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Rainfall Capture and Drip Irrigation

By Dr. Frank J. Dainello, Extension Horticulturist
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As drought conditions continue to persist across the state, the greater is the need for techniques that reduce the risk of crop failure associated with these conditions. Since drought conditions are not unusual occurrences in Texas, such techniques should be incorporated into management practices of all vegetable production operations. As the state's population continues to climb, less water will be available for crop production and the urgency of incorporating these techniques into standard production practices will increase.

In an attempt to encourage the adaptation of the most advanced techniques for managing limited water resources in vegetable production, a team of scientists from the Texas Agricultural Extension Service conducted a series of demonstrations in the Winter Garden area. The results of two of these demonstrations are presented in this article.

Appearing Within . . .

- ***Rainfall Capture and Drip Irrigation***
- ***Overinflated Tractor Tires Waste Fuel and Reduce Productivity***
- ***Control Weeds in Watermelon Early in Production Season***
- ***Ten Trends That Are Shaping Produce***

The initial demonstration conducted by the Vegetable Crops Water-Use Efficiency Team was established in cooperation with McFaddin Farms of Uvalde, Texas. In this demonstration, water-use efficiency of a Rainfall Capture system (RFC), and drip irrigation plus plastic mulch, was compared with that of conventional furrow irrigation in cantaloupe production. Drip irrigation was scheduled, based on soil moisture tension as indicated by tensiometer at a 12-inch depth. When a 45 centibars tension was reached, one inch of irrigation water was applied. The cooperator scheduled the irrigation in the furrow block using his normal procedure. No supplemental water was applied in the RFC block.

The RFC system was established on October 26, 1993, in order to capture and store sufficient moisture throughout the fall and winter months for use on cantaloupe to be grown the following spring. This system consisted of establishing two polyethylene-lined mini catchment basins, 22 inches apart, on an 80-inch wide raised bed. Each basin was approximately 10 inches wide across the top, 4 inches deep, and 3 inches wide across the bottom. Holes, spaced 3 feet apart, were punched in the bottom of the lined catchment basin to allow moisture to enter the bed for storage.

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The drip- and furrow-irrigated blocks were established on April 4, 1996, and all blocks direct-seeded with the cantaloupe variety 'Caravelle' on April 12. Fruit yield and water-use data obtained in this demonstration are presented in Table 1.

A second demonstration was established in 1995 in conjunction with Cargil Farms of Uvalde. In this demonstration, comparisons were made between drip irrigation, RFC, and plastic-mulched furrow-irrigated blocks. Due to weather conditions and scheduling conflicts, the RFC system was established just prior to planting on April 6. All blocks were direct-seeded, using the variety 'Mission', by April 15. The data obtained from this demonstration is shown in Table 2.

Drip irrigation greatly increased yields, as compared to furrow irrigation, at both locations (25,812 lbs/A and 29,621 lbs/A, compared to 13, 367 lbs/A and 16,988 lbs/A, respectively, for the drip and the furrow). In addition, applied water was reduced 16-20 inches in the drip blocks, respectively, at the Cargil and McFaddin locations. Surprisingly, under the conditions of these demonstrations, the RFC system resulted in higher yields than furrow irrigation.

A good measure of applied water-use efficiency is the ratio of total gallons of water applied to pounds of fruit produced. Ratios of 4.3 : 1 and 50 : 1 were obtained at the McFaddin farm from drip and furrow, respectively, whereas 7.4 : 1 and 33.4 : 1 were recorded at the Cargil location.

Approximately the same total volume of water (rainfall + irrigation water) was required to produce a cantaloupe crop exceeding 25,000 lbs/A with drip irrigation in both years of these demonstrations: 17 inches. In 1994, 4 inches of irrigation water was applied, via drip, while 13 inches was received from rainfall. In 1995, 8 inches of drip-irrigation water was accompanied by 9 inches of rainfall. Although sufficient rainfall was received during these demonstrations to enable a crop to be produced, fruit size was slightly reduced. Consequently, RFC alone is not a viable replacement for irrigation, but rather a supplement to irrigation in most areas. Additional work is

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OVERINFLATED TRACTOR TIRES WASTE FUEL AND REDUCE PRODUCTIVITY

This article by Kleber P. Lancas, S. K. Upadhyaya, M. Sime, and S. Shafii appeared in California Agriculture, Vol. 50, No. 2

Under typical California farming conditions, field experiments have shown that using a low/correct inflation pressure for radial ply tires can result in significant savings in time and money. It can also lessen soil compaction and help control power-hop in mechanical front-wheel drive and four-wheel drive tractors. In tilled, moist Capay clay soil, the tractor using low/correct tire pressure required 20% less diesel fuel, and productivity increased 5.7% during the same stubble-disking operation.

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needed to determine what effect RFC can have on the needs of crops watered by drip, furrow, and sprinkler methods.

Although both of these systems can increase production costs significantly, they may be required for successful production in the future if drought conditions persist and/or water for production becomes limited as a result of increasing population.

