Adding Value to Lamb by Evaluating and Reducing the Incidence of Lung Lesions

J. A. Daniel[1], J. Held[1], W. Epperson[2] and L. Holler[2]
[1] Department of Animal & Range Sciences
[2] Department of Veterinary Science
South Dakota State University, Brookings, SD 57007

Introduction:

Interest in assessing the significance of lung lesions in ruminants at slaughter has only recently emerged. Early reports examined the prevalence and effects of lung lesions on cattle performance (Wittum et al., 1995, Bryant et al., 1996). These reports concluded that lung lesions in cattle could be reliably diagnosed by observation at slaughter, and are associated with decreased performance and product quality (Gardner et al., 1999). Only very recently has the biological effect of lung lesions been assessed in fed lambs. These studies indicate that, depending on severity, lung lesions can decrease animal performance. Our recent work has indicated 44% incidence of lung lesions in Spring born lambs at South Dakota State University (Daniel et al., 2003). We also observed a decrease in gain of 0.08 pounds per day during the entire post-weaning period (Daniel et al., 2003). Others have observed, lambs with severe lung lesions had reduced daily gain during the last month of the finishing period, a 5-10% decrease (Goodwin et al., 2001). Affected lambs usually have no history of respiratory disease prior to slaughter, therefore lung lesions represent subclinical (silent) respiratory disease.

Lung lesions have been shown to negatively impact growth performance of lambs and eliminate a lamb carcass from the highly valuable Kosher lamb market. Of lambs presented for Kosher slaughter, 20-30% are rejected due to lung lesions. Carcasses qualifying for kosher have $5-10 per head in added value, therefore rejection of 20-30% of lambs represents a significant loss to the sheep industry. The cause, timing, and predisposing conditions for development of the lung lesions are unknown, thus limiting the development of intervention plans to prevent lung lesion formation. At present, lung lesions can only be diagnosed at slaughter.

Lung lesions are a common condition in lambs, which lower growth performance and potentially decreasing carcass value, thus reducing profits for sheep producers. It is important that work be done to describe and attempt to limit lung lesions in lambs. We have planned a series of studies to determine the microbes associated with lung lesions and the time frame of lesions formation. We plan to find cost effective strategies to implement on commercial farms/ranches that would limit the affects of lung lesions in lambs. The studies described here assess the timing of the onset incidence of lung lesions in lambs produced at the SDSU Sheep Unit.

Research Procedures:

Timing of onset of lung lesions in lambs.

In Spring of 2003, crossbred wethers born at the SDSU Sheep Unit were divided into three slaughter groups prior to weaning. Lambs were born in a 32 day lambing period (February 4 - March 8, 2003). Lambs were weaned at 78 ± 0.13 days of age and either slaughter the following day (weaning slaughter group, n = 21) or fed common commercial lamb rations on an ad lib basis as a group. Remaining lambs were slaughtered in two groups (mid-finishing, 50 days post-weaning, n = 20, or finished, 71 days post-weaning, n = 21). A ventral-dorsal and lateral x-ray image of the lungs of each lamb was collected 1 week prior to slaughter. Live weights were collected on lambs the day prior to slaughter and designated as slaughter weight. Following slaughter, lungs were examined and scored for presence of lung lesions. Lambs were determined to have lung lesions if reactive lymph nodes and absesses were present in the lung, if over 50% of the right cranial lobe was consolidated, or if pleural adhesions were present. Lung samples were collected from all lambs and cultured for the presence of bacteria.

Results and Discussion:

Of the lambs in the weaning slaughter group, there was not a single incidence of a lung lesion as scored by our categorizing system (figure 1). One lamb (5%) did have 20% consolidation of the right cranial lobe, and eight other lambs (38%) had very minor consolidation of the right cranial lobe (1 percent or less). Of the lambs in the mid-finishing slaughter group, six lambs (30%) had lung lesions using our scoring system. A total of 19 in the mid-finishing slaughter lambs (95%) had some consolidation of the right cranial lobe (at least 1 percent). Of the lambs in the finished slaughter group, eight lambs (38%) had lung lesions using our scoring system. A total of 19 lambs in the finished slaughter group (90%) had some consolidation of the right cranial lobe (at least 1 percent). Of the lambs which developed lung lesions, all of the lambs were at least 60 days of age at weaning and 110 days of age at slaughter, and weighed at least 84 pounds. These data suggest that lung lesions are a problem that occurs in the lambs post-weaning, although it is possible that some pre-weaning event could predispose the lambs to develop lung lesions.

