small amounts applied at each irrigation. However, these treatments suffered growth reduction as compared to those in M10 as a result of water stress (2).

The M10 treatment plants apparently did not suffer water stress. The drainage percentage increased from 21% to 27% as a result of shallower placement of the tensiometers. These results suggest that this treatment was over-irrigated, and that the over-irrigation was increased by shallower tensiometer placement. Future research should be directed toward studies of irrigation response in the 10 to 16 kPa range and toward studies of the effects of smaller applications per irrigation as means of reducing drainage losses.

Fig. 3 also shows that approximately 20% of the irrigation water applied was lost to drainage for all three bare soil treatments. This drainage occurred despite the fact that the irrigation amounts applied were small with respect to those of the mulched treatments. However, plant growth was much reduced as compared to that of the mulched treatments (2), and apparently the drainage losses occurred because the reduced plant sizes also reduced the effectiveness of the plant root systems in extracting soil water.

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BLUEBERRY RESPONSE TO IRRIGATION AND GROUND COVER

D. Z. Haman
University of Florida, IFAS
Dept. of Agricultural Engineering
Gainesville, FL 32611

A. G. Smajstrla
University of Florida, IFAS
Dept. of Agricultural Engineering
Gainesville, FL 32611

P. M. Lyrene
University of Florida, IFAS
Dept. of Fruit Crops
Gainesville, FL 32611

Additional index words. Micro-irrigation, mulch, tensiometers, irrigation scheduling.

Abstract. **Results of a study of blueberry growth during the first year after transplanting are presented. Two-year-old container-grown Sharpblue (*Vaccinium Corymbosum* L.), Beckyblue and Climax (*Vaccinium ashei* Reade) blueberry plants were grown in a field lysimeter system at Gainesville. Treatments consisted of irrigation at −10, −16, or −25 kPa soil water potentials and pine bark mulch versus no-mulch ground cover.**

The greatest growth occurred on the −10 kPa mulched treatment for all varieties of blueberry. Mulched plants under all treatments performed significantly better than unmulched plants. Growth of Beckyblue and Climax varieties was superior to that of the Sharpblue variety for the above conditions.

It has been demonstrated that irrigation is essential for the establishment of young blueberry plants and that it increases quantity and improves quality of fruit. Newly planted or container grown blueberries are drought-sensitive, and irrigation is essential for successful establishment and subsequent growth of young blueberry plants 4, 11). Blueberries are not drought tolerant (9) and irrigated plants have higher survival rate, greater vigor, greater plant height and more fruit per plant than non-irrigated plants (11). During productive years adequate water supply increases total yield and individual berry weight (1). It has been found that an increase in the number of flowers per stem (3, 12) is correlated with the avoidance of water stress during bud formation. Kender and Brightwell (6) reported that blueberries require 1 to 2 inches of rain or irrigation per week. Ballinger (2) recommended that an irrigation should be applied when 30% to 50% of the available water remains in the root zone. At the same time, blueberries are sensitive to excess water and require good drainage (5).

Two types of blueberries are grown in Florida: highbush and rabbiteye. Highbush blueberries are less vigorous, lower in yield, and more prone to frost damage, but they ripen 3 to 4 weeks before the earliest-ripening rabbiteyes planted at the same location. Due to this early ripening, their production is potentially very profitable in Florida (7). The rabbiteye blueberry is native to northeast Florida and is considered to be the world's highest-yielding and most vigorous cultivated blueberry species (7, 8). However, rabbiteye varieties ripen a few weeks later than highbush varieties, when prices are considerably lower. No studies which reported the effects of irrigation scheduling or the effectiveness of mulch as a production practice on the growth of young blueberry plants were found in the literature. The objectives of this research were to determine the effects of (1) irrigation scheduling and (2) mulch on growth of young blueberry plants.

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Materials and Methods

A field lysimeter system was used to study blueberry growth during the first year after transplanting. Two-year-old container-grown Sharpblue (high bush), Beckyblue and Climax (rabbiteye) blueberry plants were grown in a field lysimeter system consisting of 24 drainage type lysimeters (10). Two blueberry bushes were planted in each lysimeter giving a total of 48 plants. Treatments consisted of irrigation at -10, -16, and -25 kPa soil water potentials and pine bark mulch versus no-mulch ground cover.

