e-GRO Alert

Roberto G. Lopez
rglopez@msu.edu

Volume 9 Number 4 January 2020

Tips for Rooting Difficult or Slow-to-Root Cuttings

Exogenously applied rooting hormones can increase rooting percentage and uniformity of difficult or slow-to-root genera.

As shipments of unrooted cuttings (URCs) will be arriving soon, it is important to review the list of genera that can sometimes be problematic for propagators. This can include those that are difficult or slow-to-root, are prone to lower and upper leaf yellowing and senescence, and have high losses. Prioritizing sticking of these problematic crops is one step to prevent losses (For more information on avoiding cutting losses view e-GRO Alert 3:14; http://e-gro.org/pdf/2018_712.pdf and table 1). Lower leaf yellowing is most often a sign of ethylene or temperature stress and/ or low carbohydrate levels during shipping and storage (For more information on how to reduce

Figure 1. Dahlia a first priority genera for sticking and benefits from rooting hormones. Lower leaf yellowing and poor rooting can be an indication of ethylene & extreme temperature stress during shipping. This is an example of extreme dahlia URC shrink.

(geranium lower-leaf yellowing view e-GRO Alert 3:14; http://e-gro.org/pdf/3-14.pdf) and upper leaf yellowing is a symptom of micronutrient deficiencies during propagation. While you have no control of what may have occurred during shipping, you can increase uniformity and speed of rooting with the use of rooting hormones.

Rooting Hormones

The application of synthetic auxins [indolebutyric acid (IBA) and napthaleneacetic acid (NAA)] rooting hormones are generally not required for the majority of URCs. Although difficult- or slow-to-root genera and cultivars are often treated with basal (stem base quick dips) or foliar rooting hormones to improve the uniformity and speed of root initiation or to improve the rooting percentage. Their use can also improve rooting when environmental conditions and cultural practices are not ideal. Examples can include suboptimal temperatures or light levels or uneven mist.

Basal Applications

The recommended concentration for stem and foliar application will vary by species. Dipping the stem of several URCs at a depth of ¼ to ¾ inches into liquid or powder formulation of IBA for 1 to 4 seconds has been the most common approach. Care must be taken to avoid over application or application to the leaves as leaf yellowing, curl or distortions can occur. Powder based IBA products are generally less toxic, reduce the likelihood of spreading disease and are quicker and easier to apply than liquid IBA. Basal application rates of IBA range from 500 to 1,500 ppm.

Figure 2. Thunbergia is a first priority species and should be stuck immediately. It is slow to root, requires a higher mist frequency and rooting hormone.

Figure 3. Rooting of osteospermum cuttings 2 weeks after stick. No rooting hormone (top), URCs were sprayed with 200 ppm of IBA 24 hours after stick (bottom).

Cathy Whitman, MSU

Floriculture MICHIGAN STATE UNIVERSITY

Today, growers are using a duster (powder) or hand held spray bottle (liquid) to apply rooting hormones to the basal end of the stem.

Foliar Applications

A coarse foliar spray of IBA that allows some of the solution to run down the stem of newly stuck cuttings can also promote rooting, while reducing the time and labor required for dipping cuttings and most importantly the potential spread of diseases. Foliar application rates of IBA are generally made 24 to 48 hours after cuttings are stuck and range from 50 to 600 ppm. The potassium-salt formulation of IBA is often used for foliar applications as it is water soluble, and therefore causes less foliar damage compared to alcohol-soluble formulations. Figure 3 shows the results of studies conducted at Michigan State University (MSU) showing how a 200 ppm IBA foliar spray application promoted rooting of osteospermum. Figure shows the results of MSU studies comparing foliar applications of Hortus to a new K-IBA product that will be released by Fine Americas in 2020 to a basal application of Dip n' Grow.

Table 1 was compiled by Mike Gooder, Plantpeddler and Bob Dickman, Dickman Farms, Harvey Lang, Syngenta, Jason Twaddell, Ball Horticultural Co., Roberto Lopez and Garrett Owen, Michigan State University for a session at Cultivate in 2018. The table categorizes URCs based on their sticking priority, rooting time, dibble size, mist and rooting hormone requirements.

