
Ecologel®
SOLUTIONS LLC

PRESENTS


Hydretain®
ROOT ZONE MOISTURE MANAGER

Ecologel® SOLUTIONS LLC

Over 20 years experience providing environmentally responsible solutions for:

- Water Conservation
- Dust Mitigation
- Protection Against Mold, Mildew, Fungus & Algae
- Biological Lake and Pond Clarifiers
- Seaweed Extract Biostimulants
- Broad Array of Specialty Nutrients
- Advanced Soil Amendments

Hydretain GelTrak FungiShield FOURPlay BioPro AQUA-T Pond Bacteria cytogro

Hydretain®

Environmentally Responsible Technology Proven to Reduce Watering Requirements up to 50% or more…

for use on Lawns, Flowers, Shrubs, Trees, Food Crops and Gardens

USDA
United States Department of Agriculture

BioPreferred
www.biopreferred.gov

Notice of Certification / Application ID: 2922

May 29, 2012

Edward Wilson
Ecologel Solutions, LLC
1301 SW 37th Ave Ste 102
Ocala, FL 34474 2814

Dear Edward Wilson,

On behalf of the United States Department of Agriculture's (USDA's) BioPreferred® program, I am pleased to inform you that your application for use of the USDA Certified Biobased Product Label for Hydretain ES Plus has been approved as of April 20, 2012. The test results for your product indicate a biobased content of 93.0%.

The Label remains in effect as long as the product or package is manufactured and marketed in accordance with the approved application and requirements of §2904.5 (i.e. Code of Federal Regulations for the Voluntary Labeling Program for Biobased Products); unless one of these occur:

1. Product or package reformulation: The product or package formulation of the certified product is changed such that the biobased content is reduced to a level below that reported in the approved application. When products have been reformulated, a new application for certification must be submitted in order to resume using the USDA Certified Biobased Product Label; and/or,
2. New minimum biobased content: USDA revises the minimum biobased content required for a product or package to be eligible to display the certification mark and the product or package does not meet the revised minimum. USDA will inform you that your certification is no longer valid. In this case, you must increase the biobased content of your product to be at or above the revised minimum and re apply for certification within 60 days in order to continue to use the certification mark.

You must read the BioPreferred Brand Guidelines and Graphic Standards document prior to downloading label artwork. (eAuth login is required)

This email is your official notice of biobased product certification. Please print and save this email should you need to provide certification documentation to any entity.

The BioPreferred program looks forward to a long and successful partnership with you in the promotion of biobased products. If you have additional questions or would like further information, you may call the BioPreferred Program Information Line (877) 251 6522 or email us at biobasedlabel@dm.usda.gov.

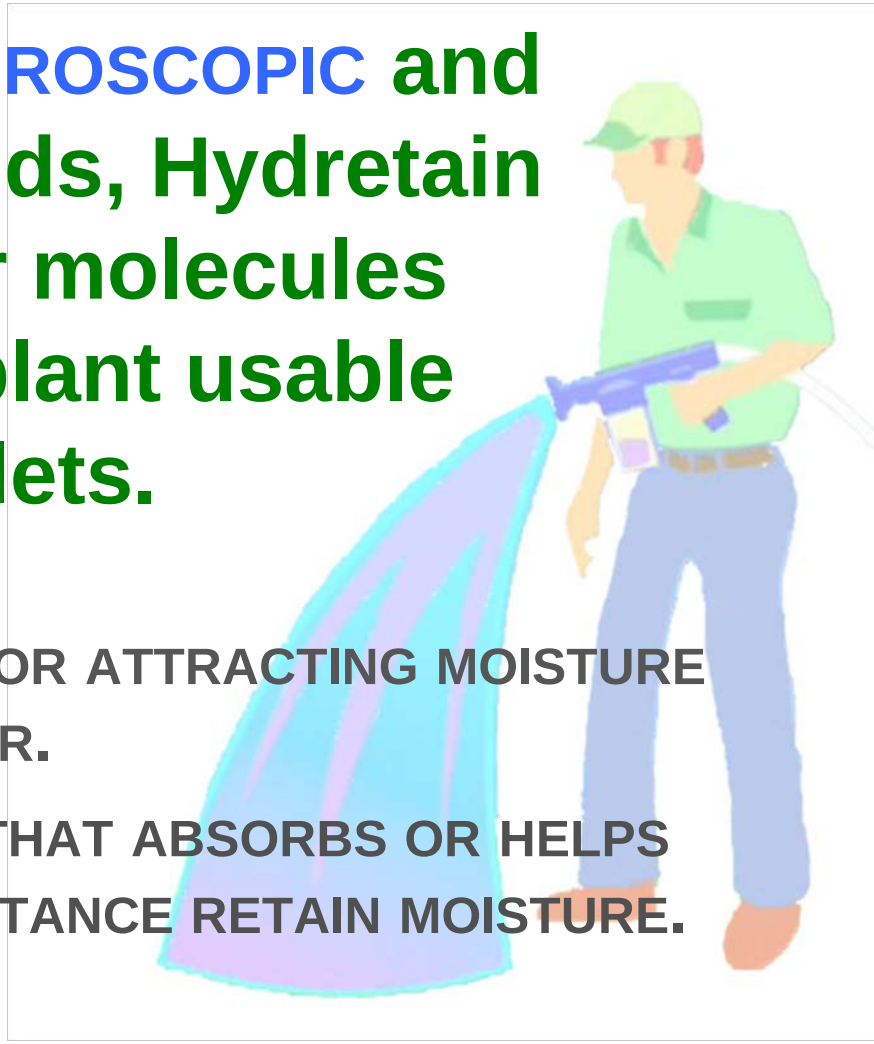
Sincerely,
Kate Lewis
Deputy Manager
USDA BioPreferred Program

