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Cleaning-cutting Experiment in Korean pine (*Pinus koraiensis*) Stand (Ⅶ)*1

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잣나무林의 除伐試驗 (第七報)*1

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ABSTRACT

Through 7-year experiment in Korean pine stand since 1975, the followings are obtained as the results of investigation in several characters :

1. In total volume, the highest value after 1980 was shown in the control plot, which was the second one for 4 years, 1975 to 1979.
2. In the increment ratios of height, diameter at breast height(D.B.H.), and individual volume, the plot with the intermittent period of 3 years showed the higher values than any other plot.

INTRODUCTION

This experiment has been still in operation since 1975. In 1975 four 16-year old Korean pine stands were set up to investigate the effect of the number of cleaning and the intermittent period on the stock growth of the stand.

In cleaning-cutting, it is thought that the intermittent period, the number of times, and the cutting ratio are to render much difference to the tree growth of the residual stand.

METHODS

Plot A does not get treated throughout the experiment.

Plot B is cleaned every two years;plot C every three years;and plot D every four years. The experimental design is described in Table 1. Each plot is a rectangle(20m×25m).

The trees to be cut are follows;

1) dead trees,

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Toble 1. Experimental design.

Year \ Plot	A	B	C	D
1975	—*	x**	x	x
1976	—	—	—	—
1977	—	x	—	—
1978	—	—	x	—
1979	—	x	—	x
1980	—	—	—	—
1981	—	x	x	—
1982	—	—	—	—
1983	—	x	—	x

* Non-treatment
** Cleaning-cutting

2) damaged trees by disease, insects, or other injurious agencies,

3) poorly formed trees,

4) wolf trees, and

5) dying trees (Hawley and Smith, 1954).

Every height was measured by climbing.

RESULTS AND DISCUSSION

The outline of the changes in several characters is shown in Table 2. Plot A has 82 trees, which means 2 trees are dead naturally since the survey in Sep., 1981 and 18 trees since the plot establishment in Sep., 1975. Mortality, 11.3% in 1978, was the heighest one among those from 1976 to 1982. Kawahara et al. (1980) reported mortality of 22% at the 3rd growth year in the thinnning experiment in a model stand of *Cryptomeria japonica*. In this Korean pine stand it's not clear why it showed the highest death ratio at the age of 22. It'll be discussed in the next report, by analyzing the stand growth.

Plot B and plot C got thinned in the fall of 1981.

There was no treatment this year according to the experimental design. Now plot B has 55 trees; C has 58; and D has 63, respectively.

Table 2. Description of the changes in the experimental plots.

Year	Plot	No. of trees	Average			Total volume
			Height	D.B.H.	Individual tree volume	
			m	*cm*	m^3	m^3
1975	A	100	7.83	9.68	0.0322	3.2220
	B	91	7.74	11.03	0.0415	3.7741
	C	83	7.18	9.76	0.0316	2.6137
	D	83	7.51	9.81	0.0316	2.6233
1978	A	96	8.22	11.99	0.0495	4.7501
	B	74	9.16	13.00	0.0668	4.9432
	C	71	8.38	12.79	0.0583	4.1377
	D	75	8.07	12.03	0.0532	3.9844
1980	A	85	10.19	13.27	0.0808	6.8653
	B	62	10.13	14.71	0.0920	5.7050
	C	63	9.67	14.77	0.0833	5.5617
	D	63	9.37	14.13	0.0816	5.1419
1982	A	82	10.93	14.44	0.1016	8.3269
	B	55	11.53	16.80	0.1357	7.4627
	C	58	10.74	16.35	0.1203	6.9744
	D	63	10.54	15.71	0.1126	7.0939

Thinning ratios ranged from 9% to 17% from year to year, in the number of trees. But the cuttings were tried to remove the trees with the similar ratio for every plot (B,C and D). As found in Table 2, every plot has the similar residual trees in number.

Changes in height are found in Table 2 and Fig. 1.

Average height in plot A was primarily the highest one among four plots. In 1982 it was seen the highest one second to that in plot B. In Fig. 1, we can outline the increment ratios in average height of each plot in comparison with its own respective height of 1975, the beginning year of the experiment. Plots A and D show the similar low increment ratios. Height increasement ratio is 17% in 1978, 35% in 1980, and 50% in 1982 in plot C. Height in plot B increased 18% in 1978, 31% in 1980, and 49% in 1982 respectively, when compared with that in 1975.

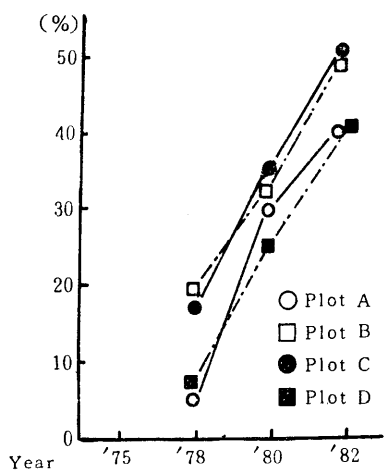

Fig. 1. Increment ratio of average height in comparison with that in 1975.

