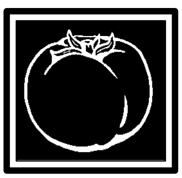
Texas Agricultural Extension Service

Vegetable Production & Marketing NEWS

VOLUME 6, NUMBER 10 OCTOBER 1996

Shading of Tomato Plants Inconsistently Affects Fruit Yield



High day and/or night temperatures interfere with tomato fruit set (Berry and Uddin, 1988). Incorporating genetic resistance to the detrimental effects of high temperature on tomato fruit set has not had uniform success. Thus, cultural methods are needed to supply tomato fruit for existing market windows. One practice that has been claimed to be of benefit is shading tomato plants during hot weather. USDA scientists in Oklahoma undertook a study to determine if shading could be used to increase yields and extend the tomato fruit production season.

The experiment was conducted at Lane, Oklahoma. Black plastic mulch and drip irrigation were used to grow the crop. Six-week-old seedlings of the varieties 'Flash' and Sunny' were transplanted on 15 May, 15 June, and 15 July in 1991 and 1992. These cultivars are considered poor fruit setters under high temperatures.

In one-half of the plots, 1 m-wide, black polypropylene 63% shade fabric was attached to cross members of T-shaped supports 4 feet above the bed surface and to wire strung between cross member tips extending the length of the plots. The shade cloth, put in place 3 weeks after transplanting, was draped over the bed ends and secured to exclude direct solar radiation. Plants were supported using the stake and weave method. Fruit was harvested twice weekly. The last harvest was determined by the size of the remaining fruit and the possibility that they would be harvestable.

The planting month interacted with shade to affect total and marketable fruit yields. Shade improved the total fruit yield of plants established in June 1991, but failed to affect fruit yield for plants established in any months in 1992.

Based on the result of the study, the scientists concluded that shading did not increase tomato fruit yield consistently, and its use is not justified.

*This article by V. M. Russo (U.S. Department of Agriculture, Agricultural Research Service, South Central Agricultural Research Laboratory, P. O. Box 159, Lane, OK 74555) appeared in **HortScience** 28(11):1133. 1993*

Appearing Within . . .

Windbreak Effects on Microclimate

The reduction of wind velocity by wind barriers has many ramifications in the microclimate of the protected zone. Soil warming is one benefit of using either temporary or permanent windbreaks. Characteristically, air above a sheltered crop is 1 to 2 degrees centigrade warmer than above a comparable, unsheltered area, a temperature increase sufficient to extend the growing season about 10 days. Average hourly air temperature under sheltered conditions tends to be warmer during the day and cooler at night. This contributed to enhanced net assimilation rates and the increased growth in sheltered areas. It also contributed to more rapid growth during the spring and fall when air temperatures are cooler. Some growers express concern that the calmer air in sheltered zones may be conducive to frost formation. In Nebraska, the warmer soil in fields protected by tree windbreaks was noted to reduce the incidence and severity of radiation frost injury to fall vegetables compared to vegetables growing in nearby exposed locations.

Along with temperature, modification of plant-water relations is a major impact of wind reduction. Higher soil moisture is attributed to a reduction in direct evaporation. Although the total volume of water used may be greater for sheltered plans due to larger plant size, the water-use efficiency generally is improved over that of plants exposed to wind. In temperate climates, permanent windbreaks contribute to increased soil moisture in the sheltered zone by trapping snow. The higher relative humidity characteristic of sheltered zones, especially those protected by vegetative windbreaks, may enhance plant growth, fruit set, and fruit quality factors, especially in arid or semiarid climates. Research indicates that species respond differently to relative humidity, independent of temperature, for vegetative and reproductive growth. Overall, modifications to the microclimate in sheltered areas contribute to 5 to 50 percent higher yields. In Nebraska, yields from small plots located in the zone with 1 to 3 times the tree windbreak height were higher by 14 to 18 percent for cabbage, 13 to 100 percent for snap beans, and gave higher early yields in muskmelon.

*This article by Laurie Hodges and James R. Brandle, entitled "Windbreaks: An Important Component in a Plasticulture System," appeared in **Hort Technology**, July/September 1996, Vol 6(3):177-181.*

Making Irrigation More Efficient

Irrigation efficiency is a measure of the amount of irrigation water beneficially used -- principally for replenishing soil moisture, leaching salts, and protecting crops from frost -- divided by the amount of water applied. Losing water to deep percolation (irrigation water percolating below the root zone where it cannot be used by the crop) or to surface runoff diminishes irrigation efficiency.

