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Fp-102(c) D-6,
Whitman

Pinus monticola[1]

FINAL REPORT

Fp-102(c), - Test of Season of Planting Western White Pine in the Blue Mountain Region.

Compiled from Forest Reports by Julius F. Kummel, Forest Examiner.

January 16, 1918.

In connection with experiments initiated to test the adaptability of western white pine to the Blue Mountain region, various plantations were established in 1914, 1915, and 1916 on the Whitman Forest. As the experiments were repeated in two successive fall seasons and in two successive springs, they afford an excellent basis to compare season of planting.

The first series, fall of 1914, spring of 1915, was established in five different localities, three in the north slope subtype and two in the transition type. In the following fall and spring, 1915-16, the tests were repeated in each locality in the transition type, in two of the former localities in the north slope subtype, and in an entirely new locality in the latter type. There are, therefore, five sets of fall and spring tests in each series.

The tests vary in size from 25 to 100 trees each. Every tree was marked by a numbered stake and at each examination the condition of the trees was tallied by number. The various plots in each locality parallel each other and

NOTE: Page 2 was missing from this report. Document continues with page 3.

[1] This document was transcribed from a photocopy of the original, which is located in the Supervisor's Office Silviculture Library Archives. To the greatest extent possible, this version is an exact duplicate of the original text.

. . . ive contrasting plots for the shorter period. In each case the period is as short, down to one year, as the data will permit in order to exclude the influence of extraneous factors as much as possible. The two types will be considered separately.

North Slope Subtype.

Survival percentages in the six pairs of fall and spring plots is as follows: (Figures in brackets denote elapsed time in years between planting and examination).

	1914-15 Series		1915-16 Series	
	Fall	Spring	Fall	Spring
Exp. 4,	74 (1)	100 (1.5)	100 (1)	92 (1)
Exp. 14,	42 (1)	68 (1.5)	74 (1)	80 (1)
Exp. 15			88 (1)	72 (1)
Exp. 16	48 (1)	96 (1.5)	____	____
Average	56	86	87	81

It is at once evident that the two series give contradictory results as between seasons. In the 1914-15 series spring planting is markedly superior in every case; in the 1915-16 series it is superior in only one instance and the fall plots lead in the two remaining tests. It will be noted further that survival is fairly constant throughout the two years in the spring plantations, but varies greatly on the fall plots. It is this marked variation in the latter plots which causes the reversal in the relative position of the seasons in the two series. The conclusion is obvious that some unfavorable factor was present in the 1914-15 series and that it effected the fall plots only.

This factor is believed to be the prevailing weather conditions during the winter of 1914-15. This conclusion is arrived at in two ways, first by a process of elimination, second by the direct evidence of weather data and personal observation of weather conditions. All trees were of the same age. Source of seed varied in the two series, but was the same in the fall and spring plots of the same series. Any influence it might have had would have been equal as regards the two seasons in the same series. Site conditions were similar as the two sets of plots are adjoining. Owing to a backward spring, the spring planted trees in the 1914-15 series had commenced growth before planting, yet this is of no significance, since it is these trees which surpass the fall stock so markedly. In the 1915-16 series, the fall planted trees were received at the planting area in what was thought to be a dried condition, yet they gave better results than the spring planted stock in two out of three instances. It is not likely that the personal factor could have been responsible, for all the planting was done by the same person or

under his direct supervision. There remains, then, only the factor of weather, as a plausible explanation for the heavy mortality on the fall plots of the 1914-15 series.

In the fall of 1914, severe cold followed almost immediately after planting and before a protecting blanket of snow had fallen. This feature was so noticeable at the time that special mention was made of it in the reports. Its occurrence is fully corroborated by Weather Bureau reports which described the weather for the State as a whole as the "coldest" and driest December in the last 25 years". Snowfall continued deficient throughout the winter. This condition is in marked contrast to what prevailed the following winter when the snowfall and temperature in November and December was above the normal. It is readily believable that the heavy mortality on the fall plantations of this year's series was directly due to the severe cold unaccompanied by snow. The frozen ground would check absorption of moisture by the roots, while evaporation from the unprotected tops would be increased in the cold dry air. There seems no reasonable doubt, therefore, that peculiar weather conditions caused the heavy loss in the fall plantations of the 1914-15 series.

It is interesting to note that the loss arising from this adverse weather condition was not confined solely to the first winter, but continued through the summer following. In other words, some of the trees were killed immediately, others survived the winter but were so weakened as to succumb before the end of the summer. This is shown, as follows, by a greater summer loss on the fall plots than on those planted in the spring in the same series.

Comparative mortality during the first summer on fall and spring plantations in the 1914-15 series.

	Fall	Spring
Exp. 4,	24	0
Exp. 14,	26	12
Exp. 16,	40[o]	0

[o]Partly due to injury by sheep.

Transition Type.

The experiments in the transition type, of which there are four sets, show similar results. In the 1914-15 series, both spring plots at the end of 1½ years have greater survival than the corresponding fall plots after only one year. In the 1915-16 series this position is reversed, and both fall plots after 2 years lead the spring plots after only 1½ years.

Summary

These tests, which were conducted in a manner assuring reliability to their data, indicate that:

1. Planting of western white pine in the north slope subtype and the transition type of the Blue Mountain region in eastern Oregon can be done successfully in both fall and spring in favorable years.
2. Spring planting appears to give more uniform results; less influence by weather conditions.
3. Fall planting is subject to heavy winter killing if weather conditions are unfavorable. Severe cold with little snow following fall planting is unfavorable, and may cause not only heavy initial loss, but so weaken many of the trees that heavy mortality continues during the following summer.
4. Because of uncertainty as to the character of weather conditions, more risk attaches to fall planting than to spring.
5. Bud swelling before planting does not necessarily produce excessive mortality.

