

FERTILIZER PELLETS IMPROVE GROWTH OF PLANTED DOUGLAS-FIR ON AN UNFAVORABLE SITE

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Old landings, skidroads, and similar areas, which have exposed subsoil, excessive compaction, and rocky soil, offer hostile environments for establishing natural and planted

trees. We thought the addition of fertilizer might be especially helpful in establishing planted seedlings on such difficult sites. "Therefore, we studied the effect of fertilizer pellets

on survival and growth of Douglas-fir seedlings planted on an old landing.

The study site is on the H. J. Andrews Experimental Forest in western Oregon, at an

elevation of 1,800 feet (fig. 1). The site was clear cut in 1950. In the 9 years following logging, a few planted or natural seedlings became established on the landing.

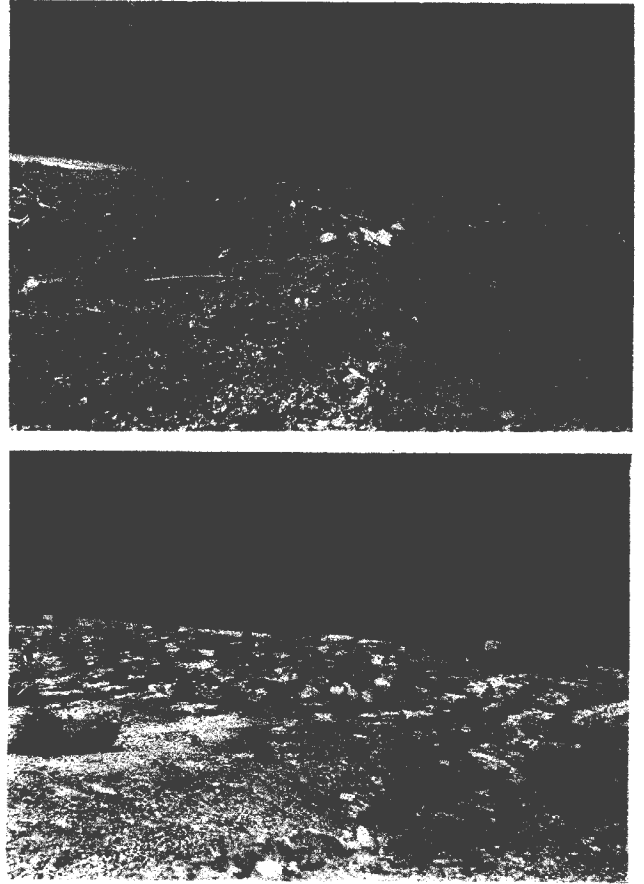


Figure 1.--Study area: Top, At planting in May 1959; bottom, after five growing seasons in November 1963.

In May 1959, we planted 200 2-0 Douglas-fir trees. A hundred randomly selected trees were fertilized.

One commercial fertilizer pellet was placed in each planting hole and covered with a small amount of soil before a tree was planted (fig. 2). The pellets contained urea formaldehyde resin and superphosphate (24 percent elemental nitrogen and 2.6 percent elemental phosphorus).

Trees were measured at planting and at the end of each of the next five growing seasons.

Survival

After 5 years, survival of trees with and without fertilizer was identical--87 percent. More of the trees without fertilizer survived for the first 3 years, but several were later heaved by frost. Survivals after each season were as follows:

| <u>Growing seasons</u> <u>after planting</u> | <u>With</u> <u>fertilizer</u> | <u>Without</u> <u>fertilizer</u> |
|---|----------------------------------|-------------------------------------|
| | <u>Percent</u> | <u>Percent</u> |
| 1----- | 91 | 95 |
| 2----- | 88 | 94 |
| 3----- | 87 | 89 |
| 4----- | 87 | 87 |
| 5----- | 87 | 87 |

Growth

The average height at planting for seedlings planted with fertilizer was 0.43 feet; for those planted without fertilizer it was 0.45 feet. Trees planted with fertilizer grew consistently faster. Growth differed the most during the first 2 years, and the fertilized trees continued to grow 40 to 50 percent faster during the last 3 years. Analysis of variance reveals that growth differences were significant at the 1-percent level in all 5 years.



Figure 2.--Planting a tree with fertilizer pellet on the rocky study site.

The tallest fertilized tree in the plantation is 4.14 feet; the tallest unfertilized one is only 3.49 feet. Seven fertilized trees and only two unfertilized ones exceed 3 feet. Average heights after each season were as follows:

| <u>Growing seasons</u> <u>after planting</u> | <u>Control</u> | <u>Fertilized</u> |
|---|----------------|-------------------|
| | <u>Feet</u> | <u>Feet</u> |
| 1----- | 0.04 | 0.11 |
| 2----- | .09 | .39 |
| 3----- | .18 | .28 |
| 4----- | .22 | .31 |
| 5----- | .35 | .49 |

Summary

Adding fertilizer pellets to planting holes significantly improved growth of Douglas-fir seedlings in all five growing seasons after planting on an old landing. But survival was the same with or without fertilizer, 87 percent.