Agriculture and Rural Development

Jan—April, 2008

Volume 7,
N0. 1-2

# The Greenhouse Business

## Adjusting to Market Realities is the Name of the Game

**Mohyuddin Mirza**

Every year brings its challenges, opportunities and rewards. A few years ago when we did our first greenhouse industry survey, labor costs were pegged at about 34% of the operating costs while heating costs were around 9%. These figures are from the early 1980's. Now, the reality is that labor costs have escalated to about 42% and heating costs have almost caught up to these costs. I was looking at heat use in one day by a grower operating a 2 acre vegetable range, when the outside temperature was over minus 40C, what I was seeing was as if dollars were being burnt. There is no doubt that government's natural gas rebate has cushioned these prices and other programs are helping as well, but the bottom line is that we have to compete with imports and our inputs are far higher than those incurred by exporting countries. Here are some Thoughts For Food, or you can call it Food for Thought:

- Market reality is that a wholesaler can cut you off just like that, even if you have a contract in place. Another supplier comes along, and supply produce cheaper than yours, and the wholesaler may use it to get your price reduced, or stop buying from you. The cucumber price from Mexico was around $15/dozen in early January, while it was over $20 last year. So, if you have planned your cash flow at last year prices, you would go into shock first, and then recover from it. Nothing will make sense to a wholesaler, because profit is the main motive. Paying for quality is no more in the market segment. I have been asked this question many times, now that we are HACCIP compliant, we have an On Farm Food Safety Program in place, we follow environmental stewardship practices, we use biological controls and other similar things, but we cannot get a better price from wholesalers. All I can say is, very good question!

- When I talk to wholesalers, I am told that consumers want good quality, but cheaper prices. Consumers tell me that they love to buy more local produce, but price is a factor. There is only a certain percentage of consumers who will pay a better price for quality , and I have wondered many times if some consumers really know what good quality vegetables look like. I think more promotion of quality, locally grown, healthy and nutritious vegetables is required and growers can do that through their cooperatives and associations. I have seen promotions only on special sales. Why not consistently promote quality on a regular basis? When I see cucumber specials for $0.99 for one week, and then the price jumps to $1.99 the next week, consumers undergo price shock syndromes. Better planned advertisement are required to attract consumer's attention. It should not be just the lower price specials, but should be quality, locally grown and nutritious.

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- We have to add value to our produce. Our value is the freshness of the product. I was talking to many growers that can deliver within 1-2 days of harvest. Besides that, we can supply, and are supplying, a diversity of products. There are many types of tomatoes we can market. We can supply five different types of cucumbers that we grow. There are at least 8 different types of tomatoes we can market. We can supply five different types of peppers.
- We have to increase production per sq. m of greenhouse space in all vegetables. If we can produce more per unit area, then we can show more elasticity in handling lower prices, at least for sometime. For example, I have seen cucumber production ranging from 110 to 150 cucs/sq.m per year. If all growers are selling at the same price, then the grower producing 150 cucs will have a better chance of competing in the market place. One must review one's management practices to see where the gaps are. This review can be done externally or internally. We have good financial reviews in place, why not have production reviews in place to identify the weakest links in the production chain. It may be your irrigation system or it could be proper temperature management or pruning techniques, etc. If your production is below average, then get it reviewed and start improving.

Market place will always have its challenges, and your ability to make adjustments at all fronts, will be required to maintain profitability and sustainability.

## What is This on Tomato Leaves?

**Mohyuddin Mirza**

It is rare to see this condition on tomatoes. I saw this one after a few years. Most of the newer cultivars don't show these types of symptoms. It is called edema. A grower reported this in just the end row of the greenhouse, and it happened during the very cold weather. You may still remember we had temperatures over minus 40 not long ago, and the air temperature around this row of plants did dip to 12C for some time.

