have the largest seeds and the tertiary have the smallest. Salinity decreased seed size for all types of heads but the greatest decrease in seed weight occurred in the tertiary heads. Seed sampling of safflower plots must take into account not only the different characteristics of the head types, but also the differential effects of salinity on the seed in the different head types.

Soil salinity did not affect the chemical composition of the oil, but it depressed the protein content of the seed by amounts ranging from 0.2% in 41191197 to 3% in US-10. In the high-salt plots the protein content of the seed was 18.99% in N-10, 18.40% in US-10, 16.93% in Gila, and 17.99% in 41191197.

1963 field plots

The field plot experiment was repeated in 1963 using the same methods employed in 1962 except that the plots were planted in late February, and the salt levels of the irrigation water were 0, 4000, 8000, and 12,000 ppm of added salts.

In 1962, varieties differed significantly in relative reduction of stem diameter but not in reduction of plant height. In 1963, significant varietal differences occurred only with respect to reduction in plant height. US-10 and N-10 were affected more than the other two varieties. The average reduction in height for the four varieties in the high-salt plot was 40%. Because of the earlier planting date, maximum seed yields in 1963 averaged 45% greater than in 1962. Low salinity stimulated seed yields more in 1963 than in 1962. As in 1962, a 25% decrease in yield occurred at 11 mmhos/cm (EC_e). A sharp decrease in yield occurred on the high-salt plot at 12 mmhos/cm. Safflower, although quite tolerant to moderate salinities, cannot tolerate higher salinities of 10 to 15 mmhos/cm as well as cotton. US-10 and Gila were more affected by moderate and high salinity than 41191197 and N-10, which is in agreement with similar trends on the high-salt plot in 1962. Oil percentages for control-plot seeds were 2% lower than in 1962 (36.4% instead of 38.4%). Oil percentage was not appreciably affected at the low-salt level in 1963, but at higher salinities, the effects were comparable for the two years.

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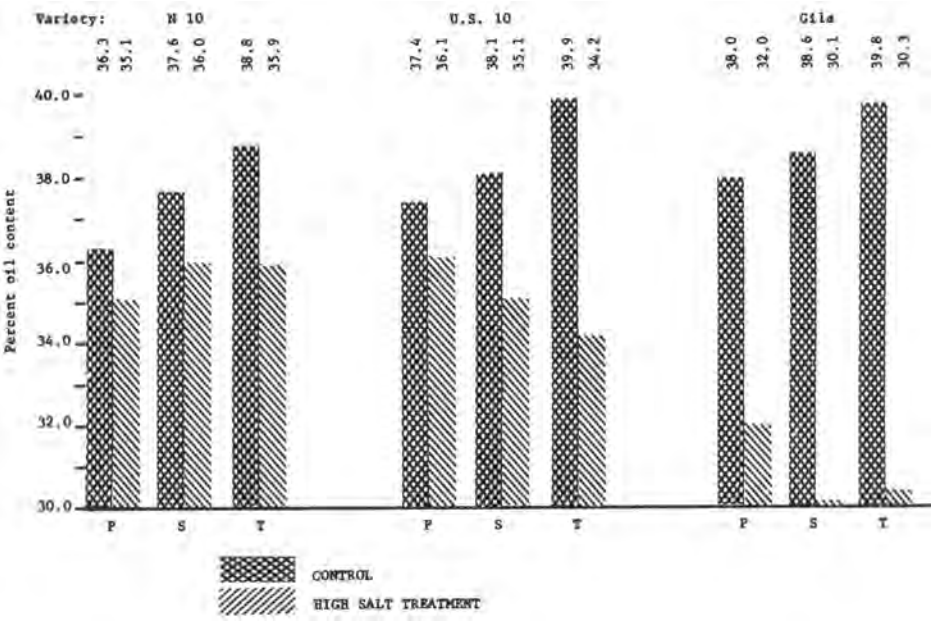
This study is part of the research being conducted by the Salinity Laboratory, United States Department of Agriculture, Riverside, California, and the University of California at Riverside.

FIG. 2, OIL CONTENT OF SAFFLOWER SEED IN CONTROL AND HIGH-SALT PLOTS



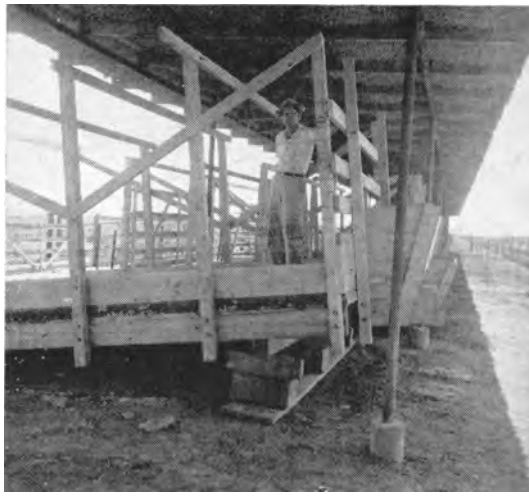
Oil content of safflower seed from primary (P), secondary (S) and tertiary (T) heads of safflower from the varieties N-10, US-10, and Gila in the control and high-salt plots, 1962.