BioPreferred Program ◆ 361 Reporters Bldg. [redacted] 300 7th St. SW ◆ Washington, DC 20024

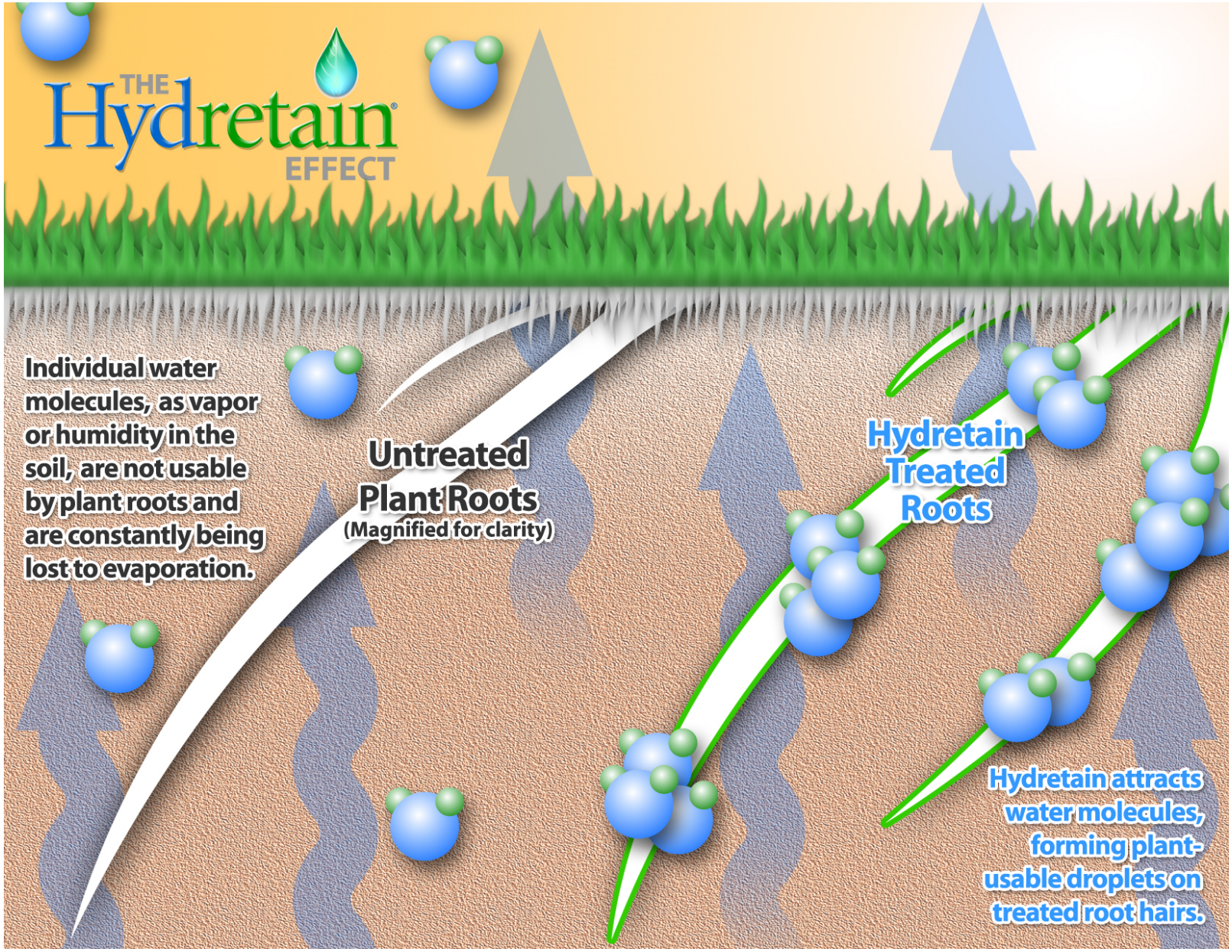
Hydretain ES Plus is USDA Certified Biobased Product

How Does Hydretain® Work?