Field Lysimeter System

A system of 24 drainage type lysimeters installed in a 0.1 ha field plot was used for this study. Lysimeters in this system were cylindrical tanks 1.8 m deep with 2.0 m^2 surface production areas (10).

The soil in the lysimeters was Arredondo fine sand (hyperthermic coated, Typic Quartzipsamment) which well represents primary Florida agricultural soils. Approximately 0.11 m^3 of peat was applied and incorporated into the top 0.3 m of the soil in each lysimeter.

An automated tensiometer and timer-controlled irrigation system was used for irrigation. Two sets of Irrometer[1] switching tensiometers were installed in each water treatment (-10 kPa, -16 kPa and -25 kPa). Two depths, 0.15 m and 0.3 m were used at each location. The magnetic switches of the four tensiometers in each treatment were wired in parallel, allowing any tensiometer to initiate an irrigation event. The length of the irrigation was controlled using an automatic dual-station irrigation controller (Irrometer, model RA). The maximum frequency of irrigation was set for once a day.

Lysimeters were well drained throughout the study. Each of the lysimeters had provisions for drainage at the bottom of the tank. This system was described in detail by Smajstrla (10).

The lysimeter system was equipped with 3 rain shelters mounted on a rail system and automated using electric motors and controls, and a rainfall detector (10). This system allowed for the total exclusion of precipitation and precise control of moisture in the lysimeters.

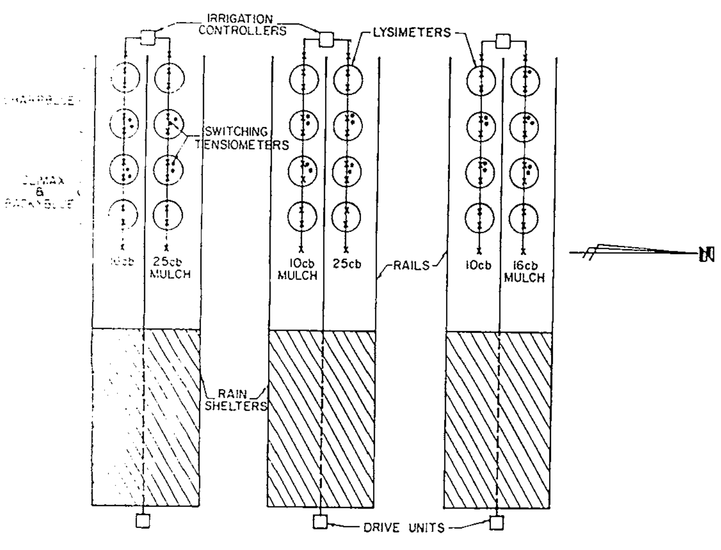

Fig. 1. The lysimeter system and experimental design.

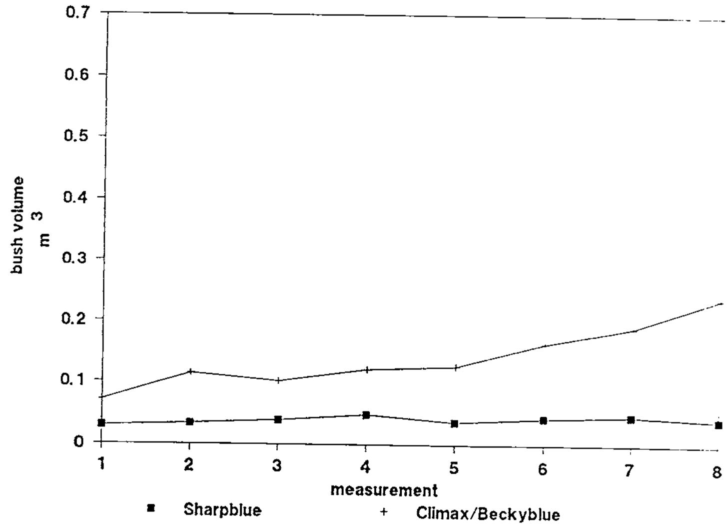

Fig. 2. Growth response of two varieties of blueberries.

