FEEDLOT FATTENING OF SHEEP IN PAKISTAN

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Summary

Ninety six Rambouillet x Kaghani intact male lambs of 18 months of age were divided into 6 groups of 16 lambs each, groups being G-1, G-2, G-3, G-4, G-5 and G-6. Average liveweight of animals on different treatments at day 0 of the experiment was G-1 (24.68 S.D 3.35), G-2 (24.56 S.D 2.55), G-3 (24.53 S.D 2.90), G-4 (24.51 S.D 3.38), G-5 (24.58 S.D 3.58) and G-6 (24.81 S.D 3.43). Animals on treatment G-1 were fed only maize silage *ad libitum*, G-2 had been offered maize silage *ad libitum* plus 4.8 kg of commercial concentrate (Sona Vanda) per group, G-3 maize silage *ad libitum* plus 4.8 kg of crushed maize grain per group. G-4 lambs were fed oat silage *ad libitum* plus 4.8 kg of crushed maize per group, G-5 oat silage plus 4.8 kg of commercial concentrate per group and G-6 only oat silage *ad libitum*. The results showed highly significant differences ($p < 0.01$) among treatment groups in silage intake throughout the feeding trial. G-2 group showed the highest silage intake while treatment G-4 showed the lowest silage intake for the first two months and treatment G-6 for the last two months. The results of growth rates (g/d/animal) showed that treatments G-1 and G-6, where no supplementation was given, had a weight loss throughout the feeding trial. However, weight loss in treatment G-6 was more severe than treatment G-1. Treatments G-2, G-3, G-4 and G-5 all showed weight gain however, treatment G-2 had the most gain. G-2 group also showed the highest wool production while G-6 the lowest. These results indicated that silage when made from full bloom crops of oats and silage fed alone without any supplementation causes weight loss in sheep. Supplementation with concentrates having 19% CP is far better than the crushed maize grain and maize silage is better than oats silage. Maize silage is superior than oat silage however, better performance could be expected if silages were made at the early bloom (dough) stage of plant maturity. The results indicate that treatment G-2 shows highest response while treatment G-6 the lowest. So the response of different treatments on both the parameters of weight gain and wool production is almost similar.

(**Key Words:** Silage, Intake, Sheep, Maize Silage, Oat Silage)

Introduction

Most of the pastures in Pakistan are poor nutritionally due to their low protein and high fibre contents. The animals grazed on these pastures have retarding effect on growth especially in winter. The nutrient deficient pasture results in live-weight loss in grazing animals, thus delaying their age of maturity and uneconomical weight gains (Mirza et al., 1988). In Pakistan, a lot of interest is generating in feeding of conserved crops to provide consistent nutrition throughout the year. Decisions about the type and quality of the conserved forage and about the amount and composition of the concentrate are of crucial economic importance, since feed cost can account for more than half the total cost of meat production (Kirby, 1982). Therefore, this experiment was conducted to examine the effect of maize and oat silage plus grain supplementation on Rambouillet x Kaghani male lambs.

Materials and Methods

Ninety six Rambouillet x Kaghani intact male lambs of 18 months of age were divided into six identical groups with 16 animals per group. These animals were grouped as G-1, G-2, G-3, G-4, G-5 and G-6. Average live weight of animals on different treatments at day 0 of the experiment was G-1 (24.68 S.D 3.35), G-2 (24.56 S.D 2.55), G-3 (24.53 S.D 2.90), G-4 (24.51 S.D 3.38), G-5 (24.58 S.D 3.58) and G-6 (24.81 S.D 3.43). Animals on treatment G-1 were fed only maize silage *ad libitum* daily, G-2 maize silage *ad libitum* plus 4.8 kg of commercial concentrate (Sona Vanda) per group, per day, G-3 maize silage *ad libitum* plus 4.8 kg of crushed maize grain per

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group daily. G-4 was oat silage *ad libitum* plus 4.8 kg of crushed maize per group daily, G-5 oat silage plus 4.8 kg of commercial concentrate per group, per day and G-6 only oat silage *ad libitum* daily.

