Sodium Cellulose Glycolate as a Thickening Agent for Applying Auxin Solutions to Stem Cuttings©

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Stem cuttings of *Abelia* 'Edward Goucher', *Buxus sinica* var. *insularis* 'Wintergreen', *Hedera helix*, *Hibiscus syriacus* 'Collie Mullens', *Ilex vomitoria* 'Nana', *Juniperus rigida* subsp. *conferta* 'Blue Pacific', and *Rosa* 'Moorcap', Red Cascade™ climbing miniature rose received a basal quick-dip in solutions of Dip'N Grow at concentrations of 0 + 0, 50 + 25, 250 + 125, 500 + 250, 750 + 375, and 1000 + 500 ppm IBA + NAA prepared with and without 13.5 g·L^{-1} sodium cellulose glycolate (SCG) as a thickening agent. Cuttings of *Ilex vomitoria* 'Nana' exhibited increased rooting with increasing auxin concentration with inclusion of SCG. The other six taxa exhibited similar rooting percentages among all treatments, but exhibited an increase in root number and/or total root length with inclusion of SCG. Initial shoot growth on rooted cuttings of *Abelia* 'Edward Goucher' showed some reduction with increasing auxin concentration with inclusion of SCG, suggesting cuttings absorbed more auxin from solutions containing SCG owing to their extended period of exposure to the auxin. Otherwise, there were no negative responses to solutions containing SCG. The greater viscosity of solutions prepared with SCG can help reduce the possibility of spillage and evaporation of alcohol during use of the auxin solutions.

OBJECTIVE

This study was conducted to determine whether inclusion of sodium cellulose glycolate (SCG) as a thickening agent for solutions of IBA + NAA would affect rooting response and initial shoot development of stem cuttings of selected woody ornamentals. Sodium cellulose glycolate, also known as sodium carboxymethylcellulose, is used as a thickener, binder, emulsifier, stabilizer, and colloidal suspending agent in salad dressing, fruit pie fillings, baked goods, dietetic foods, and other products.

MATERIALS AND METHODS

Auxin solutions were prepared by diluting Dip'N Grow with deionized water to selected concentrations of IBA + NAA. Solutions were prepared both with and without 13.5 g·L^{-1} SCG, providing a total of 12 treatments. Preliminary studies indicated adhesion of SCG solutions was maximized using a rate of 13.5 g·L^{-1}. Sodium cellulose glycolate was added to auxin solutions at room temperature (73 ºF) with continuous hand stirring until all SCG had dissolved. Solutions containing SCG

were placed in capped containers and allowed to set overnight at room temperature before use.

Cutting propagation material was collected from outdoor container-grown stock plants (*Buxus sinica* var. *insularis* 'Wintergreen'), indoor container-grown stock plants (*Hedera helix* and *Rosa* 'Moorcap', Red Cascade™ climbing miniature rose), or landscape stock plants (*Abelia* 'Edward Goucher', *Hibiscus syriacus* 'Collie Mullens', *Ilex vomitoria* 'Nana', and *Juniperus rigida* subsp. *conferta* 'Blue Pacific'). Softwood or semi-hardwood cuttings of the seven taxa received a basal quick-dip in their respective solutions and were stuck into Fafard 3B mix (a blend of peat, perlite, vermiculite, and pine bark; Conrad Fafard, Inc., Agawam, Massachusetts) in individual containers and placed under intermittent mist in a greenhouse at Auburn University. Each treatment contained 15 cuttings per taxon, resulting in 180 cuttings per taxon. Cuttings were stuck in early March (*Ilex* and *Juniperus*) and mid-May (all other taxa) of 2003. At the end of an appropriate rooting period for each taxon, rooting response was evaluated based on rooting percentage, number of primary roots per rooted cuttings, and total root length per rooted cutting, along with initial shoot growth response based on total shoot length.

