

# Seedling Growth on Burned Soil

effect of prescribed burning on soil fertility reflected by the growth of pine seedlings in study of nutrient response

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**Ponderosa pine seedlings** were used in a study of soil fertility changes induced by prescribed burning to learn whether nutrient responses would be reflected by a crop natural to the soil.

The pine seedlings were grown in 10" pots—five plants to a pot—for one year on a forest soil which had been prescribed-burned. Other seedlings were grown in soil from unburned sites as a control. The soil in the tests was a Holland sandy loam from about 3,500' elevation in the Teaford Forest in Madera County. The Holland series extends widely along the Sierra range, on basic igneous rock formations, where the rainfall averages between 25" and 40" annually.

The hot or spot burn—produced by piling dead brush and fallen trees on small spots and burning for several hours—was the only condition of prescribed burning used for the tests. After sweeping the charcoal and ashes away from the centers of burned spots, soil

samples were taken from the top 10" and composited for the pot test.

A previous study on the same soil using indicator plants—lettuce and barley—showed that the lightly burned soil was intermediate in nitrogen and phosphorus supply power between the hot burn and no burn. The lightly burned condition is produced by broadcast burning the upper dry portion of the needle and duff layer while the bottom is moist.

The pot testing method involves five treatments. A check, with no nutrients added, measures the fertility of the soil as it was sampled in the field. The complete treatment has nitrogen, phosphorus, and potassium added. Following the complete treatment, each element is omitted in turn to test the nutrient supplying power of the soil when it is adequately supplied with the other two. Each treatment is replicated three times.

The pine seedlings grown on the burned soils showed nearly 50% increase in weight over the seedlings in the con-

trol—no burn—pots. This was true for the check—unfertilized—pots as well as those with different fertilizer combinations and omissions. Three other measurements of the seedlings showed the same relative differences. These were height to the growing point, stem diameter, and number of lateral branches.

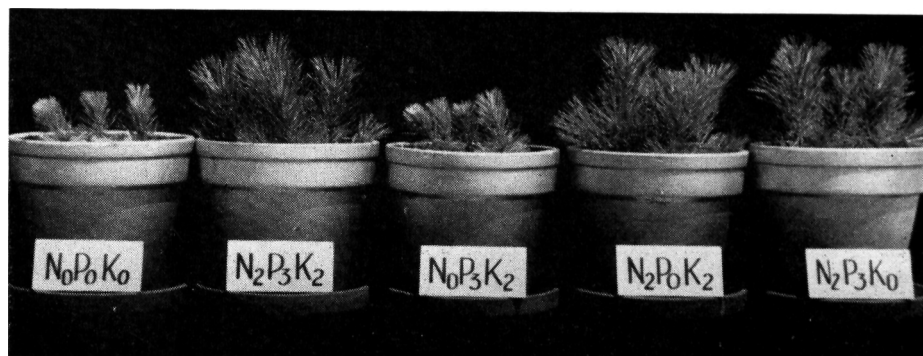
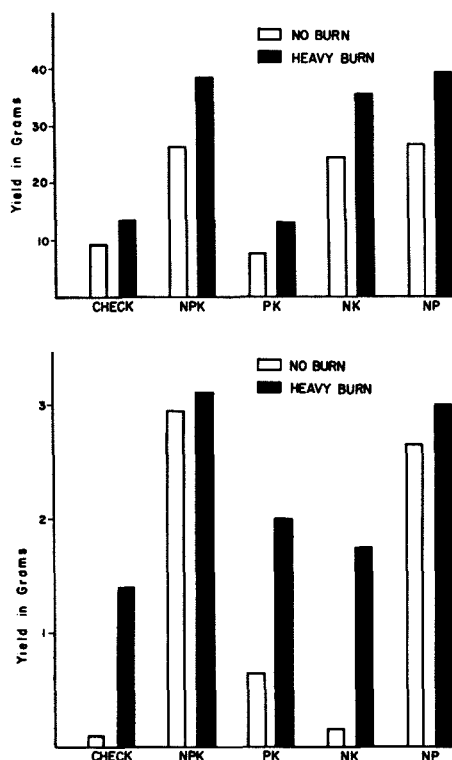
The effect of prescribed burning on the available nitrogen gave responses in the pine seedlings similar to those obtained by the standard indicator plants. The tree seedlings did not respond to phosphorus whereas lettuce is very sensitive to this element. Consequently the additional phosphorus made available by burning does not make the five-to-tenfold difference to the pine seedlings as it does to barley and lettuce.

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Average dry weights of pine seedlings—upper graph—and lettuce plants—lower graph—grown in 10" pots containing Holland soil. Check, unfertilized treatment.



Ponderosa pine seedlings after one year of growth on burned soil—above—and unburned—below—tested for nitrogen, phosphorus, and potassium supply.

