# Evaluation of Grass Clippings as a Feed Source for Sheep

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**Abstract**

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Tremendous quantities of grass clippings are hauled to landfills daily creating a burden to landfills and a missed opportunity for livestock producers. With ever-increasing urban development involving bluegrass turf, there is an excellent potential in a sustainable environment for feeding livestock dried,fresh or ensiled grass clippings. Although some lawn and turf pesticides state on the label that the clippings may not be used for livestock consumption, the three major broadleaf herbicides used on turf (2,4-dichlorophenoxyacetic acid (2,4-D), 2-methyl-4-clorophenoxy propionic acid (MCPP), and Dicamba) have no label restrictions for livestock. Consequently grass clippings treated with these herbicides could be a valuable source for sheep. Producer costs can be reduced through the use of this renewable resource.

Four studies were conducted with sheep to evaluate the suitability of grass clippings as a feed source. The first trial involved a comparison of growth and carcass characteristics of feeding fresh grass clippings as compared to other feeds. The second trial involved determining which carbohydrate source would work best to make the best quality silage. The third trial compared the growth of sheep on dried bluegrass clippings. A final study was conducted to determine the excretion of herbicides applied to the clippings. Urine from the sheep was analyzed using GCMS to determine the duration of elimination of 2,4-D and MCPP. The data demonstrated that sheep gain on both fresh and dry grass clippings with carcasses having acceptable quality. In addition, the bluegrass produced high value silage when mixed with other carbohydrates. Herbicide application resulted in detectable urine levels. The levels of MCPP and 2,4-D in urine dropped below detection limits (method detection limit - 10ppb) and were not evident two days after herbicide treated grass clippings ceased being fed.

| Results<br>10 Lambs per treatment | | |
|---|---|---|
| TREATMENT NUMBER AND TYPE | DAILY GAIN | DRESSING PERCENTAGE |
| #1 Feedlot Ration | .48 lb. | 50 |
| #2 Grass Hay | .11 lb. | 42.3 |
| #3 ½ Control Ration<br>½ Grass Clippings | .34 lb. | 47.5 |
| #4 Grass Clippings | .20 lb. | 41.2 |

*Figure 1*

## Materials and Methods

Fresh Grass Clipping Feeding Study

Forty randomly selected, white face, mixed breed lambs were used in this study. Mean body weight was approximately 45kg. Lambs were randomly allotted to four groups of ten lambs.

Each group received one of four rations. They included 100% feedlot ration (for the control group), 100% grass hay, 50% feedlot ration and 50% grass clippings, and 100% grass clippings. The ration was fed to the lambs at 3.5% of their body weight on an as received basis.

Lambs were fed these diets for 67 days before being weighed, harvested, and carcass data. Lambs were weighed on a bi-weekly basis. The four feed treatments were analyzed for protein, total digestible nutrients and nitrates.

Evaluation of grass silage and grass silage mixtures

While grass clippings are usually plentiful during the spring and summer, the supply is nonexistent over the winter. Therefore a study was conducted to evaluate the quality of silage made from grass clippings. Various combinations of carbohydrates were included in the mixture. The additions included a commercial microbial inoculate, beet pulp, ground hay, dried molasses, and flaked corn. The silage was tested for moisture, protein, and other nutrients.

Dried grass clippings feeding study

Twelve randomly selected white face lambs were used in this study. Mean body weight was 45-50 kg. Lambs were randomly allotted to four groups of three lambs.

Two groups received a ration of air dried blue grass lawn clippings. The dried clippings were fed at 4% of body weight on a dry matter basis. The other two groups were fed a conventional finishing ration of 75% corn and 25% alfalfa pellets at 4% of the body weight on a dry matter basis. Lambs were fed for 46 days and weighed five times throughout the trial.

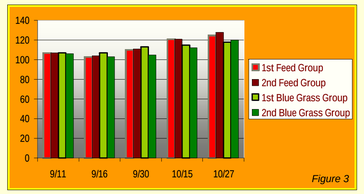


*Figure 3*

| Silage Type - Check | | |
|---|---|---|
| Silage Content | Dry Matter Basis | As Received Basis |
| Moisture % | 0.0 | 64.9 |
| Crude protein % | 21.2 | 7.4 |
| Fat % | 1.3 | 0.5 |
| Crude fiber % | 31.6 | 11.1 |
| Ash % | 10.4 | 3.7 |
| N-F-E % | 35.5 | 12.4 |
| Nitrate% | 0.08 | 0.03 |
| TDN % | 56.8 | 19.9 |

*Figure 2*

Results and discussion of feed and silage trials

The initial trial results indicated that the best daily gains were recorded by the lambs fed the control feedlot ration at .48 lbs daily. The 100% hay group had an average daily gain of .11. The group receiving a ration consisting of a 50% mixture of a conventional feedlot ration and fresh grass clippings gained .34 lbs daily and the final group receiving a 100% grass clipping ration had a daily gain of .20 lbs (figure 1).