RESULTS AND DISCUSSION

Rooting and shoot growth responses are shown in Figs. 1–4. Overall, results suggest, depending on taxon, rooting response of stem cuttings can be enhanced by including SCG in auxin solutions used for a basal quick-dip treatment prior to sticking cuttings in rooting medium. Sodium cellulose glycolate as a thickening agent allows more auxin solution to adhere to the cutting base, exposing the tissue to auxin over a longer time compared with use of an aqueous auxin solution alone. Larger root systems on newly rooted cuttings may enhance subsequent establishment and growth of plants beyond the propagation phase. On taxa where the SCG treatments are more effective than with auxin alone, use of SCG may also allow lower rates of auxin to be used without a decrease in rooting response. Owing to its viscosity, use of SCG in auxin solutions may be of additional convenience to the propagator by reducing the chance of spillage and evaporation of the alcohol used as a solvent for the auxin. Whether use of SCG can enhance rooting of cuttings in the absence of auxin remains a question for further investigation.

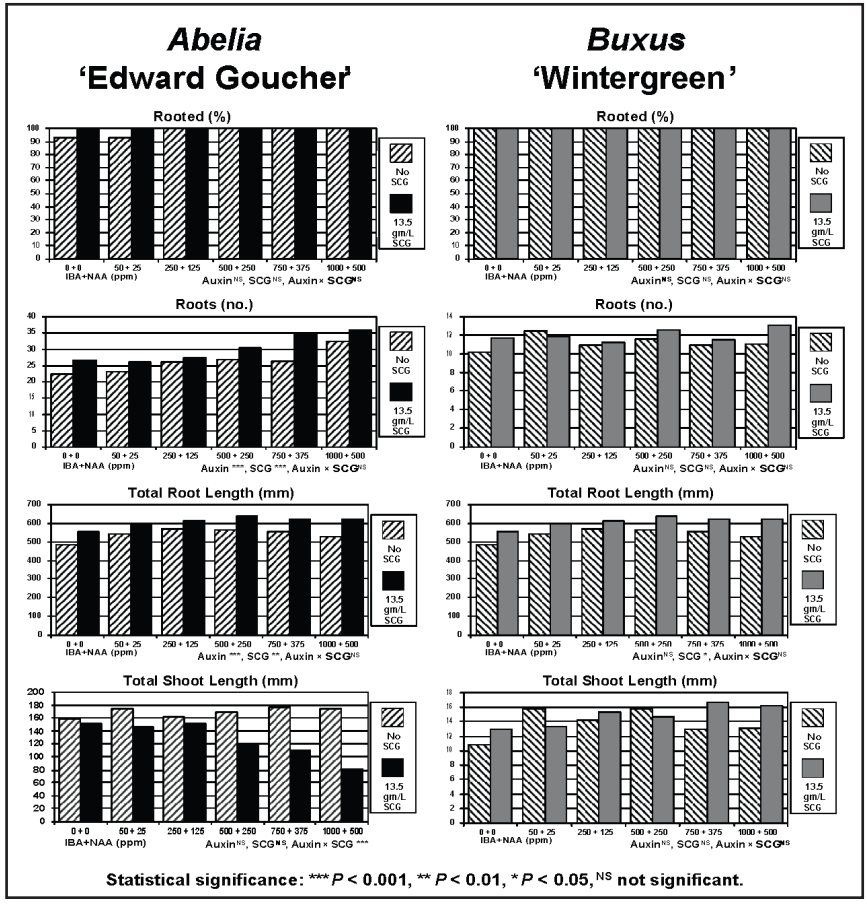

Figure 1. Rooting percentage, root number, total root length, and total shoot length on 2-inch, 2-node stem cuttings of *Abelia* 'Edward Goucher' and 2-inch, 3-node stem cuttings of *Buxus sinica* var. *insularis* 'Wintergreen' treated with solutions of IBA + NAA (Dip'N Grow) at selected concentrations prepared with 0 or 13.5 g·L^{-1} sodium cellulose glycolate (SCG).

