Dal, Froker or Hudson Oats For Finishing Lambs

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Rations based on Dal, Froker (high protein) or Hudson (average protein oat varieties or a corn-soybean oil meal control ration were fed to crossbred lambs to evaluate feedlot performance. The control ration promoted significantly greater (P< .05) average daily gain and greater feed efficiency than the oat rations, but there were no significant difference (P< .05) among the oat varieties.

Resulting carcasses did not differ (P< .05) for 13 carcass parameters among the oat varieties. However, Dal oats fed lambs yielded carcasses significantly different (P< .05) in hot and cold carcass weights, shoulder widths and loin eye area than those fed the control ration. There were no differences for these parameters between the control or Froker and Hudson oats fed lambs.

Sheep normally consume a higher proportion of forages and roughages to grain and seldom receive grains in their rations except for specific production situations. These production situations, fattening market lambs, during lambing season and suckling of multiple lambs, require an increase in the energy density of the ration to insure optimum performance.

Researchers working with ruminant animals have suggested various feeding values for oats. Dinusson *et al.* (1969a) reported that oats appeared to be equal to barley for growth, wintering and in the early fattening period for cattle. Further work directed by Dinusson *et al.* (1969b) resulted in the conclusion that oats were equal to barley when both were used at a level of not greater than 30 per cent of the ration. In the three year comparison of oats to corn for fattening lambs, Harper (1929) reported oats to be an equal substitute for corn and also replaced approximately 40 per cent of the roughage in the ration. Lambs fed oats made slightly greater and more economical gains in every trial without sacrificing carcass finish.

On the other hand, Jordan and Peters (1938) and Richards (1940) indicated that lambs should be started on oats in the feedlot for the first half of the period, but that oats did not cntain enough energy to properly finish the lambs. Briggs (1943) stated that oats compared more favorably with corn in lamb fattening rations when oats replaced only one half of the grain. Briggs further concluded that oats, at one half of the grain, had a feeding value of 101.5 per cent and oats fed alone had a feeding value of only 92 per cent compared to corn at 100 per cent. Current literature contains no data as to the feeding value of the new high protein oat varieties for ruminant animals.

The purpose of this study was to evaluate the growth performance and carcass yields of crossbred market lambs fed either the high protein oat varieties, Dal or Froker, or an average protein oat variety, Hudson, as compared to a corn-soybean oil meal control ration.

Materials and Methods

The ration compositions are presented in table 1. Digestible nutrient content of the rations is presented in table 2.

The genetic make-up of the crossbred lambs consisted of Hampshire rams bred to either Rambouillet/Finnsheep or Rambouillet/Border Leicester ewes. The experimental animals were vaccinated for enterotoxemia and dewormed prior to the start of the study. Lambs were allotted to treatments according to breed, sex and weight so as to equalize average pen weights within replicates (table 3).

Six lambs were allotted to each 12 foot × 7 foot pen and maintained under confinement conditions. Lambs were fed *ad libitum* and fresh water was kept accessible at all times. Average pen weights and feed consumption data were obtained weekly, from which average daily gains and feed efficiencies were calculated.

All pens were fed to an average weight of 105 pounds and then slaughtered following an overnight stand without access to feed or water. Hot carcass weights were obtained the day of slaughter and 12 other carcass parameters were measured after a 24 hour cooling period (table 5).

Analysis of variance (Snedecor and Cochran, 1967) and Duncan's Multiple Range Test procedures were utilized to aid in the interpretation of feedlot performance and carcass data.

Results and Discussion

Feedlot Trial

The performance of the lambs is presented in table 4. Average daily gains were approximately equal among the oat varieties, but were significantly different

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($P < .05$) from the control ration. The feed efficiencies followed a corresponding pattern with no significant differences ($P < .05$) among oat varieties. The control ration significantly differed ($P < .05$) from all three oat varieties in terms of feed efficiency.

The results indicate no apparent differences among these oat varieties and their effects on the growth response of lambs. Evaluation of the feed in terms of energy intake reveals that lambs fed Froker or Hudson oats had similar and the greatest energy intakes per kilogram of gain. Lambs fed Dal oats had an intermediate energy intake and control ration fed lambs had the lowest energy intakes per kilogram of gain. These results are contrary to the findings of several authors. Harrold *et al.* (1974) reported that high protein oats were significantly superior to lower protein oat varieties for supporting acceptable growth rates of rats.

