

177 (PS 7)

FERTILIZER REQUIREMENTS FOR GREENHOUSE-GROWN PASQUEFLOWER, *PULSATILLA PATENS* SEEDLINGS

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Pasqueflower, *Pulsatilla patens*, seeds collected from an indigenous population were grown on a commercial bedding plant mix with all possible combinations of 0, 50, 100, 150, and 200 mg/l of soluble N ( $\text{NH}_4\text{NO}_3$ ), P ( $\text{H}_3\text{PO}_4$ ) and K ( $\text{K}_2\text{SO}_4$ ) fertilizer applied weekly. Seedlings were grown for 4 months in a greenhouse with a minimum constant air temperature of 20°C and with natural lighting supplemented in February with sodium vapor HID lamps positioned 1.2m above the bench providing a 16 hr photoperiod. On 10 June, 1990 seedlings were harvested, and the following data were recorded: petiole length; number of leaves; crown diameter; shoot, root and total dry weight; and leaf tissue N, P and K content. Nitrogen and phosphorus fertilizers had a significant effect on all parameters measured, whereas the potassium fertilizer did not. The best non-destructive indicator of plant nutritional status was petiole length. Theoretical response curves with predicted optimum values of fertilizer and tissue nutrient concentration will be presented.

178 (PS 8)

VERTICILLIUM WILT INFECTION IN *CERCIS CANADENSIS*.

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*Cercis canadensis*, Eastern Redbud, is very susceptible to infection by Verticillium Wilt caused by the common soil-borne fungi *Verticillium albo-atrum* and *Verticillium dahliae*. Little is known about the inoculum levels, the time required for natural infection to occur and how fast the pathogen travels inside the host species. One-year-old *Cercis canadensis* seedlings were planted in 7.6 liter (2-gallon) containers with a 1:1:2 soil/sand/perlite mix inoculated with five levels (0, 10, 100, 500, and 1000 microsclerotia/g soil) of *V. dahliae* prior to planting. At the end of the first growing season, half of the plants were removed from the containers, surface sterilized, dissected and root sections plated out on a *Verticillium* selective media. The remaining plants were grown for a second season. Infection first occurred in plants which received 100, 500 or 1000 ms/g at the end of the first season. The infection had spread at least 5 cm during the first growing season.

179 (PS 7)

NITROGEN LEACHING FROM OSMOCOTE AS INFLUENCED BY IRRIGATION AMOUNT

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The amount of N in medium solution and leached from osmocote-fertilized pine bark in response to three irrigation amounts was measured. Pine bark (50 g) filled pvc tubes (4.5 x 14 cm) fertilized with 0.5 g 14-14-14 Osmocote (3-4 month formulation) were drip-irrigated every three days with an amount of water equal to the amount lost from evaporation (E), E + 0.1E, or E + 0.2E. Gravimetric water content of bark at irrigations was approximately 80%. Leachate from tubes was collected throughout the 59 day experiment. Medium solution N content (pour-through method) was measured on days 15, 36, and 59. Tubes were stored in a growth chamber at 21°C. Forty-five percent more N was leached at the E + 0.2E treatment than from the E + 0.1E treatment. In most cases, very little leachate or no leachate was collected from the E treatment. Medium  $\text{NH}_4$  concentrations were not different during the experiment for the irrigation treatments; however,  $\text{NO}_3$  concentrations were higher in the E treatment than at E + 0.2 on days 36 and 59.

180 (PS 8)

LANDSCAPE TECHNICIAN JOB ANALYSIS TO ESTABLISH CERTIFICATION QUALIFICATIONS IN ARIZONA

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Job analysis interviews were conducted to provide an objective basis for educational programs and certification testing by the Arizona Certified Landscape Professional program. Landscape technicians and their supervisors were interviewed to determine tasks comprising the job and the

knowledge, skills and abilities required to perform said tasks. Landscape contractors, maintenance companies, and in-house maintenance supervisors were surveyed as to the appropriateness of the interview-based job analysis and the importance of the tasks. Survey data was analyzed and used to develop educational and testing objectives for the certification program.

