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temperatures at both locations dropped to -10. The minimum temperatures reached over the next 7 days were -11 and -14 for Overton and Clarksville, respectively. Flower buds from 4 rabbiteye, 4 low-chill highbush and 1 highbush cultivar(s) were examined at both locations for percentage of dead flowers. Percent damage at Overton and Clarksville respectively, by cultivar were: 'Climax' was 74 and 69, 'Brightwell' 43 and 66, 'Baldwin' 38 and 45, 'Tifblue' 14 and 5, 'Georgiagem' 7 and 76, 'O'Neal' 12 and 0, 'Cape Fear' 7 and 0, 'Blue Ridge' 4 and 0, and for 'Croatan' 3 and 0. Percentage flower bud death for 'O'Neal' and 'Georgiagem' at Overton were contingent on bud stage of development (10% at visible swelling, 40% at bud scale separation, 85% at bud scale abscission, and 100% at bloom). For 'Climax' at Overton, there was 75% damage at the visible swelling stage, and 100% for all other stages.

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A TECHNIQUE FOR EVALUATING ZN EFFICIENCY OF CITRUS  
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The aim of the present research was to develop nutrient solution (NUS) techniques for studying citrus responses to Zn stress. Analytical grade reagents used for NUS's contain sufficient Zn for normal growth of sour orange (S.O.) seedlings even though Zn levels are below the 0.015  $\mu\text{g}\cdot\text{ml}^{-1}$  detection limit of an AA spectrophotometer. The activity of contaminant Zn can effectively be suppressed and Zn deficiency induced when an excess of the chelating agent, diethylenetriaminepentaacetate (DTPA), is added to the NUS at pH 7.5-7.8 and the system is buffered with  $\text{CaCO}_3$ . S.O. seedlings exposed to NUS containing 200  $\mu\text{M}$  DTPA developed symptoms typical of Zn deficiency, i.e. small, narrow, and chlorotic terminal leaves and stunted growth. Zn deficiency was further confirmed by leaf tissue concentration of 10  $\mu\text{g}\cdot\text{g}^{-1}$  d.w. The DTPA-induced Zn deficiency symptoms also comprised of vein clearing on older leaves suggesting DTPA absorption and Zn inactivation in tissue along the veins. The Zn deficiency did not develop when 64  $\mu\text{M}$  Zn was added to the NUS or foliar Zn sprays were applied to plants weekly.

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AN IMPROVED SYSTEM FOR DETECTING TURFGRASS STRESS RESPONSES

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An objective and quantitative batch nutrient culture system was developed to assess responses of St. Augustinegrass cultivars 'Seville' (saline tolerant) and 'Floritam' (saline sensitive) to salt stress. Individual grass plugs (50/treatment) were randomized in a walk-in growth chamber, and weekly NaCl supplementation gradually increased the conductivity over a three week period to treatment levels (2.4 [control], 12.4, 22.4, and 32.4  $\text{dS}\cdot\text{m}^{-1}$ ). Plants were sampled at the onset, and at four and eight weeks during the experiment. Microliter samples of cell sap were extracted from grass blades and measured with a vapor pressure osmometer to determine osmolarity and osmotic adjustment. Length and area of sample shoot and root systems were measured using an adaptation of video image analysis, then the samples were prepared for dry weight analysis. 'Seville' responded to increasing salt stress with uniform increases in cell osmolarity, had a more dramatic response of increased root length to salt, and overall shoot development was less stunted than for 'Floritam'. 'Floritam' did not show significant cell osmotic adjustment except at the extreme salt treatment. Image analysis area and dry weight measurements were highly positively correlated except for high salt treatments after eight weeks of continuous culture, which may indicate that dry weight partitioning is altered under prolonged saline stress. Use of this novel system maximizes assessment of turfgrass stress responses, and quantification of resistance characteristics.

