# NEFTIC - THE NEXT 25 YEARS

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I do not really know why I have been selected to give this final paper. I have never been very proficient at crystal ball gazing. My few ventures into the world of investment finance have been disasters. Even with salmon fishing I am either a week too early or a day too late. I can hardly cope with the present - never mind 25 years down the road. My one positive attribute - if it is positive - is that I have been working in forest genetics or tree improvement for exactly the same number of years as NEFTIC. I entered the field the same year NEFTIC was founded. At that time the groundwork for tree improvement in the northeast had been laid by such notable researchers as Ernie Schreiver, Jonathan Wright, Scot Pauley, Henry Baldwin and others. Carl Heimburger and Mark Hoist were at work further north. Francois Mergen, Howard Kriebel, Hans Nienstaedt and others were getting their acts together and many others were just drying off behind the ears.

With a few notable exceptions, many of these oldies have retired or moved to other breeding grounds and it has come to the point where the very junior tree breeders of the mid-50's are now the veterans. I have difficulty accepting this status, but except for Kit Yeatman, I am now the senior Canadian tree breeder - at least in respect to number of years on the work force.

Before anyone can intelligently discuss an organization, he should at least have a good understanding of that organization. NEFTIC is, and always has been rather diffuse. I am not even certain of its geographic limits. Presumably New England, New York, New Jersey and Pennsylvania form the NEFTIC core with the Atlantic Ocean, the Mason-Dixon Line, Longitude 80° W - through Ontario, Pennsylvania and West Virginia, and the Arctic Circle outlining most of the area of influence. If you will accept this as a crude delineation of NEFTIC, we can continue.

To me, and I am sure, to many others, NEFTIC has been a disappointment - it has, as yet, not lived up to its potential. It is the oldest of the tree improvement conferences. It started with a core group of highly respected and dedicated forest geneticists and continues to attract a sizable group of respected scientists. Despite the early start and continuing interest, tree improvement activities in much of the northeast have remained at the planning and research stages. After 25 years or more in the business, the contribution of forest genetics to applied forestry in the region covered by NEFTIC is unimpressive. True, we have gathered a good deal of research information about the genetics of native and non-native species and hybrids, but we have not been overly successful in getting this information into practice.

Why, with this early start and competent people, has tree improvement not had as great an impact in the northeast as it has had in the southeast, south, and even the Lake States and further north? In my opinion it comes down to just one thing - if you cannot get your research information and materials to the market place, no one is going to buy. The market place for genetically improved trees can only be reached through reasonably large planting programs. The problem is that planting has never been looked upon as a necessary forest management tool over much of the area served by NEFTIC. If you don't plant, it is difficult to justify a reasonable program in applied tree improvement.

The next obvious questions is: Has our time and effort been wasted in the northeast? Definitely not! We have acquired a great deal of information and some materials. We are in a much better position to start extensive breeding programs than we were 25 years ago - and possibly more important - a market place is now opening for our product.

Having been cast in the role of a seer. I would like to make some projections or predictions as to what I think will happen in the northeast over the next two to three decades.

First, it is widely accepted that there will be a gradual reduction in the availability, and an increase in the cost, of conventional energy fuels and of hydrocarbons as raw materials for industry. It is also accepted that demand for wood as a structural material will increase as the cost of oil-based substitutes increases. These factors, coupled with a reduced forest land base resulting from diversion of forest land to other uses, e.g. recreational, environmental, residential, etc., will make it necessary to obtain more wood from less forest area.

Demand for forest products will increase to the point where it will be essential to increase the productivity of the forests in many parts of the northeast. Artificial regeneration, by planting, is one of the tools available to a forest manager intent on increasing productivity. In eastern Canada, poor forest management practices coupled with loss of growth resulting from 30 years of spruce budworm defoliation have already made it necessary to undertake large planting programs - just to maintain present production levels. As I see it, this trend which has started in the north will gradually move southward into northern New England.

The trend toward increased forest management, including planting, is also moving northward into the NEFTIC region from the south-central States as a spin-off from the very successful tree improvement and reforestation programs of that region. I think we can expect this to continue northward - certainly into Pennsylvania and less populated parts of New York.

I do not forsee much change in the great southern New England to Washington megalopolis where population pressure and land ownership patterns are such as to almost preclude conventional large-scale forestry programs.

Accepting all this – if you will – there will finally be a real opportunity for tree breeders in the northeast to get some of their information and materials actually used.

How will we go about doing this?

