

Overview of Foliar Methods

- **The Foliar Spray Drip Down and Total Immerse Methods are used on cuttings that are leafy in the growing season.**
- Foliar methods *are not* used on dormant or leafless cuttings.
- Rooting Solutions are applied to the leaves of cuttings.
- Foliar methods use Rooting Solutions that are made using water only, applied by spray onto foliage or totally immerse.
- **For foliar methods only use Rooting Solutions made with water and Hortus IBA Water Soluble Salts or Rhizopon AA Water Soluble Tablets.**
- Never use other 'Rooting Solutions' made with active solvents since they will dehydrate and kill plant cells.

ROOTING PRODUCTS USED

To make Rooting Solutions:

- **Hortus IBA Water Soluble Salts.**
- **Rhizopon AA Water Soluble Tablets.**

MODE OF ACTION

Water-based Rooting Solutions are applied to leaves of cuttings. The Rooting Solutions enter the plant through stomata, the minute openings in the leaf. The stomata allow entry into the plant of gases and liquids such as the Rooting Solution. After entry into the vascular system of the plant, the rooting hormones in the Rooting Solution move by mass flow to the basal end of the cuttings. Plants store rooting hormones at the basal end where they are slow released to induce roots.

METHODS	PRODUCTS TO USE
TOTAL IMMERSE METHOD	Use Rooting Solutions made with Hortus IBA Water Soluble Salts
SPRAY DIP DOWN METHOD	<i>or</i> Rhizopon AA Water Soluble Tablets
The selection of a method, either the Spray Drip Down or Total Immerse Method, usually depends upon the number of cuttings in a lot. Large homogenous lots may be easier to treat by the Total Immerse Method. Many small lot sizes may be easier to treat by the Spray Drip Down Method.	

USE A SECOND FOLIAR TREATMENT

- Overcome slow root development
- Improve transplanting of rooted cuttings.
- Level the production crop.
- Improve roots of cuttings which were already treated by any method, either rooted or un-rooted.

Stimulate rooting by using the Spray Drip Down Method with one or two weekly additional applications. Use Hortus IBA Water Soluble Salts at 80-200 ppm or the initial foliar rate.

STOCK PLANT PREPARATION FOR FOLIAR METHODS

The stock plants must be adequately fertilized and kept in light during the days before the cuttings are taken. These factors allow the plant to store carbohydrates necessary for root formation.

ADJUSTING THE FOLIAR RATE

- Use as low a rate as possible to achieve rooting.
- When root formation is **slow** in formation trial at a higher rate.
- When foliar methods produce leaf spotting, leaf curl, or leaf drop it may be caused by inadequate stock plant preparation or too high a rate.

SCIENTIFIC GROUNDWORK ON FOLIAR APPLIED IBA ROOTING HORMONES

Foliar applied rooting hormones on the leaves of cuttings had positive rooting results when used by Thimann & Went (1937). Dr. Fred T. Davies (co-author of 'Plant Propagation Principles and Practices') did successful plant rooting trials using foliar applied IBA in aqueous solution. Dr. Davies' landmark studies, published in 1980-2, detailed the physiology of rooting of the cuttings.

Thimann & Went. *Phytohormones*. 1937

Davies & Joiner. Initiation and development of roots in juvenile and mature leaf bud cuttings of *Ficus pumila* L. *Amer. J. Bot.* 69(5): 804-811. 1982.

Davies, Lazarte & Joiner. Growth regulator effects on adventitious root formation in leaf bud cuttings of juvenile and mature *Ficus pumila*. *J. Amer. Soc. Hort. Sci.* 105(1):91-95. 1980.

The Spray Drip Down Method



Using the Spray Drip Down Method you stick the cuttings into trays or any other way into media. You spray the Rooting Solution onto the leaves of the cuttings until there is a drip down. You wait about 45 minutes or until the solution dries on the leaves, then turn on your misters

The Spray Drip Down Method can be used on any lot size. The solution is used one time. There

can be no cross contamination of the Rooting Solution between plant lots.

The Spray Drip Down Method has low labor cost. Workers who do sticking do not apply rooting products and do not need PPE. Spraying, performed by a trained operator, assures that the plant cuttings receive a uniform application of the Rooting Solutions.

The time for spraying is only a few minutes.



Typical backpack sprayer suitable for application

EQUIPMENT

Use a hand, backpack or power sprayer. These sprayers give uniform flow over a directed area. Overhead boom sprayers may be used however setup time may not be cost effective. Do not use proportional solution mixers; they might not give uniform Rooting Solution quality and distribution.