Harrold and McMullen (1978) suggested that good growth rates were obtained on high protein oats, but protein content was not a satisfactory prediction of performance. Wahlstrom *et al.* (1974) reported that high protein oats were more valuable as a corn replacement for swine than were average protein oats.

Table 1. Ration Composition (%)

	TREATMENT			
Ingredients	**Control**	**Dal**	**Froker**	**Hudson**
Corn	41.1	--	--	--
Soybean oil Meal	27.0	--	--	--
Dal oats	--	72.6	--	--
Froker oats	--	--	72.6	--
Hudson oats	--	--	--	72.6
"Mill" oats	--	--	--	--
Sunflower hulls	31.5	27.8	27.0	27.0
Vitamin/mineral premix	0.4	0.4	0.4	0.4
Total	100.0	100.0	100.0	100.0

[1]Vitamin/mineral premix provides the following in a pound of ration: Vitamin A, 1600 IU; Vitamin D_3, 160 IU; Riboflavin, 1.60 mg; Niacin, 12.90 mg; d-Pantothenic acid, 4.80 mg; Calcium d-Pantotinale, 5.22 mg; Choline Chloride, 32.00 mg; Choline 27.17 mg, Vitamin B_{12}, 0.13 mg; Ethoxyquin 20 mg.

Table 2. Digestible Nutrient Content of Rations[1] (100% Dry Matter Basis)

	RATION			
Item	**Control**	**Dal**	**Froker**	**Hudson**
Digestible Dry Matter (%)	59.7	47.4	56.5	62.6
Digestible Protein (%)	11.9	6.5	7.3	7.6
Digestible Energy (Kcal/Kg)	3334	2177	2999	3383

[1]Average of four animals.

Table 3. Initial and Final Pen Weights[1] (Kg)

Pen	Initial Weight	Final Weight
C1	22.41	49.95
C2	21.59	48.23
C3	22.41	49.13
D1	21.50	48.07
D2	21.59	48.70
D3	21.64	47.36
F1	21.45	47.36
F2	22.05	48.16
F3	22.18	49.70
H1	21.36	47.39
H2	22.41	47.43
H3	22.50	49.00

Weights reflect an average of 6 lambs.

Table 4. Average Daily Gain (Kg/day and Feed Efficiency[1] (Kg/Feed/Kg gain)

Treatment	Average Daily gain[2]	Feed Efficiency
Control	0.32^a	2.50^c
Dal	0.17^b	2.81^d
Froker	0.18^b	3.97^d
Hudson	0.19^b	3.76^d

[1] Average of 18 animals.

[2] [3]Values with different superscripts within columns significantly differ at $P < .05$.

TABLE 5

Carcass Parameters	**Loin Eye Area (sq cm)***
Live wt. (kg)	**Kidney Fat (kg)***
Hot Carcass wt. (kg)*	**Carcass**
Cold Carcass wt. (kg)*	**Maturity**
Shoulder width (cm)*	**Leg Conform Score**
Leg Width (cm)	**Quality Grade**
Fat Thickness (12^{th}-13^{th} lb)	**Calculated yield grade**

***Indicated parameters show sig difference ($P < .05$) only between Dal and Control rations fed lambs.**

Carcass Evaluations

The thirteen parameters of gross carcass evaluations were measured. No significant differences ($P<.05$) were observed for live animal weight, leg widths, fat thickness (12th-13th rib), carcass conformation scores, leg conformation scores, quality grade or calculated yield grades among the oat varieties or the control ration. However, carcasses resulting from Dal oats fed lambs were found to yield significantly lower hot and cold carcass weights, shoulder widths, loin eye areas and kilograms of kidney fat ($P< .05$) than the control ration fed lambs. There were no significant differences ($P< .05$) among the oat varieties for these parameters or between the control ration and either Froker or Hudson oat fed lambs. These results oppose those of Cox (1946) who reported that no difference in carcass parameters were observed when lambs were fed several levels of energy.

Differences in hot and cold carcass weights and shoulder widths indicate a lower dressing percentage for Dal oat fed lambs. The differences in kidney fat (kgs) would tend to indicate a less than desirable amount of finish on these carcasses. This was evident also in quality grades obtained for these lambs. Dal oat fed lambs tended to grade on quality grade lower (good grade) than lambs fed the control or other two oat varieties (choice grade). These data oppose that of Ray and Mandigo (1966). They concluded that lambs fed high energy rations yeilded lower quality carcasses than lambs fed lower energy rations. However, when the loin eye areas were expressed on an area per kilogram of hot carcass weight, the significant differences between the Dal and control ration fed lambs were eliminated. This further indicates a lower dressing percent of the Dal oat carcasses. Lambs fed the three oat rations yielded carcasses that were one grade leaner than control ration fed lambs, but this also was not significantly different ($P < .05$).