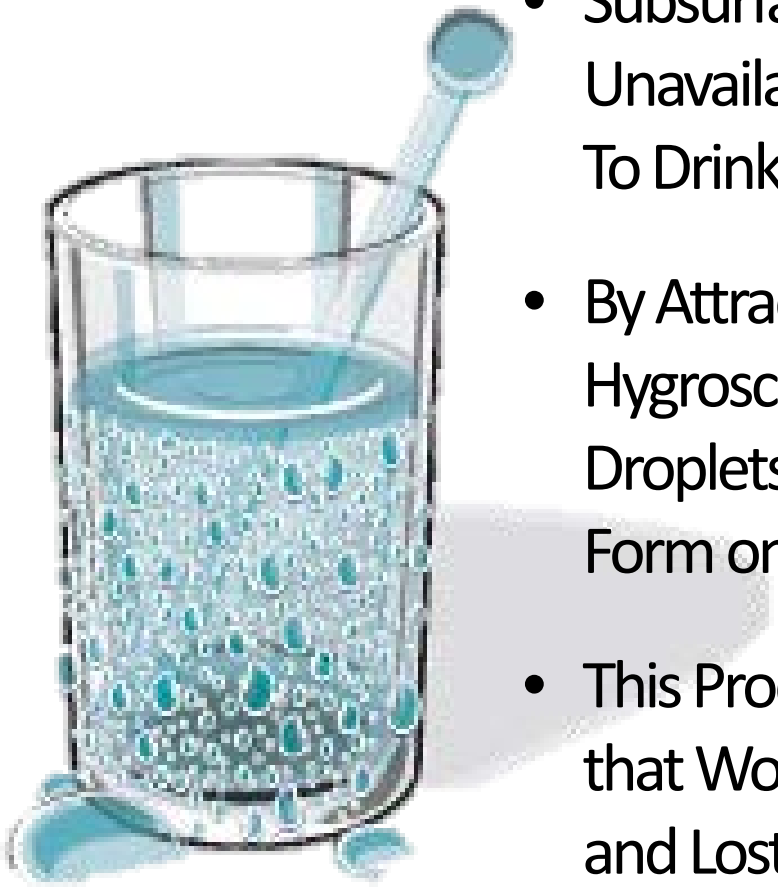
A liquid blend of HYGROSCOPIC and HUMECTANT compounds, Hydretain draws water vapor molecules together forming plant usable water droplets.



- **HYGROSCOPIC:** ABSORBING OR ATTRACTING MOISTURE FROM THE AIR.
- **HUMECTANT:** A SUBSTANCE THAT ABSORBS OR HELPS ANOTHER SUBSTANCE RETAIN MOISTURE.


THE Hydretain® EFFECT
Individual water molecules, as vapor or humidity in the soil, are not usable by plant roots and are constantly being lost to evaporation.
Untreated Plant Roots
(Magnified for clarity)
Hydretain Treated Roots
Hydretain attracts water molecules, forming plant-usable droplets on treated root hairs.

Hydretain Reduces Evaporative Loss



- Subsurface Moisture Vapor (Humidity) is Unavailable to Plant Roots, Just as We Are Unable To Drink the Humidity in the Air Around Us
- By Attracting and Storing Water Vapor Molecules, Hygroscopic Humectants, Create Microscopic Droplets – Similar to Watching Condensation Form on a Cold Glass
- This Process Helps Plants Use Soil Moisture Vapor that Would Otherwise be Unavailable to the Plant and Lost to Evaporation.