181 (PS 7)

TIMED FERTILIZER APPLICATIONS EFFECT DWARF YAUPON HOLLY NITROGEN UTILIZATION

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Multiple branched liners of *Ilex vomitoria* were greenhouse-grown in 3-liter containers with a common nursery medium and received either 2.5 g N surface-applied in 1 application as Osmocote (18N-2.6P-10K) or a total of 0, 0.5, 1.5 or 2.5 g N per container from a solution that contained N, P and K in a ratio of 6:1:3. The solution fertilizer was applied either 1, 2, or 4 times per week with total N applied per container equally divided among individual applications. After 26 weeks, plants fertilized with 1.5 or 2.5 g of N had larger shoot dry weights than plants that received 0.5 g N regardless of the number of applications. Shoot dry weights for the 1.5 and 2.5 g N treatments were similar to those of plants fertilized with Osmocote. Total N utilized by the plant system; shoots, roots and media, was similar for plants fertilized with Osmocote and all 2.5 g N treatments while N utilized by the 1.5 g N treatment applied 4 times per week was 20% more than the Osmocote treatment. Plants receiving the 0.5 g N treatment applied 1 or 2 times per week utilized the largest percentage of applied N, 76 and 77%, respectively.

182 (PS 8)

A SUMMARY OF SEVEN YEARS OF COVER CROP STUDIES AT PENN STATE

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In 1983 a research project was begun at Penn State to evaluate low growing plants for use as cover crops between rows of nursery stock. Plantings of grasses and legumes were established in fall, 1983 and spring and fall, 1984. All plantings were evaluated for establishment, growth, and competitiveness with weeds. The fall, 1984 planting is still being evaluated for persistence and weed encroachment under low maintenance conditions.

Additional studies relating to the establishment and use of cover crops have been conducted. Two studies were designed to determine the effects of different seeding techniques, mowing frequency, and selective herbicide use on establishment of several grasses. Another study was done to determine the competitiveness of the grasses with woody plants when the grass was grown as a solid sod or controlled in strips around the woody plants with herbicides. The sensitivities of the grasses to herbicides commonly used in nurseries were also determined. The fine fescues in general, and hard fescue in particular, proved to be the outstanding species for use as low maintenance cover crops with perennial crops grown at wide spacing. They were found to be extremely competitive with woody plants in solid sod, but did not significantly reduce woody plant growth if herbicide strips were maintained. A summary of the results of these studies will be presented.

183 (PS 9)

INFLUENCE OF MULCHING MATERIALS AND NITROGEN APPLICATION METHOD UPON THE GROWTH AND YIELD OF YELLOW CROOKNECK SQUASH

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The influence of nitrogen application method and mulching materials on the growth and yield of summer squash (*Curcubita pepo* L.) was investigated in the summer and fall of 1990. Black plastic, clear plastic and latex spray mulch treatments were evaluated. Nitrate was applied within mulching treatments 1) as a single broadcast application (112 kg N/ha) at planting or 2) 56 kg N/ha applied broadcast at planting plus 56 kg N/ha applied through drip irrigation four weeks later. Total yields were significantly greater for the spring season crop compared to the fall crop. This was due to increased viral disease incidence in the fall which resulted in smaller plants with reduced yields. Mulching treatments had a significant effect upon all yields in both fall and spring crops. Early, mid-season and total yields were greatest for plants grown on clear or black plastic mulches. Highest overall yield and fruit number were obtained using black plastic mulch. Fruit size was similar in all the treatments. Reduced yields were obtained when plants were produced on bare ground. Latex spray mulch provided little additional ground coverage and no differences in yield or other observations were reported when compared to the bare ground control. Weed suppression was greatest under black plastic mulch. Use of plastic mulches also resulted in decreased incidence of viral disease. Split application of ammonium nitrate had no major effects on yield or fruit number in either spring or fall experiments.