Effects of TIME OF SHEARING on wool and lamb production

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THE STRENGTH of each individual wool fiber is affected by the health of the sheep when the wool is growing. Poor feed conditions, long cold stormy periods, and lambing and lactation stress may produce "breaks" in the wool or tender wool, caused by a temporary slowing of wool growth and a reduction in the diameter of each fiber. Fleece rot also occurs during long periods of wet weather. In the coastal areas of the western United States, several of these conditions often coincide during December and January. Time of shearing will determine the position of the weakened area in the wool staple. If the area occurs midway in the length of the staple, the fleece will consist of two short lengths instead of one long fiber. Wool manufacturers consider short fibers less valuable. If the weakened area occurs at the tip or near the base of the wool fiber, the short pieces will go into the noils, but the main fiber will still be long and strong. The value of such fleece will still be lower than that of an undamaged fleece but greater than that of a fleece with a staple broken at the midgrowth point.

Shearing dates

On May 7, 1962, 208 Corriedale, Targhee, and Corriedale × Targhee ewes were shorn at Hopland Field Station, Mendocino County. Just prior to lambing, on December 28, 1962, 68 of these ewes were reshorn; 72 were reshorn on April 19, 1963; and just prior to breeding, on July 18, 1963, 68 ewes were reshorn. In the following years the ewes in each group were shorn on their anniversary dates until April 20, 1966, when all ewes were shorn on the same date. At each shearing the fleeces were weighed, graded on the spinning count system, and measured for length. Abnormalities were recorded.

All ewes were pastured together except for four months after lambing when the ewes with twins were pastured separately from the ewes with single lambs. None of the lambs was creep fed. The only difference in handling between the twin and single groups was a lower stocking rate in the twin group.

The ewes grazed range forage which consisted of a wide variety of annual grasses, legumes, and broadleaf herbs. Generally the plants germinate during November or December, growing little until mid-February or March when the most growth and production occurs. The feed dries and matures during May and June so only mature, dry forage is available from June to November or December.

High temperatures

The mean high temperatures for the months of July, August, and September were 89.8°, 90.4°, and 85.7°F, respectively. The mean low temperatures for the same months were 49.5°, 51.4°, and 46.5°F.

After the December shearing, the ewes remained in a pasture near a barn where they could find shelter at night and get out of the rain. Alfalfa hay was fed the day they were shorn and any other day during the next seven days when the weather was such that they would not go out and graze. They were fed at a rate of 2.5 lbs per head per day.

The Corriedale and Targhee × Corriedale ewes were bred to Corriedale rams and the Targhee and Corriedale × Targhee ewes were bred to Targhee rams. All groups were bred on matured native annual pastures without supplementation. Lambing occurred between January 1 and February 5. The lambs were sheared the last week of April and were weaned the last week in May or the first week of June.

The feed of all ewes was supplemented with 1 lb of alfalfa hay from December 1 to January 1, when they were brought to the barn to lamb. While at the barn they received 4 lbs of alfalfa hay per head per day. After lambing they were returned to pasture with no further supplemental feeding.

Effect on wool

It takes at least eight wet days and four inches of rain per month before a fleece rot outbreak will occur. However, high-intensity rains which wet the skin may also cause fleece rot. Even though these conditions did occur during the period of this study, few experimental ewes experienced fleece rot to a measurable degree. The number of fleeces developing wool breaks as a result of poor nutrition was so low that no conclusions could be drawn.

Graph 1 shows the shearing dates for each group, the breeding seasons, the season when the ewes were nursing their lambs, and the amount of grease wool produced during each period. Significant differences ($P < 0.05$) in quantity of grease wool were produced between shearing dates and between years. Fleeces from sheep shorn in July and December visually contained more vegetable matter and dirt than the April-shorn fleeces, so the amount of clean wool may not have varied as much as suggested by the grease wool figures.

Amounts of grease wool produced between May 7, 1962, and April 20, 1966 (47 months), were 31.4 in April, 35.0 in July, and 33.6 lbs in December. April and July were significantly different from each other ($P < 0.01$) but December was not significantly different from either April or July.

Lamb production

The average total number of lambs born and weaned per ewe bred in the three years (1964, 1965, and 1966) is shown in table 1. There were no significant differences between shearing groups in the number of lambs born; however, the December group lost fewer lambs so that the number of lambs weaned was significantly higher in that group than in the other groups.

Total pounds of lamb produced (at 120 days) per ewe bred were added together by ewe for three years. This total was then averaged to arrive at a yearly figure. Average pounds of lamb produced per group were 58.7 in April, 60.6 in July, and 68.1 in December.

Table 2 shows the percentage of open ewes as well as the percentage of mul-

Time of shearing does affect both wool and lamb production and also ewe mortality. Shearing during seasons of the year other than spring and summer can increase lamb production and also produce stronger wool fibers. Shelters and additional feed are required if bad storms strike after winter shearing.

tiple births in the three treatment years. The December-shorn ewes in the first two years had fewer open ewes and more multiple births than the other shearing date groups—explaining the higher average number of lambs for this group in table 1.

