

# THE PROPAGATION OF TAXUS BY CUTTINGS

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Thank you, Ray. Don't tell the fellows I am good at propagating! I am here just to learn. I am not here to teach anybody anything.

If you think you know a lot, you know very little. And if you know a little and you keep your ears and eyes open, sometimes, you learn a lot! So I will just make a very brief statement here of what we do in propagating yews from cuttings. I will make it so brief that some questions must be asked. I believe in questions and answers. That is how I learn and I think that is how most of us learn.

I am giving a short talk and dividing it into four parts. First, material; second, the time; third, the media; and fourth, the hormones.

Selection of material from which cuttings are to be made is a very important matter. If you take a branch from a sick plant, we all know it hasn't an opportunity to grow. If we take it from the plant, it continues on for a period of time in the rooting media, until it has a chance to make its own root or take its own feeding, it has to depend on the branch. By taking a healthy branch, it has more chance to work it out and stay alive until it has started to root. So always keep in mind; the healthy plant, a healthy cutting!

The color, too. Often we take taxus from yellowish plants. It doesn't work out as well.

The type of cutting I think is best suited for propagation has branches that grew the previous year. These branches are healthy; they are straight. They take less room in the greenhouse and we, as commercial propagators, have to put everything in the greenhouse we can to make it pay, so we try to get cuttings from the previous season's growth.

We make our cuttings about 8 to 10 inches long. We make them longer sometimes, but I don't think it is of any value. When a plant is cut back, you have a healthy plant. I think 8 to 10 inches is about the best size. If you haven't that type of wood, of course, as has been mentioned here before, you can take wood even if it is three years old, if you run short.

We had a poor growing season this year so we took cuttings of one year old wood, probably two or three inches of the old wood and the rest of it new, to make the same sized cutting. Sometimes they root even quicker that way, but it is more work to make the cuttings. We try to avoid work and take new wood, not the old. If you take the old, usually it takes more space in the greenhouse, so you can't get enough in and you can't make enough money. That is one of the big reasons we don't do it.

We used to take a lot of pains making our cuttings with a knife. I guess there are a lot of Dutchmen here! You had to have a good, sharp knife to make any cutting, they said. It didn't work. It took too much time. We can't get the proper help so we prefer to take a shears. We make all our cuttings with a shears and take four or five and cut them off and stick them in the sand. You don't have to be particular about it. It all grows.

The time of the cuttings — for our purpose we root all our cuttings in the greenhouses. We don't do any other propagating. We make our cuttings the latter part of November or during December. By making cuttings at that time, I find that we do not get as much top growth. If we make our cuttings late in January or cut them in January, we find on getting them in the greenhouse, that the branches start to grow right away. There is more care to watching these soft growths that may rot or get fungus in them. By making our cuttings early, we don't have it, and it is easier to take care of. In fact, we try to cut all our material in November. I happened to talk to Jim Wells about it this morning and he was kind of surprised that we do that. We cut all the material that we can in November and from any place.

In New Jersey, I had a girl working in the greenhouse, and I had to keep her going for the month when we really weren't working there any more, so in the latter part of November I started her making taxus cuttings. She made them and put a rubber band around them and piled them up. I threw them into a bench and the second week in January we had the best stand we ever had.

We make our cuttings in the greenhouse. We use about six inches of sand over a good clean coarse gravel. I use it for the idea we have more drainage. Our benches are all made with cypress board. When they get wet the cracks close tight. We put an inch of gravel in first. If we didn't put the gravel in sometimes the bottom of the sand becomes too wet and this means the cuttings die.

This year we took all our boards out of the benches and we put 1/8 mesh hardware cloth over. I think it will be much better. I hope we find the net result will be better. We take a 1/8 inch mesh and put that over the cross boards, and I have found we have an average of about 10 degrees more heat in the center. It is much easier to take care of and you don't have to worry about moisture sticking in the bottom.

We tried out the rhododendrons and—this doesn't fit into the taxus—but we had callus two weeks earlier this year on our Drusselhuys; well over two weeks, and it used to take from five to six weeks, and I think the taxus will work out the same way.

You can always put taxus in cold frames. It is a cheap method. You don't have to build a greenhouse. We used to do it years ago once in a while and it works out well. If you have a place where you have good drainage you don't even need sash. You can put a screen over and put a little burlap on. Use a mixture of sand and peat and stick them in there. Water them down well, but keep the sun on. I have tried it. It works out well. I don't do it any more. There are some fellows here that do it in a large way and could probably tell you more than I can.

We also root taxus in the fall in cold frames. If you take them in late July or August, I do think you should take a shorter cuttings. Your cuttings are soft and by taking a long cutting it doesn't work out so well. I think a cutting 4 to 6 inches would be well. Then I would use clean sand. It prevents a soft cutting from rotting and they are less work to take care of. You can forget them.

By growing them in the fall, they root in the early spring and most of the time you can take them up. You can bed them probably in June or

July. If you plant them in the spring you have to leave them in the beds all year. You can take them up next spring and bed them. It is a very economical way of doing it. In the greenhouse we have no time for those things, so we throw everything in the greenhouse.

