

# Woody Plant Propagation Via Dormant Hardwood Stem Cuttings



**Jim Schmidt** - NCBG Native Plant Certificate Candidate

# What are Dormant Hardwood Stem Cuttings?

- Veg. Prop vs. Seed Grown
- Types of Cuttings (soft, semi, hard)
- Dormant?



# WHY DORMANT CUTTINGS?

- Take advantage of slow period at the garden
- Reduce summer workload
- Reduce production time by speeding up rooting and subsequent growth

# HOW ARE WE GOING TO DO THIS?

- Select Species/Cultivars
- Select Rooting Medium
- Select Rooting Hormone(s)
- Take Cuttings
- Stick Cuttings
- Place Cuttings in a Rooting Chamber
- Transplant Rooted Cuttings

# Step 1: Select Cuttings

- 30 Species/Cultivars were selected
  - 17 Broadleaf Evergreens

<i>Agarista populifolia</i>	<i>Ilex opaca</i> 'Maryland Dwarf'	<i>Leucothoe axillaris</i>
<i>Ilex glabra</i> (red tip)	<i>Ilex x attenuata</i> 'Greenleaf' or 'Topel'	<i>Leucothoe racemosa</i>
<i>Ilex glabra</i> 'Shamrock'	<i>Illicium floridanum</i>	<i>Lyonia lucida</i>
<i>Ilex myrtifolia</i>	<i>Kalmia carolinianum</i>	<i>Magnolia virginiana</i> var. <i>virginiana</i>
<i>Ilex opaca</i>	<i>Kalmia latifolia</i>	<i>Myrica cerifera</i>
<i>Ilex opaca</i> 'Croonenberg'		<i>Osmanthus americanus</i>

# Step 1: Select Cuttings (Cont.)

- 30 Species/Cultivars were selected
  - 13 Deciduous species

<i>Aronia arbutifolia</i>	<i>Hydrangea quercifolia</i> 'Snow Queen'	<i>Quercus michauxii</i>
<i>Cyrilla parviflora</i>	<i>Hypericum frondosum</i>	<i>Quercus minima</i>
<i>Cyrilla racemiflora</i>	<i>Itea virginica</i> 'Saturnalia'	<i>Rhus aromatica</i>
<i>Euonymous americana</i>	<i>Quercus lyrata</i>	<i>Viburnum rafinesquianum</i>
<i>Hydrangea quercifolia</i>		

# Selection Basis

- Availability of Physiologically Suitable Plants
  - Stock plants in future
- Reported success in the literature (Dirr, etc...)
- Desirable species for NCBG Plant Sale!

# Step 2: Select Rooting Medium

## – Criteria

- Pore Space= air + water= root growth
- Proper drainage



- 4 parts perlite: 4 parts vermiculite: 3 parts peat(V/V/V)
- Ingredients were thoroughly mixed
- Moistened with water
- 6” x 6” “Jumbo Pot” filled with the mixture



# Step 3: Select Rooting Hormones

0.5% IBA

1.0% IBA

1.5% IBA

5x Dip-n-Gro = 0.5% (IBA + NAA)



# Step 4: Take Cuttings

- Cuttings taken between 12/20/10 and 2/2/11
- Minimum of 9 cuttings per hormone treatment
- Look for juvenility

# Step 5: Stick Cuttings

- Trim cuttings to about 5" in length
- Remove lower ½ of leaves from stem

- Wound the stems

- Double
- Single
- None



- Dip stems in rooting hormone solution for 5 seconds

# Step 5: Stick Cuttings (cont.)

- Insert stem into rooting medium
  - Vertically insert about  $\frac{1}{2}$  the length of cutting
  - Do not bend the stem while sticking
  - Firm medium around the cutting
  - Maximum of 9 cuttings per pot
  - Trim remaining leaves if needed
  - Thoroughly water and place pot in rooting chamber

# Step 6: Place Cuttings in Rooting Chamber

- 3' x 6' x 12" high, no bottom
- Heating mat set @ 70-75F
- Spray plants with 1% hydrogen peroxide
- Polyethylene film placed over hoops and enclosed at ends and sides
- During rooting pots were watered as needed
- Chamber vented during hot weather



## Outdoor Rooting Chambers





# Step 7: Transplant Rooted Cuttings

- Cuttings were monitored for rooting by gently tugging on the stem; or by inverting the pot and looking for roots
- When a cutting was sufficiently rooted, it was transferred to a 4" – 6" pot containing a standard potting mix



# Step 7: Transplant Rooted Cuttings (Cont.)

- Transplant was fertilized (Nutricote), watered, and placed in the misting chamber in the greenhouse
- After one week it was moved to a bench in the greenhouse until it was warm enough to be placed outside
- Any cuttings not ready to be transplanted were restuck and the process repeated until they rooted or we gave up!