Originally Developed in Australia as a Roadway Dust Suppressant

Untreated Road Section
Heavy Dusting

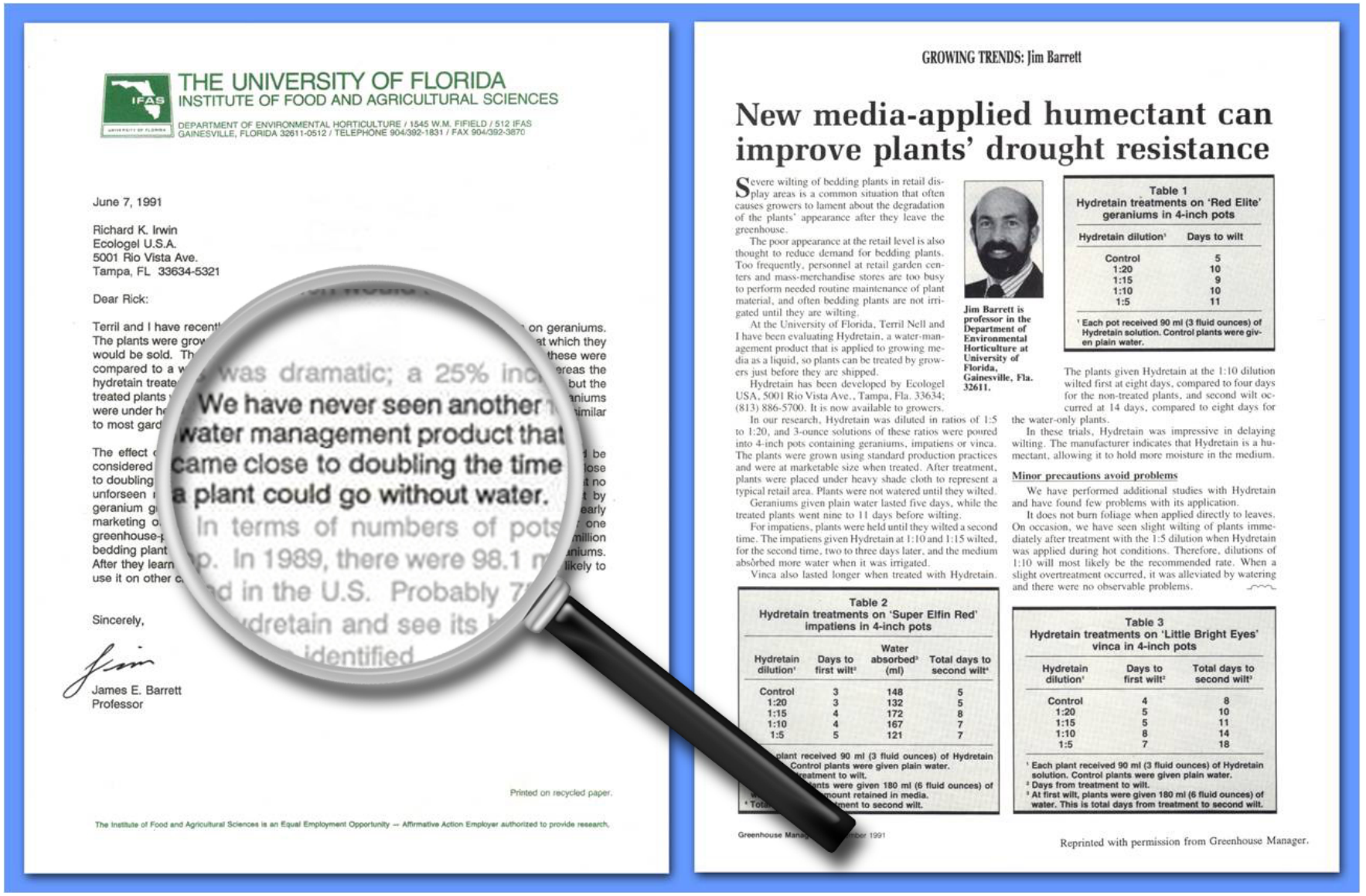
Same Truck on Treated Surface
Minimal Dusting

Hydretain® First Tested on Turf

During a six week drought period

The entire lawn was as green and healthy looking as the center section prior to a six week drought.

University Of Florida Ornamental Plant Trials



THE UNIVERSITY OF FLORIDA
INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES

DEPARTMENT OF ENVIRONMENTAL HORTICULTURE / 1545 W.M. FIFIELD / 512 IFAS
GAINESVILLE, FLORIDA 32611-0512 / TELEPHONE 904/392-1831 / FAX 904/392-3870

June 7, 1991

Richard K. Irwin
Ecologel U.S.A.
5001 Rio Vista Ave.
Tampa, FL 33634-5321

Dear Rick:

Terril and I have recent… on geraniums. The plants were grow… at which they would be sold. Th… these were compared to a w… areas the hydretain treate… but the treated plants … aniums were under h… similar to most gard…

The effect … be considered … lose to doubling … no unforseen … by geranium g… early marketing o… one greenhouse-… million bedding plant… aniums. After they learn… likely to use it on other c…

Sincerely,

James E. Barrett
Professor

Printed on recycled paper.

The Institute of Food and Agricultural Sciences is an Equal Employment Opportunity -- Affirmative Action Employer authorized to provide research,

…was dramatic; a 25% inc…
We have never seen another …
water management product that …
came close to doubling the time …
a plant could go without water.
…In terms of numbers of pots …
…p. In 1989, there were 98.1 m…
…d in the U.S. Probably 7…
…dretain and see its …
…identified

GROWING TRENDS: Jim Barrett

New media-applied humectant can improve plants' drought resistance

Severe wilting of bedding plants in retail display areas is a common situation that often causes growers to lament about the degradation of the plants' appearance after they leave the greenhouse.

The poor appearance at the retail level is also thought to reduce demand for bedding plants. Too frequently, personnel at retail garden centers and mass-merchandise stores are too busy to perform needed routine maintenance of plant material, and often bedding plants are not irrigated until they are wilting.

At the University of Florida, Terril Nell and I have been evaluating Hydretain, a water-management product that is applied to growing media as a liquid, so plants can be treated by growers just before they are shipped.

Hydretain has been developed by Ecologel USA, 5001 Rio Vista Ave., Tampa, Fla. 33634; (813) 886-5700. It is now available to growers.

In our research, Hydretain was diluted in ratios of 1:5 to 1:20, and 3-ounce solutions of these ratios were poured into 4-inch pots containing geraniums, impatiens or vinca. The plants were grown using standard production practices and were at marketable size when treated. After treatment, plants were placed under heavy shade cloth to represent a typical retail area. Plants were not watered until they wilted.