Water was applied using 3 Spot System emitters per plant, a total of 6 emitters per tank. When operated at 138 kPa, these emitters applied approximately 40 l of water per hour per plant. The water applied to each bank of 4 lysimeters was recorded with small calibrated flow meters (Hayes, Model 30301) to verify the calibration of the emitters and timers throughout the season.

Experimental Design

The experiment was designed to study the effect of two factors on the growth of young blueberry plants. These factors were the soil water potential and the use of pine bark mulch. There were three levels of soil water potential (-10 kPa, -16 kPa and -25 kPa) and mulch versus no-mulch treatments. Each treatment was applied to four Sharpblue plants and four Climax/Beckyblue plants.

Blueberries were planted 1 m apart in lysimeters and 1.4 m apart between lysimeters. The layout of the experiment is presented in Fig. 1.

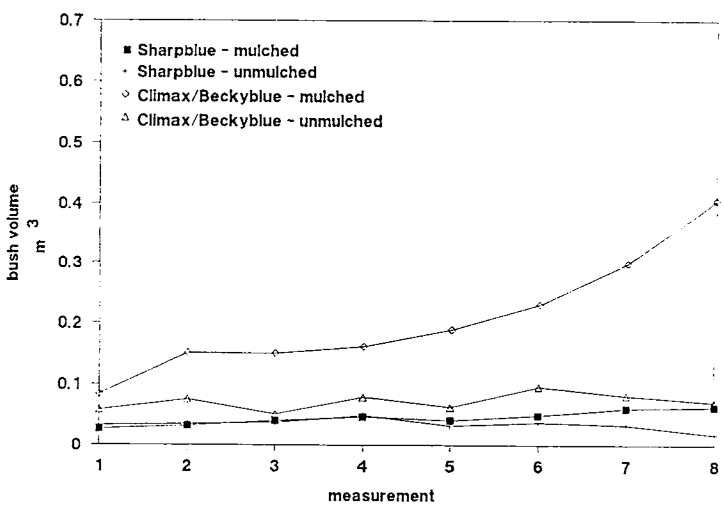

Fig. 3. Growth of mulched and unmulched blueberry plants.

[1]Mentioning of the trade name is for information only and does not imply endorsement of the product.

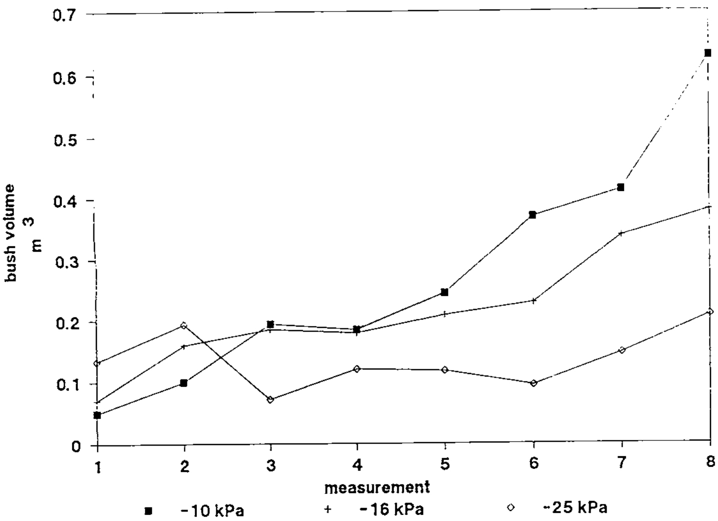

Fig. 4. Growth response of mulched Climax/Beckyblue varieties under different water potentials.

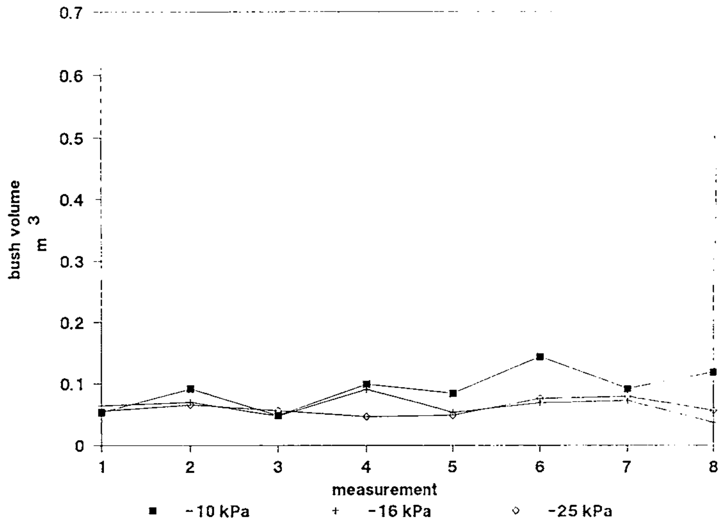

Fig. 6. Growth response of unmulched Climax/Beckyblue varieties under different water potentials.

