

# Fertilizing Arizona's Rangelands

By J. L. Stroehlein, Bahe Billy, and L. R. Amburgey

Much of Arizona's range production is limited by a low moisture supply. In areas of adequate moisture, however, production is often limited by low soil fertility.

It is known as a result of numerous field experiments that fertilization can improve forage yields and quality, influence livestock distribution, and help conserve soil and soil moisture when conditions are favorable.

In many instances results have not been satisfactory, due to a lack of moisture or other factors. Several conditions must be present for range fertilization to pay dividends. The soil must be fairly low in fertility, soil moisture must be adequate, and there must be a good stand of grass on the site.

## First Test the Soil

Evaluation of native fertility of range by soil testing should provide

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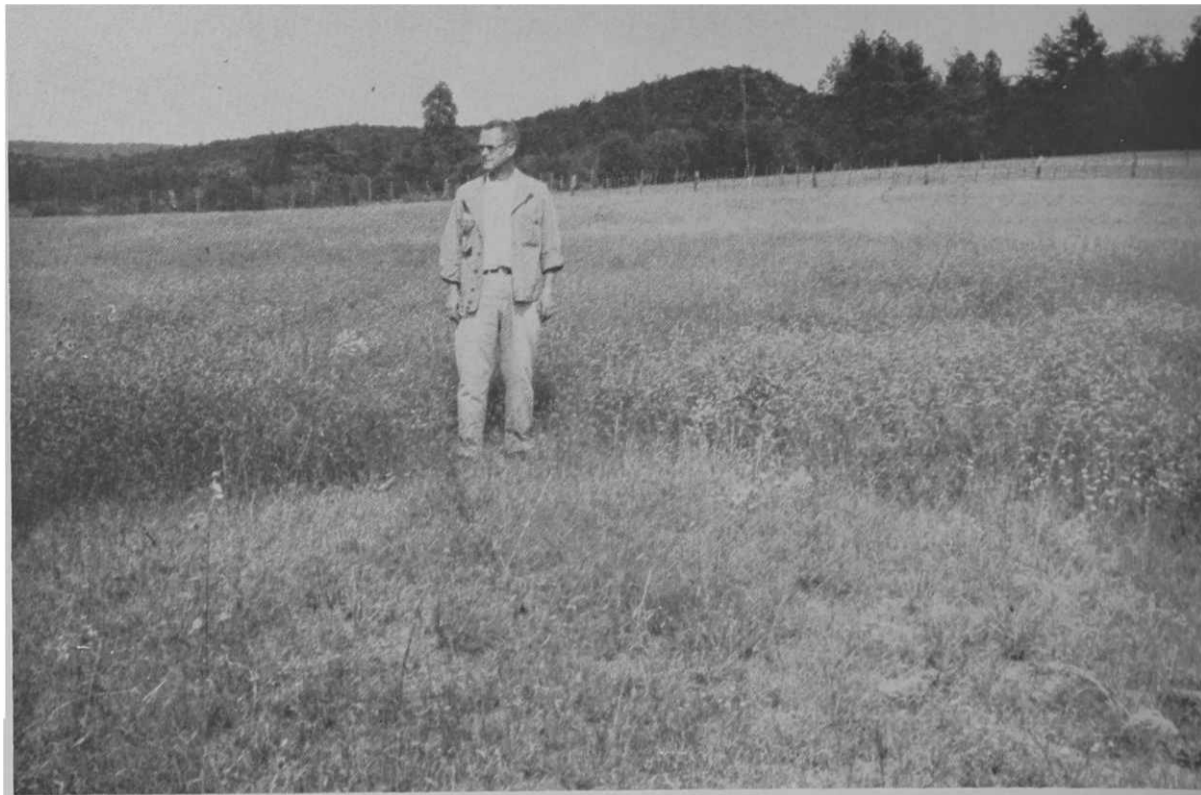
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tween applications was lengthened to eight days.

Experiments in 1959 and 1960 showed that spray formulations of insecticides were as effective as dust formulations in controlling bollworms. Since that time most of our field experiments have been conducted with spray formulations. Sprays do not contain sulfur, which is commonly added to most dust formulations for spider mite control.