Geraniums given plain water lasted five days, while the treated plants went nine to 11 days before wilting.

For impatiens, plants were held until they wilted a second time. The impatiens given Hydretain at 1:10 and 1:15 wilted, for the second time, two to three days later, and the medium absorbed more water when it was irrigated.

Vinca also lasted longer when treated with Hydretain.

Jim Barrett is professor in the Department of Environmental Horticulture at University of Florida, Gainesville, Fla. 32611.

Table 1
Hydretain treatments on 'Red Elite' geraniums in 4-inch pots

Hydretain dilution[1]	Days to wilt
Control	5
1:20	10
1:15	9
1:10	10
1:5	11

[1] Each pot received 90 ml (3 fluid ounces) of Hydretain solution. Control plants were given plain water.

The plants given Hydretain at the 1:10 dilution wilted first at eight days, compared to four days for the non-treated plants, and second wilt occurred at 14 days, compared to eight days for the water-only plants.

In these trials, Hydretain was impressive in delaying wilting. The manufacturer indicates that Hydretain is a humectant, allowing it to hold more moisture in the medium.

Minor precautions avoid problems

We have performed additional studies with Hydretain and have found few problems with its application.

It does not burn foliage when applied directly to leaves. On occasion, we have seen slight wilting of plants immediately after treatment with the 1:5 dilution when Hydretain was applied during hot conditions. Therefore, dilutions of 1:10 will most likely be the recommended rate. When a slight overtreatment occurred, it was alleviated by watering and there were no observable problems.

Table 2
Hydretain treatments on 'Super Elfin Red' impatiens in 4-inch pots

Hydretain dilution[1]	Days to first wilt[2]	Water absorbed[3] (ml)	Total days to second wilt[4]
Control	3	148	5
1:20	3	132	5
1:15	4	172	8
1:10	4	167	7
1:5	5	121	7

…plant received 90 ml (3 fluid ounces) of Hydretain … Control plants were given plain water.
…reatment to wilt.
…nts were given 180 ml (6 fluid ounces) of …
…mount retained in media.
…ment to second wilt.
[4] Total…

Table 3
Hydretain treatments on 'Little Bright Eyes' vinca in 4-inch pots

Hydretain dilution[1]	Days to first wilt[2]	Total days to second wilt[3]
Control	4	8
1:20	5	10
1:15	5	11
1:10	8	14
1:5	7	18

[1] Each plant received 90 ml (3 fluid ounces) of Hydretain solution. Control plants were given plain water.
[2] Days from treatment to wilt.
[3] At first wilt, plants were given 180 ml (6 fluid ounces) of water. This is total days from treatment to second wilt.

Greenhouse Manag… …ber 1991

Reprinted with permission from Greenhouse Manager.

