

is considered optimal), and the complete utilization of the substrate carbon by microorganism naturally present in the system (as measured by the evolved CO₂). The relative ability of existing and emerging plastic mulch products to completely biodegrade in the soil environment needs to be researched and studies should include information on the presence or absence of residues and/or toxic by-products as well as physical and temporal impacts on soil ecology and plant health. It is essential for organic producers to conform to the current standards of their organic certifying agency regarding the use of biodegradable mulches, however, comprehensive studies on the long term impacts of biodegradation of plastic mulch products will help to promote new information and product development.

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11:45 am–12:00 pm

Solarization and Biofumigation for Organic Control of White Mold in High Tunnels

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The fungus *Sclerotinia sclerotiorum* causes white mold in lettuce and attacks a wide range of other cool-season crops commonly grown in high tunnels. It survives summer heat by producing heat-resistant soil-borne sclerotia that germinate when conditions favor the pathogen's growth. In 2006, 2007, and 2008 we conducted field studies in commercial organic high tunnels in Kentucky to test two organically-acceptable management tactics for their ability to prevent fall germination of *S. sclerotiorum* sclerotia. The first was solarization, laying clear plastic over the soil surface to trap solar energy and heat the soil. The second was biofumigation, soil incorporation of Brassica green manures to release volatile isothiocyanates toxic to some soil-borne fungi. In late July plots were randomly assigned to be untreated, solarized, biofumigated with 1 kg of Indian mustard (*Brassica juncea* cv. 'Pacific gold') per square meter, or solarized and biofumigated. Mesh bags of sclerotia were buried 0, 5, 10, and 15 cm below the soil surface at the center and edge of each plot prior to treatment, then retrieved 2, 4, and 6 weeks after treatment so that sclerotia could be incubated with moist soil at 16 °C for 6 weeks to stimulate germination. Soil temperature was recorded hourly at 0–15 cm throughout the 6-week treatment period. Surface temperatures in solarized plots reached an average daytime peak of 55 °C and stayed above 30 °C at night. Temperature swings were moderated with soil depth. Solarization for 4 weeks completely inhibited germination of sclerotia at the soil surface and 5 cm below the surface in all years. Inhibition varied between years deeper in the soil profile. Biofumigation did not inhibit germination of sclerotia.

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Oral Session 20:

Laclede

Asexual Propagation

Monday, 27 July 2009, 11:00 am–12:00 pm

Moderator: Khalid Ahmad, Graduate,
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11:00–11:15 am

***Symplocos tetragona* Chen Ex Y.F. Wu and Its Cutting Propagation**

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Tetragonal sweetleaf (*Symplocos tetragona* Chen ex Y.F. Wu) is a new woody ornamental plant. Since it was discovered in 1996, this small evergreen tree attracted gardeners by its dense, gloss dark green foliage and pyramidal habit. The plant could be distinguished from other species by its yellowish green, tetragonal branchlets. Its fragrant white flowers usually bloom from March to December. The plant grows well from full sun to shade and tolerates various soil types. No injury was observed under –12 °C (Zone 7). To promote this new plant for commercial use, stem cuttings were collected on 7 August 2008 and treated with IBA and NAA at the concentrations of 1000, 3000, and 8000 mg·L⁻¹. All cuttings were inserted into 32-cell flats with perlite:peatmoss mix (3:1 by volume) and placed under a mist system. Rooting rate (%) and total root-ball volume were measured 18 weeks later. Rooting hormones significantly increased the root percentage from 40% (control) to 61 to 100%. Hormodin rooting powder yielded the highest rooting rates from 87 to 100%, regardless of its concentrations. Higher concentrations (3K and 8K) of K-IBA also produced commercially acceptable rooting rates of 87 and 73%. Double dips with KIBA+Hormodin and KNAA+Hormodin did not show any advantage. Hormodin rooting powder also greatly improved the root quality, which indicated by the total rootball volume. The highest rootball volume, 315.1 cm³, was obtained under the treatment of Hormodin #1. Cuttings treated with Hormodin #2 produced the second highest rootball volume of 268.0 cm³. Both cuttings treated with the lower K-IBA and K-NAA also showed the nice root system of 206.6 cm³ or higher. Stem cuttings of tetragonal sweetleaf could be produced commercially with 1,000 and 3,000 mg·L⁻¹ Hormodin rooting powder. Donglin Zhang is also a guest professor at the Central South University of Forestry and Technology.

11:15–11:30 am

Developmental Stage and Hormone Concentration Differentially Affect Vegetative Propagation of Select Baldcypress Clones

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In previous studies baldcypress [*Taxodium distichum* (L.) L.C. Richard] clones were selected for improved field tolerance to alkaline soils, drought, or foliar or soil salinity exposure, and/or their ornamental traits. Objectives of the current research were to 1) determine the clonal responses to K-IBA (potassium salts of indole-3-butyric acid) across seasonal developmental stages of cuttings, and 2) to determine if rooting rates (percentages) and rooted cutting quality (root number,