In recent years spider mites have been of minor importance on cotton in Arizona, and the few infestations that have been observed have come so late that no economic damage was evident. Many recent grower complaints against sprays for bollworm control appear to have resulted from late or poorly applied treatments.

Insecticide formulations recommended for bollworm control have commonly included DDT in combina-



**OBSERVING EFFECT OF fertilizers on a good stand of blue grama grass at Rodger's Q Ranch in Gila County is Dr. Lyman Amburgey, extension soils specialist. The plot on the right received 100 pounds of nitrogen, the plot on the left received 100 pounds of nitrogen plus 44 pounds of phosphorus per acre, and the plot in the foreground was unfertilized.**

a basis for fertilizer recommendations. Thus experiments initiated in 1964 studied (a) the usefulness of soil tests in outlining areas of potential fertilizer response and (b) the proper time of application with respect to rainfall.

tion with another insecticide, such as toxaphene, strobane, malathion, endrin, dieldrin, or BHC. DDT has also been used alone. A mixture of endrin and methyl parathion has also been recommended. Perhaps the most commonly used formulations are sprays or dusts containing DDT plus toxaphene or strobane.

## Restrict DDT as a Dust

Because of hazards of drift contamination of forage crops, recent state restrictions have limited the use of DDT in dust formulations although, because of a lesser hazard, *there are no similar regulations against DDT in spray formulations.* All applications containing DDT, whether in spray or dust formulations, should be made only when there is no serious possibility of contaminating neighboring forage crops. Regardless of drift hazards, there remains the possibility that DDT may soon be less effective

Several experiments were established during the summer of 1964. Nitrogen with and without phosphorus and potassium fertilizers was broadcast on field plots in June or July. Rainfall was sufficient at all sites for good growth. The plots were clipped for yield measurements in September and October. A partial list of treatments and yields is shown in the accompanying table. Response varied from no increase at Kitt Peak to more than eight times at Rodger's Ranch in Gila County.

(Continued on Next Page)

against bollworms, at least in some areas, because of a developing problem of insecticide resistance.

## New Chemicals Being Tried

Insecticides which may be used in place of DDT are being tested each year in field experiments. Although carbaryl (Sevin) has not been effective, the following toxicants (although slightly less effective than DDT formulations) have given commercial control of bollworms when used in sprays at intervals of 7 to 8 days: toxaphene or strobane at 6 pounds per acre (also as 20% dusts), one pound methyl parathion plus 4 pounds toxaphene per acre, and one pound methyl parathion plus 0.5 pound endrin per acre. Azodrin, one pound per acre, applied at 4-day intervals, was as effective as toxaphene-DDT mixtures against bollworms.

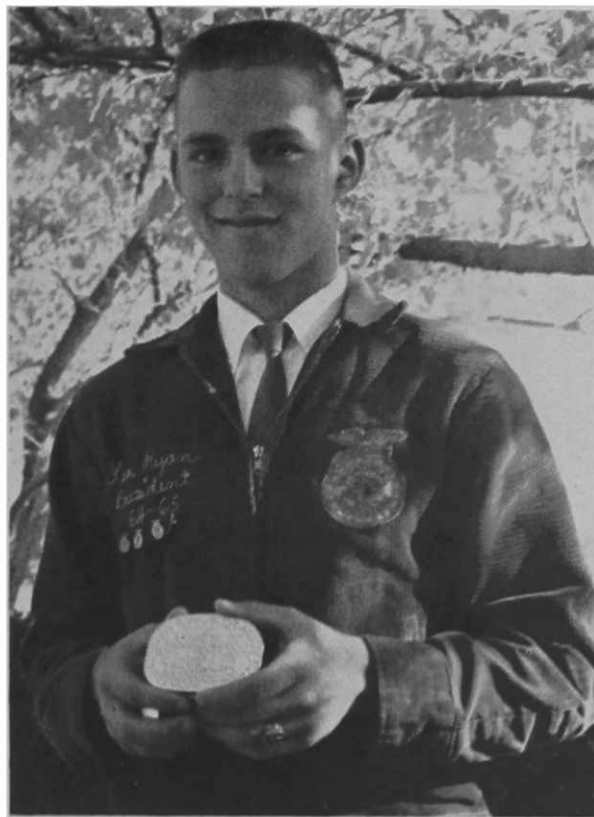
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Clipping weights alone do not show the complete value of fertilization. For example, the nutrient content of the grass may be increased and cattle distribution may be improved. It is known that cattle often prefer fertilized grass. On the other hand, cattle may not harvest as much grass as shown by the clipping weights and, furthermore, it may not be desirable from the standpoint of the grass.