The Research

Hydretain® Has Been Tested By Several Major U.S. Universities

University of FLORIDA

PENNSTATE

THE OHIO STATE UNIVERSITY

CLEMSON UNIVERSITY

Ohio Wesleyan University

ILLINOIS

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

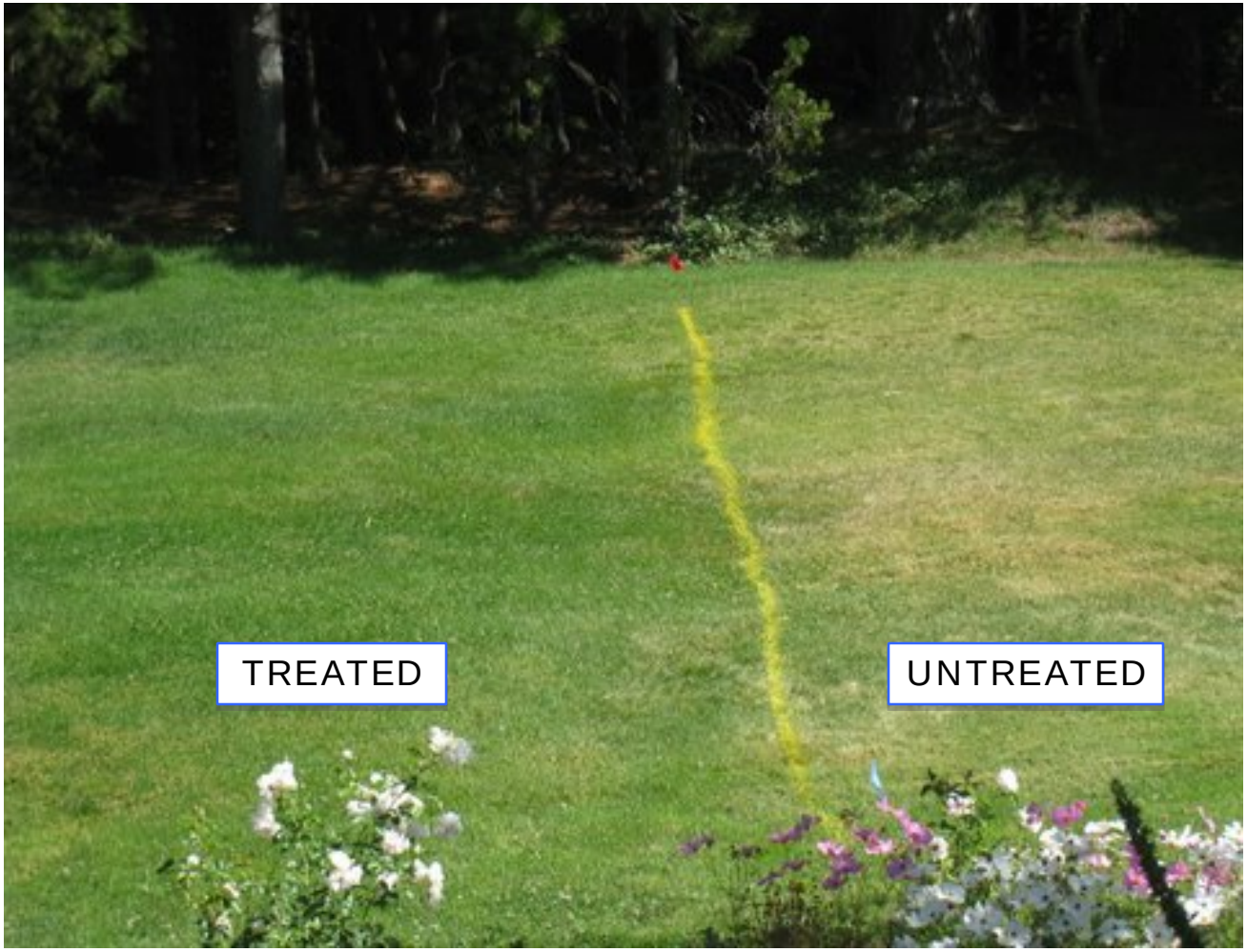
Research Reports Available Online
www.hydretain.com

Golf & SportsTurf

Banyan Golf Club, West Palm Beach Florida

The 14th fairway at Banyan had a chronic dry spot problem caused by cap rock with little top soil. The superintendent battled this problem for 15 years until trying Hydretain. Hydretain solved the problem and with regular treatments, at 3 month intervals, prevented its return.

Lake Arrowhead Country Club Field Trial



Steep slope location. Treated in June.
Photographed in July: one month after application.

Home Lawns, Parks & Commercial Properties

Recreational Park - Melbourne, FL

Side by Side Comparisons of Treated and Untreated St. Augustine Lawns

Potted Plants

After 1 Week without Water

Clemson University

COOPERATIVE EXTENSION SERVICE

CLEMSON UNIVERSITY

Baucom's Nursery in Summerville, SC, had a problem maintaining enough water on the outer edge of their poinsettia crop using over head sprinklers. Hand watering was the first approach to solving this problem, however, this employee was needed for addressing other tasks. Therefore, an alternative to hand watering was needed. On October 2, 1998, an experiment was set up to test the effectiveness of Hydretain 2X formula to eliminate hand watering.

Two test plots were used on opposite sides of the greenhouse. Two plots using four rows of twenty plants along the edge closest to the greenhouses' outer walls were selected since these plants showed signs of wilt first. On one side of the greenhouse the first ten plants and four rows were treated with just water. The remaining plants, eleven through twenty, were treated with Hydretain at the rate of 2.0 ounces per gallon (64:1). All plants were watered to run off. On the opposite side of the greenhouse this arrangement was reversed. The first ten plants and four rows were treated with Hydretain and the remaining plants were treated with just water. All plants received equal amounts of solution on the day the experiment started. From October 2, until harvest these plants would only receive the water provided from the overhead sprinklers.

A few weeks into the experiment it was evident that the plants treated with Hydretain were out performing the other plants. On week six of the experiment pictures were taken of the plants from the outer most corner of the experiment. These plants were selected to demonstrate the dramatic difference in growth between the two treatments. The plants treated with Hydretain were larger in size, retained more leaves, and developed a larger root system compared to the plants on "just water". In addition, the plants grown under "just water" were not salable.

Based on this study we believe Hydretain offers growers a solution to those "dry edges". These positive results and other research have shown Hydretain offers solutions to many moisture management issues such as; increased shelf life, better moisture management on plugs, reduced watering time, and increased germination.

Mark J. Arena
Commercial Horticulture Agent

BERKELEY COUNTY OFFICE
223 N. Live Oak Drive, Rm B-2, Moncks Corner, SC 29461-3707 843.719-4140 FAX 843.761.4221

Public Service Activities

Poinsettia Trials
Baucom's Greenhouse – Summerville, SC

Side-by-side comparison of poinsettia plants grown on the edge of benches

"The plants treated with Hydretain were larger in size, retained more leaves and developed a larger root system compared to the plants on 'just water'."