The use of hormones! You know, I never went to high school. I never went to college, and I am awfully dumb in chemicals. I am quite thick-headed as a Dutchman and I didn't want to try a lot of things I probably should have, but we finally got to the point we are trying chemicals and have been working with chemicals quite a while. We use it at the present time for our cuttings in the greenhouse. Hormodin No. 3 for the hard varieties or No. 2 for the varieties with brittle type soft skin. We find by using stronger strengths we burn the skin. We have had results by using No. 3 on them, especially if you have a good growing summer and the wood is soft.

We have been trying some commercial hormones in the last couple of years. With Rootone we had no extra effect at all. I didn't like it. I think we probably didn't use the proper strength. At the time we tried it, there was only one type of Rootone and we didn't find any success with it, so we didn't use it any more.

We have been trying for the last two years commercial hormone under the name of Cut-start, which I understand comes from the West Coast. It comes in different grades: numbers 5 to 13. We have been trying Nos. 9, 11 and 13. We find that with hard-rooting varieties all three of them were a big improvement over Hormodin No. 3. With the slower varieties we couldn't see any difference, but we also tried it on "*brevifolia*" and "*intermedia*" and probably two or three other ones, and we found we got skin burns. Perhaps the powder is too strong. I don't know the strength. I don't know where it is made up.

As I said, I am not a man who knows too much about chemicals. I have always worked by the touch and go. If it worked, it worked, and if it didn't work, it was just too bad.

Last year we also used some 2, 4, 5-triphenoxy propionic acid. I didn't have very good results with it except on the baccatas which made a big improvement. On the other varieties we had more stem burn. The leaves were yellow and the needles burned. It was over-stimulation. It makes them drop off and it didn't work out too well.

This year for the first time, we tried some indolebutyric acid, one and two per cent. I don't know whether it will work out. It may be a little bit too strong, but I am not alone down there any more, so they tell me I shouldn't be so old-fashioned, I should try some new things, too. We have to give in once in a while to the younger generation. So we have! So we are trying one and two per cent IBA and I keep a good check on it, we have everything in the same medium. We have three rows. I don't know how it will work out. Maybe next year I can let you know.

To be honest, we don't need hormones for taxus cuttings. Ten or fifteen years ago we made taxus cuttings and we never had hormones. We never thought of it. It may have taken a month or two longer. For saving of time, to use hormones is important. We want to start shipping our cuttings the middle of April. If we use hormones we can do it. Some years we can't. It may be May before we can take them out. That is the advantage. It is

not necessary. You can root almost any variety without hormones; some of the active varieties such as *baccata* types we grow relatively easy as *washingtoni*. Even without hormones we can really root anyone of those in less than six weeks if we take the *baccata* variety in November or December. If it is taken in December we rarely can take them out with decent percentage until late May. We leave them there until probably June and then pot them.

In the *baccata* types of our own introduction, it is very difficult to do. It takes an average of a month longer than the other varieties, the same with *Kelseyi* which I found to be a slow rooting *T. media* var.

We have a couple of new varieties of the verticals that we introduced a few years ago. They all came out of the same lot of seeds. I can't understand why they should root differently. It is all picked out of the same seed and there are two or three varieties of these vertical types that take twice as long.

That just about covers what I have to say. I hope there are a lot of questions because, like I said in the beginning, we learn more by questions and answers.

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MODERATOR KEEN: Thank you, John.

MR. WM. FLEMER III (Princeton Nurseries, Princeton, N. J.): I would like to ask two questions. One is whether you found that variety *densiformis* is harder to root than the other types.

MR. VERMEULEN: We found it so. It takes about a month longer to have them rooted sufficiently to take up.

MR. FLEMER: The other question is, what do you think your cost of the rooted cutting is and what do you think your actual cost of a potted plant is ?

MR. VERMEULEN: I don't know.

MR. CHARLES HESS SR.: I had these cuttings made with a knife and with a shears side by side—those made with the shears took about six weeks longer to root than with the knife.

You make a mistake in taking your cuttings late in February or January, because you get top growth before you have roots. Right? Dr. Snyder tells me that you can take them as late as February providing you give them an eight-hour day, and they will make roots before they make growth. Dr. Snyder informed me of that, and it is well worth trying. If you keep them an eight-hour day, they will not come in growth.

Another thing we found is cut your cuttings early. We pull them, put them in a polyethylene bag and put moisture on them and throw them in the barn and keep the things. We had a funny thing happen. We had a bag of *Ilex crenata belleri*. We found them in May and the things rooted in the bag, so you don't need a greenhouse!

MR. VERMEULEN: We tried the same thing and we put two or three rows of cuttings in, made with the shears along with those made with the knife. I found no difference; otherwise, I wouldn't have changed.

MR. LOUIS VANDERBROOK (Vanderbrook Nursery, Manchester, Conn.): You speak of making your cuttings in November and then not

sticking them until February. Why do you delay so long? We take all our cuttings and cut them in October and fill the greenhouses right up then, with them.

