

# PLANT & PEST ADVISORY

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## Staking Tomatoes Reduces Disease and Increases Marketable Yield

*Martha Maletta, Hunterdon County, Horticultural Consultant, William Tietjen, Warren County Agricultural Agent, Win Cowgill, Hunterdon County Agricultural Agent, Stephen A. Johnston, Specialist in Plant Pathology, and Peter Nitzsche, Morris County Agricultural Agent*

In 1993 and 1994, as part of field studies evaluating disease forecasting in tomato production, fresh market tomatoes grown on the ground were compared with tomatoes grown using the short-stake cultural system. We collected data on foliar disease caused by fungi, yields and post-harvest fruit rots. The effect of culture on these parameters was significant. Staking increased marketable yield, reduced foliar disease and reduced losses from postharvest fruit rots.

The research, supported by the New Jersey Agricultural Experiment Station/Rutgers Cooperative Extension Sustainable Agriculture Grant Program and the Hunterdon County Board of Chosen Freeholders, was done at the Rutgers Snyder Research and Extension Farm in northwestern New Jersey. The tomato variety 'Celebrity' was grown at 18 inch spacing in the row and 6 feet between rows. All the tomatoes - both stake and ground culture - were produced on raised beds with black plastic mulch and trickle irrigation. The staked plants were pruned to the sucker below the first fruit cluster. The crop was harvested weekly, graded and weighed. During peak harvest, marketable fruit was stored for one week at 60 to 70 degrees F to simulate grower, retailer or consumer practices and then examined for postharvest decays.

In both years the incidence of foliar disease was significantly lower on the stake than on the ground culture plants (see Figure 1 on page 2). The major foliar disease in both years was **early blight**; **Septoria leaf spot** was also present.

Marketable yield was higher for the stake than the ground culture tomatoes (see Figure 2 on page 2) although total yield was not affected by culture. The annual average increase in marketable yield was nearly 30%. In 1994, the staked tomatoes also yielded a higher percentage of jumbo fruit (larger than 3.5 inch diameter).

SEE TOMATOES ON PAGE 2

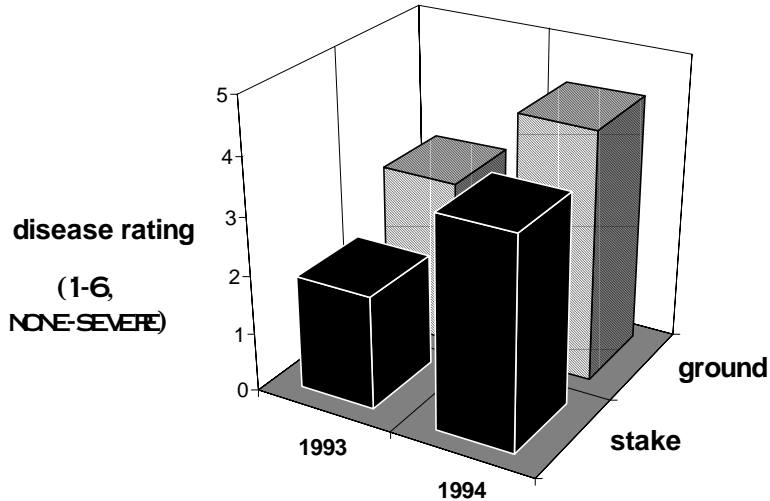


Figure 1. Effect of culture on incidence of foliar fungal disease

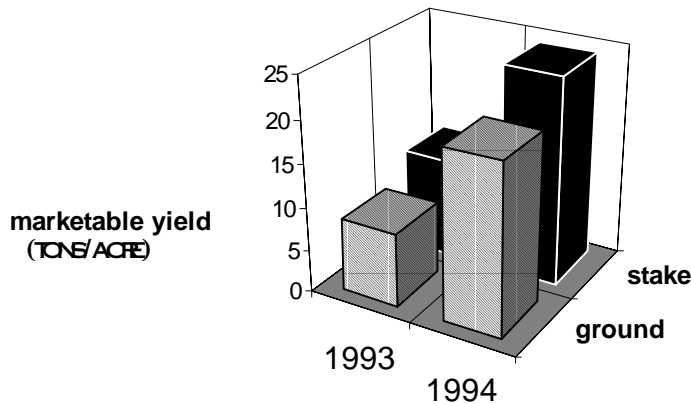


Figure 2. Effect of culture on marketable yield.

Culture also affected postharvest losses. Of the ground culture marketable fruit stored for seven days, an annual average of 30% was lost to various decays. Losses of stake culture fruit averaged 12.6% (Figure 3).