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EFFECT OF DORMANT SEASON APPLICATION OF SODIUM CHLORIDE ON SELECTED TREE SPECIES

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Tree seedlings of *Acer platanoides*, *A. rubrum*, *Quercus palustris*, and *Q. rubra* were subjected to soil-applied sodium chloride (NaCl) solutions of 0.0, 1.1 and 5.0 N NaCl once every month beginning in October 1987 and ending in April 1988. At the conclusion of the experiment in May, the trees were visually evaluated for damage and then harvested and dried. Growth measurements and shoot Na and Cl content were then taken. Based on the visual rating and the relative growth data, October applications of NaCl resulted in heavy damage and reduced growth in all four species while late winter / early spring NaCl applications produced similar results in *A. rubrum* and *Q. palustris*. Shoot Na and shoot Cl content were significantly greater in plants of all four species that received autumn and late winter / early spring salt treatments.

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INTERRELATIONS OF AMMONIUM TOXICITY AND ETHYLENE ACTION  
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Plants that are subjected to environmental stresses often develop similar symptoms regardless of the source of the stresses. Enhanced biosynthesis of ethylene may precede or accompany this development. Accumulation of ammonia in plants is related to appearance of the symptoms. Plants that are intoxicated with ammonium from external sources evolve ethylene and exhibit symptoms similar to those of plants that have been exposed to ethylene. Tomato (*Lycopersicon esculentum* Mill.) plants were grown on ammonium nutrition in solution culture. Inhibitors of ethylene biosynthesis (aminooxyacetic acid) or action ( $\text{Ag}^+$ ) lessened the injury that is associated with ammonium toxicity. Plants treated with these inhibitors evolved lesser amounts of ethylene than plants grown on ammonium nutrition without these inhibitors. Cobalt and salicylic acid were ineffective in alleviating ammonium toxicity. Nutritional or environmental stresses may lead to ammonium accumulation in plants and subsequently may induce ethylene biosynthesis and the development of the symptoms of injury.

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SOME MORPHOLOGICAL AND PHYSIOLOGICAL CHARACTERISTICS OF BLACKBERRY, STRAWBERRY AND BLUEBERRY PLANTS IRRADIATED WITH UV-B.

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Everbearing 'Darrow' blackberry, 'Earliglow' strawberry and 'Tifblue' blueberry plants were grown in the field under UV-B irradiance (280-310 nm) regime simulating 50% atmospheric ozone depletion. Different degrees of response among plant species were observed. In general, UV-B has retarding effects on the morphological characteristics as well as the physiological processes of the plants.

STABY

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DIFFERENTIAL RESPONSE OF CARNATIONS PULSED-CHASED OR CONTINUOUSLY TREATED WITH SILVER THIOSULFATE  
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Cut flowers of carnation were pulsed with 2.0 mM STS or treated continuously with 0.2 mM STS, followed by exposure to  $\text{C}_2\text{H}_4$ . A climacteric-like increase in respiration followed by a respiratory decline was induced in pulse treated flowers. No morphological changes accompanied the respiratory increase and no further response was elicited by additional  $\text{C}_2\text{H}_4$  application following the respiratory decline. Flowers continuously treated with STS did not respond to any concentration of  $\text{C}_2\text{H}_4$ . Petal tissue was separated into basal and apical portions and subjected to analysis for silver content by atomic absorption spectrophotometry. The number of free ethylene binding sites per cell was estimated.  $\text{C}_2\text{H}_4$  binding sites appear to be saturated by silver along a gradient from receptacle to petal. Incomplete saturation of the petal  $\text{C}_2\text{H}_4$  binding sites may account for the observed response.  $\text{C}_2\text{H}_4$  binding may be irreversible, implying that only a finite quantity of  $\text{C}_2\text{H}_4$  will bind at a given site.

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STUDIES ON IRRIGATION OF STOCKS AND SNAPDRAGONS

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A field experiment was conducted for two successive seasons to study the influences of irrigation intervals on growth and flowering of Stocks and Snapdragons. *Matthiola incana* and *Antirrhinum majus* were cultivated in clay loam soil and subjected to irrigation every 2, 4, 6, 8 and 10-days (90, 45, 30, 25 and 18 times of watering per season). The plant height, leaf number per stem, inflorescence number, inflorescence weight, inflorescence length, flower number per inflorescence and total weight of plants were studied. Some characters were influenced by irrigation treatments. The plants responded differently for some characters. The results gave some benefits which could be used in cultivation of Stocks and Snapdragons at different soil moisture.