*Osmanthus americanus*

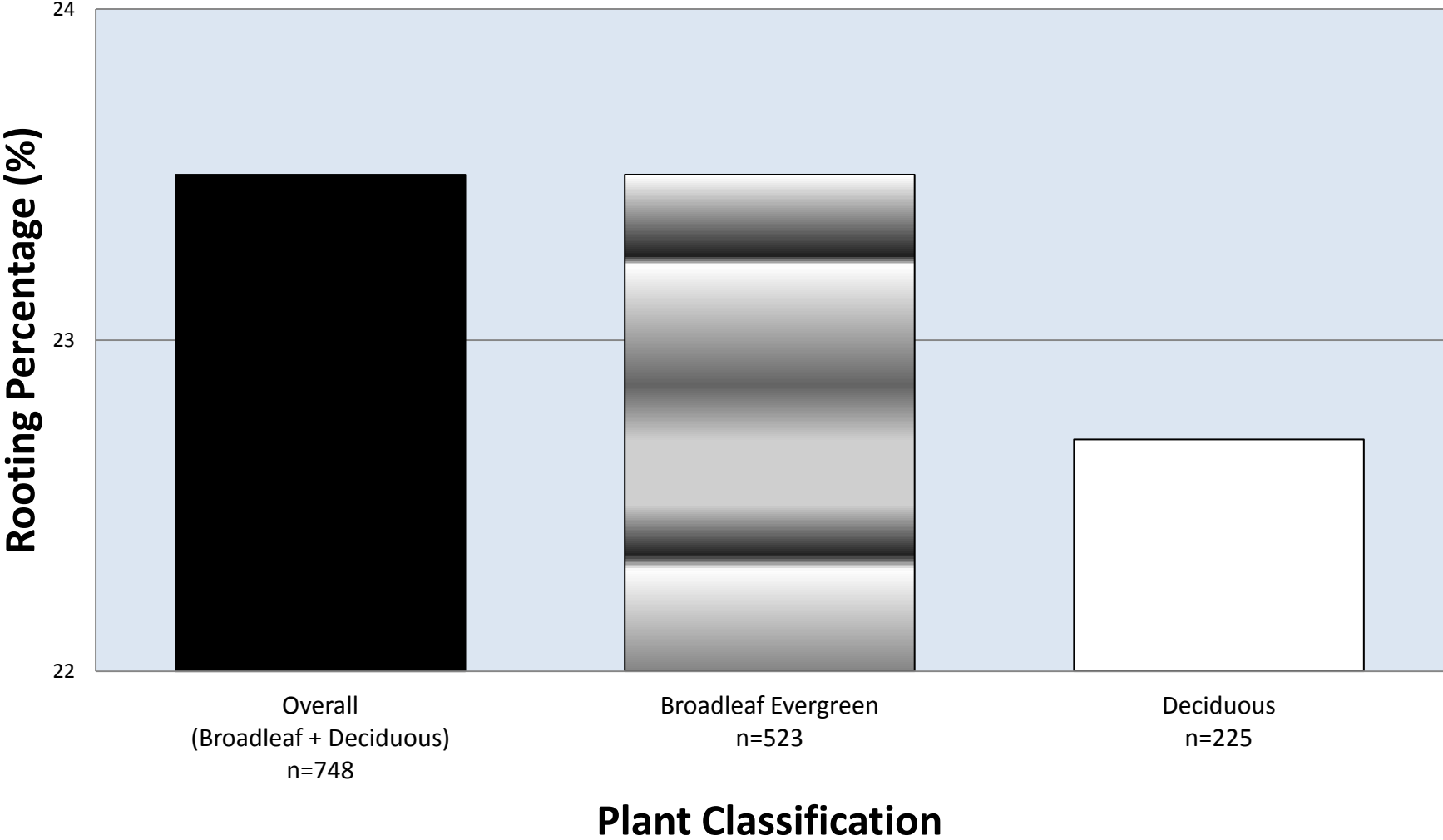


*Ilex opaca*

# Results??????????

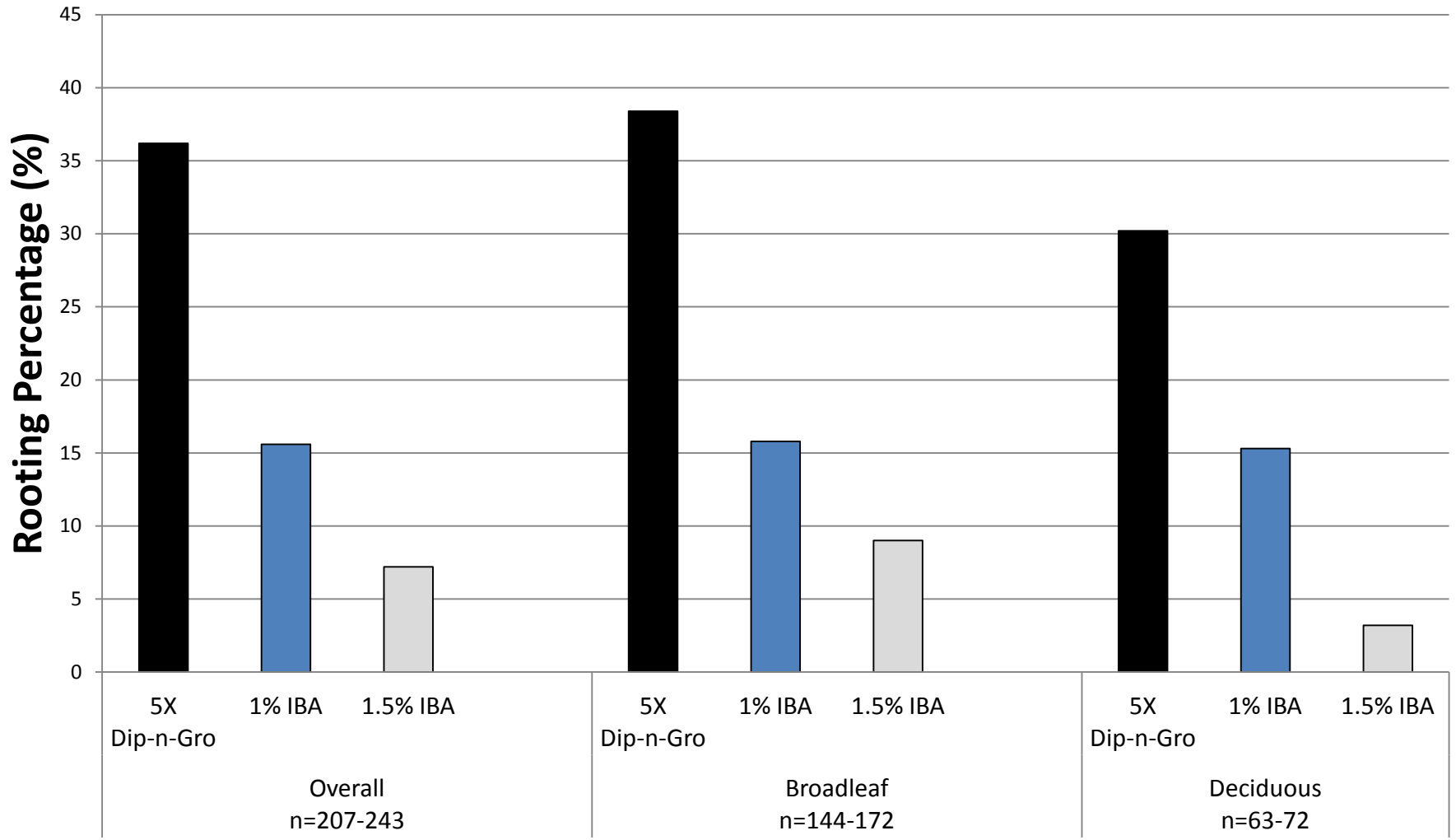
- Overall % rooted =  $176/748 = 23.5\%$
- Overall Broadleaf Evergreens =  $103/523 = 22.7\%$ 
  - *Ilex x attenuata* =  $24/54 = 44.4\%$  (Feb?, Post event?)
  - *Lyonia lucida* =  $23/54 = 42.6\%$
  - *Illicium floridanum* =  $11/18 = 61.1\%$
  - *Osmanthus virginicus*
  - *Magnolia virginiana*
- Overall Deciduous =  $51/225 = 22.7\%$ 
  - *Euonymus americanus* =  $39/63 = 61.9\%$

