

FINANCIAL MATURITY OF YELLOW BIRCH

by WILLIAM B. LEAK, *Principal Silviculturist, Northeastern Forest Experiment Station, Forest Service, U.S. Department of Agriculture, Durham, N.H.*

THE METHODS used to compute financial maturity of yellow birch sawtimber are similar to those used for paper birch sawtimber, except for minor differences in detail. The procedure followed for yellow-birch veneer-log trees was also similar, except that local veneer grades¹ and local veneer-log prices were used as the basis for the financial maturity computations.

Rates of value increase for yellow birch were computed on the basis of assumed vigor classes and growth rates, as follows:

Vigor class	10-year d.b.h. growth (inches)
1	2.0
2	1.5
3	1.0
4	.5

Initial stumpage value of the hypothetical trees was determined by the appraisal procedures outlined previously; then future value was determined by the same procedures, incorporating the appropriate d.b.h. growth figure for each vigor class. We also determined the effects of an increase of $\frac{1}{2}$ log in merchantable height, and an increase of one butt-log grade, on rates of value increase over the 10-year period.

Computed rates of value increase were expressed as an annual compound interest rate, using initial stumpage value as the basis.

Results

First, consider the effects of growth alone, without any increase in merchantable height or log grade. Compound interest rates of 3 per-

cent or better were exhibited by vigor-1 saw-log trees smaller than 20 inches d.b.h. and vigor-2 sawlog trees smaller than about 17 inches d.b.h. Rates for vigor-3 trees seldom were better than 2 percent. Rates for vigor-4 trees were about 1 percent. Rates for veneer-log trees generally were less, not quite 3 percent even for the fastest growing trees.

An increase in merchantable height of $\frac{1}{2}$ log over the 10-year period produced a slightly increased rate of interest—roughly $\frac{1}{2}$ to 1 percent greater than trees that did not increase in height. However, merchantable height increases commonly occur only in smaller trees between 12 and 16 inches.

An increase in butt-log grade over the 10-year period was found to have a major effect upon interest rates. Rates for saw-log trees were found to be 2 to 4 times greater than the unaugmented rates, while a butt-grade change in veneer-log trees resulted in roughly double the normal rate. For example, a vigor-3, 2-log sawlog tree whose butt grade increased from grade 2 to grade 1 was found to produce a compound interest rate of over 8 percent (table 1). The comparable rate for trees that did not increase in grade was between 1 and 2 percent.

In summary, the results indicated that fairly small, very fast-growing yellow birch trees may produce interest rates of 3 percent or better. Larger or slower growing trees produce considerably lower rates. Rates will be augmented a little by increases in merchantable height. However, the most important determinant of value increase is grade improvement.

Applications

The results of this investigation have important applications to the silviculture and management of northern hardwood stands containing yellow birch.

¹ The six veneer grades in order of descending quality are: AA, Aircraft, Select, 1, 2, and 3, as currently used by one of the large veneer industries in New Hampshire.

- Since rate of value increase depends heavily upon grade improvement, yellow birch trees with high quality potential cannot be grown beyond about 22 inches d.b.h. without sacrificing rates of interest. Where surface defect rules out the possibility of top-grade sawlogs and veneer logs, 18 inches d.b.h. is a reasonable maximum size. Trees of these sizes will have reached or passed the peak of grade improvement.
- Trees left as growing stock after a harvesting or thinning operation should be those that show the best possibilities for future grade improvement.
- In evaluating a specific stand and prescribing appropriate silvicultural treatments, particular attention should be paid to the possibilities of grade improvement. Yellow birch trees and stands that exhibit high grade-improvement potential are the ones that warrant intensive silvicultural work. Conversely, trees and stands that will produce low-value bulk products now and in the future do not warrant intensive care, and should be scheduled for commercial treatment only.

Table 1.—Compound interest rates for yellow birch sawlog and veneer-log trees increasing by one butt-log grade over a 10-year period—for 2-log vigor-3 trees

D.b.h. (inches)	Veneer-log trees ¹			Sawlog trees		
	Initial butt grade	Final butt grade	Interest rate (percent)	Initial butt grade	Final butt grade	Interest rate (percent)
16	Select	Aircraft	3.7	2	1	8.8
	Aircraft	AA	3.1			
18	Select	Aircraft	3.1	2	1	8.7
	Aircraft	AA	2.4			
20	Select	Aircraft	3.1	2	1	8.5
	Aircraft	AA	2.5			
22	Select	Aircraft	2.8	2	1	8.3
	Aircraft	AA	2.1			
24	Select	Aircraft	3.0	2	1	8.1
	Aircraft	AA	2.4			

¹ All veneer-log trees are assumed to have a select top log.