The two most noticeable differences in the actual body weights (figure 2) were the lower body weights of the July-shorn group in July, 1963. These ewes were carrying 15 months of wool at the time. The other outstanding difference was the low weight in April, 1966 of the December-shorn group; however, they recovered their weight in the next six-week period.

Longevity

Effects of shearing date on cumulative mortality during the experimental period are shown in table 3. In all groups the highest mortality occurred in the period after shearing. The causes of death in this experiment were not determined but it appears that acclimatization and nutrition may have been contributing factors. The average ages of the ewes that died were 5.0 years in April, and 5.5 years in both the July and December shearing groups. This difference was not significant.

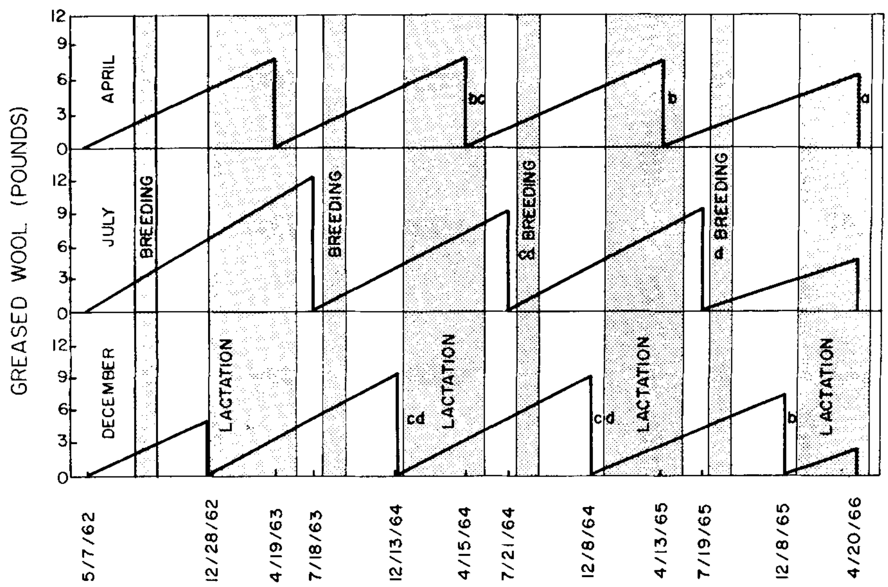
It appears from this experiment that removal of wool was detrimental to the welfare of ewes at all dates since mortality was higher immediately after shearing than at other times. On the other hand, in one group where the ewes were carrying 15 months of wool the body weight was significantly less than in the other two groups.

Shearing prior to breeding did not increase the number of ewes lambing, nor increase multiple births. At Hopland the forage is mature and dry at this time, and at best supplies only a maintenance ration. The forage is below recommended allowances for crude protein. A shorn ewe needs more energy to maintain body heat during low night-time temperatures. Since it is unlikely that she would be able to consume additional amounts of this protein-deficient forage, there could be an "antiflushing" effect.

The December-shorn ewes were carrying approximately 2 inches of wool at breeding during August when differences between high and low temperatures in one day average 40°F. The fleece would be beneficial as an insulator against these rapid changes in temperature and would conserve energy. This benefit is evidenced in the number of ewes lambing as well as the number of multiple births. This advantage was not evident during the last test year possibly due to the advanced age of the ewes.

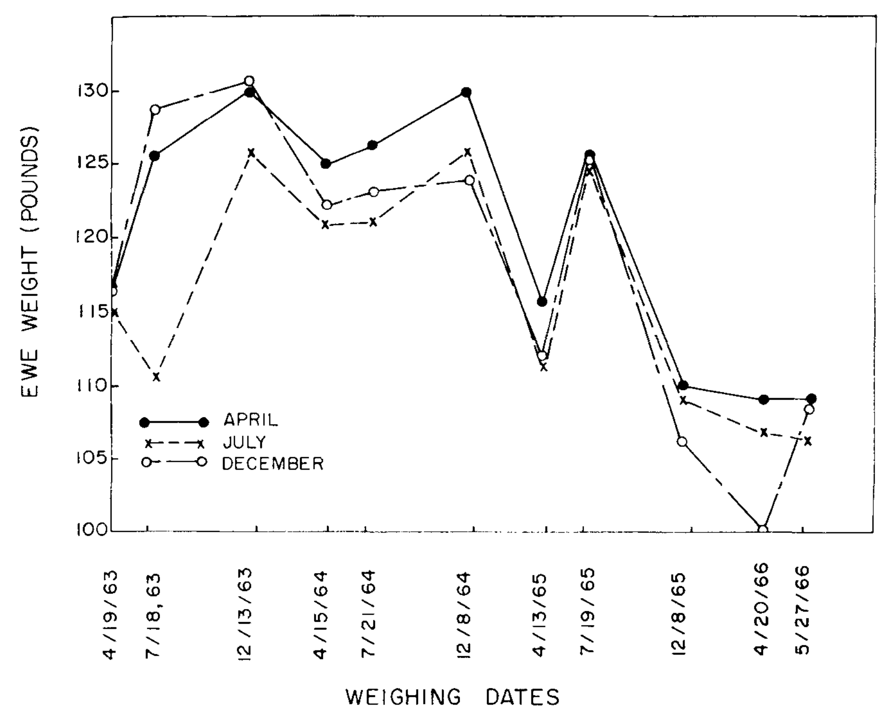
The effect of shearing date on wool growth was not completely demonstrated in this experiment since only grease weight was recorded. If the April wool (a cumulative growth of 47 months) yielded 60 per cent, then the July yield would have to be 54 per cent and December 56 per cent, to equal the same amount of clean wool. With the additional seed-

