RUTGERS COOPERATIVE EXTENSION

NEW JERSEY AGRICULTURAL EXPERIMENT STATION

New Jersey
Nursery Drought Management Plan

James Johnson
County Agricultural Agent

This publication was drafted by James Johnson, Cumberland County Agricultural Agent in 1999 and reviewed and subsquently endorsed by the State Board of Agriculture, the New Jersey Farm Bureau and the New Jersey Nursery and Landscape Association, among others. It was adopted by NJDEP by reference in their administrative order addressing the 1999 drought. It has again been referenced by NJDEP in Administrative Order 2002-05 addressing the 2002 drought in New Jersey.

This plan has been prepared to suggest methods of conserving water. Adoption of operational change recommendations can result short-term benefits, system changes may offer long-term savings but may take longer to institute and require significant investment in time and money. Notes, suggestions and recommendations are not prioritized.

A number of growers have voluntarily participated in Soil and Water Conservation District programs and through the Districts, assistance from the Natural Resources Conservation Service. With that assistance they are developing Conservation Farm Plans and Irrigation Water Management Plans for water conservation. Growers are encouraged to consult with these agencies and review the programs. On a long-term basis, these plans may offer not only water savings but possible operational savings and installation cost-sharing.

If the farm is not computerized, seriously consider computerization and Internet access. There are a number of web sites that can assist in business survival during drought emergencies. They include, but are not restricted to, the sites on the table below.

Information type	Organization	Site
Environmental & conservation	South Jersey Resource and Conservation District	www.sjrcd.org
Educational	Rutgers Cooperative Extension	www.rce.rutgers.edu drought.rutgers.edu
Legislative	New Jersey Farm Bureau	www.njfb.org
Nursery and landscape	New Jersey Nursery and Landscape Association	www.njnla.com
Regulatory	New Jersey Department of Environmental Protection	www.njdrought.org
Educational	Agricultural Experiment Stations	http://128.227.242.197
Water resources	NJ-US Geological Survey	nj.usgs.gov
Water quality	US Department of Agriculture	hermes.ecn.purdue.edu\server\water

THE STATE UNIVERSITY OF NEW JERSEY
RUTGERS

Industry Irrigation Standards

Present irrigation systems for nursery:

Container nurseries

- mini-sprinklers, impact sprinklers
- use of micro-spray, and drip systems are growing

Field nurseries

- traveling and stationary hydraulic guns, solid-set and moveable with impact sprinklers
- use of trickle systems is growing

Sod producers

- traveling and stationary hydraulic guns, wheel line sprinklers, linear move with impact sprinklers, center pivots

Present water conservation practices for nurseries:

Where applicable in field nurseries, hard-hose irrigation guns are speeded up to reduce runoff.

As feasible, larger tips are used on irrigation equipment. That reduces evaporation and makes irrigation less susceptible to movement off-target under windy conditions.

Nursery stock as free of weeds as possible to maximize water availability to the plant.

Crops with similar water requirements are planted in the same area. It helps avoid both over- and under-watering.

Growers cultivate to create a dust mulch. It produces a break in surface capillarity which reduces evaporation from the soil surface.

Irrigation systems are monitored for leaks.

In propagation areas, wind screens are installed to reduce drying and increase the amount of mist or water that stays on target.

For container nurseries and in field nursery holding areas, shade cloth is used to reduce evaporative losses, reduce transpiration of plant material and reduce plant and root temperatures.

In container nurseries, plant material is consolidated into fewer irrigation zones when possible.

Conservation Options

Wholesale nurseries

Operational changes

In container nurseries, shorten irrigation cycles to minimum time periods allowing for full wetting of the media and leaching of excess soluble salts.

In field nurseries, determine if a pan exists. If so, growers can break it by sub-soiling or spading to create conditions conducive to a large plant root zone.

Growers should monitor water use through the use of rain gauges and soil moisture sensors. This will help nurseries schedule irrigation cycles, fine-tune and confirm water application rates.

Growers with Internet access should monitor daily crop water requirements and evapotranspiration rates which are available through the South Jersey Resource and Conservation District web site. This information, coupled with on-site environmental and plant conditions will help determine optimal times for irrigation.

Nozzles on irrigation equipment should be evaluated for signs of wear. Replacement of worn nozzles will result in increased application efficiency and water savings.

When possible, growers should avoid irrigating during the heat of the day in order to reduce evaporative losses.