ROOTING PRODUCTS USED

To make Rooting Solutions:

- Hortus IBA Water Soluble Salts.
- Rhizopon AA Water Soluble Tablets

HOW TO USE THE SPRAY DRIP DOWN METHOD

STICKING & SEPARATION OF LOTS BY RATE

- Stick the un-treated cuttings in the media.
- Keep the cuttings hydrated by keeping misters on.
- It is useful to separate the plants into rooting solution rate groups. Plants with the same solution rate can be treated at the same time.

ROOTING SOLUTION

- For foliar methods, only use Rooting Solutions made with Hortus IBA Water Soluble Salts or Rhizopon AA Water Soluble Tablets. The aqueous solutions are specially formulated to allow entry into the plant's vascular system.

TREATMENT

- Spraying should be done the same day of sticking or soon after.
- Spraying should be done when the stomata in the leaves are open. If the propagation area is hot, do spraying at cool times, such as early mornings.
- Turn off the misters.
- **Spray the Rooting Solution onto leaves until the liquid drips down. If the leaves are wet from misters at the time of spraying, use an excess of Rooting Solution to overcome dilution of the solution.**
- To assure adequate treatment, apply enough solution to both the top and bottom of the leaves.

SPRAY RATE

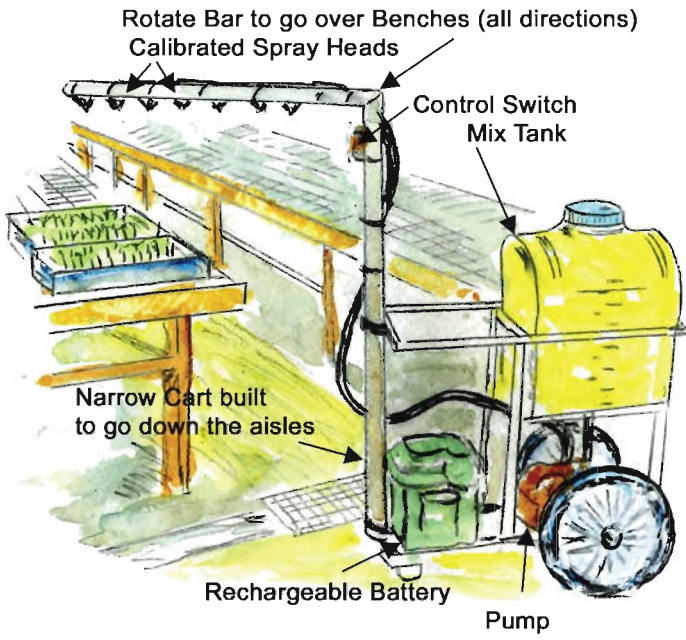
- Use about one gallon of rooting solution per 175 to 225 square foot of cuttings.

MISTERS

- **After application of the Rooting Solution wait at until the solution dries, about 3/4 hour, before turning misters on.**

UN-USED ROOTING SOLUTIONS

- **Un-used Rooting Solutions in the production tank or concentrate container can be stored at room temperature for several days without losing potency.**
- **For safety, label the Rooting Solution container.**



Custom Built Cart Used to Apply Rooting Solutions by the Spray Drip Down Method



Sprayer used by Bailey Nurseries.
Photo: Bailey Nurseries

The Total Immerse Method



Using the **Total Immerse Method**, you total immerse dip the cuttings in the Rooting Solution for a few second then drain. You can stick at any time.

The Total Immerse Method can be used for large homogeneous lots of plants or small lots. Since you will drag in biologicals from the cuttings into the solution, you should change the Rooting Solution frequently so that you do not

cross contaminate production lots. Total Immerse is useful for large leaf cuttings and cuttings whose leaves have stomata on the bottom of the leaf where spray drip down is difficult to use.

The Total Immerse Method uses simple equipment for treatment, a tank and a basket. Uniform treatment is done on large batches of cuttings is done in a few seconds. Since all cuttings are submerged in the Rooting Solution every cutting is treated. After treatment the cuttings can be stored in a plastic bag and stuck later.



Hedera (Ivy) Holland. Total immerse tank for ivy. Dip basket not shown. Photo: Rhizopon

EQUIPMENT

Use a solution tank. A dipping basket is useful.

ROOTING PRODUCTS

To make Rooting Solutions:

- **Hortus IBA Water Soluble Salts.**
- **Rhizopon AA Water Soluble Tablets**

HOW TO USE THE TOTAL IMMERSE METHOD

- Total Immerse the cuttings, using a basket, into the Rooting Solution for a few seconds. Drain.
- Stick the treated cuttings in the media, or put in plastic bags and store until sticking or planting out..
- Turn on misters as required.
- After treatment discard used Rooting Solution.