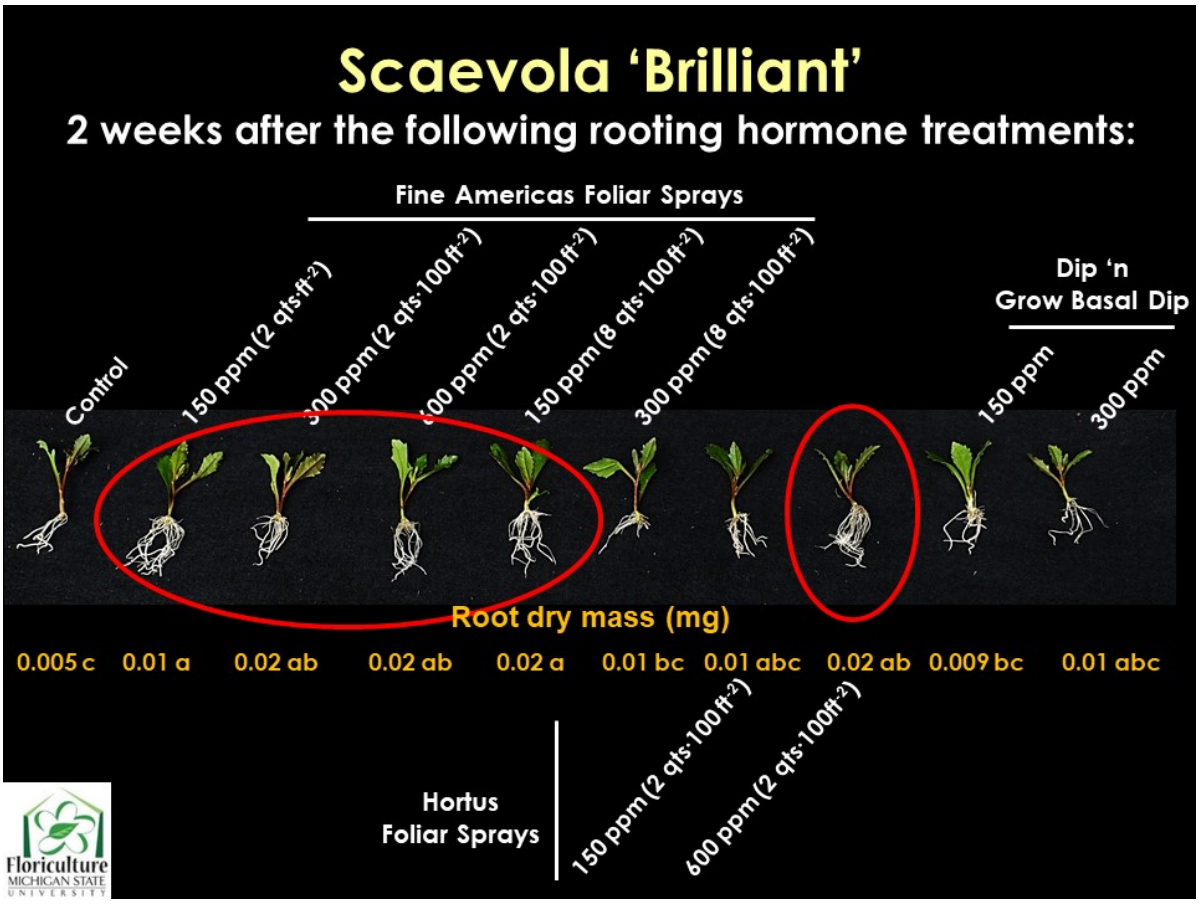

Figure 4. Root dry mass of scaevola 14 days after stick. Spray treatments were made 1 day after cuttings were stuck and dip treatments occurred at stick.

Table 1. Sticking Priority A-Z - Vegetative URCs 1 = Highest Priority 5 = Lowest Priority

Priority		Species
1	BEG	Begonia, Rex
	EUP	Euphorbia*
	GER	Geranium (zonal, interspecfic, ivy)
	HLO	Heliotrope*
	IPO	Ipomoea*
	LAN	Lantana
	LOB	Lobelia
	LBU	Lobularia
	PUR	Purslane (Portulaca)
	THU	Thunbergia
2	BAC	Bacopa
	CAL	Calibrachoa
	DAH	Dahlia*
	DIA	Diascia
	FUC	Fuchsia
	HEL	Helichrysum
	IMP	Impatiens (double and trailing)*
	LOP	Lophospermum
	MER	Mercardonia
	NEM	Nemesia
	OST	Osteospermum
	PER	Perilla*
	PHL	Phlox
	PLE	Plectranthus*
	SAL	Salvia
	TOR	Torenia*
3	ALT	Alternanthera*
	ARM	Artemesia
	BRA	Brachyscome
	BRC	Bracteantha
	CLE	Cleome*
	COL	Coleus*
	LAM	Lamium*
	MLT	Mixmasters/Trixi/Confetti
	NGI	New Guinea impatiens
	PET	Petunia*
	SAN	Sanvitalia
4	ANG	Angelonia
	ARG	Argyranthemum*
	BID	Bidens
	CEL	Celosia
	CUP	Cuphea
	GAU	Gaura
	IRE	Iresine*
	LYS	Lysimachia
	PER	Pericallis Cineraria Senetti
	SCE	Scaevola
	VER	Verbena
5	MUM	Chrysanthemum
	HED	Hedera
	VIN	Vinca

