Scientists Seeking to Learn More About the

CREOSOTEBUSH

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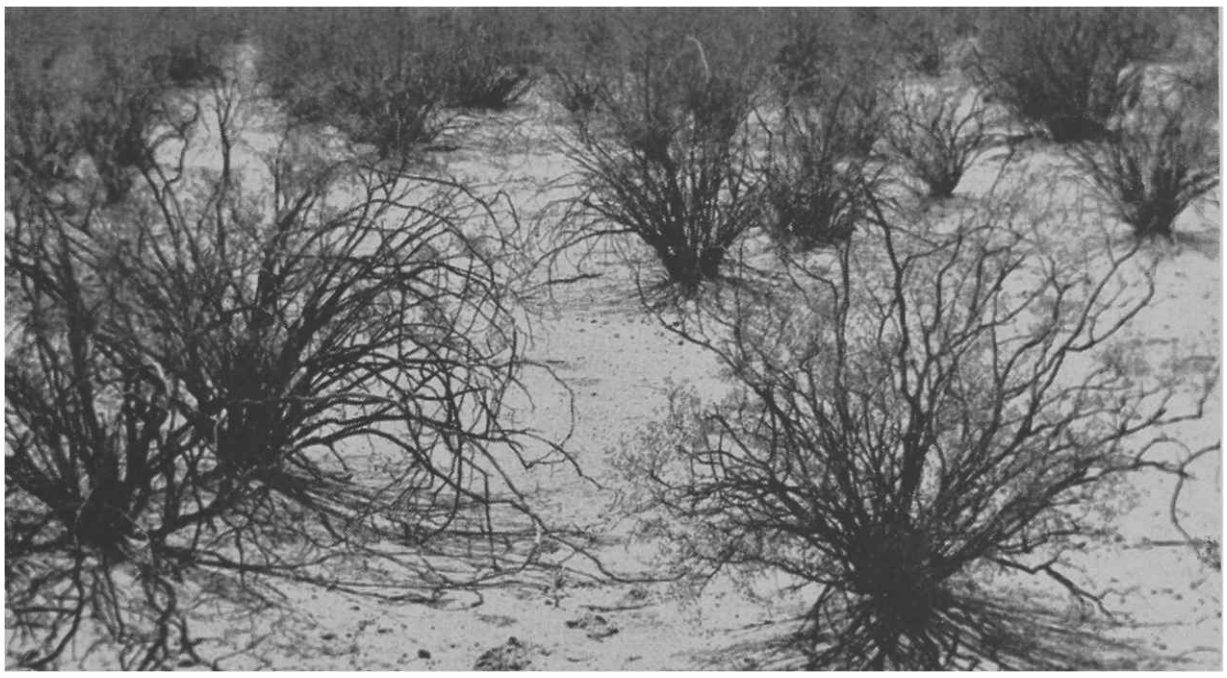

Creosotebush, or to a technical botanist, *Larrea tridentata*, reportedly grows on roughly 30 million acres in the southwestern United States. Over some of this area, stands of the shrub have increased in density. In other portions its range has been extended to areas that were formerly pure grassland.

Although often the principal plant over this vast acreage, it is generally conceded that creosotebush has little or no direct economic value and is not grazed by domestic livestock. On the other hand, were it not present, large acreages that are now largely protected would be exposed to wind erosion.

Known Widely but Not Well

Although more than three hundred references to creosotebush occur in the scientific literature, little has been written on its ecology, anatomy or physiology. Various phases of these "ologies" have been investigated at the University of Arizona, but the present study is by far the most comprehensive ecological research to date.

Creosotebush occurs under similar climatic conditions in both North and South America. In North America it ranges from Mexico on the south to southern Utah and Nevada on the north. From west to east it occurs from the slopes of the Pacific in Baja, California and southern California to western Texas along the Pecos and Rio Grande rivers. In many portions of the Mohave, Sonoran and Chihuahua deserts of Arizona, New Mexico and Mexico it is the most abundant plant.

An analysis of almost three million acres of the Sonoran Desert on the Papago Indian Reservation in Arizona indicated six distinct plant communities in which creosotebush was dominant. In one of these, classed as creosotebush alone, there were no other perennial plants. In the other five, classified as (a) creosotebush-desert shrub, (b) creosotebush-bursage, (c) creosotebush-cacti, (d) creosotebush-ocotillo, and (e) creosotebush-grass, creosotebush was more abundant than any other shrubs. In a seventh, which contained various combinations of creosotebush and shrubs, the other shrubs were dominant.

Rugged When Once Started

Germination studies indicated that although creosotebush is able to survive under extremely arid conditions after it has once become established, it does require a moist soil for germination and initial establishment. In the desert its start is apparently aided by the fact that the seeds germinate almost at once in warm weather if moisture is adequate.

A study of the creosotebush life cycle indicated that flowering occurs when daily minimum-maximum temperatures reach 40° and 80° F. respectively; also, that after drought flowering occurs before vegetative growth is resumed. During periods of moisture stress the mature leaves and flowers are shed and growth ceases on the immature leaves. Few flowers are produced during periods of excess moisture, although the leaves green up rapidly and vegetative growth may be very rapid.

CREOSOTEBUSH FLATS, such as shown ← at the left, produce very little grazing for domestic animals or wildlife.