- Mark Arena, Commercial Horticulture Agent

Hanging Baskets

Flower Beds

Description: Begonias were planted on June 1st. Picture on the left was treated was Moisture Manager one week after planting. Both were watered at the time of application. The flowers on the right have been watered to keep alive. The only water the plants on the left have received is rainwater. No fertilizer was applied to either side. Picture was taken on August 5th.

Tree Installation

Saint Cloud, MN
Summer 2002

Every Other Tree Treated with Hydretain®

Penn State Seed Germination Trial

Containers were given the same number of seeds and volumes of water. Germination rates, germination percentage and survival rates of Hydretain treated pots were superior to controls.

Agriculture - Food Crops

Tomato Research - University of Florida – Published in Hort Science

HortScience 33(2):229–232. 1998.

Evaluation of Tomato Transplant Production Methods for Improving Establishment Rates

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Additional index words. cold hardening, soluble carbohydrates, Hydretain, ethephon, pretransplant nutritional conditioning, *Lycopersicon esculentum*, chilling injury

Abstract. **Eight different tomato (*Lycopersicon esculentum* Mill.) transplant production methods were tested during two growing seasons (1993–94) to determine their effectiveness in increasing both establishment rate and yield. Seven-week-old greenhouse grown transplants of 'Hypeel 696' were shipped from Florida to Pennsylvania and planted at the Pennsylvania State Univ. Horticulture Research Farm. Transplants were also grown at the Pennsylvania State University to compare their growth with that of southern-grown plants. In 1993, increased nutrient levels during the last 10 days of transplant production significantly increased transplant size, establishment rate, and early yields, while the addition of Hydretain®, an aid to water retention and uptake, significantly increased total yield. In 1994, plants from Florida that were chilled for 7 days before transplanting and the Pennsylvania-grown plants had faster establishment rates than did nonchilled plants from Florida, but differences in yield were nonsignificant. Chilled and Pennsylvania-grown plants had significantly higher soluble carbohydrate levels in leaves, stems, and roots than did nonchilled and Florida-grown plants, while nutrient-conditioned plants had higher levels in leaves and stems. Establishment rate was not correlated with carbohydrate level. Chemical name used: (2-chloroethyl) phosphonic acid (ethephon).**

Tomato transplants comprise about one-third of all vegetable transplants grown for field production in the United States, with more than 500 million plants produced annually in Florida alone (U.S. Dept. of Commerce, 1991; Vavrina and Summerhill, 1992). One of the most critical steps in producing tomatoes from transplants is the initiation of new growth after planting in the field. This plant establishment is important for producing uniform stands that can compete effectively against weed and insect pressure (Orzolek, 1991). However, a wide range of environmental factors, such as extreme temperatures and reduced water and nutrient availability, can reduce the establishment rate.

Several different treatments have been evaluated for hardening plants to unfavorable environmental conditions. Cold tolerance of tomato seedlings increased after exposure to low temperatures (Pardossi et al., 1988; Wheaton and Morris, 1968), and ethephon application to tomato transplants increased survival rates in the field following a frost (Liptay et al., 1982). Pretransplant nutritional conditioning (PNC), the application of additional nutrients during the production cycle, increased both shoot growth before transplanting and early and total yields (Melton and Dufault, 1991). Low water availability has been alleviated through the addition of Hydretain®, a humectant that improves water retention in the soil and water uptake by the plant. Watering potted plants with Hydretain® increased the number of days to wilting for several different crops (Barrett, 1991).

Although many methods for improving tomato transplant growth and yield have been developed, the plant characteristics responsible for these improvements still are not well understood. High levels of nutrients in the plant tissue at the time of transplanting may be one factor which determines establishment rate. For example, N levels in tomato shoots at the time of transplanting were correlated with the rate of root growth in the field (Liptay and Nichollls, 1993). These nutrients may serve as a reserve that the plant can draw on after transplanting if nutrient availability and uptake are reduced. Another factor that may affect establishment is the carbohydrate level in the tissue. Again, these carbohydrates could act as an energy reserve to fuel plant growth if carbon fixation is reduced after transplanting. Also, levels of soluble carbohydrates, such as glucose, fructose, and sucrose, have been correlated with increased cold tolerance in tomato (Keller and Steffen, 1995; King et al., 1988), which may in turn lead to a faster overall growth rate. The purposes of this study were to 1) identify tomato transplant production methods that increase establishment rates and yield, and 2) determine whether high soluble carbohydrate levels before transplanting hasten establishment.

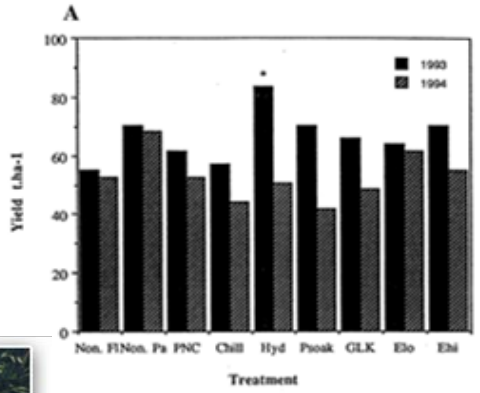
Received for publication 15 Oct. 1996. Accepted for publication 23 May 1997. The cost of publishing this paper was defrayed in part by the payment of page charges. Under postal regulations, this paper therefore must be hereby marked *advertisement* solely to indicate this fact.