For specific information regarding these demonstrations, contact: Dr. Frank J. Dainello, Extension Horticulturist-Commercial Vegetable Crops, Department of Horticultural Sciences, Texas A&M University (409/845-7341); Dr. Larry Stein, Extension Horticulturist, Texas A&M University Agricultural Research and Extension Center, Uvalde (210/278-9151); Dr. Guy Fipps, Extension Agricultural Engineer-Irrigation, Department of Agricultural Engineering, Texas A&M University (409/845-7454); and Kenneth White, County Extension Agent, Uvalde (210/278-6661).

CONTROL WEEDS IN WATERMELON EARLY IN PRODUCTION SEASON

*This article by W. M. Stall appeared in **Vegetarian,** 96-04, April 15, 1996*

Several recent studies at the University of Florida have pointed out that control of weeds is most important early in the season in watermelon production. These studies, carried out at North Florida Research and Education Center at Quincy and in Gainesville for 2 years, evaluated whether there might be yield differences from weed control in watermelon by different herbicide applications or by cultivation (hoeing).

The trial was a factorial experiment with 3 cultivations and 3 herbicide timings. The cultivations were 0, 1 (at 3-4 weeks), and 2 (3-4 weeks + 5-6 weeks). Herbicides were 0, a PRE application, and a PRE + POST application. Prefar + Alanap and Curbit were both applied as the PRE application. No differences in yield were seen between these treatments. The PRE + POST application was either Prefar + Alanap or Curbit PRE and an Alanap POST. The Post application was at vining (5-6 weeks) and was at the same time as the second cultivation.

The results indicated that the highest yields were obtained from the PRE + POST herbicides or the 2 cultivations. One cultivation or a PRE herbicide treatment had yields significantly lower.

This study indicated that there were no yield losses due to timely cultivation in lieu of herbicides, and vice versa, herbicides in lieu of cultivation.

Another study that looked at the competition of smooth amaranth (pigweed) with watermelon indicated that if smooth amaranth emerged and competed with watermelon at least 1 week after watermelon emergence, watermelon yield would be reduced 10 percent. Yield loss was dramatically increased the longer after 1 week that the competition took place.

Controlling weeds is extremely important even if the weeds and watermelon plants are small early in the season.

In this same study it was found that if watermelon was kept weed free for 4 weeks, smooth amaranth emerging after that time did not reduce yield. This study fits with the previous studies indicating that early control is most important. Control weeds, at least smooth amaranth, for at least 4 weeks. Control can be either by herbicides or cultivation.

10 Trends That Are Shaping Produce

By Dr. Charles Hall, Extension Economist, Texas A&M University, College Station

1. Fresh-cut produce will continue to grow, in part, driven by fresh-cut fruit, and will play a more important role in produce consumption and marketing.

2. Technological advances are changing the face of the produce industry, from how technology is being used, to who is going to use it.

3. The globalization of the produce industry is making produce less seasonal, opening doors for some and closing them for others.

4. Category management will drive the retail decision-making process, making the consumer the focal point and changing the way business is conducted.

5. The produce industry will continue to consolidate, with nontraditional alliances, vertical integrations, and strategic partnerships.

6. As business tools become more sophisticated, target marketing will become more effective and a more important tool for gaining market share.

7. Government regulations and legislation will continue to be a battlefield.

8. Fruit and vegetable consumption will continue to increase.

9. Taste will become the driving force behind produce purchases and influence new growing techniques, distribution, and marketing.

10. Produce distribution will continue to become more important and more sophisticated as buyers, growers, and shippers become more demanding.

Plan to Attend

TVA MID-YEAR MEETING
June 21, 1996
7:30 a.m. - 3:40 p.m.
(Reception: 7:00 p.m., June 20)
Embassy Suites Hotel, McAllen, Texas

The latest vegetable production practices and pest control techniques will be discussed. For more information, contact: Ray Prewitt, Executive Director, TVA, (210) 584-1671.

OVERTON FIELD DAY
TAMU AREC @ Overton
June 20, 1996, 8:30 a.m. - 3:30 p.m.

Sustainable Vegetable Production Project and Watermelon Trials to be highlighted. For more information, contact: Ron Earhart, Jeff Baker, or Marty Baker at (903) 834-6191.

After evaluating over 100 selections of cactus fruit and nopalito clones since 1984, Texas A&M University-Kingsville would like to distribute 10 lines to growers for small field tests. Due to lack of cold hardiness, the selections are best adapted to South Texas. The 10 clones come in red, green, yellow, orange, and purple, in Brix from 11.1% to 13.7%, and in yield from 1,600 lb/acre to 45,000 lb/acre under non-irrigated conditions. A cactus conference for professional growers, chefs, and processors will be held at the San Antonio Botanical Gardens September 12-14. The varieties can be seen in full fruit from mid-June through mid-July. For more information, contact

Peter Felker by phone: (512) 595-3966 or e-mail: P-FELDER@TAMUK.EDU

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