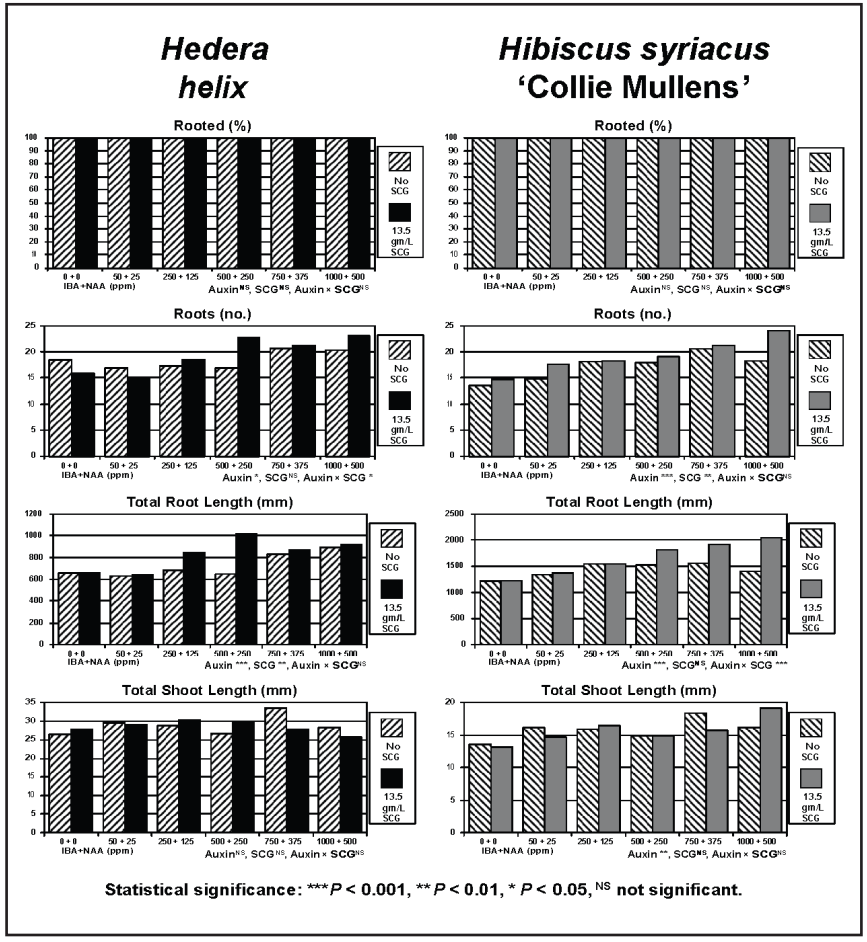

Figure 2. Rooting percentage, root number, total root length, and total shoot length on single-node stem cuttings of *Hedera helix* and 3-inch stem cuttings of *Hibiscus syriacus* 'Collie Mullens' treated with solutions of IBA + NAA (Dip'N Grow) at selected concentrations prepared with 0 or 13.5 g·L^{-1} sodium cellulose glycolate (SCG).