# Overall Rooting Results and Rooting by Plant Classification (Broadleaf Evergreen vs. Deciduous)



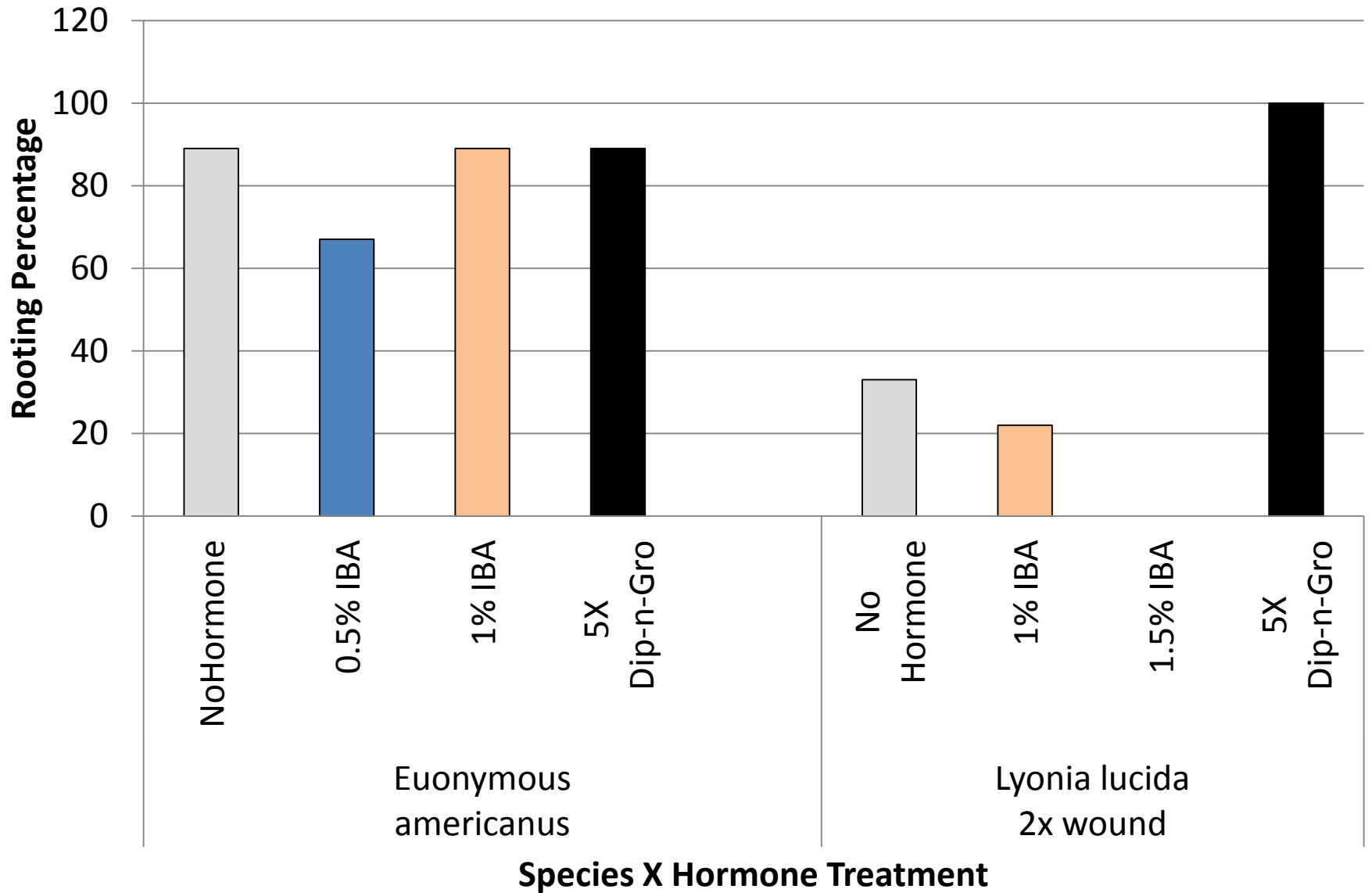
# Rooting Results

## Hormone Treatment x Plant Classification

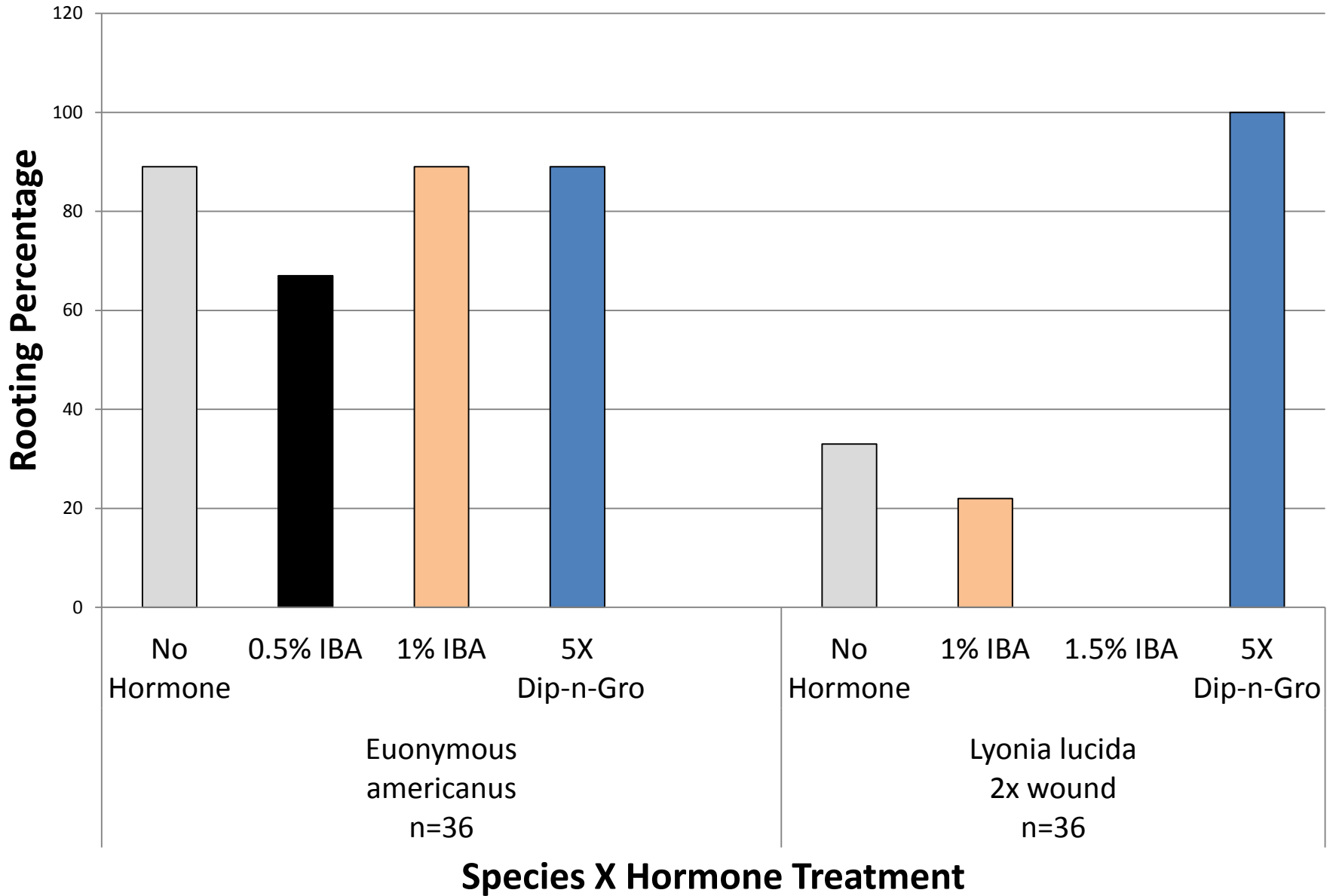


Rooting Hormone Treatments by Plant Classification