For comprehensive information on the short-stake system used in this research, contact Rutgers Cooperative Extension in your county for a copy of Fact Sheet E163, "Commercial Staked Tomato Production in New Jersey". For a reprint of the recent HortTechnology report on this study, contact Bill Tietjen, Warren County Agricultural Agent, 908-475-6505.

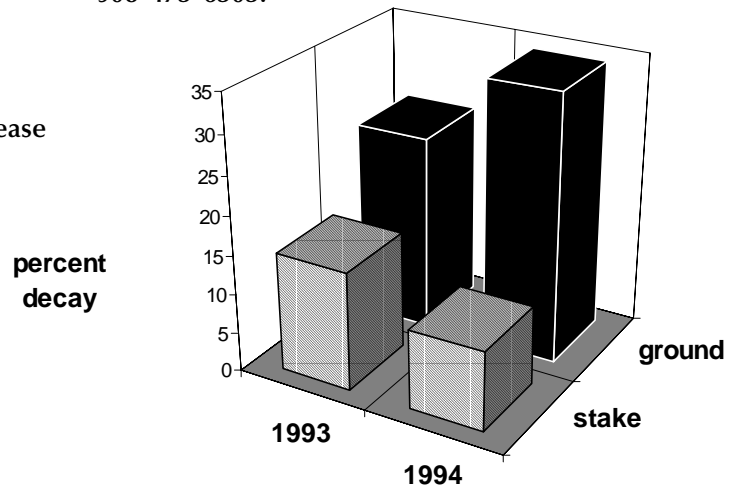


Figure 3. Effect of culture on postharvest losses.

## Deadline to Install Reflective Tape on Trailers

Trailer owners are reminded that June 1, 2001, is the deadline for the installation of red and white conspicuity tape to improve nighttime visibility on old and new trailers with a gross vehicle weight of 10,000 lbs. and 80" (or wider) overall width. This high-visibility reflective tape will greatly increase visibility of trailer boarders in low light and darkness. Using the tape on box trailers, flatbeds, livestock/grain trailers and tankers can help prevent serious accidents and cargo damage. For information on where to apply the tape on the trailer, refer to Section 393.11 of the Federal Motor Carrier Safety Regulations. This retrofit rule represents the first time federal safety standards applicable to new vehicles were made applicable to old ones. □

## Soil Survey Web Site

Joseph R. Heckman, Specialist in Soil Science

Soil survey maps are available from the Natural Resource Conservation Service (NRCS). They provide a wealth of information about local soil conditions such as drainage, texture, and crop yield potential. The NRCS is now coming out with county soil survey maps on cd-rom. Somerset and Burlington Counties are currently available. Eventually you will be able to access soil survey maps from the web. For further information, the NRCS web site for New Jersey-specific information is: [www.nj.nrcs.usda.gov](http://www.nj.nrcs.usda.gov). □

## Water Stress in Young Plants and Measuring Soil Moisture

Michelle Infante-Casella, Gloucester County Agricultural Agent

With all of the rain last season and a fair amount of snow this past winter, one would think that soil moisture should be adequate. However, in early spring, the lack of rain accompanied by high temperatures and wind created very dry conditions, especially in light soils. Any new transplants or seedlings out in the field would most likely suffer if not irrigated. Stressing the plant when it is young will cause yield losses later when plants are mature. Additionally, plant stands may suffer due to mortality. Also, a weak plant is more prone to attack by diseases and insects. Without adequate soil moisture, necessary nutrients are not absorbed by the plant, causing stunting and additional physiological disorders. These are just a few reasons why it is important to supply adequate soil moisture to young plants.

To supply the proper amounts of water to your crops at the proper timing, the use of tensiometers or gypsum blocks can help. Tensiometers consist of a 1/2" diameter plastic pipe with a porous ceramic cup attached to one end and a vacuum gauge attached to the other. The cup is saturated with water and the pipe filled with water. The cup is then inserted into the soil at the root depth. As the soil dries and wets, water flows in and out of the plastic tube through the ceramic cup, producing a reading on the gauge that measures soil water pressure. The higher the tensiometer reading, which is usually measured in centibars, the drier the soil. For many crops tensiometers are best installed about six inches from drip tape and at a depth of about 1/3 the root zone. They can also be installed at the lowest depth of the root zone.

Gypsum blocks are another tool used to measure soil moisture. Rather than measuring tension, gypsum blocks measure electrical resistance in the soil. Two electrodes are imbedded in a block of gypsum or in a ceramic block containing gypsum. The block is saturated with water and then buried in the soil. As the soil moisture changes, soil water flows in and out of the block, changing the block's electrical resistance. The gradual dissolution of the gypsum maintains the water in the block at a constant salinity, thereby counteracting the effect of salinity on the electrical resistance. When most of the gypsum is dissolved, the block must be replaced. Like tensiometers, gypsum blocks can be installed at about 1/3 the root zone or at the bottom of the root zone.

