Cutting Propagation of Perennials: from DIYs to URCs

Whether maintaining your own stock plants or ordering in unrooted cuttings (URCs), there’s something for everyone interested in propagating perennials. Holly presents new research on stock plant management, simplifying rooting hormone application, handling unrooted cuttings (URCs), and more! Photo Album

Dr. Holly Scoggins
Associate Professor
Virginia Tech

Perennial production propagule options (vegetatively-speaking)
• Buy in rooted liners
• Buy in unrooted cuttings (URC)
• Maintain stock plants and produce your own unrooted cuttings (DIY)

Decisions, decisions
• Have proper prop situation?
  – Dedicated area, mist, heat/bottom heat, clean
  – Room for stock plants (and labor for maintenance)
  – Labor to take cuttings
  – Knowledgeable propagator
Can/should you take cuttings from me?

Propagation of Patented Perennials: it is prohibited (illegal) to asexually propagate patent-protected plants unless licensed or otherwise authorized by patent holder (in writing).
VFGA’s Herbaceous Perennials Production Update; Feb. 16, 2012

Propagation by cuttings - DIY

Nodes matter!
- Some species need 2 nodes – one above + one below substrate

Tip cutting
Butt cutting

Coreopsis

Basal stem cutting

Flower stem cutting

Baptisia
Basal cutting: Leaf + chunk of the crown

Geranium maculatum

Achillea ‘Moonshine’

Cut it!

- Early in the day = more turgid cutting, less heat stress
- CLEAN knives/shears/pruners and hands
- Avoid flowers/buds
  - Many species root better/faster from veg. shoots
- Avoid taking cuttings from infested/diseased stock (duh!)
Some special cases

• Amsonia hubrichtii – take early spring before flowering. SLOW.
• Artemisia schmidtiana ‘Silver Mound’ – susceptible to over-watering
• Caryopteris, Baptisia, Phlox paniculata – need one node in media
• Summer/fall flower Asteraceae – take under SD (spring)

URCs

Propagation by cuttings – URC

• New research on URC handling, rooting, branching at VT, NC State, U. Fla., Clemson

URCs

• Keep them cool! 15 C (57 F) Max
• 35-45 F preferable
• Respiration rates start high once cut
  – Amy Enfield & Jim Faust, Clemson
• May still need to remove some leaves

Ethephon (Florel) use on stock plants

• Vegetative bedding + geraniums
• Drop flowers and buds, enhance branching
• Ethylene may continue to evolve in cuttings

So I’ve got my cuttings – now what?

• URC or DIY

Leatherwood, Dole, and Faust 2009 HortScience
Stick it!

- MOIST growing media
- Dibbling helps
- Large enough cells: 38 and up
- Uniformity matters:
  - Similar-sized cuttings will finish together
- Stick extra – need to account for shrink

Speaking of media

- Anything with good porosity will do
  - can add extra perlite to regular peat-based mix
  - Rice hulls or coir also good
  - Something hates to dry out? Add extra peat

Example: two cuttings per cell

Rooting hormone

- Concentration, length of contact time, method of application, and species of perennial all impact rooting success.
Rooting Hormone

- Indole-3-butyric acid (IBA)
- Product needs to be labeled properly (EPA Registration #)
  - Technical grade K-IBA or IBA is not registered
- Proper PPE
- Dip 'n Grow IBA+NAA
- Hortus IBA Water Soluble Salts ® (20%) by Hortus USA Corp.
  - 500 to 1500 ppm

Application of rooting hormone

- Powder vs. liquid
- Traditional stem dip
- “One Mississippi, two Mississippi...”
- Spray application
  - soon after sticking
  - Let spray dry before mist
- Immersion method
  - 10 sec.
  - “Fry Daddy”

Everything you ever wanted to know about auxin metabolism and foliar application thereof:

“Propagation of plants from cuttings using rooting solutions by foliar methods”
- by Joel Kroin of Hortus USA Corp. 2009
International Plant Propagators Proceedings

Available on the Hortus website:
www.rooting-hormones.com

Some perennials do not need it...

- Achillea (most)
- Artemisia (ex. Tarragon)
- Houttuynia
- Lamium
- Monarda
- Perovskia
- Physostegia
- Sedum
- Sempervivum
- Solidago
- Thymus
- Veronica

Recommendations for URCs from Green Leaf Plants —
Foliar application of IBA (Indole-3-butyric acid)

- Foliar app by spray or immersion
  - Ease of application
- Good results on taxa tested
  - 1000 ppm IBA (Hortus IBA water soluble salts 20%)
  - Basal quick dip, foliar app, immersion, control
  - Lavender, Gaura, Leucanthemum, Agastache
Root Measurements

http://regentinstruments.com/products/rhizo/Rhizo.html

- Rooting rate about the same among IBA treatments (and ramifications thereof)
- Spray or immersion = greater root surface area

Scheduling cuttings

- Avoid cuttings with flowers or premature flower bud set!
  - Spring or fall cuttings for Long Day perennials
- OR manipulate photoperiod
  - Flower under short days? Root under long days (14 hours or night interruption)
    - Aster, Lamium
  - Flower under long days? Root under short days (12 hours or less)
    - Agastache, Artemisia, Gaillardia, Gaura, Lavandula, Leucanthemum, Nepeta, Phlox paniculata, Salvia, Scabiosa, etc.
  
