

Vertical Growing Technology

Highlights

- **Workshop May 5-6**
- **Research Findings**

**American Society for Plasticulture
international Congress**

Information Update

The workshop scheduled for April 11 was re-scheduled for May 5th and 6th due to a conflict with an "open house" at the North Fork Elementary School greenhouse in Ft. Lauderdale.

The **Earth Ranger** greenhouse project is worth more space and will be addressed in a separate newsletter.

Research Findings

Bellevue U-Pick Operation

Summary: **Verti-Gro** relocated to Bellevue during the summer of 1999. Prior to that time this facility was owned and operated by **Ken Patterson** of **JP Farms** in Hawthorne, FL. This facility was built in 1997 before the development of the rotating stack system.

The greenhouses were purchased used and were intended for freeze protection and crop support. Only single plastic is used, but this past season only part of the facility was covered.

The entire facility uses water for frost and freeze protection. However, the **1999-2000** winter was much more severe than anticipated and the early December frost came before the frost protection system was fully in place and tested.

The temperature dropped at least six times into the low 20's. With insufficient water pressure (and no covering) the damage to the crop was more than anticipated.

The plants within the greenhouse structures have now gone through their second season. These were mostly **Sweet Charlie** with some **Camarosa** and a few **Selva** and **Oso Grande**. Plants were originally from **C.W. Allen Nursery** in **Nova Scotia** and were planted in October, 1998. No plug plants were planted that year and none have been used to date.

About **2,000 Sweet Charlie** were moved from Clermont, FL to Bellevue in **Verti-Gro** pots. These were located outside in the southeast quadrant. Most of these plants have been removed to make room for the new "*Day Neutral*" variety test of lettuce. However, even though it was impossible to determine the actual production (due to "**U-Pick**") it was apparent that the outside berries did better, even after being transported from Clermont to Bellevue. Dated photographs are available.

The strawberry plants were not treated for any fungi, insects or weeds during the summer of 1999. This was due to the fact that they were not intended to be left in for another year.

Only a few plants were to be tried, but the appearance of the plants in the late summer led us to leave the plants in place.

(It was also due to lack of time for proper plant removal and replacement)

The south greenhouse quadrant is almost all **Sweet Charlie** and had much higher production and higher quality than the north quadrant, which had a mixture of varieties. The north quadrant had a much more severe weed problem.

The inside greenhouse area is all re-circulating hydroponics. The tanks were not cleaned during the summer. More than twenty percent of the plants in the north quadrant were lost due to root fungi. With proper fungicide treatment this should not be a major problem.

The outside north quadrant is a mixture of **Sweet Charlie**, **Camarosa**, **Chandler**, **Selva**, and **Rosa Linda**. Due to freezes, the production on a per variety basis was not determined.

Replacement and movement of plants made it difficult to evaluate all the varieties accurately.

However, it is apparent that **Selva** is susceptible to *spider mites* and is believed to have led to a major mite outbreak early in the season.

The **Camarosa** and **Chandler** were very late, but mainly due to the set back with the frost damage.

Sweet Charlie still appears to be the winner, but has its problems also, mainly susceptibility to *Botrytis*.

New safer chemicals such as Elevate have helped reduce this disease significantly.

However, *Anthracnose* was a more severe problem and proper weed and disease control measures were not applied during the summer of 1999.

A proper and consistent spray program reduced the disease significantly.

Spray equipment used is the ESS and a medium pressure tank sprayer (150 psi). During the winter a low "re-entry" spray program was carried out using only the ESS sprayer.

Production on the **Sweet Charlie** began in early November, which is the earliest production we have ever achieved. The early production and quality of **Sweet Charlie** indicates that the two year cropping method has significant economic advantages over replanting every season.

The true cost comparison will be addressed in another report.

However, it was apparent, even with no summer fungi treatment that production was early and heavy on **Sweet Charlie**.

During February (19-26) several new and old day neutral varieties were planted.