Maize and oat crops were cut manually by labourers at full bloom stage and were allowed to wilt for two days on the field. The wilted fodder was then chopped by the chopper in order to get chop length of about one inch. The chopped material was ensilaged in the trench silos and was covered by the plastic sheets after compaction. The plastic sheets were plastred by mud in order to keep weight on the sheets so that no air can enter in the material.

The experiment was carried out from January to April in 1989 for 106 days and there was no mortality in any of the treatment groups during the experimental period. Core sample of the silages, collected three times during the experiment from the silos for the proximate analysis (AOAC, 1984). Similarly crushed maize and concentrate were collected three times during the experiment for proximate analysis. All animals were sheared at the end of the experiment and wool production of individual animal was recorded. All animals were weighed every 2 weeks for nightly throughout the feeding trial. Silage intake was recorded daily. All the concentrates and crushed maize were completely consumed by the animals.

The data obtained from the intake of silages was analysed using ANOVA, (Kleinbaum and Kupper, 1978) and Duncan's Multiple Range Test (DMRT) (Snedecore and Cochran, 1966). The live weight and wool production data was also analysed using ANOVA and DMRT.

Results and Discussion

Chemical composition of silage, maize grain and commercial concentrate is given in table 1. The results showed that dry matter (DM) and crude fibre (CF) contents of the maize silage were higher than those given by Ensminger and Olentine (1978). The high CF content of maize silage was because the silage was prepared at full bloom stage and it was demonstrated by high CF contents. Similarly oat silage was also made from matured crop, which was evident from its high CF contents. The high DM contents of both oat and maize silage were due to wilting effect.

TABLE 1. CHEMICAL ANALYSIS OF FEEDS

Sample	DM	CP	CF	TA	EE	TDN
			% DM			
Maize silage	45.70	7.75	30.95	6.0	1.1	62
Oat silage	30.73	9.02	40.40	9.29	1.3	51
Maize grain	86.12	8.85	4.45	2.53	4.2	87
Concentrate feed	89.21	19.20	13.88	8.83	4.0	69

DM=Dry Matter; CP=Crude Protein; CF=Crude Fibre; TA=Total Ash; EE=Ether Extract; TDN=Total Digestible Nutrients

Table 2 shows silage intake per group throughout the feeding trial. The results showed highly significant difference ($p < 0.01$) in silage intake between the treatments throughout the feeding trial. In January treatment G-2 showed highest silage intake while treatment G-4 lowest. This trend was continued during next month also. However, from third month treatment G-2 continued to show highest silage intake but lowest intake had been shown by the treatment G-6. This trend was followed in next month also. The

TABLE 2. AVERAGE DAILY SILAGE CONSUMPTION PER GROUP (KG)

Month	G-1	G-2	G-3	G-4	G-5	G-6	SE	Sig. level
January	26.88^{b}	29.17^{a}	20.62^{c}	15.99^{e}	18.26^{d}	19.45^{cd}	0.48	***
February	27.02^{b}	32.02^{a}	22.38^{c}	17.37^{e}	18.68^{d}	18.49^{d}	0.294	***
March	26.64^{b}	34.15^{a}	22.04^{c}	19.21^{d}	22.30^{c}	18.56^{d}	0.275	***
April	25.87^{b}	34.52^{a}	22.57^{c}	20.31^{d}	24.87^{b}	16.92^{e}	0.472	***

^{a,b,c,d,e}Means on the same line that do not have a common superscript differ ($p < 0.05$)
*** ($p < 0.01$)

low silage intake by the G-1 and G-6 groups are due to the fact that no supplementation was offered to the animals. Hodgson et al. (1986) showed that grazed or stall fed on forage alone resulted in low forage intake and their growth rates were depressed as a consequence of low forage intake. However, Fitzgerald (1987) showed that silage intake was quite low when fed silage alone (482 g/DM/daily) but increased 9 to 14% when supplemented with pelleted dried grass. Lambs performance was low when fed silage alone (Fitzgerald, 1987). Brazoska et al. (1987) compared oats and maize silage to young bulls of 200 to 300 kg body weight. The average daily weight gain was 813 and 782 g/day for maize and oats silage supplemented with concentrates. The silage intake for maize and oat silage was 6.37 and 6.04 kg DM/kg of gain respectively.