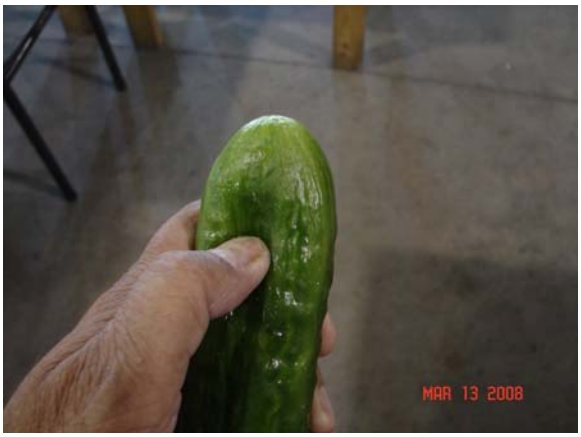
When the night temperature drops that low, especially quickly, then the roots are still pumping water and leaves get cooler, so cells burst open and cell juices callus around those areas. Generally the cell juices have E.C. around the same level as feed E.C. so they may cause physical burning. The plants recovered and not yield loss is expected. Growers may watch for botrytis developing on those spots.

# The Greenhouse Business

## A Case of Soft Cucumbers

**Mohyuddin Mirza**

What would you do if you are known for good quality cucumbers and the shipment has been returned because the blossom end turned soft. The picture below provides an idea of what I am talking about. The first thought was that something went wrong during shipping. Maybe the truck was too cold, but then cucumbers from other growers were alright, so that rules out the possibility of damage during transportation.




My second thought was that lack of calcium, or boron or maybe potassium could have caused the problem with the fruit. The results of the leach ruled that out, as well. All macro nutrients and micro nutrients were within normal range. pH and E.C. were also in the range.

A visit to the greenhouse helped solve the problem. It was the computer screen which yielded some clues. The moisture deficit which is expressed in grams/cubic meter of air was 2.4, 1.6, and 1.3 for 3 days. Moisture deficit is a calculation made by combining temperature and relative humidity. The higher the temperature and relative humidity, the lower the moisture deficit, meaning that ability of water from leaves to go into the surrounding air will be less. If moisture is not lost from leaves to the air, then transpiration is reduced and roots don't develop in the growing medium. Calcium uptake is the first one affected by lower moisture deficit and unlike potassium, calcium has to be provided to cucumbers fruit, on a constant basis. Like potassium, it is not stored in the leaves, and it is immobile. Calcium is part of the cell walls and once fixed it cannot be moved to other areas.

A recommended moisture deficit for cucumbers is in the range between 3 and 7 and that is achieved by maintaining proper temperature and relative humidity. What is worth remembering is that what you do in the greenhouse affects the post harvest quality of cucumbers and other vegetables.

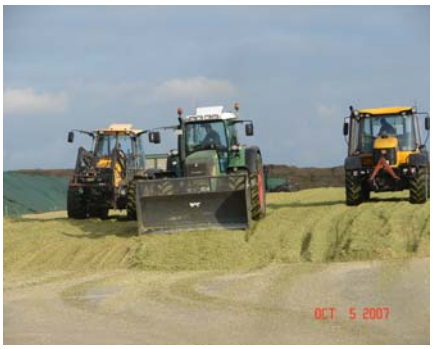
# The Greenhouse Business

## Notes from Tour of Germany and Holland

**Mohyuddin Mirza**

I had a great opportunity to visit Germany and Holland in October. Highlights of this trip were presented during the Green Industry Conference in November. Here are some things which I learned and could be of value to Alberta growers.

- Biowatt plant near Hamburg was using corn silage and manure as feed stock to produce methane gas and firing a generator. A farmer's cooperative supplies the corn and converts it to silage at the site.



What I understood from the visit was that 70% corn silage and 30% manure was mixed and precise moisture content was maintained for fermentation in a tank. Methane gas was directly used to fire a generator. At this time, the electricity was going into a grid. I think a good feasibility study is needed for Alberta greenhouses, for using biogas from plant sources and or manure.

Royal Pride Holland is now located in Wieringermeer, with 45 ha of state of the art greenhouses producing truss tomatoes only. The plan was to expand to 100 ha. The picture on the left shows growers from Alberta and Ontario visiting the facility. There was a great focus by this company on sustainability, food safety and social responsibility, as their value system. Food safety practices were very evident in the greenhouse and packing area. All of us on the tour cloaked full covers, gloves and shoe covers. Sanitation practices have to be followed because of whitefly transmitted viruses. It was mentioned that it is almost impossible to treat virus diseases in tomatoes. Crops has to be destroyed in most of the situations. More information about this company can be seen at http://www.royalpride.nl/tomato/en/company.php

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This was a pepper range. Worth noting was installation of moveable belts in each row where peppers were placed after harvest, and transported for packing. This greenhouse range was also using many cogeneration units to generate electricity for supplemental lighting. Peppers did benefit from the use of lights and crop was grown and marketed year round.