Economic Considerations

Although lamb growth performance was not affected by oat variety fed, there were slight economic advantages for Hudson and Froker oat-fed lambs in the evaluation of days to market over Dal oats fed lambs. Lambs fed Hudson and Froker oats rations averaged 136 and 147 days to market, respectively. Dal oats fed lambs averaged 157 days to market. This analysis may become important when considering production costs for fattening lambs.

Not only did Dal oats fed lambs take longer to market, but their carcass quality grades tended to be one grade lower than either Froker or Hudson oat fed lambs. This would indicate that the lambs fed Dal oats should have been fed to heavier slaughter weights. Again, an economical disadvantage due to increased production costs of the longer feeding period and possible decreased returns due to decreased carcass quality and/or penalties for less desirable heavy weight lambs.

LITERATURE CITED

Briggs, H. M. 1943. **Oats and barley for fattening lambs.** Oklahoma Agri. Exp. Sta. Bull. B-272.

Cox, R. F. 1946. **Physical balance as a factor in determining th efficiency of feed utilization by fattening lambs.** Kansas State Agri. Exp. Sta. Bull. 65.

Dinusson, W. E., D. O. Erickson, C. N. Haugse and M. L. Buchanan. 1969a. **Oats in rations for growing-fattening cattle.** ND Research Report No. 24.

Dinusson, W. E., D. O. Erickson, C. N. Haugse and M. L. Buchanan. 1969b. **High moisture oats in rations for beef cattle.** ND Farm Research Vol. 27.

Harper, C. 1929. **Fattening western lambs.** Purdue University Bull. 333.

Harrold, R. L., M. L. Buchanan and G. S. Smith. 1974. **Feeding value of different oat varieties.** N. D. Farm Research Bull. 1, 32:24.

Harrold, R. L. and M. S. McMullen. 1978. **Nutritive evaluation of eleven oat cultivars; rat performance.** 11th Annual Meeting Midwestern Section - ASAS (Abs).

Jordan, P. S. and W. H. Peters. 1938. **Feeding methods and rations for fattening lambs.** University of Minnesota Agri. Exp. Sta. Bull. 306.

Ray, E. E. and R. W. Mandigo. 1966. **Genetic and environmental factors affecting carcass traits of lambs.** J. Anim. Sci. 25:449..

Richards, D. E. 1940. **Fattening lambs on Oregon feedstuffs.** Oregon State Agri. Exp. Sta. Bull. 370.

Snedecor, G. W. and W. G. Cochran. 1967. **Statistical Methods.** Iowa State University Press, Ames, Iowa.

Wahlstrom, R. C., G. W. Libal and S. L. Robbins. 1974. **High protein oats as a replacement for corn in growing-finishing swine diets.** 18th Annual Swine Day Proceedings. South Dakota State University.

continued from page 21

Legner, E. F. 1977. **Response of *Culex spp.* larvae and their natural predators to two inoculation rates with *Dugesia dorotocephala* (Woodworth) in shallow ponds.** Mosquito News 37: 435-440.

Lischetti, A. B. 1919. **Un verme de genero Planaria, enemigo natural de les larvas del mosquito.** Review of Applied Entomology. B 8: 163.

Medved, R. A. and E. F. Legner. 1974. **Feeding and reproduction of the planarian *Dugesia dorotocephala* (Woodworth), in the presence of *Culex peus* Speiser.** Environmental Entomology. 3(4): 637-641.

Mulla, M. S. and S. C. Tsai. 1978. **Fish fry kill by Hydra and Planaria.** Mosquito News. 38(1): 43-47.

Qureshi, A. H. and E. C. Bay. 1969. **Some observations on *Hydra americana* Hyman as a predator of *Culex peus* Speiser mosquito larvae.** Mosquito News. 29: 465-471.

Stage, H. H. and W. W. Yates. 1939. **Ground beetles predatory on the eggs of Aedes mosquitoes.** Entomological Society of Washington, Proceedings. 41: 204-206.

Tsai, S. C. and E. F. Legner. 1977. **Exponential growth in culture of the planarian mosquito predator *Dugesia dorotocephala* (Woodworth).** Mosquito News. 37: 474-478.

Yu, H. S. and E. F. Legner. 1976. **Regulation of aquatic diptera by planaria.** Entomophaga. 21(1): 3-12.