Significance to the Horticulture Industry

Container Weed Germination

Influence of Substrate Physical Properties on Container Weed Germination. James E. Altland and Jennifer K. Boldt. *Journal of Environmental Horticulture* 36(1):1–6.

Container substrate components can have a measurable impact on substrate physical properties and water relations, which in turn impacts weed germination and herbicide longevity. Relatively little work has addressed the impact of substrate components on the germination and establishment of weeds in container crops. The objective of this research was to determine how a pine bark substrate amended with varying rates of sphagnum peatmoss affected substrate physical properties and creeping woodsorrel (*Oxalis corniculata* L.) germination in containers with or without applications of a preemergence herbicide. Additions of peatmoss to the pine bark substrate increased water holding capacity of the bulk substrate. However, water was not equally distributed in the vertical profile of a container. Volumetric water content on the container surface was similar regardless of peatmoss amendment. As a result, weed germination and herbicide efficacy was similar across the wide range of peatmoss amendment rates used in this study. Sphagnum peatmoss did not affect weed control with or without the use of a preemergence herbicide.

Drought Stress in Bamboo

Apparent Tolerance of Low Water Availability in Temperate Asian Bamboos. Melissa C. Smith and Richard N. Mack. *Journal of Environmental Horticulture* 36(1):7–13.

Temperate bamboos are a booming market in the specialty nursery field. Much marketing emphasis has been placed on their frost tolerance and shade tolerance for low-maintenance plantings, but their watering and irrigation requirements and responses to low soil water conditions are poorly documented (Mulkey 1986, Cochard et al. 1994, Dierick et al. 2010). Our results indicate that several species of temperate Asian bamboos are well adapted to withstand long periods of low moisture input.

Microwave Radiation Efficacy

Responses of Ten Weed Species to Microwave Radiation Exposure as Affected by Plant Size. Aman Rana and Jeffrey F. Derr. *Journal of Environmental Horticulture* 36(1):14–20.

Microwave radiations are a potential means of nonchemical weed control as a substitute for herbicides. Information is needed on the optimum plant size for effective control. More energy was needed to control older, larger plants in comparison to younger plants. Therefore, plant size will play a significant role when microwave radiation is used for weed control. Treatment of weeds less than 15 cm (6 in) tall using microwave radiation should be a more economical and viable option for farmers than treating taller weeds.

Spray Penetration

Spray Penetration and Natural Enemy Survival in Dense and Sparse Plant Canopies Treated with Carbaryl: Implications for Chemical and Biological Control. Whitney Yeary, Amy Fulcher, Heping Zhu, William Klingeman, and Jerome Grant. *Journal of Environmental Horticulture* 36(1):21–29.

Growers are subject to market pressure to produce plants with dense canopies. Canopy density may affect the efficacy of contact insecticides and the ability to use insecticides and natural enemies simultaneously. Insecticide applications are generally considered more effective on plants with a sparse canopy. In this study, spray coverage within the canopy interior was low regardless of canopy density, indicating that the interior of a plant could serve as a refugium for pest insects but also naturally-occurring biological control organisms during an insecticide application. The canopy interior may also provide a safe place to release natural enemies as part of an augmentative biological control program. The use of natural enemies may be critical to controlling pests, such as scales, that infest the trunk and other interior positions of dense plant canopies, where spray coverage was minimal and in regions or markets implementing insecticide restrictions for pollinator protection.

Stormwater Remediation

Impact of Engineered Filter Bed Substrate Composition and Plants on Stormwater Remediation within a Rain Garden System. Elizabeth D. Riley, Helen T. Kraus, Ted E. Bilderback, J.S. Owen Jr., and W.F. Hunt. *Journal of Environmental Horticulture* 36(1):30–44.

Rain gardens are commonly installed landscape features that remediate stormwater runoff. They do so via volume reduction and contaminant removal; both of which, are impacted by the engineered filter bed substrate and plant selection. For this study, three species (‘Duraheat’ river birch, wild bee balm, and ‘Shenandoah’ switch grass) were grown in two common rain-garden-engineered filter-bed substrates (sand or slate), amended with two sources of organic matter (composted yard waste or pine bark). Composted yard waste and pine bark were added to sand and slate by one of two methods, banding or incorporation, in varying amounts: banded at 2.5 cm (1 in), 5.1 cm (2 in), 7.6 cm (3 in), and 10.2 cm (4 in) or incorporated at 5%, 10%, 15%, or 20% (by vol.).

The addition of composted yard waste as a band within a sand or slate engineered filter bed substrate positively impacted the hydrology of a rain garden system by reducing the outflow volume and increasing the evapotranspiration. All species had enhanced shoot growth when sand was used rather than slate. Shoot growth was enhanced for all species when composted yard waste was banded as the organic matter amendment instead of pine bark. Also, shoot nitrogen and phosphorus content were higher when composted yard waste was banded as the organic matter amendment compared to pine bark. However, with the utilization of composted yard waste, concentrations of total soluble nitrogen in the effluent were higher compared to pine bark for both sand and slate while ortho-phosphate concentrations were generally not impacted by amendment.

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