

AGRICULTURAL EXPERIMENT STATION
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FEEDING GRAIN TO DAIRY COWS
ON
IRRIGATED LADINO CLOVER AND GRASS PASTURE

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These feeding trials were carried out to obtain data substantiating a recommended grain feeding schedule and to demonstrate that a low protein grain ration is adequate when used to supplement irrigated Ladino clover and grass pasture.

The ability of a cow to consume pasture forage will depend upon the abundance and palatability of the forage. The quality of forage consumed will be influenced also by the level of supplemental feed.

Since our first concern in dairy cattle feeding is economy, it is essential that we get cows to consume a maximum of the cheapest feed, which is pasture forage. When dairy cows are consuming a maximum of roughage, it is necessary that supplemental feed be in the form of concentrates. Analyses show that pasture forage is high in protein and, therefore, a low protein concentrate is needed as a supplement.

In these pasture feeding trials, two groups of cows were fed at two different levels of concentrates for 118 days of the 1941 pasture season. The trial was repeated with new groups of cows during the 1942 pasture season for a period of 122 days. These periods do not represent the entire pasture season. During the second trial the digestible protein in the concentrates was reduced from 12.3 percent to 9.6 percent.

These irrigated pastures would be classed as excellent. The forage consisted of about 25 percent Ladino clover and 75 percent grasses in the following order of abundance: English rye, meadow fescue, Ladino clover, native mesquite, timothy and red top.

Table 1 gives the concentrate mixture fed during each of these trials.

Table 1
Concentrate Mixtures

	<u>First Trial 1941</u> pounds	<u>Second Trial 1942</u> pounds
Bran	240	180
Oats	400	400
Barley	200	
Linseed meal	200	
Wheat		300
Coconut meal		100
Salt	22	10
Bone flour	22	10
Digestible protein (percent)	12.3	9.6

These concentrate mixtures were made up on the basis of the price of each ingredient. During the second trial the amount of salt and bone flour was reduced from 2 to 1 percent of the mix. The mix for the first trial contained 12.3 percent digestible protein. The mix for the second trial contained 9.6 percent digestible protein.

These groups of cows were evenly matched as to age, weight, stage of lactation and gestation except for age in the second trial where group one was 9 months younger than group two.

Table 2 gives the average-per-cow daily data on the four groups of cows at different levels of concentrate feeding. The groups are comparable each year but not one year against the other. In 1942 the cows in group one were 1 year and 9 months younger than group one in 1941, and group two was 7 months younger than the group two in 1941.

Table 2
Average Production and Feed Requirement Per Cow Daily by Groups

Year Groups	1941		1942		2 Yr. Ave.	
	1	2	1	2	1	2
4% milk, pound	41.99	42.15	33.94	36.93	37.96	39.54
Concentrates, pound	8.41	11.64	8.25	11.68	8.33	11.67
*T.D.N. required	22.85	23.43	22.25	23.90	22.54	23.66
T.D.N. fed (concentrates)	5.96	8.25	6.10	8.58	6.03	8.41
T.D.N. fed (silage)	--	--	.58	.58	.58	.58**
T.D.N. fed in barn	5.96	8.25	6.68	9.16	6.32	8.70
T.D.N. from pasture, lbs.	16.38	15.13	15.57	14.74	16.22	14.86
T.D.N. from pasture, %	73.9	64.8	69.9	61.7	72.0	62.8
Ratio of conc. to 4% milk	1:5.0	1:3.6	1:4.1	1:3.2	1:4.5	1:3.4

* Total digestible nutrients.

** Grass silage was fed only during the last month of the second trial.

A study of Table 2 brings out the following points:

1. Making a correction for difference in age between the groups in different years the production of both groups is equal. Therefore the mix with 9.6% digestible protein the second year was equal to the concentrate mix with 12.3% digestible protein the first year.
2. Group 1 each year did not gain as regularly in weight as did group 2; therefore, under good management a trifle more grain should have been fed.
3. Group 2 gained a trifle more than desirable in weight and consumed less cheap forage which they could have eaten as well as group 1. Therefore their rate of grain feeding was high.
4. The correct level of feeding which is halfway between the average for the two years on both groups is the same as that recommended in Oregon Extension Bulletin 592 and in Oregon Station Bulletin 398.