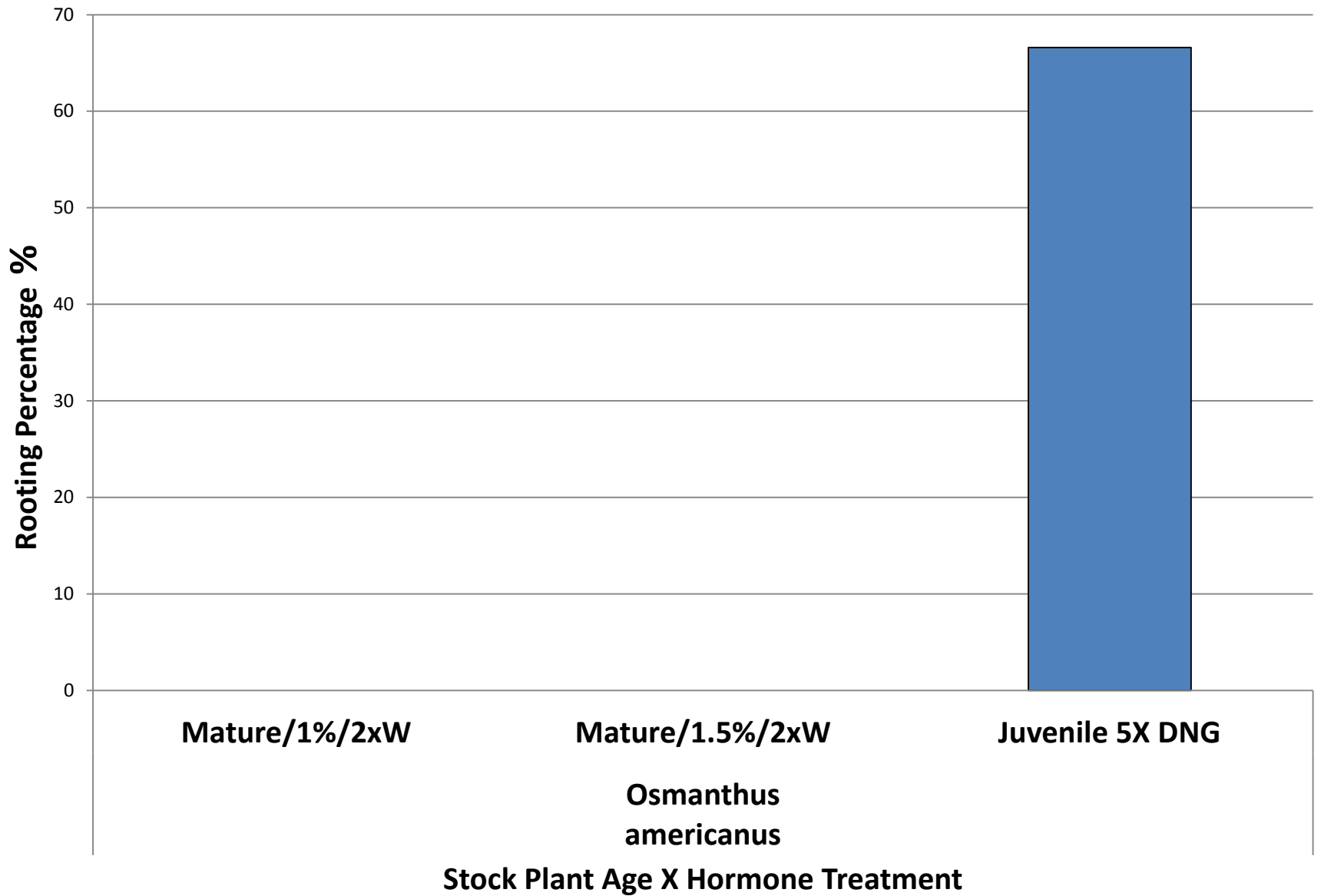
# Rooting Results for *Euonymus americanus* and *Lyonia lucida*



# Rooting Results for *Euonymus americanus* and *Lyonia lucida*



# Rooting Results for *Osmanthus americanus*



# Conclusions

- Rooting decreased with increased hormone concentration
- Dip-n-Gro (5x) worked best with broadleaf evergreens → IBA + NAA
- Need to improve environmental control
  - The Costa Rican Factor!
    - Early rooters okay
  - Modify rooting medium → improve drainage
  - Modify rooting chamber → better control of humidity and ventilation
  - Focus on juvenile cuttings (STOCK PLANTS)