Culture analysis revealed the presence of *Mannheimia (Pasteurella) Haemolytica* in 57% of the lambs with lung lesions and *Pasteurella multocida* in 50% of the lambs with lung lesions. Eight percent of lambs without lung lesions culture positive for either of these organisms. These results suggest that *Pasteurella sp*. might be a potential target to reduce the incidence of lung lesions.

Encouragingly, we were able to positively identify the presence of lung lesions by x-ray. This will allow us to identify live animals with lung lesions, and should aid in future research on the impact of lung lesions and potential strategies to reduce the negative impact of this problem in sheep.

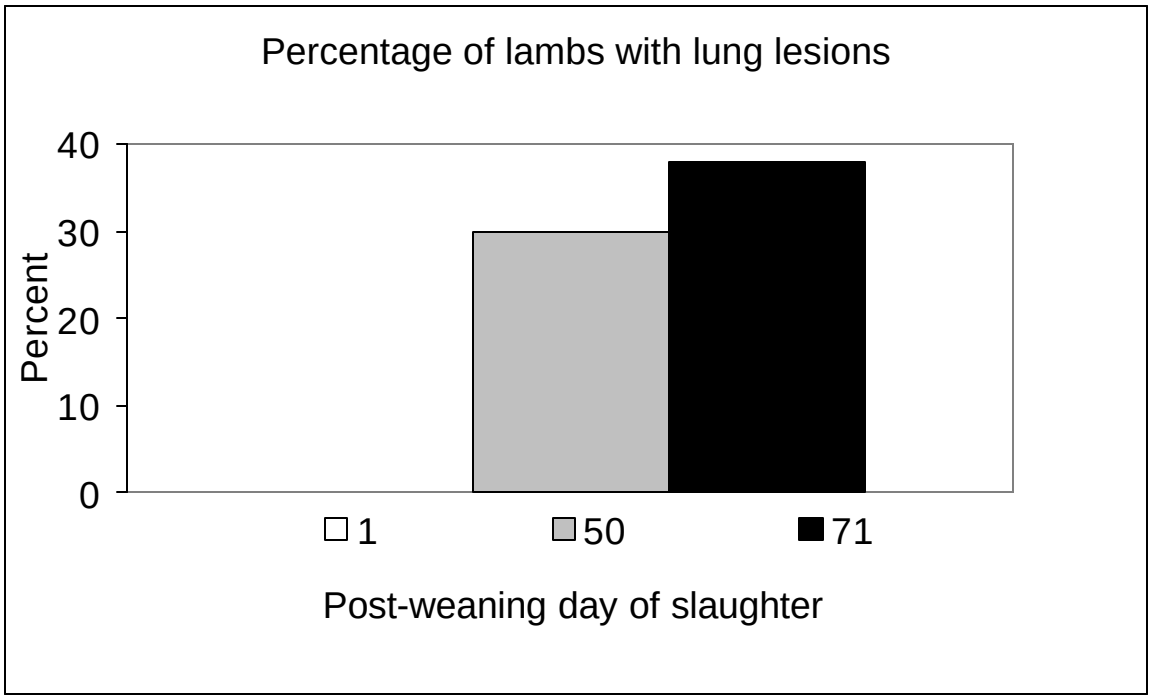

Figure 1: Percentage of lambs with lung lesions slaughtered at 1, 50 or 71 days after weaning. Lambs with reactive lymph nodes and absesses in the lung, over 50% of the right cranial lobe consolidated, or pleural adhesions were considered to have lung lesions.

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