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105. Reducing pesticide inputs in nurseries using a portable hot water immersion system. Gill, S., Schuster, C., Ross, D. S., Shrewsbury, P., and Rosenkranz, V. HortScience 42(3):430. 2007.

and agency administrators with guidelines for starting a HT program. The manual describes the benefits and goals of HT programs and promotes the HT profession. The manual gives advice on HT program coordination details from volunteer training to agency support. Detailed lesson plans for 12 HT activities and appendices with horticultural information, and professional HT resources are included. Information on the manual is available at www.rce.rutgers.edu.

Effect of Degree and Duration of Shade on Quality of Greenhouse Tomato

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Some amount of shade may be optimal to produce high quality tomatoes in a greenhouse during summer months in the northeastern United States. Simultaneous comparisons were made among greenhouse sections that were either not shaded, or covered with reflective aluminized shadecloth that attenuated 15%, 30% or 50% of direct sunlight. The shadecloth was applied at the start of warm weather in June. The houses were shaded for the rest of the summer, and fruit was picked until late August. Total yield decreased linearly with increasing shade, but there was no significant difference among shade treatments in marketable yield. The fraction of fruit that was marketable was greatest for plants grown under 50% shade. This fraction was 9% greater than in a greenhouse with no shade in 2003, and 7% greater in 2004 and 2005. Cracked skin was the defect most affected by shade. Among sensitive cultivars, up to 35% of the fruit produced in greenhouses with no shade had cracked skin, whereas in greenhouses covered with 50% shade, only 24% to 26% of the tomatoes had cracked skin. There was no consistent trend with shade in the fraction of fruit with green shoulder, blossom end rot, or irregular shape. The effect of shade increased with the duration of shading. There was no effect of 50% shade compared to no shade on total yield within 20 days, but yield decreased by 20% in the interval from 25 to 45 d after shading, and by 30% after more than 45 d of shading in 2005. Marketable yield only decreased after more than 45 d of shading for cultivars that were not sensitive to cracked skin or uneven ripening. Shade decreased fruit size over the entire season only in 2003. In general, shading increased the fraction of marketable tomato fruit without sacrificing fruit size.

Reducing Pesticide Inputs in Nurseries using a Portable Hot Water Immersion System

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Concerns about unnecessary exposure to chemicals has prompted many owners to look for alternative methods to deal with insect and mite control that place less reliance on pesticide applications. The problem is that small insects and mites present on the cuttings frequently go undetected at the propagation stage, resulting in pest outbreaks when plants are moved to nursery benches or production greenhouses. This project involves controlling nursery pests early in the production cycle to reduce the need for pesticide inputs. Our method of treating plant cutting material with hot water at set temperatures and treatment times before it is moved to the propagation stages will control several of the major pests of nursery plants. We built a mobile, insulated tank with a controlled hot water recirculation system that works in temperate regions to treat pests on nursery plants at the propagation stage. Whole-plant cuttings were submersed in water held at a constant temperature for a set amount of time, with the water being circulated around the plant cuttings. The treated cuttings were then cooled using water at 50 to 60 °F for 60 to 120 seconds. The cuttings were then stuck as in normal propagating methods. We have been working to establish what temperatures and lengths of immersion different species of nursery plants can tolerate without interfering with the plant propagation system.

Yield, Plant Architecture, and Machine Harvest Characteristics of Several Leafy Greens Grown for Processing

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Several leafy greens are grown in the mid-Atlantic region for processing (freezing), including spinach, kale, turnip greens, mustard greens, and collards. Although production of these specialty crops has been mechanized, current production practices are expensive, especially harvest costs. In addition to high maintenance costs associated with the machines currently used for harvest, in-field harvest losses often exceed 20% of the yield. To address these limitations, a study was initiated to understand the once-over harvest characteristics of these crops and to develop a more cost-effective harvesting system. In a commercial bed production setting, yield and plant architecture were measured for five different small greens. Using a harvester equipped with a new band saw–type cutting mechanism, harvest recovery characteristics were measured for each of these crops during the first cutting of the season. On average, harvest loss was lowest for spinach, averaging about 800 $kg \cdot ha^{-1}$ (10% of the yield). Collards exhibited the poorest recovery characteristics, averaging more than 4 $Mg \cdot ha^{-1}$ (20% of yields). In general, losses during harvest correlated very well with the size of the plant leaf, suggesting that a single harvester for all small greens may not be economically viable.

High-speed Mechanical Harvesting of Spinach

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Spinach grown for processing is an important high-value crop in Delaware, New Jersey, and the eastern shore of Maryland. Current production methods utilize high-density precision planting on beds under sprinkler irrigation. Fall, winter, and spring crops can be grown, and each may be harvested as many as three times. Currently, all processed spinach is mechanically harvested; most harvesters use a single cutter bar with a reciprocating blade. High maintenance costs, excessive downtime, and high harvest loss are some of the problems limiting the performance of current harvesters. To overcome these limitations, a high-speed, low-maintenance cutter is being developed that utilizes a high-velocity continuous blade. Analysis of the blade stiffness and results from preliminary field tests revealed that blade stability for a 2-m span was a concern. A polymer blade guard was designed and installed, which provided continuous support for the blade across the cutting width. Field tests indicated that losses associated with the cutting mechanism averaged less than 2% of yield for both smooth-type and semi-savoy spinach varieties, and maintenance and downtime was significantly reduced by as much as a factor of 2. In addition, harvest speed can be increased to 8 km/hour, a 40% increase over the current harvesting method.

Vegetative Growth of Two Strawberry Varieties Affected by Prohexadione-calcium Root Dips and Foliar Sprays

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Dormant crowns of 'Allstar' and 'Jewel' strawberries grown in 1-gallon pots in a greenhouse were treated with prohexadione-calcium (Apogee®) at 150 ppm as root dips prior to planting with and without Agri-Gel, or as two foliar sprays 14 days apart at the first visible development of runners. The two cultivars varied significantly in their response to prohexadione-calcium root dips. The dips significantly delayed runner production in 'Allstar'. Although the plants had nearly the same number of runners as the control when harvested, the runners were much less developed. The root dips all but halted runner production in 'Jewel', but also resulted in some plant mortality. Foliar sprays of prohexadione-calcium reduced runner numbers fairly consistently between the two cultivars. Prohexadione-calcium treatments tended to increase leaf and branch crown numbers and total plant dry weight. From