This company has developed an environment monitoring system with sensors located at strategic locations. The data on various parameters like temperature, relative humidity, carbon di oxide was more reliable and helped to better manage crops in greenhouses.

A visit to Improvement Centre highlighted the importance of research through private companies. Many companies contributed to the construction of greenhouse facilities. Research is conducted on products and technologies. Pictures were not allowed but some of the projects we saw were:

1. Performance of totally enclosed greenhouse structures for production to tomatoes. The principle was that temperature was maintained very effectively and thus much better levels of carbon di oxide were maintained. Tomato plants were trained in a V-shaped system to trap more light. Supplemental lights were used in winter and cloudy days. Year round production of over 100 kg/sq. m was projected. Cost is likely going to be around 25% higher than the conventional greenhouses.

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2. Aquaponics system where fish was cultivated under the raised gutters for tomatoes.
3. Pepper crops on raised troughs and in closed greenhouses.
4. Evaluation of coir substrates compared to growing media.

I thought it was a good concept where private sector has its own capability to conduct research. We did visit another greenhouse where tomato varieties were being tested for commercial performance. The selection was based on market demands and requirements of shipment to long distances by ship or surface. Air shipping is becoming expensive and there is great interest in vegetables which are less perishable and have a longer shelf life.

A pepper grower was developing a moveable system where plants are brought to a central station, where fruit is harvested and pruning is done. It appeared to be a promising system. The costs and benefits are being worked out.

This grower was also using supplemental lights to grow the peppers on a year round basis.


During lunch break, we noticed these young men promoting the town square. My first thought was that we don't need stilts and other equipment in the greenhouses if these men could walk through the rows. Maybe that is the reason the greenhouse design is changing in Holland, to accommodate them. Here is another idea to develop and market. (Just kidding!)

This high wire cucumber grower was developing the use of UV lights to kill lower leaves. UV lamps were mounted on a trolley, which is used on pipe rail, and lamps are turned on when the trolley is being used. This grower has also installed LED lights to test their effect on cucumbers. Leaf to fruit ratio was used to determine crop performance. Hydrogen per oxide is also used by this grower as part of a fertilizer program.

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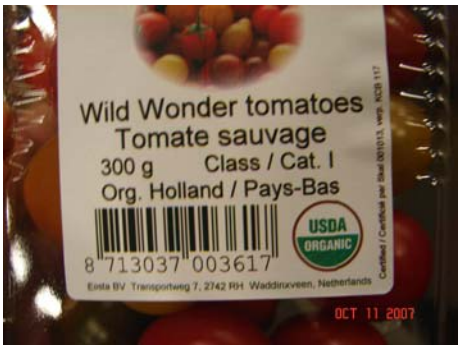
Other highlights included:

- A visit to technologies testing center, where automation was the focus. We saw moveable systems for peppers and tomatoes, and also hanging basket moveable systems.
- A visit to Louis Bolk Institute where research work is being done with organic production systems, mostly soil based cultivation and building up fertility through microbes.
- A visit to an organic vegetable greenhouse, where cultivation was all in soil. Nematodes were an issue and steam was being used to pasteurize the soil. It appeared that in Holland, soilless organic systems are not approved yet. Organic produce was being marketed through specialty stores.
- I was able to visit two packaging houses, one of them specifically handling organic produce. One thing of great interest was the introduction of biodegradable plastic made from corn. I am not sure if it was edible.




This packaging shows a USDA organic label on tomatoes. There were also organic labels from several E.U. countries.

