Texas Agricultural Extension Service

Vegetable Production & Marketing NEWS

VOLUME 6, NUMBER 12 DECEMBER 1996

Coming Events

HIGH PLAINS VEGETABLE CONFERENCE
Hereford, Texas
January 21, 1997 • 8 AM - 5 PM
For information contact: Dr. Roland Roberts, TAMU-AREC Lubbock (806) 746-6101

CENTRAL TEXAS VEGETABLE CONFERENCE
DeLeon, Texas
January 16, 1997 • 8 AM - 4:30 PM
For information contact: Bob Whitney, County Extension Agent-Comanche (915) 356-2539

EAST TEXAS VEGETABLE CONFERENCE
Tyler, Texas • February 18, 1997
For information contact: Wayne Lacy (903) 535-0885

WINTER GARDEN CROP PRODUCTION CONFERENCE
Uvalde, Texas • January 3, 1997
CEU's Available, $10 Registration.
Program will be conducted on the campus of Southwest Texas Junior College. Vegetable and row-crop production topics will be discussed. Sponsored by Atascosa, Frio, Medina, and Uvalde County Extension Offices. For information, contact one of the Extension offices.

TLC Means Quality Transplants

This article ***from American Vegetable Grower****, April 1995 by Dan Cantliffe, originally ran in* ***HortTechnology****, Oct./Dec. 1993*

It's not always easy to nail down the factors that affect transplant quality, early crop growth, and, ultimately, yields. But variables that have been pegged as influencing transplant quality include:

1) Controlling plant growth by varying tray-cell size, fertilization, irrigation, and temperature,
2) Age of transplants,
3) Storage and handling procedures.

When you are looking at how these factors fit into your operation, remember one primary principle of transplant quality: any stoppage in plant growth causes adverse responses, such as poor seed-stalk development, greater

(Continued on Page 2)

Appearing Within . . .

TLC Means Quality Transplants (Continued from Page 1)

disease susceptibility, and potentially reduced yield. Here are a few suggestions on how to adjust practices to get the best transplants possible.

Cell Size Affects Plant Size. Transplants from large tray-cell sizes are taller and have greater dry weight. For instance, in various studies, peppers and tomatoes from large cells produced larger plants and greater early yield. This response has also been seen with eggplant and certain varieties of watermelon. In another case, larger cells did increase earliness of broccoli and cauliflower, but not total yield. A possible reason for these positive results: plants from large cell sizes suffer almost no transplant shock compared to transplants from smaller cell sizes.

Older Transplants - Lower Yields. Simply put, the older your transplants, the lower your chances of getting maximum yields. Work done several years ago showed the benefit of younger transplants for tomato production. Bare-root 3- to 5-week-old transplants had greater, earlier yield than 7- or 9-week-old transplants. Another study found that 4- and 5-week-old transplants had the greatest yield, though total yields were similar from 3-, 4-, and 5-week-old transplants. Research with the variety 'Sunny' in Florida showed that after field planting, 3- and 4-week-old transplants grew faster than older transplants. Younger transplants had a greater capacity to resume growth faster after transplanting than older transplants.

However, the research also found that in seedling culture, 5- or 6-week-old plants (considered older) can be exposed to more water and nutrient stress than younger 3- or 4-week-old plants. Early and total fruit yields were similar from all transplant ages. However, 4- and 5-week-old transplants yielded more large fruit early, and 4-week-old transplants had more total yield of large fruit than 6-week-old transplants.

Coming Into View (Continued from Back Page)

courses on yield mapping, among others. "It's not switching a button or whatever," he said. Not all the sensors under development require GPS units, Kvien said. Among the smart machines he's worked with are spray applicators that detect chlorophyll, allowing growers to put herbicide or fungicide only where needed rather than over an entire field of cabbage, and herbicide applicators that turn on when they sense weeds taller than the crop. Other prototypes apply multiple sprays by injection, avoiding the need for tank-mixing, or they distinguish between broadleaf plants and grasses.

WHAT IS ZERO?

The dictionary defines zero as "having no magnitude or quantity." For decades, much food safety policy in the United States has been based on the premise that no quantity of toxins will be present in plants unless man puts them there. Thus, legislation has tended to demand a 'zero tolerance' of any man-made material that could be shown to be carcinogenic in laboratory animals. But the historical goal of zero toxin levels in food was based not so much on whether residues were actually present, but rather on our ability to detect them. Today, we are capable of detecting residues in quantities as small as one part per trillion -- the equivalent of 1 inch in 16 million miles. With improved detection ability has come a realization that a multitude of natural chemicals exist in food, and that minute levels of chemical substances (be they man-made or natural) pose little risk to the health of our society.

