

After the second year, they decrease as they are displaced by perennials.

A light layer of slash left by the clearing of open stands favors the reestablishment of grasses and forbs. In one study, light slash increased production by almost 100 pounds per acre in 1 year.

Excessive slash combined with the release of small trees that were missed poses a serious problem on cabled areas. In slash-burning experiments conducted in three seasons, a burn in December removed the least slash and killed the fewest trees missed by cabling. An August burn removed the most slash and killed the most trees, while an April burn gave intermediate results. There was a 38-percent increase in grass production on the burned plots after 3 years.

Cost comparisons for cabling, dozing, and clearing with hand axes show that cabling or chaining has been the least expensive control method. To obtain optimum benefits from cabling or chaining, followup treatments usually are necessary. This method is best for removing stands of large trees. Small trees can often be controlled more cheaply and efficiently by individual tree treatments.

For details of the results see "The pinyon-juniper type of Arizona: Effects of grazing, fire, and tree control," U. S. Dept. Agr. Prod. Res. Report No. 84, by Joseph F. Arnold, Donald A. Jameson, and Elbert H. Reid, September 1964. Copies can be obtained upon request from the Director, Rocky Mountain Forest and Range Experiment Station, 221 Forestry Building, Colorado State Univ., Fort Collins, Colorado 80521.

DETERIORATION OF BARBWIRE BY LIGHTNING

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A barbwire fence is a costly necessity for the livestock producer. Knowledge of the factors that wear it out or destroy it would help to increase ranch profits. Among these are lightning and perhaps electrolysis.

Over 60 miles of new 4-wire fence were built on the Southern Plains Experimental Range in 1941. Three "experimental treatments" for a study of the effects of electricity on barbwire were inadvertently created.

The control "treatment" was made up of about 50 miles of standard 4-wire fence with wooden posts spaced 20 ft. apart. No special provisions had been made to ground these interior, pasture-dividing fences. They were grounded to some extent by brace wires at the corners; and by brace posts and wires at intervals of one quarter mile. They were also grounded at irregular intervals in low spots by means of a galvanized wire fastened from a buried rock to each successive strand of barbwire (a "hold-down").

The second "treatment" had been created on about 10 miles of outside boundary fence by building fences similar to the interior ones except for installation of two twisted-wire stays on the barbwire between the posts. The stays, 40 inches long, usually penetrated the ground a few inches.

The third "treatment" began in 1948 when an electrical transmission line was built directly over one of two parallel fences of a mile-long lane. These fences, built in 1941, were 32 ft. apart. The transmission line that sheltered the fence below it from lightning may have affected the electrolysis phenomena.

Results

By 1955, the galvanized coating was gone from the top strand of barbwire on most of the standard fences. The wire had rusted badly, had slackened in many places, and had lost much of its temper. The second wire from the top had partly rusted, and the third usually had a dull galvanized finish, but the bottom wire showed little sign of deterioration. By contrast, all four wires on the boundary fence with stays, and on the lane fence under the transmission line, retained a solid galvanized coating and showed but little variability in deterioration.

By 1963, the top wire on the standard fence was severely rusted and pitted; and the lower wires showed much more deterioration than in 1955 (Figure 1). All four wires on the boundary fence with stays still had their protective galvanized coating (Figure 2). Although the same was true of all four wires of the lane fence protected from lightning by