Finally, when a drought is broken by a period of moderate moisture, as long as maximum temperatures remain above 80° F. and minimums do not drop below 40°, the plants renew flowering and vegetative growth with each new supply of available moisture following a sustained dry period.

When one examines creosotebush leaves under a microscope they are seen to have several unusual features that help the plant to live in even the driest of desert conditions. Most evident is a sticky resin which gives the leaves a shiny appearance. This coats the outside of the leaves and even gets into the tiny external openings (stomata) through which the plant "breathes."

Tangled in the sticky resin is a tangled mat of microscopic hairs which probably also help to maintain a higher humidity on the leaf surface and thus reduce evaporation. The stomatal openings, although minute in any event, are made even smaller by an external lip that slows down still farther the rate of water loss. Finally, cells that make up the leaf are compact, with a minimum of cell surfaces from which moisture might evaporate.

Contrary to some earlier published research, this study failed to show that

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Dr. Dalton, currently assistant professor at the University of Nevada, carried on the research on which this article is based as a graduate assistant in the Department of Watershed Management at the University of Arizona. Dr. Humphrey, serving as major adviser and thesis director, is Professor of Range Management at The University of Arizona.

Learning Which Bull is Best

Bruce Taylor

Current emphasis by beef producers and feeders in improving their product — beef — prompted this study. It is a cooperative trial in which the Circle Bar Ranch of Bueyeros, New Mexico, furnished the feeder calves and the Animal Science department of the University is testing the feedlot performance and carcass merit of steers by several sires used in the Circle Bar herd of Herefords.

The first trial of a four year study has been completed. The steers were slaughtered in the university's meats laboratory after being fed for 195 days in the experimental feedlot. Steers by four sires were included in the study. The steers were 14 to 15 months of age when slaughtered and weighed from 800 to 1000 pounds.

Too Much Tallow

Steer calves from Sire A graded highest as feeder calves, as slaughter cattle, and yielded the highest grading carcasses. In other words, they finished quickly and are a good safe bet. These steers, however, had less lean meat with more fat in the carcass than those from sire B.

Steers by sire B exceeded in rate of gain in the feedlot, but graded only high good in the carcass. They had less fat cover, less waste fat, a larger ribeye and greater value of trimmed retail cuts. Steers by this sire more nearly fit the current ideal of the so-called "meat type" steer. The problem with this kind is that they have to be fed longer to reach choice grade and currently choice is the goal of the western cattle feeders.

Our table lists the actual data for the sire groups and present recognized goals for the traits mentioned.

A study of the table reveals differences which one cannot see in the live cattle. The evidence suggests that sire B produces calves which match today's goals best and in fact very well.

How to Make the Best Better

Breeders such as the Circle Bar Ranch are ready, willing and anxious to produce a better product. Information such as is revealed in this study points the way to improvement in the breeding of modern beef cattle. Every sire represented in this test had something we need. Sire A had quality and ease of fattening. Sire B gives us lean meat and minimum waste. Sire C produced the heaviest feeder calves and greatest yield of carcass beef per day of age, while Sire D_{1-2} produces calves with a ribeye equal to tomorrow's goal. The Circle Bar Ranch now will seek to mate the sons and daughters of each sire in an effort to make tomorrow's cattle better than today's.

Carcass Characteristics of Steers by Four Sires

	Ribeye area (sq. in.)	*Fat thickness* (in.)	*Carcass per day of age* (lbs.)	*Trimmed retail cut value* ($/100 lbs.)
Suggested goal	2.00	.13	1.3	None
Sire A	1.71	.17	1.23	25.63
Sire B	1.80	.14	2.28	26.80
Sire C	1.56	.15	1.30	26.15
Sire D_{1-2}	2.08	.18	1.14	24.50

Dr. Taylor is head of the Animal Science Department. Readers who wish a detailed report on this project will get it in the annual Cattle Feeders' Day Report available at the Feeders' Day at UA Tucson farms next May 5. Those who can't attend can get a copy of the report afterward by writing to the College of Agriculture, University of Arizona.

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creosotebush "inhibited" the growth of seedlings either of the same species or of other plants. The seeds of both creosotebush and perennial grasses germinated as well when watered with wash water from creosotebush leaves and seeds as when watered with tap or distilled water. It appears, therefore, that the sparcity of vegetation often observed in stands of this shrub are due perhaps to competition for moisture, but not to any toxic effect of the plants themselves.

Not Controlled by Fire

Although fire was found to kill a rather large number of the plants of all ages, it is questionable whether fire ever played much of a part in restricting their spread. The bushes do grow to some extent in grasslands but for the most part they occur in low rainfall, desert areas where there is too little fuel to carry a fire.

Although creosotebush seems to have no particular value it is useful as an indicator of the potential value of some areas. In contrast with such plants as mesquite and burroweed, which are valuable indicators of potential grassland and of sites that can be reseeded to perennial grasses, creosotebush often indicates just the opposite.

Most typical creosotebush flats will not grow perennial grasses in sufficient amounts to make reseeding feasible. The creosotebush thus becomes valuable as an indicator of areas that cannot be reseeded, just as mesquite and burroweed indicate areas that can be.

Act Creating USDA Was Signed By Lincoln

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby established at the seat of Government of the United States a Department of Agriculture, the general designs and duties of which shall be to acquire and to diffuse among the people of the United States useful information on subjects connected with agriculture in the most general and comprehensive sense of that word . . ."

—From the Act Approved May 15, 1862, by
PRESIDENT LINCOLN