Food safety standards using modern science abandon the 'zero detect' level in favor of a negligible-risk standard based on the likelihood of a given toxin causing any health effect. In most cases, the negligible risk level is considered to be a 1 in 1 million chance of developing cancer after a lifetime of exposure to the toxin. Tolerance levels are then established which include a built-in margin for error, since they are typically based on high-dose testing of laboratory rodents.

For example, allowable residue levels for synthetic pesticides in foods are generally set at approximately 1/100th of an amount found to cause an effect in laboratory animals. In contrast, there is no systematic approach for establishing safety levels for natural pesticides. A new law, known as the 'Food Quality Protection Act of 1996', abandons zero-tolerance standards created by the 38-year-old 'Delaney Clause' in favor of a comprehensive standard based on a 'reasonable certainty of no harm to the consuming public.' The new standard is intended to be more consistent with modern science and current detection capabilities.

Representative Thomas Bliley, Jr. (R-VA), who spearheaded debate on the legislation as Chairman of the House Commerce Committee, said in a press release (July 16, 1996), "For the first time, we will be able to address the issue of food safety comprehensively, taking into account the safety of the consuming public, preservation of the food supply, and economic benefits as well." Bliley added that one component of the measure provides special enhanced protections for infants and children, adopting recommendations made in 1993 by the National Research Council.

Maximizing Yields of Green Cauliflower

by

A. A. Csizinszky

Green cauliflower (Broccoflower) is a relatively new vegetable in the United States. The curd looks like that of a white cauliflower, but is light green. The curd is less dense and the buds on the florets are not as tightly packed as in white cauliflower. Green cauliflower is an excellent source of vitamin C and folic acid. The vegetable industry is interested in growing high-value crops during the winter, but yields of cruciferous crops are often adversely affected by fluctuating temperatures. Green cauliflower is a high-value crop, but very little is known of its optimum planting time, plant spacing, and nutrient requirements. In the Netherlands, the quality of green cauliflower is rather poor during the summer months but improves in the fall.

Studies to investigate the yield potential of green cauliflower at various planting times, plant populations, and N- and K-rate combinations, were conducted at the Gulf Coast Research and Education Center, Bradenton, Florida, on Eau Gallie fine sand (sandy, siliceous, hyperthermic Alfic Haplaquod) during fall-winter-spring (October 1992 to April 1993). The production system was a full-bed polyethylene mulch with seepage irrigation. Three planting dates (October 1, 1992, November 24, 1992, and January 12, 1993) were evaluated in various treatment combinations (2 within-row spacings, 12 and 15 in 3 N rates -- 87, 174, and 261 lbs/A -- and 3 K rates -- 87, 174, and 261 lbs/A). 'Alverda' green cauliflower seedlings, raised by a commercial plant grower, were then planted in double rows in the beds at 10-inch between-row spacing in the treated areas.

Curds were harvested and graded according to U.S. Grade Standards for cauliflower (USDA 1981). Wrapper leaves were trimmed at the maximum curd diameter and curds $\geq$0.75 lb. and $\geq$4.5 inches in diameter were considered marketable size. Harvest period for the October 1, 1992 planting was from December 17, 1992 to January 12, 1993; for the November 24, 1992 planting, from February 1 to March 1, 1993; and for the January 12, 1993 planting, from March 23 to April 1, 1993.

Planting dates significantly affected the marketable yields of green cauliflower. Yields, averaged over the plant spacing and N and K rates, were highest in the January planting and lowest in the October planting. In the October planting, only 16 percent of the plants reached marketable size curds ($\geq$0.75 lb.), and a very large proportion of curds were bracty, i.e., leaves growing through and above the curds. Even in the November planting, only about half as many plants had marketable curds as in the January planting. Marketable yields were 16 percent higher at the 15-inch spacing than at the 12-inch spacing. The proportion of plants with marketable curds and average weight per curd were higher at the 15-inch spacing than at the 12-inch space. Yields increased with increasing N rates; the number of plants with marketable curds also increased. Potassium rates had no significant effect on yield or on curd size.