## From the Trade Show

- The Alga Stop is a mechanical transmitter sending ultrasonic sound into water. It claims to kill algae spores and viruses. Check **www.algastop.nl**
- Water-cooled flower displays are self contained units which keep water bacteria free, thus enhancing shelf life of flowers. **www.luykxflowercabinet.nl**
- Aqua-Hort claims to kill several fungi like Pythium and bacteria like Xanthomonas. This technology is based on addition of copper nutrition by means of electrolysis. Free copper ion kills these fungi. **www.aqua-hort.dk**
- Eco Futura was promoting growing fish and tomatoes, a sort of aquaponics. **www.ecofutura.nl**
- Humin Tech—Humic acid based products. This company was marketing soil conditions, bio-stimulants and organic fertilizers. **www.humintech.com**
- Orga plus Organic Fertilizers. Organic substances are combined with a large number of good bacteria. **www.orgaplus.nl**

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- Ferrilene is a product to treat iron chlorosis situations in plants. It is claimed that this type of iron greens up the leaves quickly and stays green longer. **www.valagro.com**
- GNA Packaging has developed horizontal wrapping machines to satisfy requirements of medium-high production. **www.freshpack-hs.nl**
- Verhagen Leiden has a different type of cleaning and vacuuming equipment for greenhouse use. **www.verhagenleiden.nl**
- Boal System—Aluminum greenhouse systems. **www.boalgroup.com**
- Multifuel Fired Boilers for the greenhouse industry. **www.vyncke.com**

If I have to summarize, what I learned from this tour, it would be like this:

- The development and use of new technologies to obtain higher yields. Obtaining 100 kg of tomatoes/sq.m was not believable a few years ago. Once technologies are developed, then they are commercialized in the world market, as well.
- Dutch companies are not afraid to invest in a new greenhouse anywhere in the world. I learned from one company that they are building in Mexico and New Zealand, to supply North American Japan markets.
- Attractive and environmentally friendly packaging was the buzz word wherever we went.
- Organic research was a priority and growers took great pride in what they were doing.
- I think smaller sized growers, maybe less than 3 ha, will not be around too long. The trend was to build 30, 50 or 100 ha. Smaller growers could only survive if they developed niche markets and diversified.
- Hortifair was so big that my legs were tired.
- There were many Alberta growers at the Hortifair, and that is very heartening to see.

## Bacterial Canker in Tomatoes Can Cause Serious Losses

**Mohyuddin Mirza**

We are globally connected and that is the price you pay. Tomato seedlings which came from a propagator from B.C., showed signs of bacterial disease which had been diagnosed by a lab in Holland as bacterial canker. This disease has been known to us since early 1980, but has not been seen for the past two decades. It is caused by a bacterium *Clavibacter michiganensis* pv. *Michiganensis.* The origin has been traced to seed infection from Bolivia, where tomato seeds were produced by the company. So, here is the story that seeds of tomatoes, produced in Bolivia, grown in B.C., under controlled conditions, and seedlings coming to Alberta, were infected by this bacterium. This is in spite of the fact that all companies involved did all due diligence, by screening the seeds, following all sanitation practices.

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It was very heartening to note that these companies did get together with Alberta growers and talked about the diseases, how it happened, and what the future course of action was. This is a very good, open and honest approach, and let us hope that we can learn from the experience of tomato growers from B.C., Ontario and Holland.

The important fact to understand is that the disease symptoms are appearing when you have just started to pick, and your suppliers are expecting certain volumes, at certain times. It is just not a simple disease in your greenhouse, it is going to become a big marketing issue. At this time it appears that tomato variety Bizar is showing the symptoms of bacterial canker. Not all tomato growers who bought seedlings from this propagator from B.C. are showing the symptoms. Symptoms can appear at young seedling stage and on mature plant leaves, stems and fruits. I have colored pictures with me, if any grower needs them, please let me know.

One of the questions being asked is, at what stage should I get rid of my crop, clean my greenhouse, and plant another crop? I think that decision has to be made by you. If you are finding daily that new plants are showing infection and your revenue is not supporting your expenses, then it is time to terminate the crop. But, the question is, if all growers plant a crop of cucumbers, and come into the market at the same time, what will happen? Cucumber price is already the lowest I have ever seen—below $4.00/dozen. Probably staggering your cucumber crop may be the answer. Check with your insurance to see if it covers business losses due to crop diseases.