FIGURE 1. WOOL PRODUCTION AND CALENDAR OF BREEDING AND LACTATION



SHEARING DATES IN RELATION TO TIME OF BREEDING AND LACTATION
a,b,c,d VALUES BEARING UNLIKE SUBSCRIPTS ARE SIGNIFICANTLY DIFFERENT (P< 0.05). FLEECE WEIGHTS FOR ALL TWELVE MONTH SHEARING DATES COMPARED.

FIGURE 2. BODY WEIGHT AFTER SUBTRACTING WOOL WEIGHT.



heads and dirt penetration in the July and December groups, this difference in yield is possible—and thus there may have been no differences between treatments.

The number of deaths in both the July- and December-shorn groups was considerably higher than in the April group. Shearing during the inclement weather in December would encourage such common diseases as pneumonia. The low nutritive value of the range forage would also cause nutritional stress due to the body energy losses. Nutritional stress may be a contributing factor in deaths among the July group as well. Forage was plentiful and of good quality at the April shearing date, so nutritional stress should not have been a factor in the higher death rate (table 3) after shearing; however, nights were still cold (less than 40°F) which would undoubtedly stress the ewe.

Sheep mortality can be influenced by the choice of shearing date. Sheepmen should try to select a season relatively free of wide fluctuations in temperature, should provide shelter where possible after shearing, and should keep the freshly shorn ewes on a high plane of nutrition.

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TABLE 1. AVERAGE NUMBER OF LAMBS BORN AND WEANED FROM THREE LAMBINGS BY SHEARING DATE

Shearing date	Lambs born per ewe	Lambs weaned per ewe	Survival percentage
April	1.10	.89[a]	80.96
July	1.09	.91[a]	83.23
December	1.19	1.07[b]	89.92

[a, b] Values bearing unlike superscripts are significantly different ($P < 0.05$).

TABLE 2. PERCENTAGE OF OPEN EWES AND EWES HAVING MULTIPLE LAMBS BY YEARS BY SHEARING DATE

Shearing date	Percentage of open ewes			Percentage of ewes with multiple births		
	1964	1965	1966	1964	1965	1966
April	14.0	4.0	2.4	26.5	14.6	19.5
July	9.5	4.8	11.4	10.5	23.3	13.6
December	6.6	1.8	5.3	28.5	33.3	10.5

TABLE 3. EWE DEATH LOSS

Shearing date	Total deaths	Time distribution of deaths*		
		April–July	July–December	December–April
	%	%	%	%
April	19	49.2	32.6	18.2
July	32	32.6	48.0	19.4
December	38	23.0	38.5	38.5

* Corrected for different number of days.

R. M. BURNS

PLASTIC CONTAINERS

avocado nursery

PLASTIC CONTAINERS for avocado nursery trees are relatively new in California, but nurserymen are showing increasing interest in them. One of the most popular avocado nursery containers for many years has been the tarpaper cylinder made from heavy roofing paper. These tarpaper containers have two main shortcomings: the relatively high labor cost of cutting and stapling; and frequent disintegration.

Polyethylene containers have been used for a number of years to propagate such tropical plants as coffee, rubber, and cocoa. In these instances the plastic container is usually a long polyethylene bag that is open at the top but closed at the bottom, with holes for drainage.

One of the first uses of plastic containers for avocados was in a nursery near Teziutlan, Mexico in June 1963, These containers were made from 8 mil black polyethylene tubing. This was cut with a regular paper cutter into 14-inch lengths. When flat, they were 10 inches wide, and when full of soil, made a container approximately 6 inches in diameter. The nurseryman was planning to reuse the plastic and he demonstrated how the container could be slipped off without being cut and without disturbing the soil and roots of the tree.

Two cooperative trials were started in California in November 1963, one at the W. E. Frey Nursery in Escondido and the other at the W. H. Brokaw Nursery in Ventura. In each of these trials 200 containers, 14 inches long, were cut from a long length of 8 mil black polyethylene tubing. The containers when filled were 6 inches in diameter. The material for each container cost about 15 cents.

Seed germination rates and seedling measurements in comparable numbers of plastic and tarpaper containers were made periodically in both trials. There were some differences in germination and growth, but these were not significant.

Avocados growing in plastic bags at the Los Padres Avocado Nursery, Watsonville. These polyethylene containers have holes in the bottom for drainage.