abandon the trial at that location.

At the New Paltz location, the potatoes plants were hilled and cultivation twice, each time the row cover was removed and replaced. Good weed control was necessary to insure good yields. The New Paltz grower removed the row cover June 21 translating to 44 days under row cover.

Two – Increase potato yields in an organic system

Floating row cover pushes the maturity of plants. By using floating row cover combined with early season varieties, good tuber size was obtained before the leafhopper had a chance to cause problems. Six five-foot sections of row were harvested in each treatment. For Superior, we found an average of 7.92 lbs versus 2.29 lbs. for 5 feet of row harvested. For Red Norland, we found an average of 7.29 lbs. versus 4.21 lbs for 5 feet of row harvested. The row cover potatoes clearly out yielded the bare ground potatoes. This is not too surprising considering the track record of row cover in other crops.

Three - Project Evaluation will clearly demonstrate the effectiveness of the technique

The bare ground potatoes were scouted each week. Potato leaf hopper was found in low numbers the third week of June. Numbers continued to increase throughout the growing season. Plants began to show leafhopper burn by early July but possibly because of the wet weather, did not die back completely till the end of August. Normally organically grown potato plants are dead by the first week of August.

Row cover Superior – 7.92 lbs/5ft of row = 230 Hundred weight/A (23,000 lbs/A)
Row cover Red Norland – 7.29 lbs/5ft of row = 212 Hundred weight/A (21,200 lbs/A)

Bare ground Superior – 2.29/5ft of row = 67 Hundred weight/A (6,700 lbs/A)
Bare ground Red Norland – 4.21/5ft of row = 122 Hundred weight/A (12,200 lbs/A)

These numbers are total yield and not marketable yield but generally organic growers are able to sell much more of the yield than conventional growers. An acre of floating row cover cost in the neighborhood of \$650-700. Based on a \$1.00/lb retail figure for organic potatoes, the return for using row cover can be very profitable. Since row cover generally last between 3-5 years, the initial investment can be spread over that time period.

8. Results and discussion:

Using floating row cover in an organic potato production system is feasible. Most growers are already using row cover on other crops. While organic potato acreage will not be large, organic growers can maximize their field resources. Hopefully this technique will become an accepted and economical practice on most organic farms.

With potato leaf hoppers, organic growers need a potato system that makes yield before plants go down. By pushing the maturity, yields can be increased. Granted, this trial is based on only one location and one summers worth of data, similar results are commonly found in other crops using row cover, so it is not a stretch to believe these results are valid. We hope to duplicate this trial next summer.

There is a little more labor involved in taking off the row cover and replacing it after the two cultivation/hilling operations. The key is getting potatoes planted and covered early and removing the row cover before the high summer temperatures limit yield.

With this trial we have shown organic potato yields can be increased by 2-3 times. Based on a quarter acre of potatoes, a grower could reasonably expect to gross \$5000. Subtracting cost of production still leaves a handsome profit.

The results of this trail will be publicized in CCE newsletters throughout the state.

9. Project locations

The trial took place in Columbia and Ulster counties.