Abstracts of the ASHS North Central Region Annual Meeting

Lincoln, Neb.

ELECTRONIC VIDEO SURVEILLANCE OF LEAF NITROGEN CONTENT FOR GREEHOUSE POINSETTIA PLANTS

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Spectral reflectance and electronic image analysis have been performed on the foliage of poinsettia plants, subjected to high (256 ppm) , moderate (128 and 64 ppm) , and zero nitrogen levels. Nitrogen deficient plants grown in a greenhouse showed an increase in red reflectance (700-750 nanometers) and a decrease in near-infrared (800-1100 nanometers) . Reflectance was measured using a spectroradiometer sensitive to visible and near-infrared light, a black and white CCD camera with Wratten 87B blocking filter, and a super VHS color camcorder. Reflectance levels were statistically different between the zero and other nitrogen treatments, but not between the moderate and high nitrogen treatments. Problems in calibrating the measuring equipment were encountered due to variable reflectance characteristics within the greenhouse. To provide a more controlled environment, poinsettias were grown in a growth chamber. Data collected show day to, day variability by plants subjected to the same treatment and more consistent light intensity. Leaf color differences between zero and high nitrogen treatments are readily apparent. Usefulness of image methods is dependent on camera and analog-digital sensitivity.

PRESENTING LONG-TERM YIELD DATA FOR GROWER ACCEPTANCE

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All commercially available Great Northerns and Pintos plus entries from the Cooperative Dry Bean Nursery and selected entries from public and private breeding programs have been evaluated in 16 trials at Scottsbluff over a 10 year period. The results for each individual entry is presented in graphic form compared to the average value for all entries in the trial. Growers relate to this concept and readily-use it in making variety selections.

THE EFFECTS OF ROOT ZONE AND PLANT CANOPY TEMPERATURE MODIFICATION ON WATER USE AND GROWTH RESPONSE OF NEW GUINEA IMPATIENS

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This research illustrates the effects of root zone and plant canopy temperature modification on New Guinea impatiens, in terms of growth response and water use. Growth response parameters measured were fresh and dry weight gain, and total leaf area. Soil moisture evaporation, plant water use, and total water use were determined for individual plants.

A microprocessor controlled plant growth chamber was used to allow for strict environmental control and monitoring capabilities.

Results demonstrate that root zone heating enhanced growth of plants subjected to air temperatures in the range of 13° to 19° C. Conversely, root zone heating was detrimental to plant growth at an air temperature of 24° C. Water use of the plants was significantly affected by root medium temperature. Results indicate that total water use of a plant may be nearly doubled at elevated root medium temperatures.

The optimal combination of air and root medium temperature for plant growth was 24° C air and 22.5° C root. For root heated plants, the most pronounced growth response occurred at air temperatures in the range of 16° to 18° C.

GENETICS AND BREEDING FOR RESISTANCE TO PATHOGENS OF BEANS WITH EMPHASIS ON THOSE CAUSING BACTERIAL AND RUST DISEASES IN THE DOMINICAN REPUBLIC AND NEBRASKA

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Disease of beans, particularly common bacterial blight (CBB) (DR, NE), rust (DR, NE), web blight (WB) (DR) and bean golden mosaic virus (BGMV) (DR) are major constraints to bean yields and seed quality. The objectives were to identify resistant (R) germplasm, to conduct genetic studies, to develop R cultivars (DR, NE), to improve research facilities and capabilities (DR), to train personnel and educate graduate students (DR, NE). The expected impact is (1) the improvement of breeding programs, yields and income to farmers and (2) returning specialists will permit improved research in the DR. The most significant advances in research were as follows: (i) BAC-6 dry bean breeding line was found to be R to CBB seed infection, (ii) The reaction to CBB was inherited quantitatively with low NSH estimates, (iii) Rust race nonspecific R was correlated with abaxial leaf pubescence; the latter trait was inherited qualitatively, (iv) R to BGMV and WB were identified and (v) Improved cultivars and breeding lines were developed (DR, NE).

MEASUREMENT OF CROP WATER USE IN NEW GUINEA IMPATIENS AS AN INDICATOR OF CROP PERFORMANCE

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Measurements of water use in potted plants are difficult to measure except through repeated weighings and adjustments for evaporative losses. Little data on specific water use is available in the literature and parameters for specific water use equations are needed. A system for measuring plant water use of New Guinea Impatiens is based on the capillary-matric action of soils and plants. Watering systems have been developed on this principle and based on plant water demand. The system can become a useful quantitative measurement device based on saturated water flow from a graduated water supply cylinder and selection of a supply line of correct hydraulic resistance. Data collected on plants grown in a controlled environment included air and dewpoint temperatures, light intensities, and air flow velocities across the plants. The data were used to calculate plant water use with the Monteith Penman equation. The predicted water use agreed closely with the measured values.

BACKYARD FARMER: AN EXTENSION OUTREACH PROGRAM

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"Backyard Farmer" is a Cooperative Extension (CE) television program that airs one night a week on the Nebraska Educational Television Network (ETV). "Backyard Farmer" is a one-hour program which airs throughout the lawn and gardening season from approximately April 1 to September 1 each year. This program combines a live call-in format, along with mail-in questions and samples to be answered by the panel. In addition they discuss timely topics which are illustrated by videotapes and live demonstrations. The panelists are specialists in horticulture, entomology, plant pathology and agronomy (weed science).

Slightly over two-thirds of the Nebraska households (69%) were familiar with "Backyard Farmer". Backyard Farmer has been watched in 49% of Nebraska households. Thus Backyard

Farmer is viewed in approximately 270,000 households.

Viewers are more likely than non-viewers to have sought advice from Cooperative Extension in the past two years. Although the total number of viewers in the urban area was higher than in the rural area, there was a higher proportion of viewers in the rural area. Nearly half of the "Backyard Farmer" viewing audience (47%) was under age 45.

VARIATION IN GROWTH AND FLOWERING HABITS OF COMMERCIALLY AVAILABLE WILDFLOWERS

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Wildflowers and native plants are increasing in commercial and residential landscape use. One factor that limits their use is finding selections with more desirable landscape characteristics Selections within species are needed to extend the flowering time, increase the diversity of flower color, improve foliage characteristics and, in many cases , reduce plant height.

Field grown seedlings of wildflowers from a commercial source were evaluated for variation in horticultural traits. The range of variation in plant height, flowering time, flower color, number of flower stalks and other traits varied significantly within species. These trials indicate there is potential to use commercially available seed propagated cultivars of wildflowers as a source of germplasm for improving traits in wildflower cultivars and selections Selections were also made in this study for desirable horticultural traits for use in future plant improvement projects.

A COOPERATIVE SYSTEM FOR SCREENING DRY BEANS FOR MULTIPLE DISEASE RESISTANCE , YIELD AND PERFORMANCE IN NEBRASKA

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The objective of this cooperative system is to establish reaction of both private and public developed dry beans to common blight, rust, and white mold as well as to document performance in the absence of disease constraints. All commercially available Great Northerns and Pintos plus entries from the Cooperative Dry Bean Nursery and selected entries from public and private breeding programs are included. Entry number ranges from 70 to 80 each year. Annual results are published in "Biological and Cultural Tests for Control of Plant Diseases".