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GRAZING MANAGEMENT, AND PLANT SPECIES SELECTION

emphasized in irrigated pasture studies

One of the quickest ways a cattleman can increase his production per unit area on irrigated pastures is by improving management practices, including not only such things as the type, handling and health of the animals, but also cultural practices associated with the pasture, from seeding through harvesting, and including plant species selection.

EXPERIMENTS CONDUCTED at Davis and the Sierra Foothill Range Field Station indicate that one of the quickest ways a pasture operator can increase his production per unit area is by good management. Good management takes into consideration not only the type, handling and health of the animals, but also all cultural practices associated with the pasture from seeding through harvesting—including the type of grazing management system used and the type of pasture being grazed.

First trial

In one trial at Davis, irrigated pastures seeded to orchardgrass, perennial ryegrass, ladino clover and strawberry clover under continuous grazing were compared with a five-field pasture under rotational grazing over a four-year period—and with a two-field, rotation-grazed pasture for two years. Beef steers were studied for three years, and beef heifers for one year. Stocking rates were approximately equal within years for each grazing treatment, and forage availability allowed maximal individual animal performance.

Treatments

The grazing treatments were: (1) one field continuous grazing where half of the field was irrigated on Tuesdays, and the other half on Thursdays, so that the entire field was irrigated weekly; (2) a two-field rotation where each field was irrigated weekly regardless of where the

TABLE 1. CATTLE PERFORMANCE UNDER CONTINUOUS VS. ROTATIONAL GRAZING ON IRRIGATED PASTURE

	Grazing system*		
	Continuous	Two-field rotation	Five-field rotation
Total animal days	1501	1505	1501
Avg. daily gain (lbs.)	1.52	1.48	1.39
Live wt. gain/acre (lbs)	961	937	862
Live wt. gain/acre/day (lbs)	4.89	4.61	4.36
Energy gain/acre Mcal	3820	3540	3590

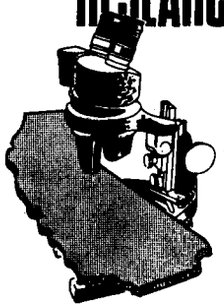
* Average for 2 years when the steers grazed for the entire forage growth season.

TABLE 2. PRODUCTION COMPARISON FOR LONG AND SHORT SEASON TYPES OF IRRIGATED PASTURE

	Type of forage pasture species	
	Long season	Short season
No. of days of trial	191	191
No. of animals/acre	2.3	2.2
No. of animal days	1826	1590
Initial wt. (lbs)	413	426
Final wt. (lbs)	723	688
Avg. daily gain (lbs)	1.64*	1.39
Total gain (lbs)	2960	2195
Beef/acre (lbs)	705*	575
Energy gain/day (Mcal)	2.04*	1.53

* Significantly different $P < 0.01$.

RESEARCH PREVIEWS



A continuing program of research in many aspects of agriculture is carried on at University campuses, field stations, leased areas, and many temporary plots loaned by cooperating landowners throughout the state. Listed below are some of the projects currently under way, but on which no formal progress reports can yet be made.

CITRUS ROOTSTOCKS

Plant pathologists at Riverside are testing the relative resistance of citrus rootstocks to infection by *Phytophthora*. Measurements should reveal which of the rootstocks have root systems most resistant to parasitism by *Phytophthora* spp., *P. parasitica* and *P. citrophthora*, and are the most suitable for commercial varieties of citrus under local conditions.

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VIEW IMPROVEMENT

Davis horticulturists are studying possible ways of enhancing the landscape for everyone. Some of the possibilities: direct seeding of woody perennials with low maintenance needs along highways in arid regions; and plantings that will make the bare, summer banks of reservoirs less unsightly between high and low water marks.

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cattle were grazing; and, (3) a five-field rotational grazing treatment with seven-day grazing per field and a 28-day recovery period for the forage between grazings. (These fields were also irrigated weekly, except for the field being grazed which was irrigated at 10-day intervals.) All fields were flood irrigated.

Yearling beef steers (good to choice grades) were allotted at random to the pasture plots after number branding, and treatment for worms. During the course of the trials the steers were weighed every 28 days after an overnight shrink without feed or water. Where the animals were carried for the entire grazing season (table 1), it was possible to obtain very good production of beef per acre (approximately 1000 lbs) although the animals did not reach an adequate finish for slaughter. Under the conditions of these experiments, continuous grazing consistently resulted in 3 to 8% higher average daily gains, and more beef per acre than rotational grazing.