Information complied by Mike Gooder, Plantpeddler and Bob Dickman, Dickman Farms, Harvey Lang, Syngenta, Jason Twaddell, Ball Horticultural Co., Roberto Lopez and Garrett Owen, Michigan State University

Rooting Hormone Essential		Rooting Hormone Beneficial	
BRA	Brachyscome	ALT	Alternathera
BRC	Bracteantha	ANG	Angelonia
CAL	Calibrachoa	ARG	Argyranthemum
CEL	Celosia	BEG	Begonia hiemalis, reinger, rex
CRO	Crossandra	BOU	Bougainvillea
DAH	Dahlia	BID	Bidens
DIP	Dipladenia	CAM	Campanula
HLO	Heliotrope	CUP	Cuphea
HEU	Heuchera	DIA	Diascia
HIB	Hibiscus	FUC	Fuchsia
LAN	Lantana	GAZ	Gazania
LOB	Lobelia	GER	Geranium zonal
LOP	Lophospermum	HEL	Helichrysum
OST	Osteospermum	LEU	Leucanthemum
RGR	Regal geranium	LOB	Lobularia
SAL	Salvia	PHL	Phlox paniculata and subulata
SCA	Scaevola	POI	Poinsettia
THU	Thunbergia	TOR	Torenia
		VER	Veronica
		VIO	Viola

High Mist Requirement	
ANG	Angelonia
ARG	Argyranthemum
BRC	Bracteantha
CEL	Celosia
LOP	Lophospermum
MLT	Multi liner
OST	Osteospermum
PER	PER Pericallis, Cineraria, Senetti
SCE	Scaevola
THU	Thunbergia

Low Mist Requirement	
EVO	Evolvulus
GER	Geranium
HED	Hedera
PUR	Purslane
PLE	Plectranthus
SED	Sedum
STR	Streptocarpella

Yellow = Small Dibble

*** = 3 week crop time**

Green = Rooting Hormone Essential

Orange = Rooting hormone beneficial

Red = High Mist

Blue = Low Mist

e-GRO Alert

www.e-gro.org

CONTRIBUTORS

Dr. Nora Catlin
Floriculture Specialist
Cornell Cooperative Extension
Suffolk County
nora.catlin@cornell.edu

Dr. Chris Currey
Assistant Professor of Floriculture
Iowa State University
ccurrey@iastate.edu

Dr. Ryan Dickson
Greenhouse Horticulture and
Controlled-Environment Agriculture
University of Arkansas
ryand@uark.edu

Nick Flax
Commercial Horticulture Educator
Penn State Extension
nzf123@psu.edu

Thomas Ford
Commercial Horticulture Educator
Penn State Extension
tgf2@psu.edu

Dan Gilrein
Entomology Specialist
Cornell Cooperative Extension
Suffolk County
dog1@cornell.edu

Dr. Joyce Latimer
Floriculture Extension & Research
Virginia Tech
jlatime@vt.edu

Heidi Lindberg
Floriculture Extension Educator
Michigan State University
wolleage@anr.msu.edu

Dr. Roberto Lopez
Floriculture Extension & Research
Michigan State University
rglopez@msu.edu

Dr. Neil Mattson
Greenhouse Research & Extension
Cornell University
neil.mattson@cornell.edu

Dr. W. Garrett Owen
Floriculture Outreach Specialist
Michigan State University
wgowen@msu.edu

Dr. Rosa E. Raudales
Greenhouse Extension Specialist
University of Connecticut
rosa.raudales@uconn.edu

Dr. Beth Scheckelhoff
Extension Educator – Greenhouse Systems
The Ohio State University
scheckelhoff.11@osu.edu

Dr. Ariana Torres-Bravo
Horticulture/ Ag. Economics
Purdue University
torres2@purdue.edu

Dr. Brian Whipker
Floriculture Extension & Research
NC State University
bwhipker@ncsu.edu

Dr. Jean Williams-Woodward
Ornamental Extension Plant Pathologist
University of Georgia
jwoodwar@uga.edu

Cooperating Universities

Cornell University
Iowa State University
University of New Hampshire Cooperative Extension
PennState Extension
Virginia Tech
Michigan State University
UConn
Purdue University
The University of Georgia
The Ohio State University
NC State University
University of Arkansas Division of Agriculture Research & Extension

In cooperation with our local and state greenhouse organizations

Maumee Valley Growers — Choose the Very Best.
Metro Detroit Flower Growers Association
NC Flower Power
Western Michigan Greenhouse Association
Connecticut Greenhouse Growers Association
Indiana Flower Growers Association
lifga
New Hampshire Plant Growers — Quality Garden Centers & Growers
Michigan Floriculture Growers Council
Virginia Flower Growers Association — Since 1954