Materials and Methods

Plant materials. All transplants, except those grown in Pennsylvania, were grown in greenhouses at the Southwest Florida Research and Education Center in Immokalee, Fla. (1993) or at Speedling, Bushnell, Fla. (1994), then shipped to Pennsylvania for planting in the field. Seeds of 'Hypeel 696' (Petoseed Seed Co., Saticoy, Calif.), a processing tomato cultivar, were sown into a nonfortified plug mix in polystyrene Todd planter flats, size 080 (Speedling, Bushnell, Fla.). Cells in the tray were inverted pyramids with a width of 2.0 cm, a depth of 4.1 cm, and a volume of 5.6 cm^3. The transplants were grown by the Speedling II system, which includes an ebb and flow watering system with constant feeding of nutrients (Thomas, 1993). Further details on commercial cultural practices were proprietary. Seven weeks after seeding the plants were shipped in their trays to Pennsylvania and planted within 5 d.

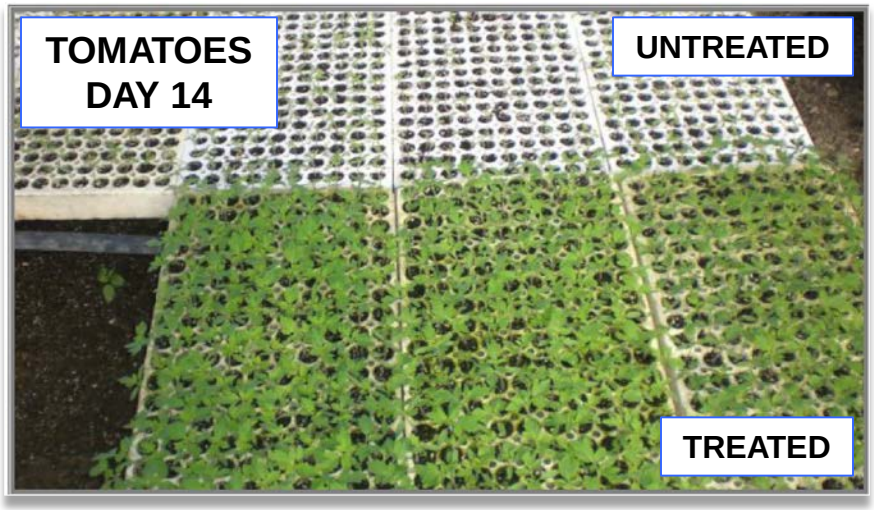
For comparison plants were grown for 6 weeks in greenhouses at the Horticulture Research Farm, Russell E. Larson Research Center, Rock Springs, Pa. Cultivar, cell size, and plug mix were identical with those used in Florida, but the plants were watered about once daily by overhead irrigation instead of the ebb-and-flow system. The plants were placed in a cold-frame for 1 week before transplanting. No additional treatments were applied.

Treatments applied to Florida-grown plants. The following six treatments were applied: 1) Roots were drenched one day before shipping with Hydretain® (Ecologel USA, Tampa, Fla.), which contained 35.2% hydrogenated simple sugars, 1.5% calcium lignosulfonate, and 63.3% inert ingredients applied at a concentration of 6.7% Hydretain®; 2) Ethephon (Ethrel®; Amchem Corp., Ambler, Pa.) was sprayed onto the foliage to the drip stage at 75 or 150 mg·L^{-1} a.i.; 3) GLK 8903, an experimental liquid product (proprietary) designed to reduce chilling damage (Great Lakes Chemical Co., West Lafayette, Ind.) was sprayed onto the foliage to the drip stage at 5 mL·L^{-1}; 4) Roots were soaked in a 1% P solution for 1 h; 5) Transplants were treated every 3 d starting 10 d before shipping (four applications total) by soaking the trays in a nutrient solution of N (200 mg·kg^{-1}) P (40 mg·kg^{-1}), and K (100 mg·kg^{-1}) for 1 h. In 1994, the N concentration was reduced to 100 mg·kg^{-1}; 6) Transplants were chilled in a growth



Hydretain treated seedlings produced as much as 40% more tomatoes during drought conditions.

Fruit & Vegetable Seedlings



FT Farfan Limited
Trinidad

Benefits

Maximize Irrigation Efficiency

Reduce Hand Watering

Decrease Irrigation Costs

Conserve Water

Protect Against Drought Stress

Survive Watering Restrictions

Minimize Wilt & Dry Spots

Improve Landscape Health

Improve Transplant Survival Rates

Increase Fertilizer & Pesticide Efficiency

Increase Seed Germination & Seedling Survival

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