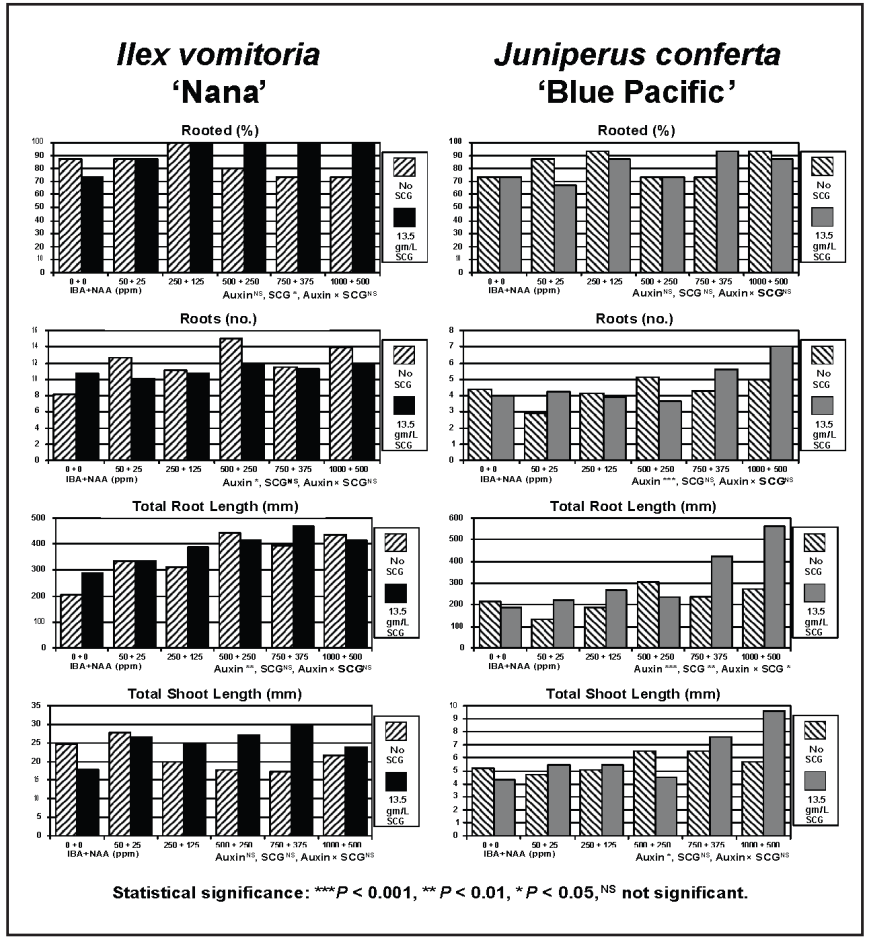

Figure 3. Rooting percentage, root number, total root length, and total shoot length on 3-inch stem cuttings of *Ilex vomitoria* 'Nana' and 3-inch stem cuttings of *Juniperus rigida subsp. conferta* 'Blue Pacific' treated with solutions of IBA + NAA (Dip'N Grow) at selected concentrations prepared with 0 or 13.5 g·L^{-1} sodium cellulose glycolate (SCG).

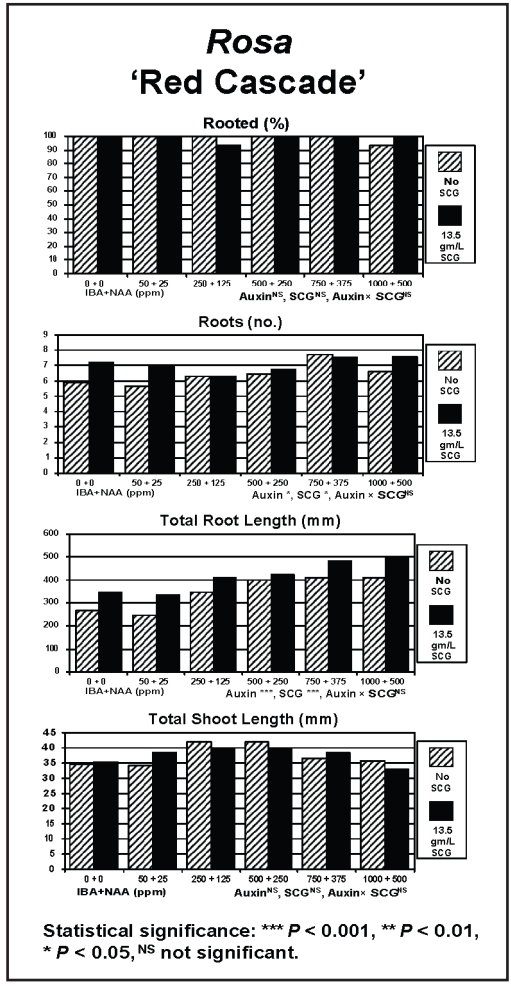

Figure 4. Rooting percentage, root number, total root length, and total shoot length on single-node stem cuttings of *Rosa* 'Moorcap', Red Cascade™ climbing miniature rose treated with solutions of IBA + NAA (Dip'N Grow) at selected concentrations prepared with 0 or 13.5 g·L^{-1} sodium cellulose glycolate (SCG).