Monitoring soil moisture and utilizing the data to irrigate at the correct times and amounts can greatly improve plant health and ultimately, increase yields. In addition, utilizing these tools can also help to conserve water. Over-irrigation can cause root rot problems and perpetuate certain soil-borne diseases, like **Pythium** and **Phytophthora**. For more information on soil moisture monitoring contact your local Rutgers Cooperative Extension Agricultural Agent or your local Natural Resource & Conservation Service representatives. □

## Time to Make Hay?

Daniel Kluchinski, Mercer County Agricultural Agent

Doesn't it seem like the 2001 season has brought it's share of unpredicted weather — heavy rains, hot temperatures, cold spells, extended wet spells followed by dry periods? Unfortunately, it is mostly weather prediction and time management that comes into play when making hay. We hope that this year's harvest will be a good one, but so far weather conditions have been challenging. You may improve your chances of getting good quality hay and getting it in the barn in a timely manner, if you use some basic meteorological phenomena and forecasting to help plan your haymaking.

The best conditions for making hay will occur after the passage of a cold front. This normally will provide a least three days of good haymaking weather. What factors can help you to determine when these conditions will occur and haymaking should begin?

How much temperature drop is expected? A 10°F or more drop is normally associated with a strong cold front passage.

✓ A forecast that mentions a trace or less of precipitation is the most desirable. A forecast of widely scattered showers, or less than 1/4 inch of precipitation, would also indicate a low rainfall risk period.

✓ A forecasted wind shift from a southerly to a westerly or northwesterly direction is a good sign for clear weather.

✓ A low humidity forecast indicates good hay making conditions.

✓ Mention of rising barometric pressure is also favorable.

✓ When viewing a forecast on television, look for a cold front diagramed slightly west of your geographic position, followed by a strong high-pressure area.

SEE HAYMAKING ON PAGE 5

## Tick Warnings

Deborah Smith-Fiola, Ocean County Agricultural Agent, and Steven Rettke, Program Associate in IPM

*Excerpted from Landscape IPM Notes, Rutgers Cooperative Extension of Ocean County, May 2001.*

During the weeks ahead, the peak activity for the immature stage of the **deer tick** (now called the **black legged tick**) will commence. This stage is the vector of 70% of all cases of Lyme Disease. The nymph is very small, about the size of a poppy seed. The tick is picked up by brushing against low (4"-6") vegetation. Since ticks don't fly or drop from trees, they crawl up and wait on vegetation for a person to walk by, and then grasp onto clothing, and crawl up. Tucking your pants into your socks (so they don't crawl up your leg unaware), wearing high rubber boots (too slippery to crawl up – but in the summer?), and wearing a repellent (to kill them upon clothing contact) are thus all precautionary recommendations to prevent a tick bite. The nymph stage will feed for 3 to 5 days, swelling with blood to the size of a sesame seed before it drops off.

The nymph prefers to live in the woods, or in adjacent vegetation, *not* in properly mowed lawns. A lawn is simply too hot and dry for nymphs to survive. Research shows that 84% of nymphs are found in the woods, 13% along wood-edge vegetation, and only 3% in the lawn.

Reliable control of deer tick nymphs currently involves one application of a granular insecticide (Sevin G or Dursban G) broadcast 8-12 feet into the woods. Shaded turf adjacent to the woods is also treated. One application during late May or the first week of June has given > 95% control of nymphs. Liquid insecticides are also labeled, but *thorough coverage*, by drenching foliage until runoff, must be performed. Only one pesticide application is necessary, because nymphs rarely move more than 10 feet from where they molted from a larva. Once they are killed within an area, they won't re-infest again until the adult moves in via animal activity during the fall season. □

## Successful Sweet Corn Irrigation

Raymond J. Samulis, Burlington County Agricultural Agent

It has been a long time since I remember having to provide significant irrigation for sweet corn this early in the year. So far, my early sweet corn trials had to be irrigated twice just to get the seed growing and out of the ground. This certainly is a practice that many of us dread for a number of reasons. One concern is that early irrigation fosters shallow rooting and more susceptibility to lodging, as well as the need for continued irrigation early in the season. Another issue is partial germination. When seeds are given a small amount of water, they can partially sprout and then wither due to more extended dry periods. Sweet corn seed emergence can be spotty in situations where no irrigation is made, which can aggravate maturity problems. Many studies I have made show that even a few days of uneven emergence will never straighten itself out, and will never catch up to the earlier emerging seeds. On a more practical level, I begin to worry about overall water supplies for the entire season each time we begin drawing down supplies this early.