MR. VERMEULEN: I didn't say we made them in February. I said at one time we made them and couldn't stick them because the greenhouse wasn't ready. Possibly I said it in a way it wasn't meant. We try to get all our cuttings in before Christmas. We cut them in November for the reason they will not make so much top growth. The other part I learned. A question to you—an eight-hour day—what do you mean?

MR. CHARLES HESS: At Cornell, they put them under black cloth and expose them to daylight for eight hours and then put them in the dark and they have found that will keep them from growing before they root.

MODERATOR KEEN: Did you publish that, Bill?

DR. SNYDER (Cornell University): Not yet. Actually, we were trying to find out why the shoots start growing in January. We took cuttings in September, October, November and December and put them under a controlled day length of eight hour days, which is about the day length we have in December under natural conditions. We found we could hold them for four or five or six months without any appreciable amount of new top growth. But within 30 days after you move them from there to a long day of more than nine hours, they all start to grow tops. It is more complicated than it sounds, since it is tied in with cold treatment. If they have not had a cold treatment they will tend to remain dormant even under the longer days. That is why if you take cuttings earlier, they are slower to break than if taken late in December and January. If they have had cold treatment, they will respond.

There has been quite a bit of work in Holland on daylength on woody materials. I think it is something we are missing over here very decidedly.

MR. E. STROOMBEEK (Warner Nursery, Willoughby, Ohio): What is the relationship between the eight-hour day and the time and the temperature you maintain?

DR. SNYDER: The temperatures were the same under both conditions, about 70 degrees.

MR. DAN CAVANAUGH (Atwater, Ohio): What do you do with your cuttings when you put them in—do you pot them all?

MR. MARTIN VAN HOFF (Rhode Island Nurseries, Newport, R. I.): We are not selling our stock. We are probably doing them for our own use and therefore, we are not crowded for time. We are not making any deadline to get those plants out and we let the plants, whether rooted, stay there as they are. Along about the first of April we might feed them one application of liquid fertilizer so they don't show any nutrient deficiency. They are planted out in the springtime after there is no danger of frost, bedded for two years and lined out.

MR. SEBIAN: I have a few comments regarding top growth. I don't keep a uniform temperature in the greenhouse. I have my thermostat under the bench and I have aprons along the side of the bench and I keep the temperature at 70 to 75. If it gets very cold I drop it to 70, and I disregard the

greenhouse temperature completely. It may drop down to 42 or even 40; when it is zero, that variation sometimes amounts to 20 to 25 degrees between the temperature under the bench and above.

I see no difference whatever. We take our cuttings practically 100 per cent in November, stack them in cold frame, four, five, six inches high and sprinkle them and put paper over them and maybe we don't use the last of them until around the middle of December. They will keep almost indefinitely but I think that the constant uniform temperature under the bench, we have aluminum benches, but I wish we had screens, - as Mr. Vermeulen stated, you would get a rise of temperature of 8 to 10 degrees.

My results—maybe Dr. Chadwick has been there—have been pretty close to 98 per cent year after year. I consider the propagation of taxus no problem whatsoever. If anyone questions it, come over and see me.

DR. SNYDER: I would like to point out that we have one greenhouse in which we are trying to have a number of different things. We have one temperature and we have to do all our things at that. We can't devote one house to say cuttings of evergreens and keep the air temperature low if we are trying to grow plants at the same time. This was at a high air temperature. You can maintain dormancy by low temperature also.

I would like to add, regardless of whether the topes grew or did not grow that there was not a bit of difference in the rooting of those taxus cuttings taken at the different monthly periods.

MR. VERMEULEN: I expected that to be a question—what temperature we keep in the greenhouse or in the upper part of the greenhouse. We keep the upper part of the greenhouse as low as possible—40 to 50. If we can keep it to 50, I like it better than 60 or 70, but we like to keep our medium temperature at 70.

MR. LESLIE HANCOCK (Woodland Nursery, Cookesville, Ont.): We are not really greenhouse propagators but we have a greenhouse which is only heated by cable. We have no heat at all in the air.

This question of taxus growing surprises me very much. We root all our evergreens and have no problem of top growth, for the simple reason in the greenhouse the air temperature—that condensation—will frost even on the top, but we keep an absolute control of our soil temperature. It is true under such conditions people think they get air too cold but we have one electric cable in the air and we just keep that moisture down. We never have any problem with top growth.

MODERATOR KEEN: Our next speaker is Mr. Martin Van Hof of Rhode Island Nurseries, who will speak to us on the matter of bringing these yews on for production. I visited a lot of nurseries this past summer and the establishment where he works is unique in that, if the block says *Hatfield* on the end of the row, that row had nothing but *Hatfield*. I visited a lot of Nurseries and they are mixed 19 different ways sometimes. Maybe you buy from him and get some mixed plants but I am sure it happens in the packing shed or somewhere else. My experience was that those plants in the field are in pure blocks.

Martin will tell us of the culture of taxus in the frame and field.

Mr. Van Hof presented his discussion, entitled: "The Culture of *Taxus* in Frame and Field." (Applause)