The carcass data indicated that the carcasses were of acceptable quality. However there were differences in yield grade, fat thickness, and muscling scores as well as dressing percents. The hay and grass clippings results indicated that these feedstuffs were lower in TDN resulting in lower back fat measurements. Lower weight gains were attributed to the moisture content (75%) of the grass fresh clippings.

The results of the silage study indicated that the grass clippings make excellent quality feed. Grass clippings alone had crude protein levels of over 20% on a dry matter basis with a percent TDN of 56.8% (figure 2). An excellent combination was the corn and clippings mixture as the crude protein stayed above 12% with a TDN% of 81. Blue grass lawn clippings would make a desirable winter feed if ensiled. In all samples, the percent nitrate levels were within safe limits (less than 1% nitrate).

The results of the dried grass clippings* trial demonstrated that the market lambs gained better with diets of dried clippings as compared to the fresh clippings (figure 3). Also the carcasses were not negatively impacted as severely as they were in the fresh clipping study (figure 4). For the length of the trial, the bluegrass clipping sheep gained .251 lb per day. The conventional feed group of sheep gained .43 lb/day with a feed cost of $.25/day or $.58 per lb of gain. Consequently grass clippings at no cost would reduce the overall feeding costs.

*Special thanks to Mr. Eric Sporey for applying the herbicide to the turf grass and for air drying the grass clippings used in these studies.

| Carcass Characteristics | | | | | |
|---|---|---|---|---|---|
| Trt Group | Carcass Wt | Fat Thickness | Leg Score | LEA | QG |
| Feed #1 | 64.9 | .45 | 11.3 | 2.84 | 11.7 |
| Feed #2 | 64.5 | .35 | 12 | 2.67 | 12 |
| Bluegrass #1 | 56.2 | .27 | 11.3 | 2.54 | 11 |
| Bluegrass #2 | 56.0 | .15 | 11.3 | 2.67 | 10.75 |
| Feed Average<br>Dressing % 51% | 64.7 | .4 | 11.7 | 2.75 | 11.85 |
| Bluegrass Average<br>Dressing % 47% | 56.1 | .21 | 11.3 | 2.61 | 10.87 |

*Figure 4*

Urine pesticide levels

Six mixed breed ewe lambs were randomly selected to determine urine herbicide residues fed grass clippings known to have been treated with a commercially available herbicide containing a mixture of 2-methyl-4-chlorophenoxy propionic acid (MCPP), 2,4-diclorophenoxyacetic acid (2-4D), and 3,6-dichloro-0-anisic acid (Dicamba). After collecting urine samples from the ewes after they had been on a grass hay diet, they were exclusively fed thoroughly-mixed grass clippings free choice for 7 days. Urine samples were collected from each sheep daily, and for 4 days after the clippings were stopped and the sheep were returned to a grass hay diet.

The urine samples were analyzed for residues of MCPP and 2,4-D using standard GC/MC methods. Both compounds were detectable in the urine of the sheep, with considerable variation in detectable levels that was attributable to the varying quantity of the clippings eaten by individual sheep on different days. (Fig 5-6) Within 2 days of the sheep being taken off of the herbicide treated grass clippings, the levels of MCPP and 2,4-D had dropped below detection limits.

The mixed grass clippings were analyzed for the presence of the herbicides and were found to contain 40.7 µg/kg of 2,4-D and less than 20 µg/kg of MCPP. Nitrate levels in the grass clippings were 0.19%.

Summary – Grass clippings treated with the herbicides MCPP and 2,4-D and fed to sheep result in detectable levels of the herbicides in the urine. Sheep principally excrete these herbicides through their urine, with urine herbicide levels being non detectable 2 days after the last feeding of the herbicide contaminated grass clippings

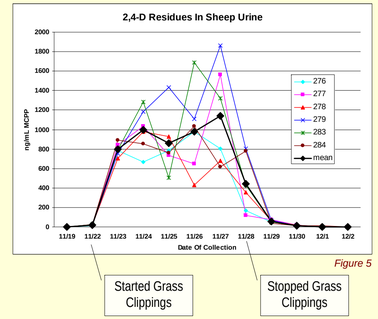


*Figure 5*

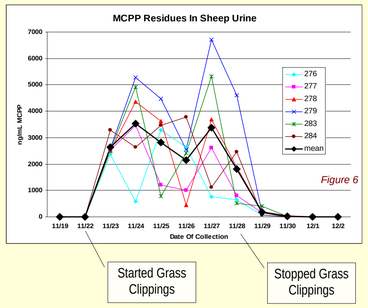


*Figure 6*

## Conclusion

The results from the 4 studies collectively indicate that grass clippings can be effectively and safely utilized as inexpensive,renewable feed sources for sheep. Grass clippings supplemented with grain resulted in acceptable daily weight gains and carcass traits at less cost per pound of gain than conventional diets. Even when grass clippings had been treated with herbicides approved for feeding to livestock, detectable levels of herbicide in the sheep urine became non-detectable 2 days after the last day the clippings were fed.