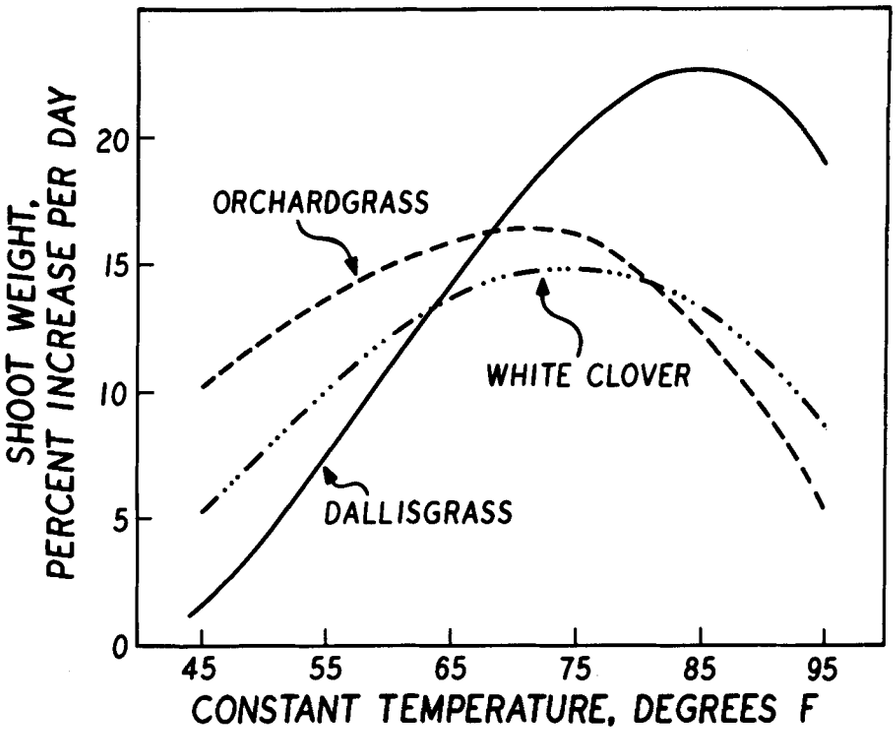
Changes in botanical composition differed among the grazing management systems. A higher percentage of legumes persisted in the sward under continuous grazing; but regardless of the grazing system, there was a trend toward higher percentages of grass over time.

Rates of water infiltration increased progressively during the four years of the experiment in both the continuous and rotationally grazed pastures, indicating that pasture irrigation should be determined by other criteria such as soil type, temperature and plant growth. However, these experiments were conducted on Yolo clay loam, a soil of generally desirable physical characteristics and results may not be the same on poorer soils.

An irrigated pasture composed of cool season forage species (orchardgrass, ryegrass, ladino and strawberry clover) was compared with one consisting of primarily warm season species (dallisgrass and bermudagrass). This trial was conducted at the Sierra Foothill Range Field Station during 1970 (see photo). The steers were allotted, treated and weighed as in the first trial, and were continuously grazed. The trial was started as soon in the spring as forage growth permitted. Here again, the stocking rates allowed maximal individual animal performance, and increased or decreased with forage availability. The cool season pasture was sprinkler irrigated and the other flood irrigated at nine to 14-day intervals.

The pasture planted to the cool season species outperformed the other in beef

EFFECT OF TEMPERATURE ON SHOOT WEIGHT INCREASE OF THREE PASTURE PLANT SPECIES



Adapted from K. J. Mitchell: Growth of pasture species, N. Z. J. Sci. and Tech., Aug. 1956.

produced by almost 20% (table 2). This is a reflection of more animal days per acre and a higher average daily gain. Even though the production of warm season grasses was high during the hot summer months, the apparent lack of growth early in the season and the rapid decline in forage production in the fall at this location resulted in less beef per acre.

The graph illustrates the effect of temperature on the growth of two commonly used pasture species (orchardgrass and white, or ladino clover) that are well adapted and have a long growing season, even though they might not produce as much forage as others (for example, dallisgrass) during mid-summer. Unless the livestock operator is able to adjust his stocking rate to efficiently utilize the short mid-summer flush of growth shown by warm-season species, stemmy, unpalatable dry matter can accumulate, lowering both the quality and productivity of the pasture.

Other aspects of irrigated pasture management that added together, and handled properly, can increase yields significantly include: type and health of cattle, irrigation, fertilization, weed control and stocking rate. These factors will influence not only production per unit area on a daily basis but also the useful life of the pasture.

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Steers on irrigated pasture at Sierra Foothill Field Station during 1970 tests comparing cool and warm season plant species.