Studies with sweet corn have shown that if plants wilt early in the growing season, vegetative growth will be slowed and yields will suffer accordingly. The amounts of water available for sweet corn growth depends upon both the rooting volume and soil texture. Sweet corn is generally considered to be a relatively shallow rooted vegetable with a root system of between 18" to 24". If you were to plant sweet corn on 36" rows with 16" spacing, there would be about one acre inch of water available for growth, while on a clay loam the same rooting zone could supply over 8.5 acre inches of water. Because of this relatively small rooting zone, as well as the nature of sweet corn itself, research has shown that sweet corn is the most responsive crop of the 15 crops in the test. In fact, sweet corn irrigation increased yields by a whopping 2,281% compared to only 35% for the top five vegetable crops.

Drought conditions also make us think more about the relationship between nitrogen utilization and available water. Without adequate available moisture, the nitrogen uptake and its subsequent effect on yield is minimized to a large extent.

There are many ways to accurately and scientifically measure soil moisture and the need to irrigate sweet corn. Plaster blocks measure the soil moisture through conductivity. Tensiometers measure moisture by reading differences in the push or pull of water moving in and out of the instrument (see related article, "Water Stress in Young Plants and Measuring Soil Moisture". A simpler way to measure soil moisture is by observing certain physical features of the soil. Sandy soils with near 0% moisture will be dry, loose and flow through your fingers (currently, much like many of our soils). Soils with 50% or less moisture will appear dry and will not form any type of ball. Soils with 50% to 75% moisture will loosely form balls and at 75% to 100% moisture the sandy soils will be slightly sticky and form balls that can easily be broken apart. □

# Sustainable Cut Flower Production

George Wulster, Specialist in Floriculture

The commercial production of cut flowers in the field has increased dramatically in the past decade, and there is a substantial interest in information on sustainable production techniques. For the purpose of this article “sustainable techniques” are those practices that reduce potential environmental impacts of production, conserve resources, and are at least economically sensible, if not the least expensive.

Producers of ornamental crops, and field cut flower growers in particular, have found it both challenging and necessary to adopt “sustainable” techniques that have benefited the producers of other horticultural commodities. The challenges result in part from quality and aesthetic requirements of the market place. This “quality” challenge is compounded by the fact that frequently a large portion of the plant is the product, not just the edible fruit or vegetable portion. This is especially true when wholesale and retail florists serve as market outlets and the threshold for insects or disease is virtually zero.

The necessity has resulted in part from the lack of labeled chemical controls for many insect, disease, and weed problems that producers face. Also, many field cut flower operations are modest in size and start off with minimal resources and investment. Despite their modest size, the diversity of species and even genera that are managed may be extremely large compared to other types of horticultural production, where often only a few cultivars are grown.

A useful resource for field flower growers with an interest in organic or sustainable cultural practices is the *Sustainable Cut Flower Production Guide*. The guide was developed by the Center for Appropriate Technology Transfer for Rural Areas (ATTRA). This publication focuses on sustainable production of cut flowers. It is not meant as a primer for inexperienced growers, but rather as a complementary piece of information that concentrates on sustainable production techniques.

Some of the topics covered include production scheduling, post harvest handling, integrated pest management, weed control and alternative fertilizers. Topics related to business management are also introduced including, marketing, cost determinations, suppliers, and other resources.

The guide can be found on the Internet at:  
<http://www.attra.org/attra-pub/cutflower.html>.

It is also accessible via the Rutgers Floriculture web page at:  
<http://aesop.Rutgers.edu/~floriculture>.

Information can also be obtained by calling ATTRA staff at the number shown below.

The ATTRA Project is operated by the National Center for Appropriate Technology under a grant from the Rural Business - Cooperative Service, U.S. Department of Agriculture. These organizations do not recommend or endorse products, companies, or individuals. ATTRA is located on the University of Arkansas campus in Fayetteville, at PO Box 3657, Fayetteville, Arkansas, 72702. ATTRA staff prefer to receive requests for information about sustainable agriculture via the toll-free number 800-346-9140. □

## HAYMAKING FROM PAGE 3

In addition to knowing when a cold front will be approaching, one needs to know when the front has actually passed. The following signs, in order of importance, are:

✓ the wind should shift in a counterclockwise manner from a southerly to a westerly or northwesterly direction.

✓ the sky should clear rapidly and the appearance of fair weather cumulus or low fleecy alto-cumulus clouds should be evident.

✓ dry bulb thermometer temperatures should drop rapidly.

✓ barometric pressure should rise steadily.

If one observes the above guidelines, a conservative estimate of a three day rainless period is 85 percent for the late May-early June period, and will be higher as the season progresses. Therefore, keep an eye to the sky and an ear to the forecast before cutting hay.

*Adapted from Forages, Hughes, D. H, M. E. Heath and D. S. Metcalfe, editors. 1962. The Iowa State University Press. p. 534. □*

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