

**2015 ACORN Conference & Trade Show
Delta Prince Edward Hotel, Charlottetown, PE**

Workshop Title:

Protected Culture- Sweet Pepper, Grafted Tomato Demo and Greenhouse Tomato Production monitoring.

Speakers:

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Executive Summary:

The NBDAAF trials helped to expand the productivity and knowledge base of protected culture growers in NB. Some of the achievements included exposing NB growers to high producing varieties of sweet peppers, introducing grafted tomatoes to NB producers, and identifying best practices for fertilization, irrigation, and temperature regulation of greenhouse tomato production.

Sweet Pepper Demo Overview:

The intent of the trial was to give NB growers an opportunity to grow some of the most productive sweet pepper varieties, as identified by trials in Quebec, and to do their own assessment on these varieties. There were 10 varieties ranging from very large types to mini peppers.

Strawberry hill farm was contracted to grow the seedlings, which were very high quality. Eight farms participated in the trial, all growing the peppers in greenhouses and tunnels.

There was specific interest in early-mid season varieties such as Carmen, Catriona, Cupid, Doe Hill and Triora.

They hosted some informal group taste testing. Growers had the opportunity to work with the peppers; they scored and provided comments on the different varieties. A chart was created with the results of the taste test.

What was learned?

It was quite clear that productivity of the peppers varied considerably between each trial farm due to differences in weather, soil fertility, and irrigation.

It was found that most of the varieties required support but that a simple weaving technique involving rebar and three levels of twine was sufficient.

In our climate it is best to grow the early to mid- season varieties in tunnels or greenhouses in order to get good levels of productivity.

It is important to have healthy and robust transplants. There was a preference for medium sized and smaller peppers as growers find it easier to sell peppers at a lower price per unit. Red Wing, Red Line, Catriona, and DRO 713 are beautiful peppers, but too large to be easily sold.

Grafted Tomato Demo Overview:

The objectives for this project were to provide growers with an opportunity to grow grafted tomato plants and to do their own assessment and also to allow NBDAAF staff the chance to get familiar with grafted tomato plants.

In this trial there were 4 growers who grew both grafted and non-grafted tomatoes in their greenhouses or tunnels. Three varieties of tomatoes were used: Frederik (beef), Sweet Heart (grape), and Sakura (cherry) with Maxifort rootstock. Participating farms were asked to grow the tomatoes in their usual style.

Schurman family farm was contracted to grow the organic seedlings.

Results:

Slides showed visible difference in vegetative growth between grafted and non-grafted varieties. Grafted varieties seemed to show more vigor and vegetative growth; however there was a concern that fruit might take more time to mature due to excess in foliage cover.

After harvest, the roots of the plants were pulled up and compared, showing that in two of the varieties (Sakura and Frederik), the root systems of the grafted plants were healthier and more robust.

Having observed more vigorous and healthier vegetative growth as well as more improved root systems in the grafted tomatoes, the question was then posed if this would translate to an increase in yield. It was found that the grafted Frederik and Sweet Heart out-produced the non-grafted plants by 10-50%.

The conclusion was that result of the trial showed a significant advantage of grafted over non-grafted tomatoes in terms of increased vigor, more resistance to soil-borne diseases, potentially more yield and extended production.

Tomato Production Monitoring:

The purpose of this study was to monitor the tomato production on 4 NB farms using a variety of tools and techniques, allowing the farmers and NBDAAF staff to become familiar with monitoring methods.

Soil fertility was monitored using the basic soil test, the greenhouse soil test (SME) and leaf tissue testing. Indoor/outdoor temperatures were monitored using thermocouples and irrigation practices were monitored using water meters, tensiometers, and visual observations.

Each farm had a slightly different protected culture setup including: heated greenhouse, unheated greenhouse, caterpillar tunnels and multi-bay high tunnels.

Soil fertility:

The basic soil test was done before planting and gives an analysis of the nutrients available in the soil. This helps to determine what sort of initial fertility treatment the soil should receive.

The SME (Saturated Media Extract) test, also known as the greenhouse soil test provides a snapshot of what nutrients are immediately available to the plants and could be done several times in the growing season. This allows the grower to track changes in nutrient availability over time. The results of this testing suggest that amendments/fertilizers might need to be added throughout the growing season and that potassium is often overlooked.

The leaf tissue test, tests the nutrients that the plant has taken up. It is an excellent method for comparing two test groups, (in this case grafted vs. non-grafted tomatoes). The healthier plants will take up nutrients more readily.

Temperature:

Graphs were created tracking the temperatures at each of the 4 farms throughout the season. The ideal temperature range for growing tomatoes is between 15° C and 32° C. Often the temperatures strayed beyond these ranges, on the cool side earlier and later in the season and on the warm side in the middle of the season but for the most part temperatures held with these parameters. It may be worth looking at providing more ventilation mid season and some amount of heating early on.

Irrigation:

Crops grown in greenhouses/ tunnels, plants must be irrigated usually using drip irrigation. Tensiometers were used to help determine best watering practices for crops in greenhouses/tunnels. Tensiometers measure the soil water tension or "availability of water".

The first thing that was noticed was that in order to even get a good reading from the tensiometer, watering practices had to be improved as a single drip line with spaghetti emitters left many dry spots, small saucer sized patches of moisture sometimes not even around the stem of the plant, separated by 1ft or more dry sections.

Water meters were also used to track how much water is put into the system.

Based on the observations the following practices were recommended:

- 1) Using black and white plastic mulch (white side up) to retain moisture, suppress weeds and reflect light back up at the plants.
- 2) Using four drip lines per bed with closely spaced, low output emitters.
- 3) Alternating between a period of irrigation and aeration.

4) Providing more water when the crop is in full production.

Good irrigation practices are very important for organic producers because it promotes improved nutrient mineralization as well as more robust soil microbiology.