Table 3

Average Daily Production Per Cow on Two Levels of Protein

	<u>1941</u>	<u>1942</u>
Age (years and months)	4.4	5.5
Stage of lactation (days)	95	80
Initial weight	1143	1195
Final weight	1178	1232
Gain, pounds	35	37
Concentrates, pounds	12.5	14.9
Milk, pounds	52.1	58.8
Milk 4%, pounds	46.1	51.7
Calculated dig. pro. in concentrates, percent	12.3	9.6

These cows grazed on the same pasture each year. The forage was possibly a little more abundant during 1942 than in 1941. During 1941 there was ample forage to enable the cows to graze to the limit of their capacity or desire.

It is evident from these data that 9.6 percent digestible protein in the concentrates was adequate for maximum milk production.

Table 4

Schedule of Concentrate Feeding to Cows on Excellent, Good, and Fair Irrigated Pastures

<u>Pounds milk Produced Daily</u>				<u>Amount of Concentrate to Feed Daily</u>		
<u>3.0</u> <u>Percent</u>	<u>4.0</u> <u>Percent</u>	<u>5.0</u> <u>Percent</u>	<u>6.0</u> <u>Percent</u>	<u>With</u> <u>Excellent</u> <u>Pasture</u>	<u>With</u> <u>Good</u> <u>Pasture</u>	<u>With</u> <u>Fair</u> <u>Pasture</u>
16.5	14.0	12.0	10.5	None	None	2
19.0	16.0	14.0	12.0	None	1	3
22.0	18.5	16.0	14.0	None	2	4
24.5	21.0	18.0	16.0	1	3	5
27.0	23.0	20.0	17.5	2	4	6
30.0	25.5	22.0	19.5	3	5	7
32.5	27.5	24.0	21.0	4	6	8
35.5	30.0	26.0	23.0	5	7	9
38.0	32.5	28.0	24.5	6	8	10
41.0	34.5	30.0	26.5	7	9	11
43.5	37.0	32.0	28.0	8	10	12
46.0	39.0	34.0	30.0	9	11	13
49.0	41.5	36.0	32.0	10	12	14
52.0	44.0	38.0	33.5	11	13	15
54.5	46.0	40.0	35.5	12	14	16*
57.0	48.5	42.0	37.5	13	15	17*
60.0	50.5	44.0	39.0	14	16*	18*
62.5	53.0	46.0	41.0	15	17*	19*
65.5	55.0	48.0	42.5	16*	18*	20*

* No more concentrates should be fed than the cow can eat and digest without going off feed regardless of the amount required to maintain production.

Summary

1. When grazing on irrigated Ladino clover and grass pasture, 1100 to 1200-pound cows may obtain 65 to 75 percent of their necessary nutrients from pasture when producing approximately 40 pounds of 4 percent milk daily or 1.6 pounds of butterfat daily.
2. On the basis of T.D.N. required, the 16 cows used in these trials grazed an average of 115 pounds of forage daily.
3. An average of two trials in two successive years indicates that concentrates fed at the ratio of 1 pound of concentrates to 4.5 pounds of 4 percent milk was not quite equal to a ratio of 1:3.4 of 4 percent milk when the cows were on excellent pasture and producing 38 to 40 pounds of 4 percent milk daily. A ratio of 1:4.0 would be the correct level under the conditions given.

4. The production of milk on concentrates containing 9.6 percent digestible protein was equal to the production when the concentrates contained 12.3 percent digestible protein, all other conditions being equal.
5. Cows should be fed individually on the basis of production. The level of grain feeding should be kept as near as possible to that recommended in Table 4.