'Alverda' green cauliflower yields were much below the yield of 'Snow Crown Hybrid' white cauliflower at this location with similar N and K rates. For example, in the October planting, the best green cauliflower yield of 2.1 lb/A was only 35 percent, and in the spring (January to April) planting, only 60 percent of the white cauliflower yield reported in previous years. Furthermore, green cauliflower had a slower curd development when planted in October and November than in January, as indicated by the length of the growing and harvesting season at the 3 planting dates. The reason for the poor yields in the fall plantings may be the high day and night temperatures during seedling development. Experiments with 'Snowball Imperial' and 'Snowball A' cauliflower found that curd initiation was inhibited when transplants were kept at $\geq$70 degrees F. Some cauliflower cultivars required a longer period to form curds under high temperatures than under moderate or cool conditions. In the Florida tests, green cauliflower seedlings had optimum day and night temperatures for growth and development only in the January planting, when sown at the end of November. Therefore, in areas with similar climatic conditions to those described herein, green cauliflower should be planted during the cooler winter months for maximum yields. Another advantage of the winter-spring timing of green flower production would be the reduced pesticide and irrigation costs due to a shorter growing period than in an early or late fall planting. Green cauliflower yields did not increase with increasing K rates, and residual K concentrations in the soil were high after the harvest.

In summary, under warm, humid climatic conditions, seedling growth and planting of green cauliflower should be timed when minimum temperatures fall to $\geq$ 70 degrees F. The crop requires large amount of N, since even under favorable climatic conditions (January to April), only 63 percent of the plants had marketable curds with N at 174 lb/A, but 71 percent of the plants had marketable curds with N at 261. The crop had a low demand for K and should be planted at 15-inch within-row spacing to maximize marketable yields.

This article appeared in ***HortScience*** *31(6)930-933, 1996.*

Coming Into View

by Renee Stern

This article appeared in
***The Grower**, November 1996*

Precision farming presents several promising opportunities for vegetable growers, particularly potato growers, but those opportunities remain a few years away. While precision farming continues to spin off new ideas that marry technology and agriculture, in most cases commercial products for vegetable growers still hover just out of reach. But the next few years will bring yield monitors and mapping systems, sprayers, and equipment sensors within growers' grasp. HarvestMaster, Logan, Utah, has offered a yield mapping system for potatoes on a limited basis the past two years. The system is now beginning to hit a wider market.

Many of the other products, including nutrient spreaders and pesticide applicators, are undergoing field tests, said Pierre Robert, Director of the University of Minnesota's Precision Agriculture Center in St. Paul. Yield monitors and mapping systems, though, have received the most attention, he said. Craig Kvien, a crop scientist at the University of Georgia, Tifton, said that interest has risen because growers want maps that show how yields vary across a field, enabling them to compare different farming practices. But even that map isn't sufficient, Robert said. Growers should compile records of fertilizer and pesticide applications, soil analyses, and other factors that might influence yields. Although that data may be crude now, he said, better sensors using Differential Global Positioning Systems will refine and expand a database to help growers 'optimize profits'. Roberts advocates on-the-farm research that varies the amount of nitrogen applied, for instance, on several strips that can later be checked with yield monitors to see which amount has the most impact.

Kvien said aerial photos offer another way to gather information. "That bird's-eye view is really good," he said about zeroing in on problem sections. "You can't get that kind of feel from just walking the field." Banding together with neighboring growers can help keep costs affordable, Kvien said, adding that he spends $1 to $2 per acre on aerial photos. The high cost of pesticides and other inputs will encourage vegetable growers to adopt whatever techniques promise savings -- or hopes of higher yields -- when they become available, he said. One of the obstacles to use of yield monitors, Kvien said, is the wide variety of harvest methods involved with vegetables. Manufacturers can't simply overhaul a system for potatoes to work on beans.

But yield monitors and maps aren't the whole story. Shelby Fleischer, a professor in the Department of Entomology, Penn State University, uses GPS units to map insect populations for integrated pest management. The maps help refine pesticide applications even further than standard IPM methods, translating into respectable savings, which run as high as 80 percent in his test fields. GPS units, which use a satellite network for navigation and precise measurements, are part of the 'enabling technologies' for precision farming, said Art Lange, product manager at Trimble Navigation Ltd., Sunnyvale, California. With DGPS, tractors and other farm equipment can be fitted with sensors to work more precisely, such as cultivators that dig right up to a line of irrigation tape without slicing it. Units accurate to just less than a meter now cost around $3,000; for accuracy to the centimeter, expect to pay about $20,000. Lange predicted that price would eventually drop to about $6,000. "I don't expect anyone to use the new technology until they see the payoff and find the equipment can be easily handled by the average field hand," he said. That ease-of-use aspect can't be overlooked, Robert said. Growers will need new skills for precision farming, and the Precision Agriculture Center is developing

(Continued on Page 2)

Frank J. Dainello
Extension Horticulturist
Commercial Vegetable Crops
The Texas A&M University System
College Station, TX 77843-2134

Charles R. Hall
Extension Economist-Horticultural Marketing
Department of Agricultural Economics
The Texas A&M University System
College Station, TX 77843-2124