that with cuttings that have been handled every year over this five year period I could expect anywhere from 29 per cent to 100 per cent rooting. I do not know why this occurs. Consequently, I do not recommend the use of the quick dip except as a trial on something that is really giving you trouble. It has been of benefit to us on certain species of cuttings at certain times of the year, and it has speeded up the rooting of Pfitzer juniper cuttings. One year juniper, for instance, gave us 72 per cent rooting and were ready to pot in six weeks. It never happened again. Thank you.

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MODERATOR LANCASTER: Thank you, John.

Our next and final panel speaker is Mr. E. Stroombeek, from the Warner Nursery Company, Willoughby, Ohio.

Mr. Stroombeek presenter his prepared paper, "Hormone Application by the Quick-dip Method." (Applause)

## HORMONE APPLICATION BY THE QUICK DIP METHOD

E. STROOMBEEK
*Warner Nursery Company*
*Willoughby, Ohio*

We at the Warner Nursery decided to give the so-called "quick dip" method a try in the summer of 1953. We had been using the Hormodin powders No 2 and 3 exclusively and had found their range to be quite limited We were looking for a stronger concentration of growth substance, as for example, especially 2 per cent indolebutyric acid Since this was not commercially available we bought a small quantity of pure crystals in order to prepare our own solution.

When this substance was obtained we made some tests, diluting crystals in alcohol in approximately the same percentage range as the Hormodin powders, namely ½, 1 and 2 per cent It turned out that dipping in these straight alcohol solutions was not satisfactory and resulted in considerable burning. Adding small quantities of water to these solutions gave more encouraging results but we soon found out that adding too much water to the 1 per cent and 2 per cent alcohol solutions resulted in the recrystallization of the indolebutyric acid. This rendered the solution useless. At the same time we also found that indolebutyric acid diluted in alcohol in the lower percentage range was more effective than the higher percentages available in powder form For instance ¼ per cent indolebutyric acid in solution in alcohol plus water, was more effective than Hormodin No. 3,

From this point on we concentrated on these lower percentage solutions and had increasingly good results using them on evergreen as well as various softwood cuttings. We gradually used less powder formulations, and in 1955, after giving the controversial chloromone a

try, we switched our entire hormone application to the quick dip method, using ½ per cent indolebutyric acid in alcohol as the basic solution.

Before going into more detail about the solutions we use I want to point out that in our approach to the problems connected with the quick dip method we didn't use the "scientific approach." We did not have the necessary background in chemistry or the precise measuring equipment required for this type of research However, we were convinced of the feasibility of this type of application At the same time we kept the basic requirements, necessary for mass application to cuttings, foremost in mind The necessary requirements, besides good results are: (1) simple preparation, (2) ease of handling by employees, and (3) guaranteed stability of solution during mass application over an unlimited length of time

Now I would like to go into more detail about the solutions we use. As mentioned before, our basic solution consists of ½ percent indolebutyric acid in alcohol. After buying the crystals in 50 or 100 gram parcels, from the Nutritional Biochemicals Corporation, in Cleveland, we take them to a druggist who weighs the crystals into 2 gram quantities which are kept in sealed plastic containers under refrigeration. We have kept some of these chemicals in containers for years and have never experienced any loss in strength.

By adding 2 grams of crystals to 400 c.c. methyl alcohol we establish our basic solution. With this basic solution we prepare four different concentrations, which cover our whole range of cuttings; i.e. for softwood cuttings during the summer in intermittent mist frames, as well as in foghouse and for evergreen cuttings propagated during the fall and winter in the conventional greenhouse method of propagation. We arbitrarily named the work solutions, strong, regular, weak and extra weak (Table 1).

The dilution of the indolebutyric acid in these solutions might appear to be rather severe, but the consistently good results we had over a number of years have proven these low percentage solutions to be superior to their powder counterparts. The only explanation we have is that indolebutyric acid becomes more readily available to the cutting when in liquid solution than when in powder form. It may be that the talc carrier itself might obstruct the direct absorption of the hormone.

**Table 1.**—Preparation of quick dip work solutions

| Work Solution | Method of Propagation | % Active Ingredient |
|---|---|---|
| Strong | 1 part basic solution, plus 1 part water | ¼ |
| Regular | 1 part basic solution, plus 1 part alcohol, plus 1 part water | 1/6 |
| Weak | 1 part basic solution, plus 1 part alcohol, plus 2 parts water | ⅛ |
| Extra weak | 1 part basic solution, plus 2 parts alcohol, plus 6 parts water | 1/12 |

I would like to point out that these solutions have a relatively large amount of water in them It is the water that acts as a stabilizer, making these solutions suited for mass production at room temperature. If we attempted to keep a solution consisting mainly of alcohol on the workbench and were to dip 4 to 7000 cuttings a day in it, it would soon become quite concentrated. In other words, because alcohol is quite volatile we would be using a higher concentration later in the afternoon than we were early in the morning This could naturally have adverse results. By using the rather large amounts of water we have never noticed any important change in the concentration of our solutions, as evidenced by erratic rooting.

