USE OF LAMBING CUBICLES AND THE BEHAVIOR OF EWES AT PARTURITION

H. W. Gonyou and J. M. Stookey

University of Illinois 1, Urbana 61801

Summary

Three trials were conducted involving 393 ewes to determine the feasibility of using cubicles to provide isolation for parturient ewes in lambing pens. The cubicles consisted of an enclosure with 1 m high walls and a small (.6 m wide) opening to allow ewes free access. In trial 1, 42% of the parturitions occurred in the cubicles, which occupied only 19% of the pen area. No preference was noted for large (1.8 x 1.2 m) vs small (1.8 x 1.2 m) cubicles. Use of the cubicles increased from 4% of the time 24 h before parturition to 25% of the time during the 6 h immediately preceding parturition. In trial 2, ewes did not show a preference for open vs covered walls on cubicles or for open vs covered cubicle ceilings. Cubicles were again used to a greater (P<.01) extent than would be predicted by their relative area (26% use, 18% area). In the final trial, mature ewes used cubicles to a greater (P<.10) extent than did yearlings (55 vs 38%, respectively). Cubicles and areas of the pen farthest from the working area of the herdsman were most frequently (P<.001) used during parturition. Cubicles appeared to be effective in preventing separation of newborn lambs from their dam and in reducing interference by other ewes. (Key Words: Sheep, Maternal Behavior, Lambing Cubicles, Isolation, Interference.)

Introduction

Disruption of mother-young interactions shortly after parturition can be a serious problem in sheep production. Welch and Kilgour (1970) reported that 10% of the lambs that they observed were paired with ewes that were not their mother. Winfield (1970) observed interference in the mothering process by other ewes for 29% of all lambs born. Poor maternal-young bonds may result in lamb losses because lambs are deserted or have difficulty being allowed to nurse. Incorrect pairing of lamb and ewe is also detrimental to genetic selection.

Reports on both wild and domestic sheep indicate that ewes may reduce the possibility of mismothering by seeking areas isolated from other ewes at the time of parturition. Rocky Mountain sheep leave their home range for several days at the time of parturition (Geist, 1971). Feral Soay ewes remain in their home range, but separate themselves from the rest of the flock (Grubb, 1974). Arnold and Morgan (1975) reported that 46% of Merino ewes isolated themselves before parturition.

The cubicle system of lambing management developed in this series of trials was designed to provide isolated areas within a lambing pen in an attempt to reduce inappropriate maternal behavior. The effects of cubicle size, design and location were assessed in terms of cubicle use at lambing. The efficacy of the cubicles to reduce lamb contact by alien ewes is described.

Materials and Methods

Ewes observed in these trials represented a variety of breeds and breed crosses. All births occurred in the spring of 1981 at the Dixon Springs Agricultural Research Station of the University of Illinois. Each trial was about 6 wk in duration and ewes were placed in the pen 2 to 4 wk before the expected date of parturition. Trial 1 began in February and the final trial ended in May. Recording of the locations of parturition and some general observations were made by staff at frequent intervals throughout the day and night. Ewes were allowed outside to feed from a fence-line feeder for 4 to 8 h once daily. The term “lambing pen” is used to denote the large indoor area where ewes were confined except when being fed. Cubicle refers to a small enclosed area in the lambing pen with access to the remainder of the pen via an opening in one side. Cubicles were con-
structured of panels with a height of 1 m. The entrance to each cubicle was .6 m wide and had a threshold .25 m in height consisting of a board or plastic bars. Right-angled corners within the lambing pens were eliminated whenever possible by means of partitions. The entire lambing pen, including cubicles, was bedded with straw or poor quality hay periodically. Unless otherwise indicated, statistical tests of significance were based on the Z or $\chi^2$ distributions (Alder and Roessler, 1968).

**Trial 1.** This trial was designed to determine the use of cubicles by ewes in late gestation and during parturition. In addition, two sizes of cubicles were evaluated. Twelve cubicles of two different sizes (1.8 x 1.8 m and 1.8 x 1.2 m) were arranged in three groups of four in the lambing pen. In addition, the remainder of the pen was divided into areas by means of posts in the center and along the side of the pen (figure 1). A total of 162 ewes were observed during the trial and the location of each parturition was recorded. The ewes in this study were all mature (2-yr-old or older). Approximately 100 ewes were in the pen at a time. When the number decreased below 90, additional ewes were added.

Continuous observations of the ewes in the pen were made for a 72-h period during which about 110 ewes were present and 16 parturitions occurred. All ewes were paint branded on both flanks before the observations to allow individual identification. Ewes in the cubicles were identified at 15-min intervals during the 72-h period. Of the parturitions observed, 13 took place after the initial 24 h and were used to determine cubicle use before parturition. Ewes and newborn lambs were left in the pen or cubicle for 4 h during the observation period. At other times, ewes and lambs were removed at the convenience of the herdsmen and were rarely left beyond 2 h.