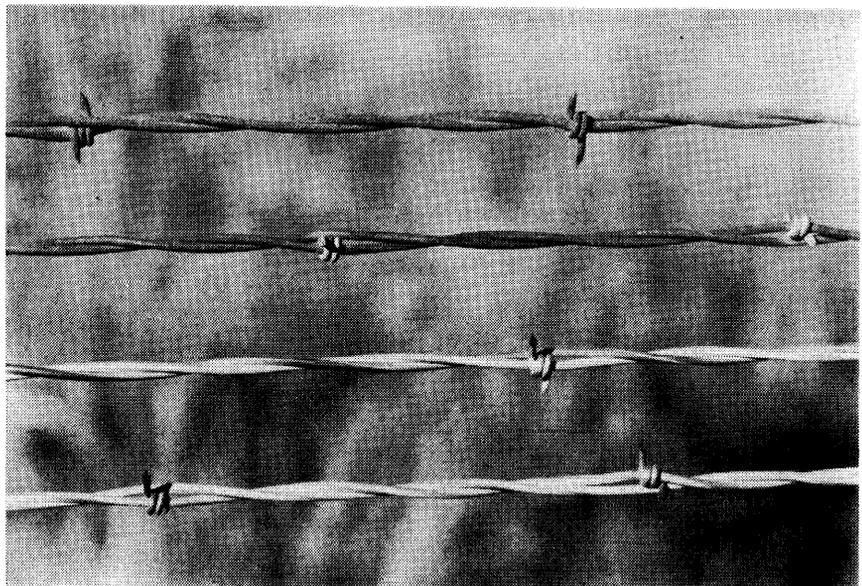


FIGURE 1. By 1963, the top wire on standard fences was rusted, pitted, and without temper. The second wire from the top was badly rusted but not yet pitted. The other two wires still retained some of their galvanized coating.

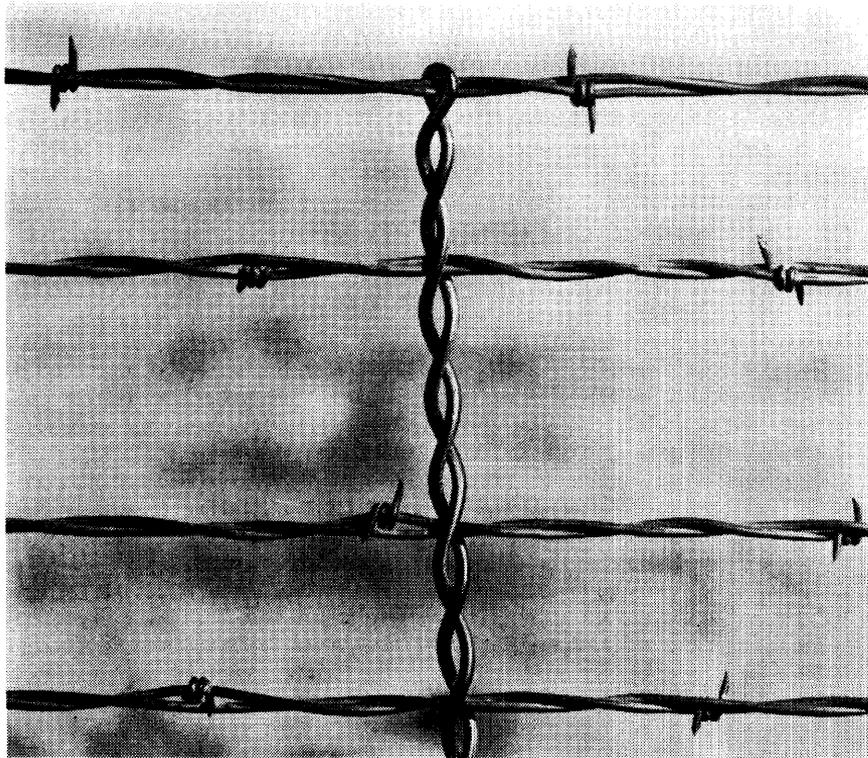


FIGURE 2. By 1963, all wires on the fences grounded by twisted wire stays still retained their galvanized coating, and they showed but little deterioration.

the transmission line, the unprotected parallel fence had deteriorated badly.

This short note does not permit elaboration of all the evidence avail-

able to substantiate our theory that lightning caused much of the damage. Galvanizing remained much longer on all four wires of the standard fences for about 12 inches on

either side of those wires used as hold-downs in the draws. Apparently, the wooden posts also acted as grounds to dissipate some electrical energy, since the galvanizing remained longer on all four wires for about 3 inches on either side of many posts. Sagebrush, forbs, and tall grass growing in the fence line apparently grounded the bottom wire effectively, but grounded each higher wire less effectively. This grounding effect was confirmed on numerous occasions by the presence of dead sage foliage along the fences.

We conclude from these observations that *thorough* grounding of barbwire fences is essential. We do not know the optimum spacing for the grounds, but believe it should be frequent. Hold-downs 100 yards apart did not prevent electrical deterioration of the top wires on standard fences. Until more is known, we suggest that twisted-wire stays be installed every 16 to 20 ft, or between each two posts, in most fences in the West. These stays should make firm contact with the soil.

Wire stays not only protect the fence wire and posts from electrical deterioration, but reduce livestock losses from lightning along the fence lines. They also make a sturdier fence that requires less maintenance.