

Juniperous hoirzontalis plumosa	115.0 A	45.0 B	123.0 A
Pachysandra terminalis	239.3 A	260.0 A	121.3 B
Picea glauca conica	64.6 NA	20.6 NA	20.6 NA
Rhododendron 'Dr. Dresselhuys'	218.3 A	26.6 B	23.3 B
Rhododendron catawbiense grandiflorum	52.8 A	54.0 A	36.2 B
Viburum carlesi compactum	149.0 A	203.6 B	40.2 C
Viburnum plicatum tomantosum	20.0 A*	20.0 A*	20.0 A*
Virburnum wrighti	385.3 A	260.6 B	159.3 C

NA = no analysis made due to the small number of cuttings which rooted.  
Numbers with the same letter on the same line are not significantly different from each other.  
(P. 05)

\* In this species only root numbers are listed, not coded values.

#### LITERATURE CITED

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4. Stoutemeyer, V. T. and O'Rourke, F. L. 1945. Rooting cuttings from plants sprayed with growth regulating substances. *Proc. Amer. Soc. Hort. Sci.* 46: 407-411.
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HUGH STEAVENSON: Our next speaker is one of our very loyal members, Al Lowenfels.

#### VARIOUS TYPES AND STRENGTHS OF HORMONES FROM U. S. A., ENGLAND AND HOLLAND

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I planned to bring containers of Hormones that are sold commercially and say a few words about my experiences with them. But then I felt that few words on the whole subject of root promoting substances would be of interest.

Hormones for plant growth are comparatively new. *Baileys Nursery Manual*, 22nd adition—a wonderful book in



many ways published in 1919 says nothing about hormones. Neither does the article signed by B. M. Watson in Baileys Encyclopedia mention Hormones. Laurie and an assistant Professor named Chadwick in Modern Nursery mention Potassium permanganate and Sucrose as rooting aids. Their book was published in 1931. Also slight attention is given to acetic acid, Manganese sulphate and Manganese dioxide.

Hottes in How to Grow Plants (1940) cites the work that Boyce Thompson Institute did in this field since 1924, mentioning Dr. Hitchcock and Zimmerman, who defined a hormone as a substance produced in one part of the body usually ductless glands and is then transferred to another part where it has a specific physiological effect. Hormones change adolescent children unto adults and when the Hormones disappear from the body old age is brought on. Hottes continues telling how in 1910 a Danish botanist proved that some of these same substances will also have an important effect on plants. (In fact I once read someplace that if you dipped the bases of cuttings in the urine of a pregnant woman, rooting would be improved). At first Boyce Thompson experimented with gases but finally Professor Kogel of Holland found a crystalline substance in urine known as Indoleacetic Acid and experiments showed that this and other substances would be of great help. Kains and McQuestern in 1942 tell how a man named Fitting used Hormones for plants in 1910. They tell how Hitchcock in 1933 reported the effect of carbon monoxide on initiating roots and was the first to use a chemical substance on an organ of a plant. Boyce Thompson investigation found 32 possible root promoting substances. Then this institute gave a license to Merck and Co to market a powder which was called Hormodin A.

Sheats of England wrote a detailed and supposedly authoritative book on Propagation in 1948. Oddly enough Sheats found no use for Hormones. Sheats stated that Hormone treated cutting made more and better roots—but when planted outside—that after 6 months the untreated plants were more advanced than the treated ones. He concluded 'It is safe to say that up to date no real commercial advantage has yet been gained by the use of substances for the production of plants by cuttings'. And in his detailed instructions on how to propagate hundreds of species I haven't found one that mentions hormones.

We of course know that hormones DO help many plants form roots, in fact I do not see how we could propagate many subjects without them and so far I know hormone treated cuttings do as well—and often better than plants rooted without them. Now a few words about the Hormones I brought along. I propagate all my material myself including transplanting into bands or peat pots so my words are entirely the result of my own observations.

I did not bring Hormodin—or Rootone along for I felt you are all familiar with them. Seradix is an English pro-

duct (and I believe it is used in Canada). It comes in three strengths and I feel that it is similar to Hormodin. Rootagen comes in two strengths for soft and harder cuttings. I didn't have much success with either.