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Table 1. TEST OF FALL AND SPRING PLANTING OF WESTERN WHITE PINE IN BLUE MT. REGION - WHITMAN FOREST

(Note: Figures in brackets under "Survival Percent" denote elapsed time in years from date of planting to date of examination).

Designation	Year	No. of trees	Age	Source of seed	Character of Site	Survival Percent		Remarks
						Fall	Spring	
North Slope Subtype								
Exp. No. 4, Old Burn, Strps. 10 & 11	1914-1915	50 each	1-1-1	Crater	Gentle north slope, light volcanic ash, soil, scanty ground cover, altitude 5500'.	74 (1)	100 (1.5)	Heavy winter killing in
Ditto., Strps. 12 & 13	1915-1916	50 in #12 25 in #13	1-1-1	Wenatchee	Ditto	100 (1)	92 (1)	Note of winter loss in … to that above. Loss … due to sheep grazing.
Exp. No. 14, Big Flat, Strps. 1 & 2	1914-1915	50 each	1-1-1	Crater	Medium east slope, sandy loam, altitude 5200', medium ground cover.	42 (1)	68 (1.5)	Winter killing and rodents on spring plots
Ditto., Strps. 3 & 4	1915-1916	50 in #3, 25 in #4	1-1-1	Wenatchee	Ditto	74 (1)	80 (1)	Rodents large factor in winter killing than in (spring)
Exp. No. 15, Old Burn, Strp. 3 & 4	1915-1916	50 in #3 25 in #4	1-1-1	Wenatchee	Steep northeast slope, sandy loam soil, scanty ground cover, altitude 5000'.	88 (1)	72 (1)	Rodents and grazing la…. Very little winter kill
Exp. No. 16, Watertrough, Strp. 1 & 2	1914-1915	25 each	1-1-1	Crater	Medium north slope, sandy loam, medium ground cover, altitude 4800 feet	48 (1)	96 (1.5)	Heavy loss on fall plot … and grazing
Transition Type								
Exp. No. 2, Columbia, Strp. 22 & 24	1914-1915	100 each	1-1-1	Crater	Gentle east slope, light volcanic ash soil, near bottom of draw in moist situation, altitude 5500 ft.	74 (1)	Between 74 – 94 (1.5)	Winter killing and rodent on fall plots. Rodents on spring plot.
Ditto., Strp. 26 & 28	1915-1916	100 each	1-1-1	Wenatchee	Ditto.	94 (2)	77 (1.5)	Note small loss in fall … above. Heavy loss on … due to poor drainage.
Ditto., Strp. 23 & 25	1914-1915	100 on #23 92 in #25	1-1-1	Crater	Gentle north slope, light volcanic ash soil; altitude 5900', near top of slope, severe exposure.	85 (1)	97 (1.5	Rodents and winter kill fall plot.
Ditto., Strp. 27 & 29	1915-1916	100 in #27 97 in #29	1-1-1	Wenatchee	Ditto.	67 (2)	52 (1.5)	Rodents and drought on … loss than above cause … of summer of 1917.

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Table 2 – LIST OF FALL AND SPRING PLANTING OF WESTERN WHITE PINE IN BLUE MT. REGION – WHITMAN FOREST.

(Note Figures in brackets under "Survival Percent" denote elapsed time in years from date of planting to date of examination).

Source of seed	Character of Site	Survival Percent		Remarks.
		Fall	Spring	
	North Slope Subtype			
Crater	Gentle north slope, light volcanic ash, soil, scanty ground cover, altitude 5500'.	74 (1)	100 (1.5)	Heavy winter killing in fall plots.
Wenatchee	Ditto.	100 (1)	92 (1)	Note no winter loss in fall plot in contrast to that above. Loss in spring plot partly due to sheep grazing.
Crater	Medium east slopes, sandy loam, altitude 5200', medium ground cover.	42 (1)	68 (1.5)	Winter killing and rodents on fall plot, and rodents on spring plot.
Wenatchee	Ditto.	74 (1)	80 (1)	Rodents large factor in both plots. Note less winter killing than in fall plot above.
Wenatchee	Steep northeast slope, sandy loam soil, scanty ground cover, altitude 5000'.	88 (1)	72 (1)	Rodents and grazing largely responsible. Very little winter killing in fall plot.
Crater	Medium north slope, sandy loam, medium ground cover, altitude 4800 feet.	48 (1)	96 (1.5)	Heavy loss on fall plot due to winter killing and grazing.
	Transition Type			
Crater	Gentle east slope, light volcanic ash soil, ear bottom of draw in moist situation, altitude 5500 ft.	74 (1)	Between 74- - 94 (1.5)	Winter killing and rodents caused heavy loss on fall plot. Rodents partly responsible in spring plot.
Wenatchee	Ditto.	94 (2)	77 (1.5)	Note small loss in fall compared with plot above. Heavy loss on spring plot partly due to poor drainage.
Crater	Gentle north slope, light volcanic ash soil; altitude 5900', near top of slope, severe exposure.	85 (1)	97 (1.5)	Rodents and winter killing cause of loss in fall plot.
Wenatchee	Ditto.	67 (2)	52 (1.5)	Rodents and drought on both plots. Greater loss than above caused by severe drought of summer of 1917.