

## Foliar Indole-3-Butyric Acid Rooting Hormone Application and Cost Analysis

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### INTRODUCTION

Indole-3-butyric acid (IBA) is an auxin that promotes root initiation. Specifically, in this trial Hortus IBA Water Soluble Salts were used as an overspray of hormone on 32,464.5 sq. ft. At Decker's Nursery, foliar rooting hormone is used on both hard and softwood cuttings with astonishing results. The information presented is from a complete overspray of hormone on hardwood winter cuttings.

### MATERIALS AND METHODS

Cuttings were direct stuck into 18-count, 32-count, and 50-count trays. The trays are stuck, watered, sprayed with foliar IBA rooting hormone, and covered by a homemade Dutch style greenhouse tent (Fig. 1).

Cuttings are all given three initial foliar sprays applied at 24-hr. intervals. To ensure uniformity and to push certain crops along, there will be future supplemental reapplications given. These reapplications are applied every 2–3 weeks or as needed.



**Figure 1.** Homemade Dutch style greenhouse tent.

Over the following weeks and months constant monitoring and care is given to the cuttings. Tents are ventilated, watered, and checked for progress. In the time you will start to notice cell differentiation and callusing on the basal end of the cuttings (Fig. 2).



**Figure 2.** Callus developing at the base of a conifer cutting.

This is an indicator that the rooting hormone is active within the cutting and roots are on their way. Please note that some cuttings like taxa of some *Chamaecyparis* will create a large callus but never root. This indicator is helpful but not true for all plant taxa. In time you should start noticing root development (Fig. 3).



**Figure 3.** Root development on a boxwood cutting.

Root development from foliar hormone can go overboard. With excess hormone and humidity there can be development of adventitious roots along the

entire stem. Here is an example of a softwood cutting from an unrelated crop showing excessive adventitious roots; note the roots covering the entire cutting (Fig. 4).



**Figure 4.** Rooted cutting showing excessive adventitious root development.

### Spray Protocol

- Use distilled water for mixing IBA solution.
- Use a flag marker to mark each day's sticking progress to track the 3-day spray rotation.
- Measure IBA powder to mix in 1-gal of distilled water increments for desired parts per million.
- Unused hormone is kept in the sprayer overnight. Add additional hormone in gallon increments.
- All hormone applications occur in early morning; Stomata are open, and cuttings are generally not in moisture stress.

## Backpack Sprayer Used

The electric backpack sprayer used is a Dramm BP-4 (Fig. 5, right). This backpack sprayer is versatile and makes applying

hormone inside or outside of a tent fast, and user friendly (Fig. 5, center and left).



Figure 5. Dramm BP-4 sprayer (left), applying hormone inside or outside of a tent (center and left).

## COST ANALYSIS

### Area

- Hormone was reapplied at 2000 PPM, 40 grams in 1 gallon of distilled water.
- Treated north houses 1-12, each containing 2 tents. ( $90.5 \text{ ft} \times 11.5 \text{ ft} = 1,040.75 \text{ sq. ft./tent}$ )
- Treated south houses S1 - S2 west, S5 west  $\frac{1}{2}$ .
  - $11.5 \text{ ft} \times 186 \text{ ft} = 2139 \text{ sq. ft. per tent}$
- Total area treated
  - $1,045.75 \times 24 = 24,978 \text{ sq. ft. north houses}$
  - $2139 \times 3.5 \text{ tents (2139 sq. ft.)} = 7,486.5 \text{ sq. ft. south houses}$
  - $32,464.5 \text{ sq. ft. total area treated.}$

### Solution Rate

- 40 grams per 1-gal distilled water =  $\sim 2000 \text{ ppm}$
- Total solution required is 18 gal
  - $18 \text{ gal} \times 40 \text{ grams} = 720 \text{ grams applied (note: a 3-gal electronic backpack sprays about five short tents)}$
  - $32,464.5 \text{ sq. ft.} / 18 \text{ gal} = 1803 \text{ sq. ft. per gallon of solution. (about } 1\frac{1}{2} \text{ tents)}$
  - $32,464.5 / 720 \text{ grams} = 45 \text{ sq. ft. per gram of IBA.}$

### Hormone Cost Per Application

- \$0.45 per gram of IBA
  - $720 \times \$0.45 = \$324$  per application at 2000 ppm
  - \$0.45 per 45 sq. ft. = \$0.01 per sq. ft.
  - Each tray in propagation is about 1.6 sq. ft.
    - Each hormone application costs about \$0.016 per tray per application.
    - 18 plants per tray, \$0.0008 per plant per application.
    - 32 plants per tray, \$0.0005 per plant per application.
    - 50 plants per tray, \$0.00032 per plant per application.

### Hormone Cost Per Season (Per Plant)

- 3 initial applications at sticking
  - 18 trays, \$0.0024
  - 32 trays, \$0.0015
  - 50 trays, \$0.00096
- 3 supplemental applications (2–3-week intervals after sticking)
  - 18 trays, \$0.0024; total = \$0.0048 per plant (½ of a penny)
  - 32 trays, \$0.0015, total = \$0.003 per plant (1/3 of a penny)
  - 50 trays, \$0.00096; total = \$0.00192 per plant (1/5 of a penny)