

APPLICATION OF GENETICAL METHODS IN THE SPRUCE-FIR TYPE FROM  
THE VIEWPOINT OF THE FOREST MANAGER

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It is certainly stimulating to be with all the distinguished persons that have been on the program of this Conference. You can be sure that I am very pleased to have an opportunity to explain to you, with the help of my good neighbor, Tom McLintock, what we think we can do with genetics in the spruce-fir region of Maine. Our competitors in the wood pulp and paper industries down South and out West have foresters that are very busy working on genetics. The question arises frequently, with us in Maine, as to whether we might be missing a trick by not doing more with genetics in the spruce-fir country.

There are three things, it seems to me, that we ought to be doing. But, before I discuss those it would probably be well if I took just a moment to refresh your memories on the nature of the spruce-fir stands in northern New England. I realize that some of you are able silviculturists, far better informed on spruce and fir than I am, out there are a few others here who may have been away from the northern woods awhile and forgotten some of the characteristics. Spruce-fir stands are in a good majority of the cases, mixed stands of black, white, and red spruce, balsam fir, hemlock, cedar, tamarack, pine, and assorted hardwoods. The percentages of the various species vary widely from stand to stand and furthermore the size and age of the trees within any stand normally vary also. Thus, we have as our normal situation an all-aged mixed stand of timber.

Reproduction is obtained through natural means with some species, and probably some useful species, following virtually any type of a logging operation. Seed of some kind always seems to be available in quantity and hardwood sprouts often supplement, the abundant crop of seedlings. Thus, planting is, restricted to a few abandoned fields on farms and in the area as a whole is of no consequence.

The economy of the region is dominated by the pulp and paper industry with other wood using industries playing a relatively minor role in the business picture. Up to the present time the stumpage supply has been sufficient to meet the demands of most consumers, thanks very largely to the abundant and continuing supply of usable natural reproduction. High-powered silviculture has, therefore not been put into the woods operations on a large scale. Two of the large land owners now mark the timber cut from their lands but the great majority of the operations in the spruce-fir region are controlled by diameter limits and by logging methods designed to leave good stands and promote reproduction. Many holdings, especially small woodlots, are cut with no controls whatever.

How then can genetical methods be introduced into management of this spruce-fir type, where natural reproduction is abundant, where all-aged mixed stands are the rule, and where pressures calling for intensive silviculture are currently not great? Obviously any improvement in tree quality must come from the application of silviculture. The first thing we can do, then, is to mark the trees to be cut and in so doing leave only the better

trees wherever possible. The marking rules and guider; commonly recommended and used in the region today probably are doing a fairly good job for us in giving us hotter seed. These rules call for the cutting of mature trees, poor risk trees, diseased and malformed trees, and for the leaving of a well-spaced stand of medium-sized thrifty trees of desirable species under which a good seedbed exists for the starting of new seedlings. The rules are varied from stand to stand to conform to the planned cutting cycle. Repeated cuts on this basis should, it scorns to me, improve the stand. However, we don't know that this will be true for our knowledge of the silvitcs of our species is quite limited.

A second thing that we can do is to be on the lookout for "elite" trees. Whenever these are found steps should be taken to see that they are preserved to provide seed in the future. But here again we don't know very well what a superior tree looks like except in a general way. Few of us have had any experience in such things, and that brings us to the third point.

Before any great strides can be expected in tree improvement in our spruce-fir stands, a very considerable amount of research will have to be done to increase our knowledge of the silvics of our trees. We are still woefully ignorant of exactly why some of our trees tend to rot early in life while others tend to remain sound, why some of our trees are limby while others are clean, why some are well formed and others are short, why some grow rapidly and others grow slowly. Maybe genetics can explain some of these variations, but there are many things besides genetics involved and until we know more about our trees and what causes the many differences between trees, our manipulation of the environment through cutting must be done on a general basis such as is now done with our present rules. As we learn more we can adjust our marking rules accordingly. So it is essential that we should encourage research work on our native species and gradually get answers to our questions.

There are a few foresters working in our region who feel that even though planting is hopelessly impractical at the present time we should be starting some genetical investigations looking toward the possibility of its being sensible to plant possibly 60 or 80 years hence. Many of us have difficulty seeing that far ahead, but on the other hand any timberlands manager can easily make a list of improvements in trees that he would like to see. For example, a balsam fir that would not rot easily and that was also unattractive to the spruce budworm would be a great improvement over some of our present stock. A faster growing, cleaner, wind-firm spruce tree that would still yield as much or even more good fiber as our present trees do would certainly be attractive. Research men must not only find out how to produce these trees, but someone must also figure out ways and means to get those trees into productive stands under economical conditions. It might not be too soon to start developing better varieties of fir and spruce, but it certainly looks as though it would be quite awhile before we would be planting any of them commercially.

In summary, there are three things we could be doing now in the management of the spruce-fir lands to get genetical methods into the woods. First, we could mark our cuts, keeping the remaining seed sources definitely in mind. Secondly, we could keep a sharp outlook for "elite" trees and preserve them when found. Finally, we should encourage research work which will give us better information to guide our marking.