Procedure

Blueberries were transplanted 15 Apr. 1987. The existing sprinkler irrigation system was used for plant establishment. Micro-irrigation water treatments started in July, 1987 and continued through September 1988.

Blueberry plants were fertilized once a month using 12-4-8 (N-P-K) fertilizer with micronutrients (Blueberry Special) at the rate of 30 g per plant per month from March through September. Plants were also treated with SUBDUE and BENLATE as needed to control fungal diseases.

Growth measurements were taken once a month. At this time the height and width of each plant were recorded. Volumes of the bushes were calculated using these data and assuming cylindrical shapes.

Results and Discussion

Significant differences between varieties and treatments were observed. The Climax/Beckyblue (rabbiteye) varieties grew much faster and looked healthier as compared to the Sharpblue (highbush) variety. Fig. 2 presents average growth for all Climax/Beckyblue plants and all Sharpblue plants for all treatments. Average bush volumes at the end of the experiment were 0.23 m^3 for Climax/Beckyblue and 0.04 m^3 for Sharpblue.

All mulched plants grew much better than unmulched plants (Fig. 3). Unmulched Sharpblue did not show any growth during the experiment, while unmulched Climax/Beckyblue showed only a small increase in volume.

For the mulched plants, all varieties responded best to the wettest (-10kPa) soil water potential treatment, while growth was the poorest for the driest (-25kPa) treatment (Fig. 4-5). The Climax/Beckyblue varieties grew more rapidly at all soil water potentials as compared to Sharpblue.

For the unmulched plants, the mulch effect dominated the effects of the irrigation treatments (Fig. 6-7). Only the -10kPa Climax/Beckyblue treatment exhibited any growth. The plant size remained constant or was reduced at all irrigation schedules. This effect was attributed in part to the high soil temperatures and rapid drying of the soil surfaces in the low water-holding capacity sandy soil.

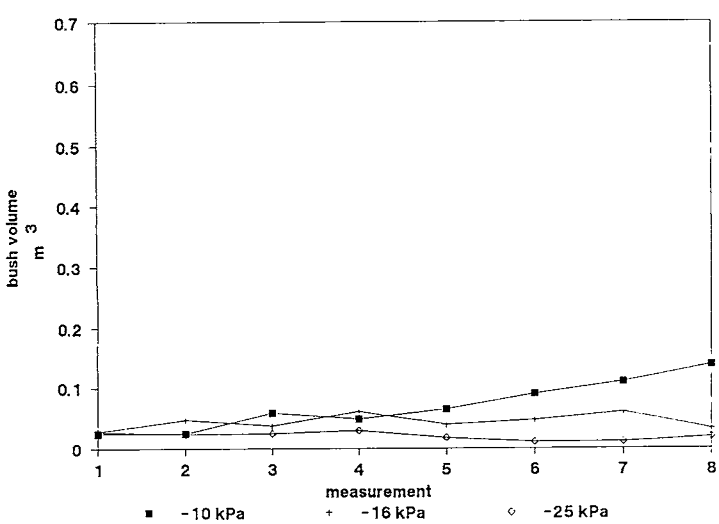

Fig. 5. Growth response of mulched Sharpblue variety under different water potentials.