We keep an instruction chart in the workroom to guide the person who is in charge of preparing the solutions We use wide mouthed, black painted jars to hold the various solutions, which are placed on the bench between two workers. After making the cutting, the worker keeps the finished ones in his hand, attempting to hold the basal ends as even as possible. After making 10 to 25 cuttings, he lifts the cover from the jar, dips the cuttings, shakes them quickly and puts the bundle, upside down in a box where they remain until the basal ends are dry This seems to be quite important, since it assures a uniform absorption of the hormone by the cuttings. If these were stuck while wet, the solution covering the base could be diluted by the moisture available in the medium. As soon as the work solution in the jar runs low we simply add a fresh quantity to it This practice, which is repeated every 2 or 3 days gives added assurance that the work solution remains at a given concentration Sometimes we will not use a certain solution for weeks or months during which time it is kept under refrigeration. We have never noticed any decreased effects from this practice.

One of the major advantages of the quick dip method shows up while sticking the cuttings, in that there is no worry about the amount of powder covering each cutting or need to make a furrow. There is no chance of stripping off the powder and no chance of diluting or washing off the powder when watering or turning on the intermittent mist. Another advantage of the quick dip method is the fact that the relatively large amount of alcohol in the solutions acts as a perfect fungicide.

A bottle containing 400 c.c. of basic solution of ½ per cent indolebutyric acid in alcohol will be sufficient to treat between 25 and 35,000 cuttings. The price of 1 gram of indolebutyric acid varies between 45

**Table 2.**—Use of various work solutions to promote the rooting of cuttings

| Work Solution | Type of Cutting Treated |
|---|---|
| Strong | American holly, hard English holly, hard, ripe wood of some of the red hybrid rhododendrons |
| Regular | *Taxus,* ripe wood of rhododendrons, English holly, softwood cuttings of *Cotoneaster* varieites, Red maple, Pink dogwood, and Hetzi juniper. |
| Weak and Extra Weak | Softwood cuttings of hybrid rhododendrons, viburnums, *Magnolia, Pyracantha, Ilex* vars, Red plums, Smoke bush, and boxwood |

and 60 cents. In order to give you some idea how we use the work solutions, I will mention some of the plant material which is treated with each concentration. (Table 2).

I have never believed in over-emphasizing the importance of hormone application since it is just one of the many factors that has to be taken into account when making cuttings. However, provided all those other factors are taken care of, proper hormone application usually makes the difference between a lightly rooted cutting and one with a heavy and well branched root system. While using these hormones, we at Warner Nursery have found through the last four years that the quick dip method consistently gives better and quicker results than the powder forms. Thank you.

MODERATOR LANCASTER: If agreeable with the members of the Society, and the panel, I am going to ask that if anyone has any questions please write them out and bring them to the Question Box, Friday night.

Leaving the panel discussion of the quick-dip method of hormone application, we will go on to the "Budding of Dogwood in the Field" by Hoskins A. Shadow, Tennessee Valley Nursery, Winchester, Tennessee. Mr. Shadow.

Mr. Hoskins Shadow presented his prepared paper on "The Budding of Dogwood in the Field." (Applause)

## THE BUDDING OF DOGWOOD IN THE FIELD

HOSKINS A SHADOW
*Tennessee Valley Nursery*
*Winchester, Tennessee*

It is my desire to give you as near as possible the procedure we follow in the field propagation of dogwood on a commercial basis.

Our source of seed is from the native dogwood, which is abundant in our area. These berries are gathered in the early fall and are brought to our packing shed where we buy them, from collectors, by the pound.

We prefer that the berries be well ripened and find that the best test is to press the berries between the thumb and fore finger If the seed presses out freely, the berries are ripe and are ready to be cleaned. We use a Dybvig Seed Cleaner for this process and find it very satisfactory.

After the seeds are cleaned, they are placed in the open air and sun to dry for a few hours and are then stored in bags in lots of 25 lbs., which is a convenient quantity to handle, since it will not mold, if hung from a rafter.

When weather permits in late October and early November, we plant in a fertile, well prepared seed bed directly in the field. Our standard row is 42 inches, and the seed are placed in a "V-shaped furrow about one to one and a half inches deep. This furrow is then filled with well decayed hardwood sawdust and firmed with a roller or Cultipacker. We find this desirable, as it prevents, to some degree, the loss of sawdust by wind erosion.