

AN INTEGRATED SOIL MANAGEMENT APPROACH TO IMPROVING  
WATER PENETRATION, ROOT GROWTH, QUALITY, AND YIELD OF PRUNES

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The purpose of this experiment is (1) to loosen subsurface soil compaction that interferes with water penetration and root growth, (2) to improve and stabilize the structure at the soil surface so that it does not seal and thereby limit water penetration, and (3) to control the pattern of vehicle traffic so that part of the orchard floor remains permanently uncompacted.

Two orchards, one in Yuba County and one in Tulare County were subsoiled in the fall of 1978. The Tulare orchard was tilled and half of the plots were treated with a structure stabilizing polymer, Nalco 2190, in the fall of 1978. Annual ryegrass was sown in all plots to provide cover for the soil surface. The Yuba orchard was disced in the spring of 1979 and treated as follows:

- a. One fourth of the plots were treated with Nalco 2190 and perennial ryegrass was sown for a permanent sod cover.
- b. One fourth of the plots were treated with a second structure stabilizing polymer, Dupont Elvanol (polyvinyl alcohol or PVA) and perennial ryegrass was sown.
- c. One fourth of the plots received no polymer, but perennial ryegrass was sown for permanent sod.
- d. One fourth of the plots received neither polymer or sod cover. These were to be disced during the season for weed control.

Both orchards were evaluated in the summer of 1979 for infiltration rate, soil moisture percentage, and fruit size.

In the Yuba County orchard, no differences in infiltration rate or prune size were found due to subsoiling. Soil moisture to five feet deep, however, was an average of 13% greater in the subsoiled plots over those not subsoiled. Either more water infiltrated the subsoiled plots, or there were less roots to extract water there. The latter explanation seems more likely since prune size and infiltration rate were no greater in the subsoiled plots. There were no differences in any of the measurements made among the four surface soil structure treatments.

The Tulare County orchard showed a similar soil moisture increase at the one and two foot depths in subsoiled plots, but not deeper. Again there were no differences in infiltration rate or prune size due to any of the treatments.

Measurements will be continued in 1980.