



Figure 1. Left—High mortality of liveoak on a deep soil on the Ranch Experiment Station following 7 years of drouth.  
Figure 2. Right—High mortality of brush on a shallow soil on the Ranch Experiment Station following 7 years of drouth.

# Effect of Drouth on Woody Plants

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The drouth of 1951-57 caused severe death losses among the range plants of the Edwards Plateau of Texas. Effects of the drouth appeared to be greater in certain woody species than on the grasses and forbs. A study was conducted during the summer of 1958 to ob-

tain more information on the effect of drouth and grazing on the various woody plant species occurring on the Ranch Experiment Station between Sonora and Rocksprings.

## Three Categories

Woody plants were classified in three categories: plants alive; plants with trunks or stems dead, but with sprouts growing from the roots; and plants dead.

Ten belt transects 100 feet long and 1 foot wide were run in each of six pastures on the station. Three pastures were grazed continuously at 48 animal units per section, one with cattle, one with sheep and one with goats. Two pastures were grazed continuously with cattle, sheep and goats, one at 32 and one at 16 animal units per section. A sixth pasture was grazed with cattle, sheep and goats under a deferred-rotation system.

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Figure 3. Left—Mortality of oak species on a shallow soil with an east exposure on the Ranch Experiment Station following 7 years of drouth. Figure 4. Right—Mortality of oak species on a shallow soil with a west exposure on the Ranch Experiment Station following 7 years of drouth.



The pre-drouth composition of the woody plant cover was composed of liveoak, 64 percent; shinoak, 26 percent; black persimmon, 4 percent; and cedar 2 percent. The remainder of the woody plant cover was composed of *Celtis* spp., catclaw, agrito, prickly ash, elbow bush, kidneywood and others.

#### Not From Grazing

Variations of brush cover by species were found among the pastures in the different grazing systems, but they were relatively small. It is concluded that the rates of grazing by different kinds of animals on these pastures had little effect on the drouth kill of the brush species.

Pronounced differences, however, were observed in brush kill among the various sites. Liveoak mortality was: deep soils, 68 percent, Figure 1; shallow divide, 60 percent, Figure 2; east exposure, 53 percent, Figure 3; west exposure, 44 percent, Figure 4; and rocky draws, 38 percent. Shinoak mortality was: shallow divide, 47 percent, Figure 2; east exposure, 44 percent, Figure 3; west exposure, 19 percent, Figure 4; and rocky draws, 7 percent. No shinoak was present on the deep soils.

Because of the heavy reduction in the oak species, the total brush

cover on the station was reduced to 56 percent of the amount present when the drouth began in 1950.

Probable reasons for the higher death loss of brush on both the deep and shallow soils are that these two sites were the most drouthy during the long dry period. The deep soils received runoff from the surrounding hills and draws during years of normal precipitation and produced a more dense cover of plants. When rainfall decreased and runoff stopped, the competition for soil moisture became acute and the plants suffered an excessive death loss. The shallow soils were incapable of water storage and thus remained extremely dry throughout the drouth period.

Soils on the hillsides profited from any rain because of the large exposed rock surface which supplied extra moisture to small pockets adjoining the rocks. Soils in the rocky draws also received moisture from runoff and were in a more favorable position than soils on the slope.

Hackberry generally was located on the deep soils and suffered nearly a 100 percent kill. Large cedar trees also suffered a death

loss of approximately 90 percent. There was no drouth kill in young cedar trees less than 7 feet in height, nor in persimmon, catclaw, agrito, elbow bush, prickly ash and others. These plants not only survived the drouth, but they increased in the percentage of total brush cover because of the decrease of liveoak and shinoak.

#### Effect on Livestock

Liveoak suffered a 54 percent mortality on all sites during the drouth, thus reducing its composition in the woody plant cover from 64 to 52 percent. Thirty percent of the shinoak died, but, because of the high death loss of liveoak, the composition of shinoak in the brush cover increased from 26 to 33 percent. Cedar increased from 1 to 2 percent of the total brush cover during this period.

The most serious change was the increase in the amount of black persimmon from 4 to 8 percent of the total woody plant cover. Black persimmon is difficult to kill with chemicals or by mechanical means. It is much less palatable to livestock than the liveoak which it replaced, and, because of the reduced competition from the liveoak, this species made unusual growth during this period.