I foresee fairly large, conventional tree breeding programs emerging in the northern and southern parts of the region and possibly in other heavily forested areas. Much of the ground work for these programs has been carried out both here and elsewhere so it is largely a problem of setting up the infrastructure to allow them to function. The cooperative tree improvement programs which have proven successful further south provide a proven mechanism for this. Over much of the remaining part of the region we will be faced with much smaller, although not necessarily less important, breeding programs and we will continue to be faced with the problem of getting tree improvement information and materials into practice.

Over the next couple of decades we will see changes in the approach used in many of our improvement programs. I think that vegetative propagation of selected genotypes for direct use in reforestation will be a much more important feature of some programs. This will have special significance to the success of the smaller programs. Vegetative propagation as a means of mass propagating selected genotypes has been utilized only on a limited scale in the northeast and then only for Populus species and hybrids. Recent developments in the art of rooting of conifers and hardwoods make it appear feasible as an alternative to sexual reproduction, at least for juvenile materials.

It also appears that cultural manipulation of conifers, most notably hedging and regular repropagation, will make it possible to retain selected materials in a juvenile condition for many years. Techniques for doing this are also available for some hardwoods.

The major problem still to be overcome in the mass propagation of conifers is that of rejuvenation. As yet we cannot take a mature proven genotype and rejuvenate it to the state where it can be propagated with ease and grow as a normal juvenile seedling. I am quite confident that given the necessary support, this problem can be overcome within the next 10 to 20 years. However, when it is, it will be a whole new ball game. I cannot overemphasize the importance of solving this problem in rejuvenation of mature genotypes especially as it relates to many of the smaller improvement programs in and around the northeastern megalopolis.

Although we may be 10, 20, or more years away from solving the problem of rejuvenation, solution of the converse problem, i.e. accelerating sexual maturity, is much closer. Work of Pharis and others has clearly demonstrated that it is possible to force juvenile trees to flower. It appears that given the necessary financial support it will be possible to work out techniques to get any of the Pinaceae to flower. This will have special significance in our breeding program as it will be

possible to obtain flowers on demand and thus to reduce the period between generations. The major problem as I see it, and it is by no means an insurmountable problem, is how to do this on a production scale.

Twenty-five years ago, species hybridization was of prime interest as an improvement technique among tree breeders in the northeast and elsewhere. However, except for species that could be mass propagated vegetatively, i.e. Populus, the techniques have generally not proven successful. The development of improved vegetative propagation methods for difficult-to-root species, has once again made it possible to seriously consider species hybridization as an improvement technique. I think it has special significance to the smaller improvement programs of the NEFTIC region.

The preceding has just been a few of the possible changes in methods or approaches that I foresee in our breeding programs over the next 25 years.

What will we be breeding for?

In the larger improvement programs serving the northern, southern, and possibly western parts of NEFTIC, I envisage fairly conventional breeding programs designed to provide qualitative and quantitative improvement in growth and form for fibre and structural materials.

For much of the remaining part of the NEFTIC I foresee a continuation of a wide diversity of smaller improvement programs in such things as amenity, pollution tolerance, quality hardwoods, insect and disease resistance, etc. Vegetative propagation will be an important means of getting improved trees into production especially in these small programs.

The problem of energy is and will continue to be of prime importance in the northeast. Reasonably large scale use of wood to help satisfy this need has been suggested. It is already evident, at least in rural parts of the region, that wood in its conventional form is reducing demand on fossil fuels. However, before wood can make a significant contribution to reducing energy requirements, large central power plants would have to be built and these would require substantial quantities of wood for fuel - and it must be low cost wood.

The question comes up, should we be breeding trees for fuel? I just do not see it. I think we will be making better, if not full use of our wood wastes and bi-products of conventional forestry operations. We will also be using lower quality hardwoods of energy. I do not foresee planting trees in the northeast, with energy as a primary end product except in very special circumstances. I think the wood we produce in our plantations will be too valuable for other products to use as fuel.

In fact, the use of wood for fuel will provide us with the necessary economic incentives and opportunities to upgrade the level of forest management in many areas. There will be an opportunity to convert low quality forests to better ones and an opportunity for tree breeders to have an important input into this increased level of management.

Very briefly, I found the first 25 years of NEFTIC to be a time for information gathering coupled with a lack of financial support and the frustration of not being able to sell our products. I foresee the next 25 years as exciting ones. There will be a strong demand for our products in,at least, part of the region, and a degree of urgency to get the products to the market place.

TWENTY-SEVENTH NORTHEASTERN FOREST TREE IMPROVEMENT CONFERENCE

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