COMMON ROOTING HORMONES METHODS OF AUXIN APPLICATION
BENEFITS OF ROOT-PROMOTING COMPOUNDS

In this lab, you will be introduced to common rooting hormones that we will be using throughout the plant propagation course. You will also be introduced to several methods of auxin application.

There are four primary reasons for treating cuttings with root-promoting compounds. These compounds can increase the percentage of cuttings which form roots, reduce the time to root initiation, increase the number of roots produced per cutting, and increase the uniformity of rooting Compounds commonly used to promote rooting include indoleacetic acid, indolebutyric acid, napthaleneacetic acid and a number of phenoxy compounds. IAA is a naturally occurring auxin but is not widely used because it is readily metabolized into inactive forms by plant tissue. IBA is the most widely used form of auxin in propagation. NAA is a synthetic auxin and phenoxy compounds are used primarily as herbicides but can also be used as sources of auxin.

Rooting compounds are available in either the pure chemical form or as commercial preparations. Pure crystals of reagent grade chemical can be purchased from a chemical supply company and must be diluted. Acid forms of pure auxin are not water soluble, so K-formulations of IBA and NAA are often preferable due to their solubility in water. Commercial preparations are either dissolved in a solvent or dispersed in talc. Some of these preparations also contain a fungicide such as thiram.

There are 4 general application methods for auxins.

- In the talcum powder application, the bases of cuttings are dipped directly in the talcum powder based hormone just prior to sticking the cutting. Some propagators dip the cutting base in water first to increase the quantity of tack added to the cutting.
- In dilute solution application lower concentrations of auxin are used and cutting bases are soaked in the solution for an extended period.
- In the Concentrated Quick Dip method, higher concentrations of auxin are used the cuttings are dipped in the solution and removed very quickly.
    - For both liquid solution methods some growers may allow the cutting bases to dry prior to sticking while monitoring cuttings to ensure they maintain turgor.
- Recent concerns over worker protections have increased the use of foliar spray applications of liquid auxins. I some cases traditional auxin concentrations may be modified by either increasing or decreasing the concentration compared to soak or quick dip rates depending on species rooting response.

Some general guidelines should be followed for using rooting hormones. Never dip cuttings directly in stock solution. Remove a small quantity of powder or solution from stock and use this portion for treatment. Discard any powder or solution left after treatment. Liquid stock solutions should always be stored under dark conditions in a refrigerator between uses.

In this lab, you will be introduced to procedures commonly used to evaluate the effectiveness of several auxin sources, formulations and concentrations. This is an example and the activities in your local lab may be modified by your local instructor.

The objectives of this lab are to:

- Familiarize students with common types of rooting hormones
- Demonstrate procedures for stock solution preparation and dilution
- Compare effects of auxin source, formulation and concentration on % rooting, mean root

number, and mean root length of cuttings

For this experiment, you will need a flat with adequate number of cells to fit all treatments and filled with a substrate prescribed by your instructor as well as plastic tags to label treatments. Auxin treatments that will be applied include NAA at 1,000, 5,000, and 10,000 ppm, IBA at 1,000, 5,000, and 10,000 ppm, Hormex or Hormodin (commercial talc formulations), Dip n Grow at both high and low concentrations, and a control, or no treatment. Directions on the box should be followed for preparing Dip n Grow treatment concentrations. If dilutions of NAA and IBA are not already available, consult with your instructor on preparing these dilutions.

Auxin treatments for your lab location may vary depending on the plant species or available products – Consult your local lab instructor for details.

Prepare cuttings of a single species or cultivar; 6 for each hormone treatment and the control treatment. Treat each group, except the control, by dipping the basal ¾" of each cutting into the rooting powder or solution. Quick dip the cuttings by dipping them in the solution for 1 second. Cuttings should then be stuck in flats pre-filled with substrate and each treatment should be labeled accordingly. After all cuttings are treated, stuck, and labeled, place flat on a mist bench. Check cuttings weekly to determine when rooting has initiated.

All cuttings will be evaluated after several weeks. Clean substrate from roots and record number of cuttings rooted, number of roots per cutting, and mean root length per cutting. Calculate rooting percentage based on all cuttings. Remember that number of roots per cutting and mean root length are calculated based only on rooted cuttings.

Once data has been collected and effects calculated, summarize the data and write a short discussion of significant differences among treatments. Take a close look especially at differences between the no auxin control treatment and all other hormone treatments.