Barley supplementation had no effect on silage intake when supplemented average 250 g per head daily but decreased silage intake by 17 to 24% was observed when supplemented average 500 g per head daily (Fitzgerlad, 1987). These results confirm our results which shows that treatment G-3 have lower silage intake compared to treatment G-1 when supplemented with maize grain.

Gordon et al. (1987) showed no affect when CP supplementation was increased for the silage based diet on the milk yield of British Friesian cows. Table 3 shows average daily consumption of silage intake per kg of body weight. These results are similar to the results given in table 2 and similar trend had been observed in the silage intake of sheep.

Table 4 shows means of growth performance of sheep throughout the feeding trial. It shows no significant difference at the begining of the feeding trial but as the experiment progressed highly significant differences had been observed between the treatments on day 60 and day 106 of the experiment, as shown in the table 4. The results of growth rates g/d/animal showed that treatment G-1 and G-6, where no supplementation was given, showed weight loss throughout the

TABLE 3. AVERAGE DAILY CONSUMPTION OF SILAGE PER KG OF BODY WEIGHT (KG)

Month	G-1	G-2	G-3	G-4	G-5	G-6	SE	Sig. level
January	0.069^{b}	0.072^{a}	0.053^{c}	0.041^{e}	0.046^{d}	0.050^{cd}	0.012	***
February	0.071^{b}	0.072^{a}	0.056^{c}	0.044^{e}	0.045^{d}	0.051^{d}	0.007	***
March	0.069^{b}	0.068^{a}	0.050^{c}	0.045^{d}	0.051^{c}	0.055^{d}	0.007	***
April	0.069^{b}	0.062^{a}	0.049^{c}	0.046^{d}	0.054^{b}	0.057^{c}	0.012	***

^{a,b,c,d,e}Means on the same line that do not have a common superscript differ ($p < 0.05$)
*** ($p < 0.01$)

TABLE 4. GROWTH PERFORMANCE OF SHEEP

	G-1	G-2	G-3	G-4	G-5	G-6	SE	Sig. level
No. of animals	16	16	16	16	16	16		
Wt., day 0 (kg)	24.68	24.56	24.53	24.51	24.58	24.81	0.80	N.S
Wt., day 60 (kg)	23.89^{cd}	30.91^{a}	27.25^{b}	26.28^{bc}	26.78^{bc}	21.12^{d}	1.0	***
Wt., day 106 (kg)	23.81^{c}	36.69^{a}	30.53^{b}	29.0^{b}	30.47^{b}	17.97^{d}	1.22	***
Wt. gain day 0-60 g/d/animal	-13.12^{c}	105.73^{a}	45.31^{b}	29.58^{b}	36.67^{b}	-61.35^{d}	9.6	***
Wt. gain day 60-106 g/d/animal	-1.63^{c}	125.68^{a}	71.33^{b}	59.10^{b}	80.16^{b}	-40.08^{d}	10.18	***
Wt. gain day 0-106 g/d/animal	-8.14^{c}	114.39^{a}	56.60^{b}	42.39^{b}	55.54^{b}	52.12^{d}	7.36	***

^{a,b,c,d}Means on the same line that do not have a common superscript differ ($p < 0.05$)
*** ($p < 0.01$)

feeding trial. However, weight loss on treatment G-6 was more severe than the treatment G-1. Treatments G-2, G-3, G-4 and G-5 all showed weight gain, G-2 showed the most weight gain.

