We use the alcoholic quick-dip treatment on genera considered to be difficult to root. However, we are not always assured of success, for we have obtained both positive and negative results. Specific concentrations do not produce uniform results from year to year nor from season to season. Negative results often show up as follows:

1. Excessive rooting. This oftentimes is followed by a retardation of root development.

2. The buds are affected by what I choose to call deep sleep or a state of extra dormancy. This is particularly true in the case of cuttings from those plants that are in the dormant condition.

3. An actual killing of the treated area at the base of the cutting.

Now although we have had good results with the quick-dip alcoholic solution treatments with a variety of plant materials we still prefer the powder treatment of cuttings. Our use of alcoholic solutions is pretty much limited to instructional and demonstrational tests rather than a recommended practice. Thank you.

MODERATOR LANCASTER: Thank you Harvey.

Our next speaker on the panel will be Thomas S. Pinney, Jr. from the Evergreen Nursery Company, Sturgeon Bay, Wisconsin. (Applause)

Mr. Pinney then presented his paper on the procedures he uses to treat cuttings by the quick-dip method.

THE METHOD OF QUICK DIP HORMONE TREATMENT OF CUTTING WOOD AT THE EVERGREEN NURSERY CO.

THOMAS S. PINNEY
Evergreen Nursery Company
Sturgeon Bay, Wisconsin

Since this discussion is limited to five or six minutes, my remarks will be brief and concerned with the generalities of our quick dip hormone program. If anyone is interested in further detail, I would be glad to discuss it with them at their convenience.

Through trial and error we have found that indolebutyric acid has been the most satisfactory chemical for our purpose. We have used alpha naphtaleneacetic acid and napthaleneacetamide in test work only. They have proved to have a very narrow effective range while IBA has a much wider spectrum. A wider range means less chance of injury due to inadvertent errors. The results obtained from the three chemicals were quite similar.

We use 95 per cent ethanol as the solvent but are endeavoring to find another carrier not subject to the beverage tax which will act as a solvent for IBA and still be miscible with water.

The general formula for making up the concentrate is one gram of IBA per 100 C.C. of 95 per cent ethanol. This results in a 10,000 ppm IBA concentrate. It is of prime importance to add the ethanol to the IBA, not the reverse. The concentrate can be stored up to three months in a dark place in a sealed brown bottle at 40 degrees Fahrenheit. It may be possible to store it for a longer period, but at the pre-

sent time we know that this storage period results in a very negligible change in the concentration.

We use a range of concentration between 1,000 ppm and 2,500 ppm, depending on the cutting material. This varies with the species as well as the physiological and anatomical status of the cutting wood. The concentrate is diluted through the use of distilled water. We have made up a detailed chart giving the exact proportions of the concentrate and distilled water necessary to make a given volume and concentration. Again, it is important to add the distilled water to the concentrate, not the reverse. We feel that accuracy is extremely important so as to keep to a minimum the possibility of errors. We also add a fungicide such as Captan to this solution. We have experienced difficulty at various times with flocculation which results in the precipitation of the IBA. The chemistry of this particular solution unfortunately is not too well developed, and as a result it is hard to predict when or if the problem will occur. If difficulty is experienced, either additional ethanol may be substituted for a part of the distilled water or the temperature of the solution may be raised.

The application of the hormone is simple. The first step is to place two to three inches of the solution in a large open dish. Next, the ends of the cuttings are cut off even on a paper cutter and dipped into the solution for one second. They are then handled in the usual manner and stuck in perlite. The dish containing the solution for dipping is never allowed to stand exposed for over two or three hours due to the possibility of change of concentration through evaporation. There is no way that we know of detecting how rapidly the concentration of solution changes in the open dish, so we take all precautions that are economically feasible to keep this change to a minimum. We do not feel that it is a very serious problem since when we get down to an inch or so in the container, which is normally two to three hours dipping times, we throw it out and put in fresh material. We always wash the container thoroughly before adding any fresh solution. This also keeps to a minimum the possibility of transferring disease, which is another reason why we add a fungicide.

We have found this method to be rather effective on most types of junipers, *Taxus,* and arborvitae. It may only increase the percentage by a small amount over common type power hormones, but the real value appears to be in the quality and extensiveness of the root system. It also is very flexible in allowing us to change our concentrations whenever we feel we can benefit by doing this, and it lends itself well to experimental work. Our experiments contain at least 1,000 cuttings and usually 5,000 per test. It cost us last year about $60.00 to treat 144,000 cuttings, which represents our total evergreen cuttage operation. We feel this is rather economical.

The advantages of this method in our small operation are, — One, we know very nearly the concentration we are applying, whereas with powder hormones very often they have been on the shelf for a long time and their effectiveness could be greatly decreased, which results in an erratic performance from year to year. Secondly, we have been able to

develop a good enough quality root system on such plants as Pfitzer juniper in seven months (69%) as to allow us to plant the cuttings directly in the field under irrigation with a great saving in labor.

Another factor is that we nurserymen all want to restick, we don't want to throw a cutting away. Well, you never have to bother to restick after using the higher concentrations. It is either rooted or dead. This makes our decision quite simple. Thank you.

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MODERATOR LANCASTER: Our next speaker is John Roller, Verhalen Nursery Company, Scottsville, Texas, which incidentally is in the second largest state.

MR. JOHN ROLLER: It is the largest state in the Union without polar bears.

Mr. John Roller presented his discussion on the use and effects of the quick-dip method for treating cuttings. (Applause)

PREPARATION AND USE OF QUICK DIP SOLUTIONS ON CUTTINGS

JOHN B. ROLLER
Verhalen Nursery Company
Scottsville, Texas

We have been using this quick dip method for five years now, and the way we mix our solution is quite similar to that described by Mr. Gray and Mr. Pinney. The only difference is that we use two grams of indolebutyric acid and two grams of napthaleneacetic acid in order to get a little wider range for plants which might benefit. Now this is mixed in 200 c.c. of isopropyl alcohol, or the common old rubbing alcohol which costs about nineteen cents a pint. We went through the red tape to obtain ethanol and we finally came to the conclusion that we could see no difference whatever in the results between isopropyl and ethyl alcohol

Although we have been using this quick dip method for a relatively long time I have had the same results as Harvey Gray has had, that is, inconsistent rooting.

For one of the concentrations that we use, I take 10 c.c. of the stock solution and mix this with 90 c c. of tap water We use five, ten, and twenty per cent solutions.

Our cuttings are made, dipped and stuck I have had 100 per cent rooting on some types of cuttings which for me were usually difficult to root. For example, we have a dwarf blue Pfitzer which would take sometimes 18 months to root, and then with a very low percentage. By actual count we were able to root 100 per cent in small batches.

I am not going in too much detail about mixing these solutions since it is quite similar to what you have already heard. I have found