Diameter at breast height(D.B.H.) showed the highest value(11.03cm) in plot B at the starting year (Table 2).

As stated in the previous report (Kim and Yi, 1981), D.B.H. in plot A showed broad distribution from 8cm to 24cm. The other plots showed the bell-shaped distribution with their highest frequencies on 16—18cm. It means that there is arising a great competition among the trees in plot A and the trees are subdivided into the several classes; dominants, co-dominants, and the oppressed.

When comparing the present D.B.H. with that in 1975, we can draw out Fig. 3. Plot C showed the salient ratio as compared with the other ones. D.B.H. in plot C increased about 70% now in comparison with that in 1975. Plots A, B, and D are showing the similar changes in D.B.H. increment ratio. But plot D showed the lowest value among all 4 plots.

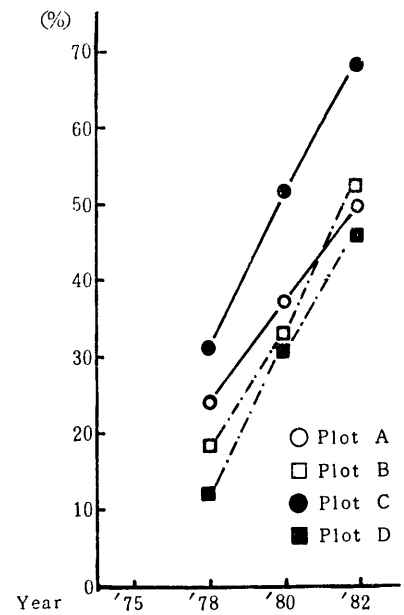

Fig. 2. Increment ratio of average D.B.H. in comparison with that in 1975.

In volume growth, as shown in Fig. 3, the total volume in plot A is higher than in any other plot. It's interesting that plot B showed the higher total volume upto 1978 than plot A but *vice versa* after 1980.

Plot C shows the comparatively low total volume through the whole period. But in the increase ratio of individual tree volume, plot C distinguished itself. It's well accordant with the results

in Fig.1 and Fig.2. It's too early to conclude the positive effect of the intermittent period of 3 years on tree growth ratio in plot B. It'll be clarified in the next study.

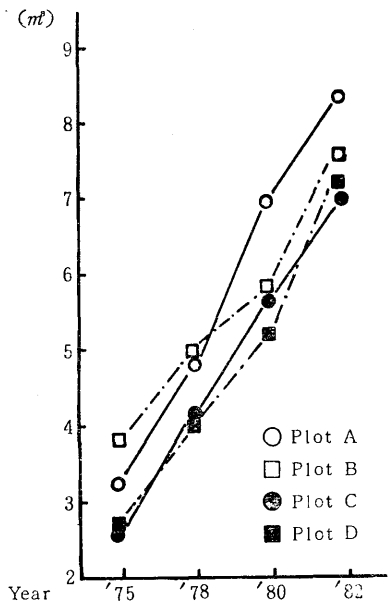

Fig.3. Change in total volume.

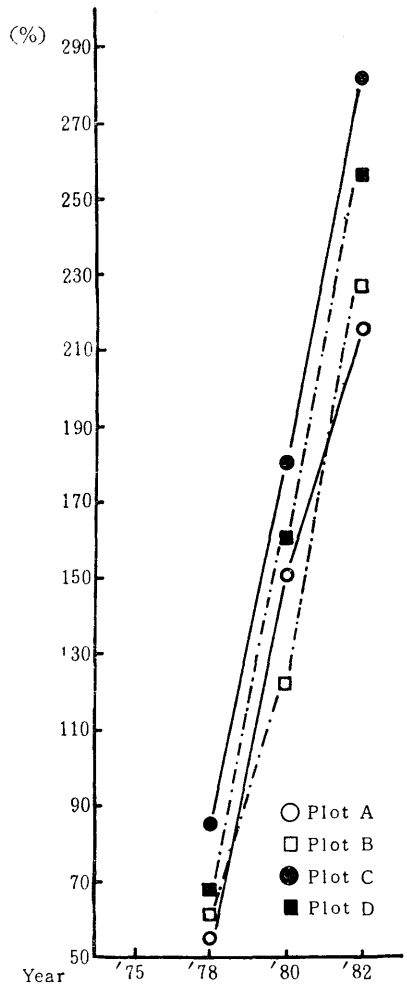

Fig.4. Increment ratio of average tree volume in comparison with that in 1975.

LITERATURE CITED

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摘 要

除伐 및 그 間斷年數가 잣나무林의 成長에 미치는 影響을 調査하기 위해 1975年에 設定한 試驗林에 있어 各形質의 成長을 處理別로 比較한 結果 다음과 같은 結果를 얻었다.

1. 總材積量에 있어서는 設定時부터 2位이던 無處理區가 5年後인 1980年부터 가장 많은 材積을 보여 1982年 現在 83.27㎥/*ha*를 보이고 있다.

2. 樹高, 胸高直徑, 單木材積에 있어 設定 當時의 그 값과 比較한 成長率에 있어서는 3年마다 除伐區가 가장 높은 값을 나타내고 있다.