**Trial 2.** The trial was designed to investigate the effect of solid or open walls and ceilings on the use of lambing cubicles. The lambing pen was arranged to include eight cubicles (1.8 x 1.8 m) as shown in figure 2. The cubicles represented 18% of the pen area and were assigned in a factorial design to treatments of open or covered sides, and open or covered ceiling. Open walls consisted of wire fencing while covered ceilings and walls consisted of wire fencing draped with jute sacking. The entire pen was subdivided by posts into the areas indicated in figure 2. In addition to

![Figure 1](image1.png)  
**Figure 1.** Diagram of cubicles and areas on lambing pen; *indicates area used extensively for lambing. Trial 1.

![Figure 2](image2.png)  
**Figure 2.** Diagram of lambing pen and cubicles used in trail 2. Broken lines on cubicles indicate open wall. Solid lines indicate covered walls, X indicates covered ceiling and *indicates area of pen used most extensively for lambing. O indicates unused area.

![Figure 3](image3.png)  
**Figure 3.** Diagram of lambing pen and cubicle arrangement used in trial 3. Exit was to feeding station outdoors. See text for locations of lambings.
recording the location of parturition for 133 ewes, herdsmen checked each cubicle periodically during both day and night to determine its usage by nonparturient ewes. Variation in the use of cubicles was tested by an analysis of variance (Nie et al., 1975). About 70 ewes were present in the lambing pen at a time.

**Trial 3.** This trial was designed to determine areas of the pen used most for parturition and compare the use of cubicles by mature ewes and yearlings. The cubicles (about 1.8 x 1.8 m) were arranged as indicated in figure 3 and represented 37% of the total pen area. Location of parturition was recorded for 73 yearlings and 49 mature ewes. Comparisons were made between the one-half of the pen nearest the alley and that furthest away (cubicles 8 and 15 omitted) and among the five areas of cubicles (1 through 4, 5 through 7, 9 through 11, 12 through 14 and 16 through 18). About 100 ewes were in the pen at one time.

**Results**

**Trial 1.** Of the parturitions recorded in the trial, 138 occurred in the pen and the remainder were outside during the feeding period. The results are based on the parturitions occurring inside. Forty-two percent of the parturitions were in cubicles and the ratio was greater than would be expected in terms of floor area (table 1, P<.001). There was no preference for either size of cubicle. Some of the cubicles were used extensively, while others were rarely used. Certain areas of the pen were also used heavily (figure 1). During the 72-h observation, 59% of the ewes present entered at least one cubicle. An average of only 5.8% of the ewes were in the cubicles at a time, which was significantly less than that expected based on floor area (P<.001). The increase from average use (5.8%) to use at parturition (42%) was evident in the ewes observed for 24 h before giving birth. During the period 18 to 24 h before parturition, the ewes spent only 4% of the time in cubicles. During the final 6 h before parturition, the ewes spent 25% of the time in cubicles.

Lambs born in cubicles did not leave them even when left for 4 h during the continuous observations. The threshold of the opening into pen was observed to prevent lambs from escaping. Ewes remained with their lambs and generally defended them from other ewes attempting to enter the cubicle. Thus, ewes and lambs in the cubicles were never separated by more than 2 m. On only one occasion during the entire trial did two ewes give birth simultaneously to lambs in the same cubicle. On a number of occasions, one ewe would deliver inside a cubicle and a second ewe deliver in the pen just outside the cubicle. Because of the cubicle wall and threshold, this situation did not result in misdirected maternal care. The lambs born in the open pen were frequently interfered with by other ewes. Confusion over lambs was observed during the continuous observation when two ewes delivered lambs at about the same time in the open area of the pen. In addition, members of a set of twins born in the open pen were observed to be separated by as much as 8 m during the 4 h after birth before the ewe managed to get them back together.

**Trial 2.** During the trial, parturitions of 34 ewes, or 25.6%, were in the cubicles. As cubicles represented only 18% of the total area, lambing

---

**TABLE 1. USE OF CUBICLES AND OPEN PEN BY EWES DURING PARTURITION**

<table>
<thead>
<tr>
<th>Item</th>
<th>Cubicles</th>
<th>Open pen</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trial 1 (138 ewes)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area, %</td>
<td>19</td>
<td>81</td>
<td>P&lt;.001</td>
</tr>
<tr>
<td>Parturitions, no.</td>
<td>58</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td><strong>Trial 2 (133 ewes)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area, %</td>
<td>18</td>
<td>82</td>
<td>P&lt;.05</td>
</tr>
<tr>
<td>Parturitions, no.</td>
<td>34</td>
<td>99</td>
<td></td>
</tr>
<tr>
<td><strong>Trial 3 (122 ewes)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area, %</td>
<td>37</td>
<td>63</td>
<td>P&lt;.05</td>
</tr>
<tr>
<td>Parturitions, no.</td>
<td>55</td>
<td>67</td>
<td></td>
</tr>
</tbody>
</table>
in the cubicles was greater than expected based on relative areas (table 1, P<.05). Identical numbers of parturitions occurred in cubicles with open or closed walls, and with open or covered ceilings. Treatment interactions were not significant. Use of the cubicles by nonparturient ewes was greater (P<.05) in open-walled than covered-walled pens (53.3 vs 18.5 observed users/pen, respectively). Although cubicles with covered ceilings were less frequently used than those with open ceilings (28.0 vs 43.7 observed users/pen, respectively), the difference was not significant. One area of the open pen was used by a large proportion (18%) of the parturient ewes (figure 2).