### Still Some Questions

Range grasses will respond dramatically to fertilization under certain conditions. However, many questions are not answered about the value and economics of range fertilization. Among these questions are costs of fertilization and possible returns in yield. The use of extra forage produced depends on the feed supply and cattle numbers on hand. Soil tests may show areas of greatest response. Proper time of application may further insure returns.

These experiments, as well as a few others in the past, have indicated that best results will be obtained when fertilizers are applied after the start of the rainy season. Nitrogen fertilizer moves readily into moist soil and is not as likely to be lost as when broadcast on hot dry soil prior to summer rains. Summer rains produce about 90 percent of the perennial grass forage in southern Arizona, and maximum use of fertilizer will be made soon after the plants begin to grow. The nature of the rainy season is such that, once started,



**COW-CALF MATCHING** champ at an Angus Field Day at the U of A was Ken Ryan, 16, son of Mr. and Mrs. Walter R. Ryan of Marana. Ken, member of the Marana FFA chapter, made highest score in matching calves with their dams.

additional rains are likely, helping to insure adequate moisture. Selection of soil types with good infiltration rates and moisture storage capacity also insures maximum benefits of rainfall.

Fertilization probably will play an increasing role in ranching in certain areas of Arizona.

### Effect of Fertilizers on Yield of Range Grasses During 1964

Location	Treatment		Vegetation	Rainfall measured in.
	N-P-K lbs./A	Yield, Dry Matter lbs./A		
Kitt Peak	0-0-0	1,260	Native Gramas, and Three/awns	8.05 July 13 to Sept. 2
	200-88-0	1,370		
Scott's, Gila Co.	0-0-0	520	Native Three/awns and Gramas	11.57 July 24 to Sept. 19
	50-0-0	1,560		
	100-0-0	2,650		
	50-44-0	1,950		
	100-44-0	2,730		
Rodger's, Gila Co.	0-0-0	300	Blue Grama and Three/awns	Estimated to be average (20-22" annually)
	50-0-0	1,250		
	100-0-0	2,300		
	50-44-0	1,460		
	100-44-0	2,510		
	0-44-0	230		
Bisbee	0-0-0	1,590	Lehmann Lovegrass	3.25* Aug. 1 to Sept. 3
	100-0-0	2,970		
	200-0-0	3,090		
	100-60-0	3,460		
	200-60-0	3,440		

\* July rains fairly abundant but not recorded.

## Do Imports Affect U.S. Cattle Prices?

By Robert A. Young  
and  
James Simpson

The monthly average price paid for steers of Choice grade at Chicago declined from \$30.13 per hundredweight in November 1962 to a low of \$20.52 per hundredweight in May 1964. Since beef cattle represent an important segment of the U.S. agricultural economy (accounting for an average of \$7.7 billion per year in sales for the period 1958-63), serious concern over this situation has been expressed by domestic cattle feeders and range cattle producers. Their concern has been widely echoed by private and public organizations in those states and communities where the production and marketing of cattle is an important source of income and employment.

At least two major developments relating to the supply of beef have been associated with this falling price of fed cattle. First, total cattle numbers in the United States in 1964 reached an all-time high of over 107 million head, some 17 percent above the cattle population at the beginning of the cycle in 1958. Slaughter of cattle rose accordingly. Production of beef in 1963 was at an all-time high, and 1964 brought another new record. Second, shipments of live and dressed beef into the United States by exporting nations had jumped from an average of less than three percent of United States consumption in the period of 1952-57, reaching levels of nearly 10 percent of total U. S. supplies of beef in calendar 1963. Sharply conflicting opinions have been expressed as to the relative impact of changes in these supply factors upon the price of cattle in the United States.

This is first of two articles which will review and analyze the evidence as to the effect of these conditions

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Dr. Young is assistant professor of Agricultural Economics, Mr. Simpson is a senior student in the College of Agriculture. An early version of this article was submitted as a term paper by Mr. Simpson. This is first half of a two-part study.