These results indicated that silage when made from full bloom crops of oat and when silage fed alone without any supplementation causes weight loss in lambs. Supplementation with concentrates having 19% CP was far better than the crushed maize grain and maize silage was better than oats silage.

Response of sheep to supplementation in the oat silage groups have been poor because of the poor quality of oat silage. The growth has been more in the second half of the experiment, probably because of the improvement in the microbial ecosystem of the animals. Better performance could be expected if silages were made at the early bloom (dough) stage of plant maturity.

Table 5 shows wool production by sheep over the experimental period. The results indicated that treatment G-2 showed highest response while

TABLE 5. WOOL PRODUCTION BY THE SHEEP OVER THE EXPERIMENTAL PERIOD (KG)

	G-1	G-2	G-3	G-4	G-5	G-6	SE	Sig. level
No. of animals	16	16	16	16	16	16		
Wool production per animal over the experiment	1.66^{b}	2.06^{a}	1.86^{ab}	1.78^{ab}	1.69^{b}	1.33^{c}	0.112	***

^{a,b,c}Means on the same line that do not have a common superscript differ ($p < 0.05$)
*** ($p < 0.01$)

treatment G-6 the lowest. So the response of different treatments on both parameters of weight gain and wool production was almost similar.

Literature Cited

AOAC. 1984. *Official methods of analysis of the association of analytical chemists.* 14th ed. Association of Official Analytical Chemists, Washington D. C.

Brazoska, F., S. Kloat and Z. Kocon. 1987. Efektyconose opasania buhajkow kirzonkami z kukurydzy, traw oraz celych roslin zboz. *Biuletyn Informacyjny*, Instytute Zootechniki, Zaklad Informacji Zootechniki, 32-083 Balice K. Krakowa, Poland.

Ensminger, M. E. and C. J. Olentine. 1978. Feeds and nutrition. The Ensminger Publishing Company, Clovis, California.

Fitzgerald, J. J. 1987a. Finishing of store lambs on-silage based diets. Effect of supplementing silage with barley, pelleted dried grass or molasses/soyabean meal on silage intake and lamb performance. Irish J. Agri. Res. 26(2/3):153-164.

Fitzgerald, J. J. 1987b. Finishing store lambs on silage-based diets. Effects of stage of grass growth when ensiled and barley supplementation on silage intake and lamb performance. Irish. Agri. Res. 26 (2/3): 139 151.

Fitzgerald, J. J. 1987c. Finishing of store lambs on-silage based diets. Effect of formic acid treatment on wilting and concentrate supplementation on silage intake and performance of store lambs. Irish J. Agri. Res. 25 (3):327-345.

Fitzgerald, J. J. 1987d. Finishing store lambs on silage-based diets. Effects of formic acid with or without foradehyde as silage additive and barley supplementation on silage intake and lamb performance. Irish. Agri. Res. 25(3):363-377.

Gordon, F. J. and A. C. Peoples. 1987. The utilization of wilted and unwilted silages by lactating cows and the influence of changes in the protein and energy concentrations of the supplement offered. Animal Production 43(3):355-366.

Hodgson, J., J. A. Milne and R. H. Armstrong. 1986. Forage brassicas for finishing lambs. In Hill Farming Research Organisation. Biennial report 1984-85, Penicuik, U.K.

Kleinbaum, D. G. and L. L. Kupper. 1978. Applied regression analysis and other multivariable methods. Duxbury Press. North Scitrate Massachusetts. p. 289-314.

Kirby, P. S. 1982. Protein supplementation of grass silage diets for beef cattle. *Animal Science* 1981, Reference Book 254 (8):1-21. MAFF/ADAS Agricultural Science Service Research and Development Report.

Mirza, I. H., J. K. Jadoon, M. A. Naqvi and A. Ali. 1988. Performance of lambs fed urea molasses block vs concentrates. AJAS 1(1):27 31.

Snedecore, G. W. and W. G. Cochran. 1966. Statistical Methods. Iowa State Univ. Press, Ames, Iowa, U.S.A.