Dr. Royal Heins, Oro Farms – see "resources"

Warm bottom = faster rooting!

- Keep root zone in the mid 70’s (75 F ± 3)
  - Air temps can be lower
  - Some taxa MUCH lower – Nepeta, Phlox, Geranium
- Redi-heat Propagation Mats
  - 21”W x 10’ L $190 thru Hummert
    - Output 40 watts per linear foot
    - Requires Thermostat (watch watt load on GFI)

Light issues

- Too bright = too much transpiration
  - Keep under 2,500 foot candles
  - Shade cloth (internal or external)
- Not enough accumulated light in a day (daily light integral)
  - Supplemental lighting (high pressure sodium ideal) in winter, esp. northern climates.
  - Watch day length…
Mist is a must

• No “one schedule fits all”
• Adjust based on stage of rooting, light levels, humidity levels, and temperature
  – Argus: solar incidence to time mist cycles
• Furry leaves? Reduce mist

• Too wet = no airspace = reduced oxygen
• Too dry = loss of turgidity, stress

Keep emitters clean!
Debris = big blorpy droplets

Nutrients in the cutting

• Will continue to drop until roots appear
  – Growth occurring with no uptake

Timing of Macronutrient Supply during Cutting Propagation of Petunia – Santai et al. 2011 HortScience

Fertilizer?

• Varying strategies
  – None
  – Add to rooting media
    • Rapid leaching; some perennial species sensitive to high salts
  – Apply through mist (?)
    • 50-75 ppm
    • Low phosphorous, low ammoniacal N
    • 13-2-13, 17-4-17
    • Calcium nitrate - great for a bump
    • Once rooted and on bench – 100-150 ppm N
To pinch or not to pinch...

Roll ‘em, roll ‘em, roll ‘em

- Multi-tasking!
- Cuttings from liners
- Shear or pinch (or both?)
  - Tipping – 1 or 2 nodes taken
  - Encourages branching

Increasing branching/bulk of liners

- LOTS more on this Tuesday 8:00 a.m.
  - Mara Grossman, Virginia Tech, on Branching Agents on Perennial Liners

Configure on *Leucanthemum*

- Basal branches doubled with all treatments compared to untreated controls
- Reduced root weight did not affect appearance of plant after transplant and grow out

Augeo and Florel on *Verbena*

- Plants treated with Augeo had more than 9 x more branches than untreated plants
- Plants treated with Florel had 5 x more branches than untreated plants

*Verbena stricta*
Control of liner growth

- paclobutrazol, uniconazole, flurprimidol or ancymidol liner dips
  - MSU, UF, VT research
  - PGR Liner Dips on Herbaceous Perennials in GPN Mag – Joyce L

Timing is everything

Stock plants: a love/hate relationship

“Stock plant management is an expensive practice, fraught with perils: variety mixups, weeds, pests and pathogens, winter kill, bench space that can’t be turned, yada yada, yada.”
- John Freil

One [season] and done!
Cuttings from young plants more likely to root
VFGA’s Herbaceous Perennials Production Update; Feb. 16, 2012

Outside stock blocks limits cutting availability to growing season

Weed/moss/liverwort control in stock plants
Perennial stock plant handling - pinching

Stock plant pinching study at Clemson
(Jim Faust)
• Increase quantity of cuttings with two pinches
• Pinch high (vs. low)
  — 80% increase in cutting yield for Lavandula

Can stock plant nutrition play a role in the quantity and rooting performance of cuttings?

Our results: YES, but species-specific

Effect of N rate on Rooting percentage of selected taxa

Effect of stock plant N-rate on root surface area

Nitrogen rate recommendations

<table>
<thead>
<tr>
<th>Taxa</th>
<th>Number of Cuttings (mg·L⁻¹)</th>
<th>Rooting Percentages (mg·L⁻¹)</th>
<th>Root Surface Area (mg·L⁻¹)</th>
<th>Nitrogen Recommendations</th>
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<tbody>
<tr>
<td>Perovskia</td>
<td>NS</td>
<td>100</td>
<td>50</td>
<td>Low 50 – 100</td>
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<tr>
<td>Salvia</td>
<td>150-200</td>
<td>50 - 150</td>
<td>NS</td>
<td>Moderate 100 – 150</td>
</tr>
<tr>
<td>Gaura</td>
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<td>100</td>
<td>150-200</td>
<td>Moderate 100 – 150</td>
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<td>Dianthus</td>
<td>250</td>
<td>100-150</td>
<td>50</td>
<td>Moderate 150</td>
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Stock plant N-rate can affect root volume

Happy propagating!

Rooting rate and root mass

Happy propagating!
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Rooting URCs: Water Management

Effect of Media Components and rooting hormone on rooting time

<table>
<thead>
<tr>
<th>Percentage of Perlite in the Media</th>
<th>Dip'n Grow</th>
<th>KIBA</th>
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<tbody>
<tr>
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