**Trial 3.** The cubicles were used for 46% of all parturitions which was more than would be predicted on the basis of area ratios (P<.05). For the mature ewes, 55% of the parturitions were in cubicles compared with only 38% for the yearling ewes (P<.10). Parturitions in one-half of the open pen and cubicles nearest the alley were fewer than in the remainder of the pen (38 vs 81; P<.001). Subgroups of cubicles differed in the proportion of ewes using them during parturition (P<.001). Cubicles 1 through 4, in the center of the pen, were used by seven ewes. Cubicles 9 through 11 and 12 through 14, in the corners near the alley, were used by four and five ewes, respectively. Cubicles in the corners at the rear of the pen were used more extensively (17 and 21 ewes in cubicles 5 through 7 and 16 through 18, respectively).

**Discussion**

Although several factors differed among the three trials, there was a significant proportion of ewes in each that used the cubicles as opposed to the open pen during parturition. Although larger numbers of cubicles were available in trial 3 compared with trial 1, only 4% more ewes made use of the cubicles. As cubicles were not used extensively until parturition, vacant cubicles were usually available during both trial 1 and 2 when one cubicle was available for every eight to 10 ewes. The fact that more ewes did not use cubicles when they were available suggests that individual preferences exist among ewes. The proportion of ewes in a flock with a particular preference could vary due to the genetic makeup of the flock or previous experience. Arnold and Morgan (1975) observed that some ewes sought isolation at parturition and others did not. The proportion which sought isolation (46%) was very similar to the proportion that used cubicles in trials 1 and 3.

In trials 1 and 2, certain areas in the pen were used extensively during parturition. Welch and Kilgour (1970) reported that preferred sites for parturition are common in lambing paddocks and may be reinforced by an accumulation of birth fluids. The sites used in trials 1 and 2 tended to be remote from the areas of frequent human activity. Cubicles in these areas were used more frequently than those elsewhere. This hypothesis was strengthened in trial 3 in which the majority of lambs were born away from the working alley. In addition, the corners in the working area were also rarely used. Use of the cubicles in trial 2 may have been greater if the experimental design and facility had not precluded the use of a large remote area for cubicles.

The use of the cubicles changed from a level that indicated avoidance to one of preference during the 12 h before parturition. This indicates that the cubicles possessed a characteristic attractive to some parturient ewes. Once in a cubicle, the ewe was rarely interfered with by other ewes. The period during which this increased usage occurred was similar to the period during which Alexander (1960) observed prelambing maternal interest and Arnold and Morgan (1975) observed behavioral signs of parturition. Alexander et al. (1979) observed that shelter belts in the center of a paddock were used extensively by all ewes and that at the time of parturition some ewes would use the periphery in an apparent attempt to be isolated. Although Stevens et al. (1981), using a large paddock, failed to observe significant numbers of ewes separating themselves from the flock at parturition, they indicated that their technique was not sensitive enough to detect isolation by only short distances. In the case of cubicles, the area intended for use at parturition was primarily attractive to the ewes at the time of parturition only. It would appear likely that the use of cubicles is due to both the location in the pen and their provision of an isolated area.

In trial 2, the ewes failed to display a preference for covered or open cubicles at the time of parturition. Although Geist (1971) concluded that Rocky Mountain sheep sought protected areas in the cliffs for parturition, Grubb (1974) reported a wide variation in site selection in Soay sheep. Only 29% of the Soay sheep
observed at parturition were next to walls, rocks or in enclosures while the remainder lambed in open areas. It would appear from the results of trial 2 that visual isolation is not of great importance to all ewes and that protection from physical interference may be the mechanism involved.

The differential use of cubicles by mature ewes and yearlings agrees with other reports of primiparous ewes displaying poorer maternal behavior than older ewes. Shelley (1970) reported that 21% of young ewes deserted their lambs while only 13% of mature ewes deserted. Grubb (1974) reported that none of the Soay sheep lambing as yearlings raised their lambs and most displayed no maternal interest. Whether the lack of maternal care is due to age, lack of experience or generally poorer nutritional status of the young ewes is not clear.

The usefulness of cubicles in lambing pens depends upon their ability to protect the ewe and lambs from interference by other ewes, and to keep ewes adjacent to their lambs until the maternal-young bond is completed and the herdsman can move them to a new area. In addition, ewes must use the cubicles during parturition and rarely enter them at other times. These studies suggest that a significant proportion of parturitions of ewes in confinement will occur in cubicles, especially if they are strategically placed in the pen. Further, lambs born in cubicles remained close to their dam and were rarely interfered with by other ewes, even when a second ewe gave birth immediately outside of the cubicle.

Literature Cited