The more evenly water is applied over a field, the potentially more efficient the irrigation. If every part of the field were to receive the same amount of water, uniformity would be 100 percent, but as a practical matter, no irrigation system can achieve 100 percent uniformity -- some parts of the field always receive more water than other parts. When the uniformity of a system is particularly poor, some parts of the field may have to be severely over-irrigated so that the areas receiving less water in a given period will be adequately irrigated. This over-irrigating can cause excessive deep percolation.

Deep percolation takes place when the amount of water infiltrating the soil exceeds the soil moisture depletion, that is, the amount of soil moisture used by the crop since the last irrigation. This can be caused by over-irrigation or by water being applied unevenly over the field. Shortening irrigation set times to prevent over-irrigation and changing the design of the irrigation system to apply water more uniformly can lessen deep percolation. Because a well designed drip system can apply water with a high degree of uniformity, deep percolation may be greatly reduced under drip irrigation.

Water flows off the lower end of a field as surface runoff when irrigation water is applied at a rate faster than the rate at which water can infiltrate the soil. Applying water more slowly or using a drip system in place of conventional irrigation can reduce surface runoff.

From Drip Irrigation for Row Crops, pp. 5-7, University of California Irrigation Program

Herbicide-Resistant Weeds Can Be Combated

Growers can keep resistant weeds from sabotaging their herbicide programs by taking some precautions.

"Weed resistance has been a problem with several classes of herbicides," says Dr. William Curran, assistant professor of weed sciences at Penn State University.

Since the 1960s, more than 50 species of weeds throughout the world have developed biotypes that are resistant to different herbicide families. Herbicide resistance has been caused by monoculture cropping patterns, such as growing continuous corn; using herbicides that persist in soil; using less tillage and thus reducing non-chemical weed control options; and spreading resistant weed seeds along with cattle manure.

"When choosing a herbicide program, base your decision mainly on anticipated weed problems and potential herbicide resistance," said Dr. Curran. "Also consider crop and herbicide rotations, potential herbicide injury to crops, your tillage system, your herbicide application equipment, soil characteristics, potential environmental hazards, and cost."

The following crop management strategies can help deter herbicide-resistant weeds:

- Use herbicides only when necessary.

- Rotate herbicides with different sites of action in weeds, such as ammino acids, enzymes, or proteins. Do not make more than two consecutive applications of herbicides with the same site of action to the same field unless other weed-control practices are included. Two consecutive applications means single annual applications for two years or two split applications in one year.

- Apply herbicides in tank-mixed, prepackaged, or sequential mixtures that include multiple sites of action. The herbicides must be effective against potentially resistant weeds for this strategy to work.

- Rotate crops, particularly those with different life cycles.

- When growing new herbicide-resistant crop varieties, do not use more than two consecutive applications of herbicides with the same site of action against the same weed unless other weed-control practices are included.

- When feasible, combine herbicide use with mechanical weed control.

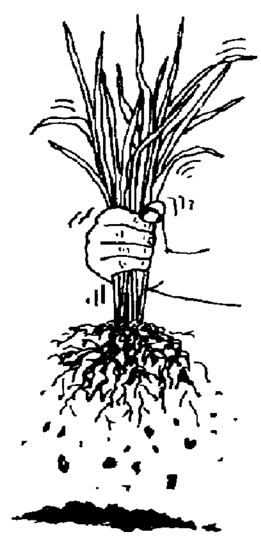
- Where there is little potential for soil erosion, include primary tillage as a component of a weed management program.

- Scout fields regularly and identify weeds present. Respond quickly to changes in weed populations to restrict the spread of weeds that may have developed resistance.

- Clean tillage and harvest equipment before moving it from fields infested with resistant weeds.

- Encourage local organizations, such as railroads, public utilities, and highway departments to use vegetation-management systems that do not lead to selection of resistant weeds. If these organizations use Total Vegetation Control (TVC), resistant weeds from TVC areas can spread to cropland.

From an article appearing in ***The Great Lakes Vegetable Growers News****, January 1994.*



DowElanco Awarded Supplemental Treflan Label for Use on Peppers

By Dr. Frank J. Dainello, Extension Horticulturist-Commercial Vegetable Crops
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Treflan has been labeled for use on peppers as a preplant applications for a long time. Under the conditions of the recently approved supplemental label, its use has been expanded to include a postemergence, incorporated treatment when plants are 5 to 7 inches tall. The new use pattern is restricted to application with ground equipment equipped with drop nozzles and spray shields, to prevent Treflan contact with the young plants.

Another restriction of Treflan's use in this manner is that a grower must have a signed Waiver of Liability Certificate for the crop to hold DowElanco harmless from all claims and liability arising from crop damage or loss of yield from the use of Treflan on peppers.

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