In the meantime, you should know about this disease. Some information was provided at the meeting by these companies. You can learn more from the following website: **http://www.agf.gov.bc.ca/cropprot/bactcanker.htm**

**Once bacterial canker is confirmed:**

**Immediately:**

- Remove infected plants and adjacent plants carefully.
- Place infected plants in plastic bags to reduce spread, and remove from greenhouse.
- Do not reuse coir or bags from any infected plants.
- Disinfect pruning tools promptly.
- Wash hands well, and change clothing, after infected plants are removed (wash clothing before wearing them again).
- Limit the traffic in the areas where infected plants were found. Work with plants in the infected area last, or assign certain workers to this area.
- Monitor the crop carefully for disease. Pay close attention to plants in the proximity of the initial outbreak.
- Stop recycling water, or start using bleach or hydrogen peroxide or ozone, to treat your water.

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**Prevention for the following growing season:**

- Thoroughly clean the greenhouse after harvest. Remove plant material, clean all greenhouse surfaces, and disinfect irrigation lines.
- Examine transplants before planting. Plant only healthy seedlings.
- Reduce possible sources of soil or moisture contamination.
- Install a foot bath with a disinfectant at the greenhouse entrance.
- Disinfect pruning equipment.

## Some Rules of Thumb for Energy Use in Greenhouses

**Energy Consumption Per Year**

| | | | |
|---|---|---|---|
| Cucumbers | 16,000 GJ/ha | or | 6,500 GJ/acre |
| Tomatoes | 19,000 GJ/ha | or | 7,695 GJ/acre |
| Peppers | 15,000 GJ/ha | or | 6,075 GJ/acre |
| Perennials | 14,700 GJ/ha | or | 5,950 GJ/acre |

**Energy Contents of Different Fuels**

| | | | |
|---|---|---|---|
| Natural Gas | 38.16 MJ/m3 | or | 10.60 kWh/m3 |
| Coal | 31.10 MJ/kg | or | 8.64 kWh/kg |
| Wood Waste | 14.46 MJ/kg | or | 3.72 kWh/kg—25% more moisture |
| Bunker Oil | 40.06 MJ/kg | or | 11.13 kWh/kg |
| Wood Pellets | 18.84 MJ/kg | or | 5.23 kWh/kg |

**Projections for a 20,000 m2 or 5 acre Tomato Operation @ 1.90 GJ/m2 or 0.17 GJ/ft2**

| | | | |
|---|---|---|---|
| On Natural Gas | 37,900 GJ | or | 1,196,172 m3 |
| On Coal | 42,353 GJ | or | 1,361,831 kg |
| On Wood | 42,353 GJ | or | 2,680,566 kg |

# The Greenhouse Business

## RAISING QUALITY BEDDING PLANTS

**Mohyuddin Mirza**

What you see outside in early April is not what you see inside a greenhouse. Two successive snow storms dumped wet, heavy snow and your thoughts of spring coming around get dampened. But the reality is that greenhouses ins Alberta are full of all sort of bedding plants, hanging baskets, containers, annuals and perennials. It is good time to visit a greenhouse and enjoy greenery and make your selections at this time. In the meantime here are few tips to keep and maintain quality for your customers.

- Focus on balanced nutrition. Many growers forget that regular fertilizers do not have a key fertilizer calcium in it. Calcium provides strength to stems and shoots and reduces breakage of side shoots. So make sure you are using calcium nitrate on a regular basis.
- Set up a good insect monitoring program. Aphids and whiteflies at this stage can wipe out your crop or render it un-saleable.
- Pay more attention to hanging baskets and containers. They bring more revenue per unit area of the greenhouse. Use diverse plant material and different color combinations.
- Customers like clean and symmetrical baskets. Remove any weeds growing inside those baskets.

Maintain a good moisture content. Don't go on a wet and dry irrigation cycle at this time. Too dry and wilted baskets will drop flowers quickly.

And one thing more about Blossoms For The Cure program. Alberta Greenhouse Growers Association has a program for bedding plant growers. We want to raise $ 10,000 this year for Alberta Cancer Board. Check our www.agga.ca for details.

The Greenhouse Business is published bi-monthly by the Business Development Branch of Business and Innovations Division of Alberta Agriculture, Food and Rural Development.

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