System changes

Where applicable, use trickle irrigation systems for irrigation. Trickle irrigation can reduce water use by over 50%.

Experiment with irrigation systems that are controlled by moisture sensors and/or on-site weather stations. Computerized control of such systems has been shown to enhance water use efficiency.

Growers should evaluate pumps for flow capacity at pressure to establish a base standard. If a noticeable line pressure drop occurs, the system should be evaluated for leaks and worn nozzles.

For container nurseries, determine how to most effectively re-use irrigation water that has been captured in the impoundment. Systems that blend impoundment water with well water are being used successfully and have reduce well water use by over 50%. Impoundment water has also been used for irrigation of other crops.

For propagation houses, experiment with use of fog systems to reduce temperature, transpirational losses.

For new construction and renovation of propagation houses, incorporate peak ventilation systems to reduce house temperatures.

Experiment with the use of soil amendments to increase the water-holding capacity.

In container nurseries, determine if larger overwintering structures can fit into the nursery operation. Use of larger structure has been shown to reduce water consumption.

Install an on-site weather station which measures air and soil temperatures, rainfall, relative humidity, solar radiation, wind speed, and can calculate evapotranspiration. Information will assist in determining irrigation timing and rates of application. Use of a Class A evaporative pan for monitoring evaporative rates may also indicate evaporative losses at a lower cost.

Re-wholesale and retail nurseries

Operational changes

Where possible, avoid irrigating during the heat of the day to reduce evaporative losses.

Where possible, consolidate plant material into smaller areas.

When possible, speed up irrigation cycles to reduce runoff.

Use mulch when possible to reduce evaporation and reduce root temperatures on both B&B and container stock.

Use water bags (“gator bags”) to slowly water large B&B stock.

Use large B&B trees as shade for smaller plant material

System changes

Use shade cloth when possible to reduce evaporative losses, reduce transpiration of plant material and reduce plant and root temperatures.

Where applicable, use trickle irrigation systems for irrigation. Trickle irrigation can reduce water use by over 50%.

Sod Producers

Operational changes

If possible, avoid irrigating during the heat of the day to reduce evaporative losses.

Where possible, use larger droplet size nozzles to reduce impact from wind.

Check application rates and monitor speed of travel to prevent runoff.

Growers should monitor water use

through the use of rain gauges and soil moisture sensors. This will help nurseries schedule irrigation cycles, fine-tune and confirm water application rates.

Growers with Internet access should monitor daily crop water requirements and evapotranspiration rates which are available through the South Jersey Resource and Conservation District web site. This information, coupled with on-site environmental and plant conditions will help determine optimal times for irrigation.

Nozzles on irrigation equipment should be evaluated for signs of wear. Replacement of worn nozzles will result in increased application efficiency and water savings.

System changes

Where applicable, use lower output irrigation equipment to enhance penetration and reduce possibility of runoff.

Change nozzles from impact heads to low volume/pressure nozzles on drop to reduce evaporative losses on pivot and linear move systems. Size nozzle flow rates so application rates do not exceed soil intake rates to prevent runoff.

Install an on-site weather station which measures air and soil temperatures, rainfall, relative humidity, solar radiation, wind speed and can calculate evapotranspiration. Information will assist in determining irrigation timing and rates of application. Use of a Class A evaporative pan for monitoring evaporative rates may also indicate evaporative losses at a lower cost.

Educational programming

Nurserymen, sod producers, re-wholesale and retail nurseries should educate customers about water conservation techniques with handouts, newsletters and/or in the media.

Rutgers Cooperative Extension, the New Jersey Department of Agriculture and the New Jersey Department of Environmental Protection should coordinate to develop drought information in fact sheets, newsletter releases and web site information for farmers.

Rutgers Cooperative Extension should incorporate information on water use options during appropriate meetings and in correspondence.

Desktop publishing by Rutgers Cooperative Extension/Resource Center Services

Published on recycled paper

RUTGERS COOPERATIVE EXTENSION
N.J. AGRICULTURAL EXPERIMENT STATION
RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY
NEW BRUNSWICK

Distributed in cooperation with U.S. Department of Agriculture in furtherance of the Acts of Congress on May 8 and June 30, 1914. Rutgers Cooperative Extension works in agriculture, family and consumer sciences, and 4-H. Zane R. Helsel, Director of Extension. Rutgers Cooperative Extension provides information and educational services to all people without regard to race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Rutgers Cooperative Extension is an Equal Opportunity Employer.