

An Evaluation of Winter Vegetable Production

Organic On-Farm Research Program

Introduction

Summer 2001

Margie Loo operates a certified organic farm in Valley, PEI. She markets her vegetables through the Charlottetown Farmers Market. Equipped with a mid-sized heated greenhouse her farm is capable of providing vegetables to the Market almost year round. Margie became intrigued with work Elliot Coleman has done on his farm in Maine using unheated, movable greenhouses to extend his production season.



Figure 2: Newly constructed movable greenhouse

A mobile greenhouse is a fully equipped greenhouse which can be moved on rollers or sliders from one location to another without being dismantled. The idea for a moveable greenhouse came about around the end of the 19th century to solve the problem of “sick greenhouse soil”. It allowed for more natural soil conditions by exposing the soil to direct sunlight, wind, rain and sub-freezing temperatures. The greenhouse does not extend the growing season but rather extends the harvest season (Coleman 1995).

In order to have harvestable crops in the winter months, crops have to be planted in time to reach maturity before the day length shortens to less than 10 hours. Because day lengths on PEI are somewhat different from that of Maine, several planting dates needed to be tried to determine the most optimum ones for PEI.

Project Design



Figure 3: Inside of greenhouse

One ton per acre lime was applied in the spring and well rotted manure and composted crab bodies were applied just prior to planting. The area the greenhouse was to sit on was marked off and divided in two. One side was planted with carrots and scallions (young or green onions) and the other with several different salad greens including beet greens, spinach, arugula, corn salad, kale, mizuna, sorrel and claytonia (**table 1**). The salad greens were grouped by family and winter growth habits. These traditional winter crops don't mind the short days, nor are they harmed by freezing or by remaining frozen for periods of time. Inside the greenhouses the plants thrive because they are not exposed to desiccating

wind chill and alternating wetting and drying conditions which cause havoc on the outdoor plants.

The greenhouse, purchased from Trillium Greenhouse Equipment Inc., Dundas Ontario (905-628-4954), was constructed adjacent to the plot and placed over the plot in October. Floating row covers were used to provide additional protection from the cold during extra cold periods.

Temperatures in the greenhouse were monitored throughout the fall. It was noted that ambient air temperatures were never low enough to drop the temperature to below freezing within the greenhouse before January. On January 4, the overnight temperature dropped to -15°C, the temperature inside the greenhouse dropped to -9°C and the temperature below the floating row cover dropped to -5°C.

Snow which gathered on the roof of the greenhouse was controlled by using a pole with a cushion attached to the end. This was gently pushed against the plastic on the inside allowing the snow to slip off from the outside.

Table 1: Crop planted and date planted of crops on left and right sides of greenhouse

Date planted	First half	Second half
July 9		Sorrel
July 16	carrots, scallions	
July 23	carrots, scallions	
July 30	carrots, scallions	
August 6	carrots, scallions	
August 20		kale, beets
August 27		arugula, claytonia, beets, spinach, kale, mizuna
September 3		arugula, claytonia, beets, spinach, kale, mizuna
September 10		arugula, claytonia, beets, spinach, kale, mizuna
September 17		claytonia, corn salad, spinach, kale, mizuna
September 24		corn salad
October 1		corn salad

Results

Greens

Due to the exceptionally warm fall and hence long growing season, there was an overlap in the field grown mesclun and that which was grown in the greenhouse indicating that the first mesclun planting date was too early for the fall conditions observed in 2001.

The majority of the greens were ready for harvest by early October with the exception of the beet greens and spinach. These two crops would have benefitted by being planted two weeks earlier. The corn salad, understood to be a cold loving plant, was planted last. Steady growth was observed throughout the fall, but it was not ready for harvest by the end of December.

By the end of December two cuts had been made on the greens and although they were still healthy and growing, the speed of growth had decreased significantly.

Carrots

The optimum planting date for the carrots was July 23 and July 30, as these planting dates allowed the crop to size up enough for bunching. The early planting was too early producing carrots too large for the market and the late planting never had time to size up. It is possible that the late planting may not have sized up because of poor germinating conditions due to a lack of moisture during the germination time. This was partially compensated for with irrigation but was not entirely successful.

Scallions

Scallions were started both from seeds and from sets. The sets were quite old by mid July and the seed seemed to be a superior product, however it was not planted early enough allowing only the July 23 planting to be ready for harvest by January.

Table 2: Dollar return per square foot of greenhouse area for individual vegetable crops

Crop	Dollar return /\$ per ft ² per cutting
Carrot	2.00, 2.50 ¹
Scallion	1.50
Kale	1.95 ²
Mizuna	1.85 ²
Arugula	1.34 ²
Claytonia	0.84 ²

¹ indicates price after New Year
² indicates 3 cuts

Margie was pleased with the production she achieved with her greenhouse, but any new venture there are always modifications.

Suggested Modifications

1. The planting schedule followed was adequate with the exception of increasing the number of planting dates for the greens from four to six so that there would be untouched plots for January when the plants grow the slowest.
2. Two planting dates for carrots is sufficient - July 16, and July 23.
3. a small percentage of the carrots had roots exposed above the ground making them more susceptible to frost damage. Mulching with eel grass could be a more effective protection than the row covers. Another option could be deeper planting or hilling to prevent the crowns from showing.
4. The scallions could be planted more densely because they do not bulb up. This would allow a greater return per square foot.
5. Two layers of plastic separated by an air space would make the greenhouse more heat efficient.
6. The orientation and location of the greenhouse is an important consideration when planting. Access to sunlight and minimizing shadows is essential to keeping temperatures from dropping too low.
7. Shelter is another important consideration when building a greenhouse. It is important to have protection from the north wind
8. In order to have a continuous harvest during the winter months proper timing of planting/cutting is essential.
9. Markets should be identified prior to planting.

The Organic On-Farm Research Program is a program aimed at assisting farmers in carrying out innovative demonstrations and evaluations on their farms that will improve the sustainability of PEI's agricultural industry. For more information please call your local agricultural district office or the Organic Development Officer.