Hormoroot is made by an individual in Jersey. It comes in various strengths including some very strong. I found it quite good. Hormex comes from the West Coast in various strengths. One thing I like about Hormex—the Talcum powder seems finer and so clings better. Incidentally in a 1939 report Hitchcock and Zimmerman stated that an ingredient of controlled talc, soluble in chloroform was found to be active when used on tomato plants. At that time they also reported that the principal action of the hormone occurse within a short time, probably in many cases within 24 hours. I have been using Hormex for the past two years and find it quite satisfactory.

Jiffy Grow, a liquid with an alcohol base I have just started to use this past season and am therefor unable to report conclusive results. This is also my 1st year with Proliferol. Rhizopan I bought when I visited the marvelous nursery area at Boskoop Holland. Unfortunately I cannot read Dutch so I'm not sure what strength I received in my one can for it comes in various strentghs so I hardly knew what I was doing with it. Chloromone is a green liquid. Altho commended by one prominent Jersey member, I didn't find it too satisfactory. And the price of \$3.00 for a small container seems too high for general commercial use.

I have often wondered how long hormones in powder would remain effective. Fortunately Dr. Hitchcock of Boyce Thompson is still alive and so I wrote him. He answered," Altho there is scant information about the lasting properties of commercial preparations, our results, (not all published) indicate that the low concentrations are effective for 1-2 years and the higher concentration powders for longer periods, up to 5 years. No doubt the concentrations have varied in commercial preparations but at the time we tested some of these powders it was evident that the most effective range in milligrams of indolebutyric acid per gram of fine talc were respectively 2, 5 and 8 Mg/g. Dr. Hitchcock also sent me some of the papers of the investigations around 1940 which I brought along. Please do not take them they are the only ones I have. Boyce Thompson issues a catalog of all their publications—they are at Yonkers New York.

I keep records of what I do—and have some of them along too in case any member cares to discuss this subject.

My conclusions are that Hormodin deserves the #1 spot. The directions in each package tell which one of the three strengths to use on a wide variety of subjects—and I believe that generally propagators have found it most satisfactory.

The past two years I have also used Hormex—and this too has worked well—and there is one benefit—it not only has



the three regular strengths—the same as Hormodin—but also is sold in higher concentrations for harder to root subjects. I think that Hormex costs less than other powders. I have a circular that shows their prices.

I think I should mention that Eastman, Rochester, N.Y. sells basic chemicals for making your own hormone liquid mixtures. I inquired about this a few years back but felt that trying to work out the right method of mixing and using their chemicals was beyond me. However undoubtedly in this august gathering there probably are some who use the Eastman chemicals or might be interested in finding out about them.

HUGH STEAVENSON: Our next speaker, as can be seen from the program, is Bob Fleming.

**PHYSIOLOGICAL AND ANATOMICAL  
EFFECTS OF GIBBERELIC ACID  
ON PLANT CUTTINGS**

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**INTRODUCTION**

Gibberellic acid has been tested in various experiments by many researchers with the purpose of determining its usefulness in the field of horticulture. Much has been discovered with respect to the effects on the above-ground parts of plants. Little information was available in 1957 on the direct effect on root promotion as in the case of cuttings or root growth as it is affected by treatments with gibberellic acid. For this reason the following study was carried out. It was conceivable, as in some ways gibberellic acid duplicated the response of plants to treatment with known auxins or plant hormones, that the material might also favorably affect root induction in plant cuttings. The effects of the known auxins were well established, toxicity levels were known, and the inhibiting effect on root growth was known. Little information was available at the time concerning this phase of research using gibberellic acid. From literature available it was evident that gibberellic acid has a low toxicity rating. Responses have been evident on plants with as little as one ppm up to and beyond 1000 ppm with no indication of injury with the exception that, at the high concentrations plant response, where evident, was more pronounced than at lower concentrations.

While much of the literature pertaining to increased growth after treatment with gibberellic acid, showed a decrease in per cent dry weight of roots in relation to top, there is no indication that inhibition has been the cause. Where