These were **Tristar**, **Quinalt**, **Ozark Beauty**, **Jewel** and the new **Pacific** and **Aromas**.

Diamante was planted about the same time in another location.

Some of these varieties were purchased for runner (tip) production, but the production was so heavy we decided to leave the fruit on.

All of the varieties produced fairly heavily except **Jewel** and **Quinalt**.

In all fairness to these varieties there were problems with shipments being lost on some of them and the plants were obviously affected.

The new variety **Pacific**, appears to have extremely good potential in Florida and particularly further north for early fall production and late spring production.

(to fit in with the **Sweet Charlie** cropping schedule)

Interestingly, the **Sweet Charlie** produces much later in the insulated **Verti-Gro** pot than anticipated!

Since the root is insulated the production can be earlier and maintained longer.

Soil temperature is obviously not a problem in the **Verti-Gro** pot.

In a climate controlled house **Sweet Charlie** has great potential, as do some of the new "*Day Neutral*" varieties. Some **Sweet Charlie** is being grown for runner (tip) production (as well as **Pacific**).

This is a test procedure only for plug production. The procedure may work better in northern cooler climates and particularly in parts of the world where good strawberries are hard to come by.

Sweet Charlie tips have been produced in two other years in Florida and Georgia with good results. Care must be taken to control diseases and mites.

The **Verti-Gro insulated EPS pot** adds some new dimensions to growing tips for plug production.

First of all, there is no soil, so there are no soil borne diseases.

Weeds should not be a problem if care is taken to keep them out from blown in seeds. Heat, particularly from the soil, (or black plastic) is not a problem. Runners should never touch the soil.

Plug production and plug usage will become a much larger part of our plans in the future.

The inconsistency of supply from Canada and the difficulty in planting large bare root green-top plants makes plug plants in the **Verti-Gro System** a distinct possibility for the future.

Plus are obviously more expensive and freight is higher. However, the rewards may be worth the extra cost.

(Plugs normally cost **\$0.18 each** while bare root plants are about **\$.08 each**)

Plugs were not ordered in time to have a trial in **1999-2000**, but orders have been placed for plugs for **fall 2000**.

Since strawberries do not normally do well in Florida during the summer alternative inter-cropping has begun.

Lettuce is a definite alternative crop in the **Verti-Gro** system, as are herbs, spinach, oriental greens, mustard and many other crops.

The decision on the type of crop is first based on the market potential "**U-Pick**" or "**Pick Your Own**" with direct "*farm market*" or "*stand*" sales dictates an entirely different approach to planting.

These crops and cropping procedure are to be covered in a separate paper.

Conclusions: Strawberry plants carried over the summer in Florida have potential.

Some things learned:

1. Begin fresh water treatment during the last month of harvest.
2. **Do not** re-circulate the summer water. **Discard!**
3. Water sparingly just to keep the plants from severe wilt.
4. Spray or pull weeds as necessary. Since there are no flowers, certain weed control chemicals can be used. Unfortunately, **Daethal** is no longer produced.
5. Spray with a fungicide at least every three weeks during the summer and use a fungicide drench at least once a month.
6. Monitor for *mites* and *thrips* and use IPM or standard chemical methods. Since there is no harvest chemical is better.
7. Prune bad plants heavily during late August or early September.
8. Apply half strength solution with full iron levels in September. Use a very low Nitrogen solution.
9. Treat for *Anthracnose* and mites early.
10. Check top pots for excessive crown splitting and replant to other pots if necessary.

Conclusions: Physical

1. Do not plant too close inside, especially in high towers.
2. Do not go over nine pots high inside in a “*U-Pick*” operation (and possibly only eight pots high)
3. Outside, the stacks can be 5-6 pots high.
4. Use two emitters per stack for safety purposes.
5. Increase frost protection and check frequently. Apply frost protection at 36 degrees F.
6. Cover greenhouse and plants when temperatures are expected to drop below 25 degrees F.

Conferences & Workshops

UF AREC Workshop, May 16th.
ASP Plasticsulture 2000 Sept 23-27