The cuttings of *Cornus* and *Corylus* rooted very poorly and no differences were found between the different treatments. The cuttings of *Spiraea* and *Viburnum* rooted very well but again no differences were found.

From the work completed to date, it appears that the effectiveness of fertilizer applications varies with the time of application, the method of application, the amount of fertilizer and the plant species.

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MODERATOR WARNER: Thank you, Mr Zimmerman.

Our next speaker is Frank Turner, who I am sure needs no introduction When we were talking a while ago, he was very conscious of this rule that we have in the Propagators' Society that we should not withhold information from fellow members. He is so conscientious about that, he told me he was telling things he didn't even know.

Mr. Frank Turner, Berryhill Nursery Company, Springfield, Ohio, presented his paper. (Applause)

## FORM VARIATIONS IN TAXUS AS RELATED TO THE SOURCE OF THE CUTTING ON THE STOCK PLANT

FRANK TURNER
*Berryhill Nursery Company*
*Springfield, Ohio*

Thank you for the privilege of appearing before you to call some of these observations to your attention To clarify the title, "Form Variations in *Taxus* as Related to the Source of the Cutting on the Stock Plant," I will say that we are referring to the location or level from which the cutting is taken from the stock plant as it in turn is related to the subsequent development of the mature specimen My remarks are made in order to stimulate thinking about observable differences that could be attributed to taking cutting pieces from various plants and from the "same" plant in different locations, whether that be done by design or habit

On several occasions at these meetings we have been reminded of the influence of position on the plant and the influence of the age and variety of plant on the rooting of yew cuttings These reports have been confined almost universally to the speed, percentage, and quality of rooting. In some reports the plant subjects have been of types usually considered quite difficult to root. We have seldom, if ever, had reports on the subsequent development of these rooted cuttings. In saying this, I mean to imply that there seems to be little information on the capability of these experimentally rooted cuttings to efficiently make plants of good quality and desirable structure.

If you grant that this situation is true regarding variations in plants in general, I believe that I can point out some observable variations in *Taxus* varieties which may be due to the type of cutting and the location on the plant from which it was taken

Some of the reasons why a grower selects a particular type of plant and type of cutting for propagation have good reason. He often be-

lieves, and rightly so. that cuttings from the lower third of a tree root best. On the other hand, with certain varieties, he is also endeavoring to select a lead shoot, or the nearest thing available to it that he can get. He often takes the lower wood to overcome a slightly disavantageous time (early) to start his propagation of *Taxus*. There are also other reasons such as habit and conviction tending to fix his pattern for selecting cuttings

I believe we are just beginning to discover slight variations in our supposedly even run crops ol yews These can often be desirable changes and the key to desirable improvements These same characteristics may also explain why a grower might believe that he has developed a superior selection in a given variety In truth he has done this, not by choosing superior plants but rather by choosing superior cuttings. Some variations that can be found are as follows:

*Taxus browni* is found in both near globe and near upright forms.

*Taxus capitata* has individual specimens that will always produce an upright tree with a central leader, regardless of where on the tree the cutting is taken.

*Taxus columnaris,* on the other hand, produces a flat spreading tree when lower side branch cuttings are taken. It yields an upright tree when lead shoots are taken as cuttings

*Taxus media hicksi* often develops a poor lower structure (unless overly severe shearing is practiced ) This difficulty relates to the persistent taking of top cuttings.

*Taxus kelseyi* is a plant that will take many forms

I know these are common examples that most of us accept quite readily. Because they are so commonplace, I doubt that we expect to develop specific techniques for securing the exact development of and extra performance from even the less than ten varieties that constitute what we might call our major crops in the *Taxus* species.

In consideration of the time available and for the sake of simplicity I have produced examples that could have only remotely developed as a result of a mutation or reversion to the adult or juvenile stage. I believe that if we give consideration to known practical results we will end up with some workable explanations For example, it is a known fact that we get change from overworking stock plants That is true for *Taxus* and even more so for some other plant species It is apparently possible with some clones of our standard *Taxus* plants to induce practically a physiological change in growth type (from lateral branch growth to apical dominance) by mechanical manipulation such as staking and tying.

It may well be that at this time we do not see how processes similar to these can be applied to *Taxus,* although they have been applied to other plant families. For instance, we know how to change a rose from a bush to a vine If that is true, how far can we go with *Taxus?*

The fact that there are modifications brought about by taking different types ol cuttings from *Taxus* stock plants, does not necessarily mean that they are always good variations. Each one has to be checked. If you have two variations coming from the same parent plant, they have to be checked against each other. If they are under con-

sideration as a crop, you should have them planted side by side in the field in order to make a final satisfactory commercial appraisal Here, we have some more or less basic rules to guide us For example, plants of *Taxus* grown from extreme lead shoots are almost universally poor developers ol bottom structure While I haven't referred to it previously there must be some explanation as to why some types develop sparse root structure while others develop heavy root systems.

In conclusion, may I say that we are dealing with something that we do not as yet have rules lor naming. We have a thing here, that has caused us innumerable difficulties in identification.

I believe that we have a good opportunity to strike pay-dirt if we persevere diligently in our efforts to observe, analyze, test and try, some of the variations of which I speak

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MODERATOR WARNER: Thank you, Mr. Turner. We are right on schedule and therefore will delay any questions until the end of the panel.

Mr. Harvey Gray from Farmingdale, New York, is our next speaker Mr. Gray.

MR. HARVEY GRAY (Long Island Agricultural and Technical Institute, Farmingdale, New York): This paper is an extract from a class project at the State Institute at Farmingdale in a course on Nursery Management It really is the class' work and not mine, although I asked them to set it up and run it.

Mr Gray then presented his paper on "*Tsuga canadensis* from Cuttings." (Applause)

## TSUGA CANADENSIS FROM CUTTINGS

HARVEY GRAY
*State University of New York*
*Farmingdale, New York*

Rooting *Tsuga canadensis* cuttings has always presented a challenge to the plant propagator A test on the rooting of this plant was devised and put into operation on December 15, 1957. A total of 1518 cuttings was involved in the test. The cuttings were made from the previous season's growth, taken from five year old vigorous nursery plants. The ten inch cuttings were wounded with a spiral type cut and subjected to various synthetic hormone treatments. Indolebutyric acid diluted in talc and in alcohol at .8% and 2% concentration, making four different treatments, was used.

The following rooting media used straight or in mixtures as indicated in the table were: medium sand from a local sand pit, sphagnum peat and two grades of styrofoam, irregular pea size pieces and coarse dust. All media were placed in flats and moistened to an even consistency. The cuttings were inserted and the flats were placed in a polyethylene vapor proof case. All of our polyethylene cases are made vapor proof by completely enclosing and sealing. To accomplish this,