Vegetarian 90-06
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I. NOTES OF INTEREST

A. Calendar.


B. New Publications


II. COMMERCIAL VEGETABLES

A. Using Up-To-Date Fertilizer Recommendations.

Recent questions from a couple of counties have caused some of us to be concerned about the availability of the most up-to-date recommendations for commercial vegetable fertilizer recommendations. These questions indicate that some of the "old" literature, guides, and manuscripts are still floating around as reference material. Sometimes, these old numbers conflict with the newer ones, especially for crops for which there is new research information.

For vegetable fertilizer recommendations, the following guides and fact sheets represent the latest publications we have on the subject. Please use these publications and throw out the old ones.

1. Cir. 225C. Commercial Vegetable Fertilization Guide.

2. Cir. 806. Commercial Vegetable Crop Nutrient Requirements.


B. Fall Broccoli Variety Selection for North Florida.

An earlier article provided information on broccoli variety selection for spring planting in north Florida. Information provided here gives a summarization of results of trials conducted at the NFREC Quincy in falls of 1986-1989. If more in-depth information is desired, Broccoli Variety Evaluation 1981-1989, NFREC Research Report 90-5 is available.

Transplanting dates were 12 Sept. 1986, 8 Sept. 1987, 14 Sept. 1988 and 22 Sept. 1989. In-row spacing was 9 inches and between row spacing was 36 inches. Total nutrients applied 175-108-295 lbs/A of N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O. All plants were produced in expanded polystyrene trays with
dimensions of 1 inch x 1 inch wide x 3 inches deep (100A Speedling tray). The varieties tested are listed in the following table along with seed source, number of years planted, average yield over number of years planted, and number of days from transplanting to first harvest. All varieties listed were planted in the fall of 1989. Planting date was delayed in fall of 1989 due to wet conditions. This late planting date resulted in several varieties not maturing all of the heads before a killing freeze occurred. Some varieties were not included in all years because of lack of seed or were new releases.

The highest overall yielding variety was 'Commodore.' It never placed first in any year but placed second in 1 year and third in 2 other years. 'Green Charger' was second overall with 'Samurai' placing third overall. 'Samurai' is a very late variety that did not mature in 1989 before a killing freeze destroyed the crop. 'Greenbelt' placed fourth overall and was the only variety to place in the top five in both spring and fall trials. The yield variation between fall crops was greater than that which occurred in the spring crops. The highest yielding early variety (≤60 days) was 'Commodore' but was followed closely by 'Galaxy.' The highest yielding mid-season variety (61-66 days) was 'Green Charger' and the highest yielding late varieties (≥67 days) were 'Samurai' and 'Green Belt.' With this classification we have 5 early varieties, 9 mid-season and 4 late varieties. Selection of varieties from each maturity group could allow an extended season from a single planting date.

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<tr>
<th>Variety</th>
<th>Seed Source</th>
<th>Number of Years Planted</th>
<th>Average Yield Crates/Acre</th>
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<td>Green Valiant</td>
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<td>Packman</td>
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<td>Green Duke</td>
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<td>Mariner</td>
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<td>Commander</td>
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<td>Premium Crop</td>
<td>Petoseed</td>
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<td>395</td>
<td>61</td>
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<tr>
<td>Chancellor</td>
<td>Sakata</td>
<td>2</td>
<td>362</td>
<td>66</td>
</tr>
</tbody>
</table>

*All varieties were planted in fall 1989. Yields for 1989 were not included for 'Green Valiant,' 'Green Belt,' 'Lancelot,' 'Pirate' or 'Samurai' because a killing freeze severely reduced yield. Missing years were due to lack of seed or release of new varieties.

(Olson, Vegetarian 90-06)
C. Maintaining Air Quality in Cold Storage Rooms - Part 2 - Avoiding and Controlling Contaminated Air.

In the previous article (Part 1 - Concerns and Symptoms - Vegetarian May 1990), we introduced potential problems of air quality which can develop in cold storage areas. A confined space is defined as an area having limited access and poor ventilation and is not designed for continuous human occupancy. Examples include storage tanks, pipe chases, sewer lines, utility vaults, etc. Any or all of these criteria can create a confined space hazard. Cold rooms meet the criterion of having poor ventilation and are not designed for prolonged human occupancy. The recommended air exchange rates for cold rooms are based on assumption of continuous occupancy: 5 cubic feet of air per minute per person (cfm/PERSON). For intermittent occupancy it is assumed that infiltration is sufficient. (Source: ASHRAE Standard 62-1981)

As indicated in the first article, the concern in a cold storage room is the poor ventilation characteristics which are inherent by design. The potential hazards created by such include oxygen deficiency or asphyxiation, the creation of toxic atmospheres and the creation of flammable or explosive atmospheres. The most obvious correction is increased ventilation. However, this also means increased cooling and the resultant increase in operating costs. Therefore the most effective way to deal with a confined space hazard is to prevent it from occurring in the first place. This can be accomplished by the implementation of engineering and administrative controls coupled with air monitoring techniques serving as an early warning system.

