Height Growth of Noble Fir 8 Years After Planting in the Olympic Mountains

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Eight years after they were planted in the Olympic Mountains, average height of noble fir trees was 7.9 feet. Annual height growth the previous 3 years ranged from 1.0 to 2.6 feet.

Snow damage to planted Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco) has been observed at higher elevations in the Olympic Mountains on the Quinault District of the Olympic National Forest. Douglas-fir tops are damaged by snow; and boles are deformed by heavy snowpacks, which creep downslope during the winter. Douglas-fir has been the favored species for planting, although Pacific silver fir (*Abies amabilis* (Dougl.) Forbes) and noble fir (*A. procera* Rehd.) are more resistant to snow damage (*4*). However, noble fir is not native to the Olympic Mountains; the nearest natural stands are about 70 miles south in the Willapa Hills (*1*). Nothing is known of the productivity of this species on the Quinault District.

Within its natural range in western Washington, the relative productivity of young noble fir, as measured by the height of dominant trees, is less than Douglas-fir on high-quality Douglas-fir sites at elevations less than 2,700 feet, but is equal to Douglas-fir on low-quality Douglas-fir sites at elevations greater than 2,700 feet (*3*). Both noble fir and Pacific silver fir have slow early height growth; but past the juvenile phase, these true firs have a long period of rapid, uniform height growth and catch up with or surpass associated Douglas-fir and western hemlock (Tsuga heterophylla (Raf.) Sarg.) (*2*).

In 1974, some noble fir was planted on the Quinault District to test the growth and performance of this species. One trial planting was made on an east aspect at 2,700 feet elevation on an area with moderately deep, rocky soil. After the original stand of Pacific silver fir and western hemlock was clearcut in 1970, the area was broadcast burned and handplanted with Douglas-firin 1971. Initial survival was low; and the area was replanted in November 1974 with Douglas-fir, Pacific silver fir, and a small amount of 3+0 noble fir. Seeds for this noble fir came from a 3,000- to 3,500-foot elevation zone on the Snoqualmie National Forest in the Washington Cascade Mountains.

The early survival of planted noble fir is not known. The area now contains a small amount of scattered noble fir. The area also contains Douglas-fir from the two plantings in 1971 and 1974, Pacific silver fir from both planting and natural regeneration, and western hemlock from natural regeneration.

This paper reports on the total height and previous 3-year annual height growth of surviving noble fir 8 years after planting.

Methods

Thirteen noble fir trees of various diameters at breast height (d.b.h.) were selected for measurement. Diameter at breast height, total height, and annual height growth for the previous 3 years were measured. Two selected trees were in the 0.5-inch d.b.h. class, five were in the 1.0-inch d.b.h. class and six were in the 1.5-inch d.b.h. class.

Results and Discussion

Eight years after planting, the noble fir look healthy and vigorous. Measured total height ranged from 5.2 feet to 10.5 feet; measured annual height growth for the previous 3 years ranged from 1 .0 feet to 2.6 feet. Average values for total height and previous 3-year annual height growth, by diameter class, are shown in table 1.

Before widespread planting of noble fir at higher elevations is initiated, a long-term test of the relative productivity of this species on the Quinault District needs to be made. This small test has shown, however, that planted noble fir will grow in the Olympic Mountains.

Table 1.-*Average total height and average annual height growth by diameter class for noble fir 8 years after planting in the Olympic Mountains*

Diameter-at-breast height class	Total height	Previous annual height growth		
		1980	1981	1982
In	*Ft*	- - - - - - - - - - - - - - *%* - - - - - - - - - - - - - -		
0.5	5.8	1.0	1.5	1.2
1.0	8.0	1.4	1.6	2.0
1.5	9.8	1.7	2.3	2.4
Average	7.9	1.4	1.8	1.9

Literature Cited

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