Comparison of Two Water-soluble Forms of IBA for Rooting Cuttings

Eugene K. Blythe

Coastal Research and Extension Center, Mississippi State University
South Mississippi Branch Experiment Station, Poplarville, MS 39470

blythe@pss.msstate.edu

Index Words: Auxin, Indole-3-butyric acid, K-IBA, Vegetative Propagation.

Significance to Industry: A question posed by commercial nursery growers as to whether rooting results obtained in cutting propagation using auxin solutions made with Hortus IBA Water Soluble Salts [an EPA-registered product which forms the potassium salt of indole-3-butyric acid (K-IBA) when dissolved in water] would be comparable to results obtaining using technical grade K-IBA (available for research use, but not EPA-registered for commercial use) prompted a study to examine this issue. Solutions were prepared using these two products at five rates of IBA: 500, 1000, 1500, 2000, and 3000 ppm. Subterminal (3-node) cuttings of *Ligustrum japonicum* 'Texanum' (Texas privet), single-node cuttings of Rosa 'Red Cascade' (rose), and subterminal (2-node) cuttings of *Trachelospermum jasminoides* (star jasmine) received a 1-sec basal quick-dip in one of the ten auxin solutions. Cuttings of all three crops showed no significant difference in rooting response between the two products. Results indicate that commercial propagators can switch from K-IBA to Hortus Water Soluble Salts for a basal quick-dip without an adjustment in IBA rate.

Nature of Work: In 1935, Thimann and Koepfli (4) reported the synthetic preparation of the auxin indole-3-acetic acid (IAA), a naturally occurring substance that had recently been found to have root-forming properties, and demonstrated its practical use in stimulating root formation on cuttings. Soon after, the synthetic auxins indole-3-butyric acid (IBA; now known to occur in plants) and 1-naphthaleneacetic acid (NAA) were shown to be more effective than IAA for rooting cuttings (5). IBA and NAA are currently the most widely used auxins for promoting root formation on stem cuttings (1). Auxin treatments are commonly used in commercial plant propagation to increase overall rooting percentages, hasten root initiation, increase the number and quality of roots, and encourage uniformity of rooting (2,3). Commercial root-promoting products (“rooting hormones”) are available in various formulations: liquid concentrates, water-soluble salts and tablets, gels, and powder (talc) (1).

Some growers have used the potassium (K) salt of IBA (K-IBA) over the years for preparation of water-based IBA solutions. Technical grade K-IBA is commonly used in plant propagation research; however, this product, previously purchased by growers from scientific supply companies, is no longer available for sale for use as a root-promoting compound due to lack of Environmental Protection Agency (EPA) registration. One EPA-registered product that can be used as an alternative to K-IBA is Hortus IBA Water Soluble Salts (containing 20% IBA, a pH buffer, and proprietary ingredients; Phytotronics Inc., Earth City, MO), which produces K-IBA when the product is dissolved in water.

Commercial nursery growers have questioned whether rooting results obtained using auxin solutions made with Hortus IBA Water Soluble Salts are comparable to results obtained using technical K-IBA. The current study was conducted to examine this issue using cuttings of three commonly grown nursery crops.

Solutions of K-IBA (Sigma, St. Louis, MO) and Hortus IBA Water Soluble Salts were prepared at five rates of IBA: 500, 1000, 1500, 2000, and 3000 ppm (total of ten treatments). Subterminal (3-node, 3.5-inch) cuttings of *Ligustrum japonicum* 'Texanum' (Texas privet), single-node (1-inch) cuttings of Rosa 'Red Cascade' (rose), and subterminal (2-node, 2.75-inch) cuttings of *Trachelospermum jasminoides* (star jasmine) were prepared on July 8, 2012, received a 1-sec basal quick-dip in one of the ten auxin solutions (30 cuttings per treatment), stuck in Sunshine Redi-earth Professional Growing Mix in 50-cell plug trays, and rooted in a greenhouse under intermittent mist for 6 to 7 weeks.