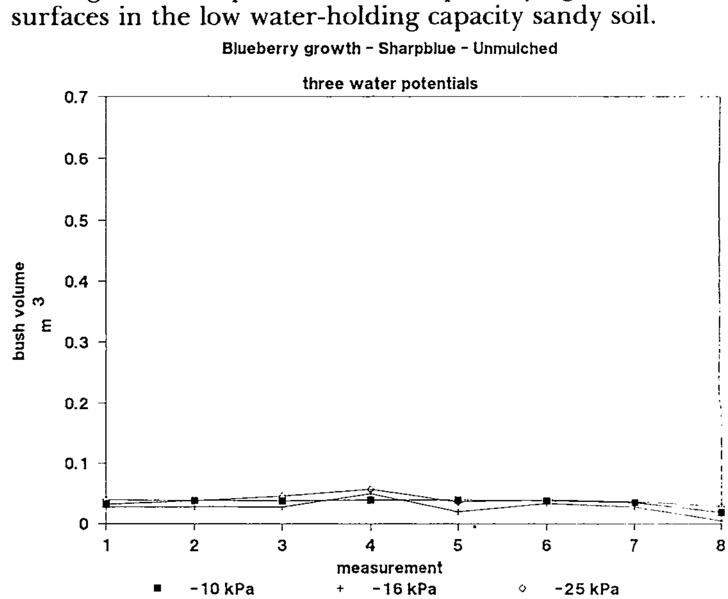

Fig. 7. Growth response of unmulched Sharpblue variety under different water potentials.

These results clearly demonstrate the value of mulch in maintaining high-water contents and low-soil temperatures at the soil surface where many blueberry roots are located. These results also demonstrate that growth was much improved by keeping the soil near field capacity by irrigating when the soil/water potential reached -l0kPa.

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ACCUMULATED PHILOSOPHY ON STUDENT RECRUITING, TEACHING, RESEARCH AND FUNDING

NORMAN F. CHILDERS
Department of Fruit Crops
University of Florida, IFAS
1137 Fifield Hall, Gainesville, FL 32611

Abstract. **There is need for a vigorous student recruitment program for under-graduate horticultural majors in Florida and across the nation. Enrollments are critically low. More jobs are available for well-trained horticultural graduates than there are graduates (10 to 1 in Florida). A student recruitment program is suggested for Florida that proved highly successful in two other states. The horticultural profession needs more motivated "born-to- teach" teachers. Teachers need more administrative encouragement through better promotion standards and funding. The misguided, wasteful, expensive inefficient "boom/bust" *federal competitive grants* and other *designated grants systems* of funding are disrupting the balance, effectiveness and stability of the teaching, extension and applied and "high-tech" research for the agricultural industry. An *agriculturally experienced group* of professionals, farmers and legislators must reexamine agricultural college funding to determine if we should return to the former, more efficient and fair system of allocating money directly to deans, directors and department heads for them to decide with industry help, instead of committees and administrators in Washington, DC, where the funds best can be spent locally.**

Introduction

This paper could be one of the first, if not the first, at these meetings on student recruiting and teaching of horticulture. Perhaps we should take more time to study this subject with horticultural student enrollments so critically low. Within a few years, if not already, this student deficiency will have an adverse effect on leadership and advancement of the horticultural industry in Florida and the USA.

Land grant universities, of which the University of Florida is one of the larger, were established in 1862 to teach students "agriculture and mechanic arts". In recent years, the research program in these colleges has begun to heavily dominate the teaching program. Teaching must be brought into better balance with research[5].

Philosophy presented here is mine and has developed over some 78 years of living with agriculture, researching it, taking part in extension, student recruiting and teaching of horticulture in agricultural colleges. My father, Luke Childers, probably had the greatest influence on my career. He was from a farm of 13 children, an MS soils graduate of Missouri University, on the football team, a fraternity man, a soils department professor at the Universities of Idaho and Missouri, and one of the first county agricultural agents in the country. He put me in Vo-Ag, took me to farms to do farm work, talk to farmers and go to meetings. He told me his majoring in soils was only a part of growing a plant. The plant is the key to life. So, he advised me to major in horticulture, get a Ph.D, be a professor, maybe a station director or a dean. This example emphasizes the importance of including parents in any student recruitment program.

Recruiting Horticultural Students

Recruiting students in horticulture has to be a continuous effort. We must have a goodly number of horticultural undergraduates from which to choose gifted and motivated graduate students to replace those of us retiring or leaving the industry and, also, to justify the faculty and the facilities at land grant colleges (3,4).

The usual student recruiting techniques are important - brochures (2), radio, TV shorts, exhibits, tours, and meetings with counselors, teachers, students and parents. But something more is needed to "final-sell" prospective students on the fact that agriculture is the biggest employer