

VARIATION WITHIN INJURY CLASSES ON 223 WHITE
BIRCH TREES FROM 1948 to 1951

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In 1948, permanent sample plots were established in birch stands in order to follow the progress of dieback from year to year. After their establishment, cuttings and burns contributed to the elimination of a number of these plots. In addition, in the preparation of this report all the plots which had not been studied by the same forest ranger all the way through, have been discarded in order to reduce to a minimum the influence of the personal factor. This left us seven (7) plots, all located in the Lake St. John district including 223 birch trees, the data of which are presented here. Evidently, definite conclusions cannot be drawn from such a small number of trees; our intention is only to report some facts related to observations made on these trees, which might throw some light on the problem.

Data on stand conditions and facts characterizing each tree were taken at the time of the establishment of the plot. The work to be performed each year consisted in classifying each numbered tree, in one of the following classes adopted by the Fredericton Laboratory of Forest Biology: 1, 2, 3A, 3B, 4, 5A, 5B, 6A, 6B.

The comparison of the data collected in 1951 with the classification made of the same trees in 1948, shows that 4.0% of the trees improved, 11.2% had remained in the same class, and on the great majority or 84.8% dieback continued to progress.

In order to establish the variation within injury classes, the data were summarized in the following way:

- (a) First, on the basis of the 1948 classification, all the trees were divided into groups, bringing together all the trees pertaining to the same class.
- (b) Secondly, to each class was attributed a deterioration value represented by a straight number, starting at one for class 1, going up to 9 for class 6B.
- (c) Finally, to each tree was given the deterioration value corresponding to its grading for 1948, 1949, 1950, 1951. This permitted us to get for each year a sum of deterioration values for all the trees included in each class, and then an average representing the group for each year.

Such averages have also been worked out for different groups of classes, and for all classes together.

The results obtained are shown in table 1. In the table, columns 3 to 6 inclusive give the mean deterioration values obtained

Table 1. Progress of dieback on 223 White Birch Trees from 1948 to 1951 (incl.).

Classes	No. of trees in each group in 1948	Mean Deterioration Value - Year					Progression (✓) or Regression (-) in Deterioration				
		1948	1949	1950	1951	1948 to 1949	1949-1950	1950-1951	1948-1951		
Class 1	79	1.00	1.75	2.63	3.51	✓ 0.75	✓ 0.88	✓ 0.88	✓ 2.51		
2	50	2.00	2.12	2.98	3.38	✓ 0.12	✓ 0.86	✓ 0.40	✓ 1.38		
3A	49	3.00	3.75	4.33	4.80	✓ 0.75	✓ 0.58	✓ 0.47	✓ 1.80		
3B	15	4.00	4.40	4.67	4.73	✓ 0.40	✓ 0.27	✓ 0.06	✓ 0.73		
4	15	5.00	5.27	5.13	5.53	✓ 0.27	- 0.14	✓ 0.40	✓ 0.53		
5A	10	6.00	7.30	6.30	6.90	✓ 1.30	- 1.00	✓ 0.60	✓ 0.90		
5B	5	7.00	7.60	7.80	7.80	✓ 0.60	✓ 0.20	0.00	✓ 0.80		

Groups of classes

Cl. 1 & 2	129	1.39	1.88	2.77	3.30	✓ 0.49	✓ 0.89	✓ 0.53	✓ 1.81
Cl. 3A, 3B & 4	79	3.57	4.16	4.54	4.92	✓ 0.59	✓ 0.38	✓ 0.33	✓ 1.35
Cl. 1 to 4 incl.	208	1.98	2.75	3.44	3.92	✓ 0.77	✓ 0.69	✓ 0.43	✓ 1.94

All Classes 223	2,377	6.57	7.57	8.57	9.14	✓ 0.80	✓ 0.60	✓ 0.47	✓ 1.87
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for each group and for each year, whereas, columns 7 to 10, reflect the progression or regression in deterioration, that is the difference between deterioration values from year to year, and for the whole period.

The variation within injury classes from year to year being best shown by columns 7 to 10, our comments will be limited to this portion of the Table 1.

Considering the classes separately, it seems that there has been a continuous progression in deterioration every year from 1948 to 1951, for classes 1, 2, 3A, and 3B. Contrarily, classes 4 and 5A indicate a progression for 1949, a regression for 1950 and again a progression for 1951; although the regression noted for 5A trees in 1950, might look surprising, this can be explained by the fact that some of the trees classified as 5A in 1948, have put out sprouts in 1950, and consequently they had to be classified in class 4.

The progression in deterioration is also apparent on class 5B except in 1951, where 5B trees did not change as a whole.

The regression on 4 and 5A trees would suggest the advent of favourable conditions for recovery between 1949 and 1950. If so, it should be pointed out that such conditions are first and mostly apparent on 4 and 5A trees. On the individuals pertaining to classes to 3A and 3B, same circumstances seem to have been translated by a decline in the rate of deterioration which appeared the same year and lasted during two consecutive years, whereas on class 2 trees this reduction was apparent only one year after.

Referring to groups of classes, the data show a progression in deterioration year after year for each group. However, it is worth mentioning that for groups 1 and 2, the increase was more in 1950 than in 1949, whereas for the other groups it is less. However, this increase has a tendency to decline in 1951 for all the groups.

If the data given in column 10 are divided by 3 to obtain a mean rate of deterioration for each class, the following is obtained:

<u>Classes</u>	<u>Rate of deterioration</u>
Class 1	0.84
" 2	0.46
" 3A	0.60
" 3B	0.24
" 4	0.18
" 5A	0.30
" 5B	0.27
All classes	0.62

According to these results, the rate of deterioration for 1, 2 and 3A would appear much higher than for the remaining classes. It would seem therefore, that the deterioration of the tree is faster at the beginning, and this may be true, but it must be remembered that the amount of deterioration taking place between classes 1 and 2, 2 and 3A, is less important than between classes 3A and 3B, 3B and 4, 4 and 5A, 5A and 5B.