Upon harvest, root systems were washed to remove rooting substrate, then scanned and analyzed with WinRHIZO software (Regent Instruments Inc., Quebec, Canada) to determine total root length. Roots emerging from rooted cuttings were counted. Linear models were used to analyze total root length data with the GLIMMIX procedure of SAS. Generalized linear mixed models were used to analyze root count data with the Poisson distribution (rose) or negative binomial distribution (Texas privet and star jasmine) with the GLIMMIX procedure of SAS. Models included auxin rate (quantitative) and IBA source (qualitative). There were no significant interactions between auxin rate and IBA source.

Results and Discussion: Upon harvest, cuttings of Texas privet exhibited no significant difference in number of roots or total root length between the two products or among the different rates of IBA (Table 1). Cuttings of rose exhibited no significant difference in number of roots and a marginally significant increase in total root length using the Hortus product compared with technical K-IBA; number of roots and total root length showed highly significant and marginal increases, respectively, with increasing rate of IBA with both products. Cuttings of star jasmine exhibited no significant differences in number of roots or total root length between the two products, but significant increases with increasing rate of IBA with both products. Results indicate that commercial propagators can switch from K-IBA to Hortus Water Soluble Salts for a basal quick-dip without an adjustment in IBA rate.

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Table 1. Rooting response of cuttings of *Ligustrum japonicum* 'Texanum' (Texas privet), *Rosa* 'Red Cascade' (rose), and *Trachelospermum jasminoides* (star jasmine) obtained using a basal quick-dip in solutions of the potassium salt of IBA (K-IBA) or Hortus IBA Water Soluble Salts (WSS) (each prepared at 500, 1000, 1500, 2000, and 3000 ppm IBA) and rooted under intermittent mist in a greenhouse (n=30).

		Roots (no.)		Total root length (cm)	
	IBA rate (ppm)	K-IBA	WSS	K-IBA	WSS
Ligustrum japonicum 'Texanum'	500	8.1	7.9	80	93
	1000	8.3	7.7	88	81
	1500	8.3	8.2	91	88
	2000	7.7	8.3	85	86
	3000	8.3	7.6	91	92
Significance[z]:					
Auxin type		NS		NS	
Auxin rate		NS		NS	
Rosa 'Red Cascade'	500	3.1	3.4	51	57
	1000	3.6	3.2	52	61
	1500	3.6	3.8	56	63
	2000	4.1	4.2	60	60
	3000	4.7	5.6	59	65
Significance:					
Auxin type		NS		*	
Auxin rate		***		*	
Trachelospermum jasminoides	500	3.3	4.1	87	95
	1000	4.5	4.4	112	108
	1500	5.5	5.1	115	101
	2000	5.5	4.8	130	127
	3000	6.0	5.7	169	151
Significance:					
Auxin type		NS		NS	
Auxin rate		***		***	

[z]Not significant or significant at α = 0.05 (*), 0.01 (**), or 0.001 (***).

Comparative Rooting Response of Cuttings Using a Basal Quick-Dip in Two Water-soluble Forms of IBA

Eugene K. Blythe

Mississippi State University, Coastal Research and Extension Center, South Mississippi Branch Experiment Station, Poplarville, MS   blythe@pss.msstate.edu