Engineering controls would include substitution of alternate materials or equipment. Examples would be using electric fork lifts to prevent the build up of carbon monoxide, soot and carbon dioxide emissions. Other engineering controls include isolation of heavy traffic areas from occupied areas or using mechanized equipment to limit the need for human contact. If ventilation is contemplated, limit it to local exhaust rather than general dilution to reduce the amount of conditioned air that is lost.

Administrative controls would include frequent maintenance of fork lifts to ensure efficient combustion and minimum emissions. Rotating employee schedules to limit or control time spent in the area of concern is another common administrative control. Training all employees in the recognition of those procedures or conditions with the potential for creating confined space hazards is a must.

This brings us to our next topic. 

What should be done if an atmospheric hazard exists in a confined space? The first thing is to identify and quantify the contaminant(s). Air monitoring is therefore conducted for three parameters unless specific information is known about the area to dictate otherwise. These parameters include oxygen content, explosive atmospheres and toxic atmospheres. The order is crucial because the oxygen content will affect the potential for explosive concentrations to be created and should therefore be monitored first (the higher the oxygen content the less fuel required for an explosive mixture to occur).

The oxygen content of ambient air is about 21%. Oxygen-deficient atmospheres are defined as those containing less than 19.5% O₂. Oxygen-enriched atmospheres are those containing more than 23% O₂. If either of these conditions are met two choices remain before the area can be occupied. The first and most preferable method is purging. This technique involves forcing ambient air into the area with high volume blowers to increase the oxygen content to normal concentration. The key to purging is that once begun it must be continued as long as personnel remain in the area. If purging is interrupted the
condition can reoccur. Air monitoring is also crucial to ensure the area is not entered until the oxygen content reaches 19.5-23%. In situations where purging may not be practical it may be necessary to stop work and rely on infiltration. Air monitoring should still be used to determine when the area is safe to reoccupy and that the condition does not return. The second and less preferable alternative is to issue supplied-air breathing units to employees within the space. This is least preferred because the hazardous condition still exists, personnel are incumbered by the breathing apparatus and specialized training is required.

Although explosive atmospheres are not usually a concern in cold storage rooms, similar control measures are used in alleviating this hazardous condition. Explosive atmospheres exist when the Lower Explosive Limit (LEL) of an unknown atmosphere reaches 20% or more as indicated by an instrument called a combustible gas detector or explosimeter. This instrument takes specialized training to interpret the readings as the LEL will vary if the explosive substance is known. The method for controlling explosive atmospheres is called inerting. This involves displacement of the explosive mixture in the space with a nonreactive gas such as nitrogen. Following introduction of the inert gas the area must undergo a final purge with fresh air to ensure sufficient oxygen content. Again for cold rooms it may be necessary to rely on infiltration and continued air monitoring before allowing personnel to return to the area. Air monitoring should be continuously conducted to determine the concentration of explosive atmospheres in the space and ensure the oxygen content is safe for re-entry.

Finally, toxic atmospheres are frequently encountered in confined spaces. This can be particularly dangerous because of the nature of the space. By definition there is limited ventilation which creates a concentrating effect on the contaminant. In most cases enough background information is known about the area and the potential contaminants to identify the monitoring strategy and tailor it accordingly.

Potential contaminants include carbon dioxide, carbon monoxide, ammonia vapors, chlorine gas, hydrogen sulfide, pesticide vapors and particulates. Direct reading instruments are available for each of these materials to detect and quantify their concentrations. Levels of concern are known as permissible exposure limits (PEL) and are governed by OSHA, the Occupational Safety and Health Administration. If the concentration of any contaminant reaches the PEL, the area must be either purged, (allowed to air out) or respiratory protective equipment must be issued specific to the contaminant of concern. As always, once the purging begins it must be continued as long as personnel remain in the area. Air monitoring must also be continued to ensure the effectiveness of these efforts and that limits on the respiratory protection are not exceeded.

In the event of a chemical spill or other emergency, similar actions need to be taken. The first step in any emergency is to communicate the hazard, evacuate the area and become informed about the substance of concern. The main source of information about toxic compounds is the Material Safety Data Sheet (MSDS). These should be maintained in a central location for ease of access and organization. Refer to the MSDS to determine the extent of the emergency. Notify the local fire department or emergency medical teams as necessary. Refer to the MSDS again and identify any individuals experiencing symptoms of exposure. If so, have someone take them to the nearest medical center or obtain assistance from the emergency medical team. If internal response is contemplated, refer to the MSDS and determine the toxicity of the material and the proper clean up
procedures. If it is appropriate or if only a small amount was lost, the spill may be cleaned up locally provided proper equipment is available. This includes spill pillows or clay absorbent and neutralizing agents. Respirators with the appropriate cartridges, disposable gloves and safety glasses/goggles must also be worn as indicated on the MSDS. Finally, contaminated materials must be disposed of properly as hazardous waste and response personnel should shower as soon as possible.

The key to the success of any safety procedure is practice. Emergency drills or scenarios should be conducted periodically to ensure that all personnel understand their responsibilities. This includes announcement of the emergency, evacuation routes/procedures and medical assistance.