SLOPING For Beef Feed

MANAGEMENT OF MANURE has been called the number one technical problem facing the livestock industry today. As the degree of confinement of animals becomes greater, the problems are intensified. The use of sloping floors in feed lots had been suggested as a possible solution to the collection aspect of manure management. The movement of cattle was expected to cause manure to be moved toward the lower end of a sloping floor and pushed off. This would result in a self-cleaning floor, with ultimate manure collection in an area where further movement by loader or conveyor system could be accomplished easily. However, studies were also needed on possible adverse effects on cattle held on floors with a slope sufficient for self-cleaning. Tests reported here were initiated recently at the Imperial Valley Field Station to investigate the effect of slope on both manure removal and animal behavior.

Pen construction

Three identical 12 × 14-ft pens with tiltable concrete floors were constructed. The pen floors were tilted to angles of 1.25, 4.75, and 7.0 degrees from horizontal. An adjacent pen of the same size with a natural (dirt) floor was also used. All pens were under a 10½-ft-high hay



FLOORS Cattle Lots

Sloping feed lot floors as little as 4¾ degrees allowed manure to accumulate by gravity without adversely affecting weight gains, and with beef cattle spending less time lying on sloppy floors, according to tests at Imperial Valley Field Station.

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shade. Twenty steers, averaging 680 lbs, were randomly distributed among the four pens, on July 24, 1963. The test ran for 168 days, at which time the steers on the concrete floors averaged 975 lbs. The animals on the natural floor were removed after eight weeks because of the extremely boggy condition of the ground. The space allotted per animal was approximately 33 sq ft which is ⅓ to ¼ the usual space allotment in commercial feedlots. Animal behavior studies consisted of observations at 10-minute intervals over a 24-hour period on three different occasions. The animals were fed a ration consisting of 25% alfalfa, 44% barley, 30% beet pulp, and 1% bone meal and weighed at four-week intervals.

Floor conditions

A few days after the cattle were placed on the 1.25-degree sloped floor, it was covered with sloppy manure, whereas the other floors remained fairly dry near the upper ends. Results of weighing a 12-week accumulation of manure are given in table 1. From a digestion trial on the ration it was determined that indigestible dry matter was 25% of the feed. Thus, about 1,900 lbs of dry matter were produced during this period, and considerable material sloughed off the rear of all the floors.

Weight gains

The weight gain data are given in table 2. There was no statistical difference in the overall rates of gain among pens. However, it is interesting to note that gains on the nearly flat concrete floor were highest during the first period but lower when compared with other pens during each of the remaining five periods. The activity observations contribute additional information that correlates with the weight data. The percentages of time a steer spent lying down during a 24-hour period are given in table 3.

The steep slope may have bothered the animals for some time, because those on the 7-degree floor spent more time on their feet at the 30-day check than animals on the other floors. During two later checks, once after manure had accumulated for 44 days, and once immediately after cleaning the pens of 84 days' accumulation, the animals on the 1.25-degree slope floor were lying down only about half the amount of time of those in the other pens. Apparently these animals disliked lying on the sloppy floor; furthermore, after becoming accustomed to standing a greater percentage of the time, they continued standing after the floor was cleaned.

Feed consumption

Feed consumption data were taken for each pen but not for each animal. Statistical analysis, treating each weigh period as a sample, showed no significant difference in feed consumption or feed efficiency among pens.

Tentative conclusions from this test are: (1) most of the manure sloughed off from a 4.75-degree sloping floor (a 7-degree slope offered no particular advantage); (2) weight gains were not adversely affected by floors of 4.75- or 7-degree slope; and (3) cattle spent considerably less time lying on a sloppy floor—with such behavior possibly reflected in weight gains. Further research will be conducted to confirm these conclusions and to investigate possible modification of the system.

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TABLE 1—ACCUMULATION OF MANURE ON FLOORS AFTER 12 WEEKS

	7° slope	4.75° slope	1.25° slope
Wet manure, lbs	543	667	2086
Per cent dry matter	48.2	27.5	33.3
Dry weight, lbs	261	222	575

TABLE 2—AVERAGE DAILY GAINS
Pounds per Day

Period	7° slope	4.75° slope	1.25° slope	Level dirt floor
7/24– 8/21	0.83	1.18	1.80	1.02
8/22– 9/19	2.39	2.81	1.75	2.20
9/20–10/17	1.65	1.59	1.49	
10/18–11/13	2.26	1.81	0.83	
11/14–12/11	2.73	2.87	2.69	
12/12– 1/8	1.31	1.06	0.94	
Total	1.86	1.89	1.59	

TABLE 3—PER CENT OF TIME STEERS SPENT LYING DOWN DURING 24-HOUR ACTIVITY STUDY

Days on test	7° slope	4.75° slope	1.25° slope	Flat dirt pen
30[1]	33	52	46	47
72[2]	51	53	27	53[3]
113[1]	55	47	28	58[3]

[1] Floor cleaned just prior to 24-hour activity study.
[2] Floors with 44-day accumulation of manure.
[3] Steers had been removed to a larger lot and were returned only for one day for behavior study.