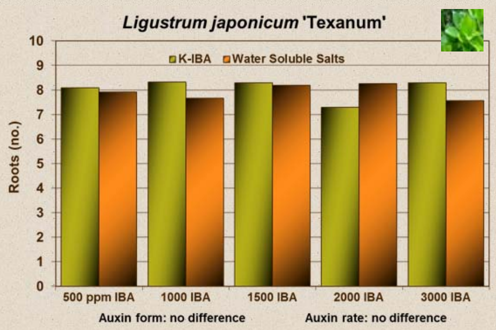
ABSTRACT

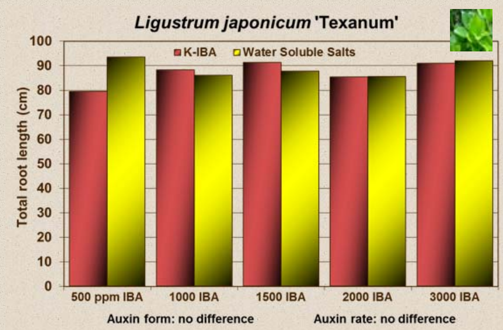
A question posed by commercial nursery growers as to whether rooting results obtained in cutting propagation using auxin solutions made with Hortus IBA Water Soluble Salts [an EPA-registered product which forms the potassium salt of indole-3-butyric acid (K-IBA) when dissolved in water] would be comparable to results obtained using technical grade K-IBA (available for research use, but not EPA-registered for commercial use) prompted a study to examine this issue. Solutions were prepared using these two products at five rates of IBA: 500, 1000, 1500, 2000, and 3000 ppm. Subterminal (3-node) cuttings of *Ligustrum japonicum* 'Texanum' (Texas privet), single-node cuttings of *Rosa* 'Red Cascade' (rose), and subterminal (2-node) cuttings of *Trachelospermum jasminoides* (star jasmine) received a 1-sec basal quick-dip in one of the ten auxin solutions. Cuttings of all three crops showed no significant difference in rooting response between the two products. Results indicate that commercial propagators can switch from K-IBA to Hortus Water Soluble Salts for a basal quick-dip without an adjustment in IBA rate.

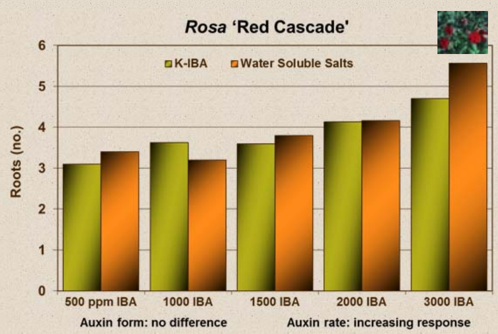
BACKGROUND

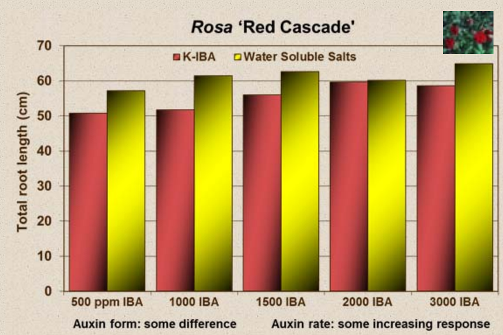
Some growers have used the potassium (K) salt of IBA (K-IBA) over the years for preparation of water-based IBA solutions. Technical grade K-IBA is commonly used in plant propagation research; however, this product, previously purchased by growers from scientific supply companies, is no longer available for sale for use as a root-promoting compound due to lack of Environmental Protection Agency (EPA) registration. One EPA-registered product that can be used as an alternative to K-IBA is Hortus IBA Water Soluble Salts (containing 20% IBA, a pH buffer, and proprietary ingredients; Phytotronics Inc., Earth City, MO), which produces K-IBA when the product is dissolved in water.

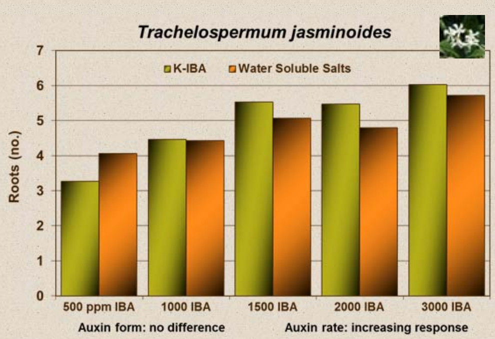
Commercial nursery growers have questioned whether rooting results obtained using auxin solutions made with Hortus IBA Water Soluble Salts are comparable to results obtaining using technical K-IBA. The current study was conducted to examine this issue using cuttings of three commonly grown nursery crops.

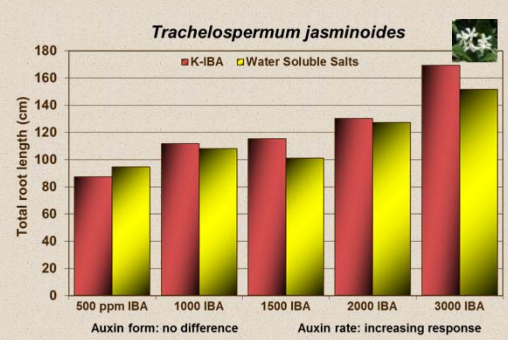












MATERIALS AND METHODS

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RESULTS AND DISCUSSION

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