While these procedures may seem involved and extensive, the bottom line is to remain calm and act responsibly. Safety training and control measures go a long way in preventing confined space hazards. In the event of unsafe air in a cold room, the basic correction in a cold room involves evacuation, infiltration/ventilation and air monitoring to ensure safe conditions are confirmed before re-entry. When in doubt refer to the MSDS or contact local authorities.

(D. Endicott and S. Sargent, Vegetarian 90-06)

(Dan Endicott is Industrial Hygienist, Div. of Environmental Health and Safety, University of Florida, Gainesville).

D. Vegetable Crops Library.

From time to time, books on vegetable production, postharvest handling, and marketing are noted in this column as a service to those in Florida interested in keeping up on vegetable crops literature.

Manuals prepared by the Organization for Economic Co-operation and Development in Paris are available from OCED Publications and Information Centre, 2001 L Street N.W., Suite 700, Washington, D.C. 20036-4095. These manuals provide grade standards for international shipment of produce. They are well illustrated in color to show what is and what is not permitted in each grade.

1. Apples and Pears, Tomatoes, Citrus Fruit, Shelling Peas, Beans, Carrots (1979) $24.00
2. Strawberries (1979) $7.50
3. Garlic (1979) $12.00
5. Onions (1984) $14.00
6. Aubergines (1987) $15.00

These manuals should be very useful to those that are or are considering export or importation of produce.

A new book of interest is A Color Atlas of Postharvest Diseases of Fruits and Vegetables, Volume 1 General Introduction and Fruits by Anna L. Snowdon. It is available from CRC Press, Inc., 200 Corporate Blvd. N.W., Boca Raton, FL 33431 for $80.08. Most of the book is devoted to fruit crops but strawberries, melons and watermelons are included in this volume. The other vegetables will be included in Volume 2 to be published soon.

(Maynard, Vegetarian 90-06)

III. VEGETABLE GARDENING

A. 1990 St. Johns County Vegetable Gardening Contest.

County agent Jim Dilbeck and I just completed a tour of gardens throughout St. Johns County. This was the 11th year for the contest, in which participants enter their gardens in 1 of 9 categories, then Jim and I try to find them. The 9 categories included youth (individual); youth (group); container, organic;
landscape, small, medium, large, and market. Awards and recognition were given during a meeting of all the gardeners which featured a critique of each garden and a showing of slides of each garden.

Highlights

Gardens were exceptional this spring due in all likelihood to the early severe cold snap that froze out some pests then left us with a fairly long, early frost-free growing season. Most of the gardeners had their tomatoes and other such vegetables planted in February instead of the usual month of March.

As usual, the tomato was the queen vegetable - just about every gardener had some beautiful plants standing shoulder high to show off. Most were loaded with pretty fruit. The 'Better Boy' is still the most commonly grown variety, perhaps in 85 percent of the gardens we visited. Gardeners like it because plants are usually available and they have good luck with it. But other varieties do well also. We saw some nice 'Bonnie Best', 'Beefsteak', and 'Celebrity'.

Other most common vegetables were sweet corn (usually 'Silver Queen'), southern peas, onions, bush snap beans, pole beans, summer squash, cucumbers, peppers, and okra. Most of the cool season vegetables had been harvested already. Many gardens also contained the usual assortment of other crops such as herbs, pumpkin, asparagus, strawberry, New Zealand spinach, garlic, and dill.

Problems

The most obvious problem encountered was plant stunting and stress due to the drought. Watering restrictions had many gardeners behind on their watering schedules, and their vegetables showed it. Even though sufficient fertilizer had been applied, the low soil moisture prevented maximum nutrient uptake. In second place was the general area of soil fertility (or lack of it), which again was influenced by the dry soil conditions.

Weeds probably came in third, although most gardens were thriving in spite of them.

Next came the problem of an over-abundance of vegetative growth and a reduction in fruit set. Squash, tomato, beans, and peas were the most common victims.

Most gardens were relatively free of any serious disease and insect invasions. Tomato bacterial wilt was evident in two or three gardens, blossom-end rot was starting to show up in some fruits and leaf-miners were noticeable here and there.

In summary, every gardener we visited who had taken good care of the basics of gardening - varietal selection, watering, fertilizing, and pest control were well satisfied with their efforts. Freezers were filling up nicely and most gardeners were bragging rather than complaining. I was happy to see the amount of leaves, lawn clippings and other organic waste the gardeners were trying to recycle through their gardens. We had only 4 or 5 100% organic gardeners, but most expressed a desire to cut down on their dependency of chemicals and to increase their ability to use alternatives such as compost and home remedies that work.

Hopefully, the St. Johns happening was a reflection of the gardening situation statewide. A conservative estimate is that we have over 1,000,000 vegetable gardens in Florida, and with the Gallup Poll estimate of $300 for the average retail price value after expenses for each garden, the "industry" is worth about $300,000,000 in Florida. And that's not counting all of the other benefits of gardening.

(Stephens, Vegetarian 90-06)
<table>
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<th>Title</th>
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<td>Dr. D. J. Cantliffe</td>
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