

**NOTES:**

**LAMBING PERFORMANCE OF ST. CROIX HAIR SHEEP IN A HIGH-RAINFALL AREA OF HAWAII**

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**ABSTRACT**

*Production and health data was collected over a two-year period on a flock of St. Croix ewes managed in the Hilo area on the island of Hawaii (19°43"N, 155°3"W). Annual rainfall averaged 3,475 mm for the two-year period. Ewes were managed on pasture without shelter and bred for lambing once in March, 1992 and in April and November, 1993. Ewes were supplemented with energy and protein during late gestation and early lactation. Ewe production and lamb 60-d weaning weights, and preweaning growth rates were similar to information previously reported for St. Croix sheep managed in arid, tropical and arid, temperate climates and fed 90% of NRC requirements. The incidence of fly strike was extremely low. Sheep (especially lambs) developed a transient dermatitis during the wettest periods of the year but developed a resistance once infected. Periodic treatment for foot scald was necessary during the wettest periods of the year.*

**KEYWORDS:** *St. Croix, Sheep, High-Rainfall, Performance*

**INTRODUCTION**

Sheep production in the warm, humid regions of the U. S. has not been very successful primarily because of heat stress (Goode et al., 1983). Heat stress in sheep reduces fertility in rams and ewes and reduces overall production by ewes and growing lambs. Other factors that have limited sheep production in the warm, humid regions, particularly those areas receiving significant amounts of rainfall, include economic losses due to internal parasites, wool rot, fly strike, and hoof rot.

There has been a growing interest in the U. S. to use hair sheep to improve sheep production in the humid South (Grauberger, 1994). Unlike their woolly relatives, hair sheep have coats similar to cattle or goats and are well adapted to warm, humid environments. Hair sheep are desirable for low-input systems where there is little advantage to wool production.

Generally, when hair sheep and wool sheep are compared in warm, humid environments, hair sheep:

- \* show greater resistance to heat stress
- \* are more fertile and more prolific
- \* have a higher production per unit of ewe body weight
- \* lambs have better survivability and show superior resistance to parasites (Bradford and Fitzhugh, 1983)

St. Croix, Barbados Blackbelly, and St. Croix X Barbados hair sheep have been produced successfully by small private enterprises on the island of Hawaii. However, most of these sheep operations are located in the drier areas of the island. The ability of hair sheep to adapt to the warmer areas receiving very high rainfall have not been well documented. In these areas there is a greater risk of health problems associated with the excessive rainfall. A study was conducted to evaluate the adaptability and production of St. Croix sheep in the Hilo area on the island of Hawaii. In this paper, performance data and information on the incidence of disease and disease treatment are reported.

## **MATERIALS AND METHODS**

Production and health information was collected over a two-year period on a flock of St. Croix ewes managed at the University of Hawaii at Hilo farm laboratory. The farm is located on the windward side of the island of Hawaii, 6.1 kilometers south of Hilo (19°43"N, 155°3"W). The average annual rainfall at the farm during the study was 3,475 mm.

The university flock was comprised of 10 to 13 mature ewes and 0 to 2 yearling replacement ewes during the two year study. Ewes were bred to lamb in March in 1992 and in April and November in 1993. During breeding, ewes were exposed to the ram for 45 days. Replacement ewes were bred to lamb at one year of age. Lambs were weaned at 60-d of age and were weighed once at birth and again at weaning. Examples of a St. Croix mature ram and St. Croix ewes with lambs from the university farm are shown in figures 1 through 4.

The university flock was managed without shelter in a rotational grazing system established on an old lava flow that had been covered with a thick stand of trees. Pasture forage was composed primarily of a mixture of grasses, forbs, and tree seedlings that re-established themselves after the trees had been removed. Pasture forage was moderate in quality. Ewes had free access to a salt-mineral mix and were supplemented with energy and protein four weeks before and four weeks after lambing.

Lambs were vaccinated against the common clostrial diseases and vibriosis at four weeks of age and again at weaning. Mature sheep received annual boosters. Mature sheep and lambs were treated for internal parasites every four to six weeks. At drenching time, sheep were also evaluated for possible hoof and skin problems. Hoof paring and treatment for foot scald (zinc sulfate or copper sulfate solution) was done as needed.

Production data for spring lambing in 1992-93 were pooled to make a few comparisons among means. Differences among means for the effect of sex on birth weight, 60-d weaning

weights, and preweaning average daily gains were determined on spring lambing data using Fisher's protected LSD procedure.

## RESULTS AND DISCUSSION

**Production.** Fertility, prolificacy, and fecundity of St. Croix ewes bred for spring lambing were consistent with previously published information on St. Croix hair sheep (Table 1). Ewes averaged a 100% conception rate, 200% prolificacy, and an 89% weaning rate. Wildeus (1991) reported comparable values for St. Croix ewes managed in a semi-arid, tropical environment (St. Croix, V.I.) or an arid, temperate environment (Logan, Utah).

Under conditions at the farm, ewe performance during fall lambing was not as successful as spring lambing. Ewes bred to lamb in the fall (1993) had only a 66.7% conception rate (Table 1). However, the ewes that did lamb showed a high rate of multiple litters and had the same weaning rate as ewes lambing in the spring. The number of lambs born per ewe lambing and the percentage of lambs weaned in the fall averaged 1.7 and 88.2%, respectively (Table 1). The reason for the lower conception rate in ewes lambing in the fall is unclear. All ewes appeared to be cycling since they were marked by the rams during the breeding season. Further research is needed to evaluate the reproductive performance of St. Croix ewes at different times of the year in Hawaii.

The total weight of lambs produced per ewe in the present study appeared consistent with what other researchers have observed for St. Croix sheep (Table 1). The weight of lamb born/ewe lambing and the weight of lamb weaned/ewe lambing in the present study averaged 7.2 kg and 24.2 kg, respectively for ewes lambing in the spring. Wildeus et al. (1991) reported an average of 6.4 kg lamb born/ewe lambing and 24.2 kg lamb weaned/ewe lambing for St. Croix ewes managed in dry lot in St. Croix, V.I. or Logan, Utah. Ewes were group-fed a pelleted diet containing 80% alfalfa and 20% barley to meet 90% of NRC requirements. Lambs were also creep-fed the same pelleted ration. An average of 4.9 kg lamb born/ewe lambing and 18.2 kg lamb weaned/ewe lambing was observed for St. Croix ewes managed on a guinea-grass-legume pasture in St. Croix, V.I. (Wildeus et al., 1991). Ewes were given a mineral supplement only. Averages represent ewe production and lambing at three different times of the year over a five year period. The lower production values for the pasture study were primarily the result of variation in the quantity and the quality of pasture and the inclusion of young, primiparous ewes.

Birth weights, 60-d weaning weights, and preweaning average daily gains for both spring and fall lambs were similar to values reported by Wildeus and co-worker (1991) for St. Croix ewes fed 90% of their NRC requirements throughout their reproductive cycle (Table 2). Male lambs were heavier at birth than female lambs in the spring-lambing group ( $P < .05$ ), but sex of lamb did not significantly affect weaning weight or preweaning average daily gain of lambs born in the spring (Table 2). Limited numbers of single-born lambs prevented an evaluation of the effect of type of birth on lamb weight or growth rate.

**Health.** All classes of St. Croix sheep at the farm developed foot scald in various degrees of severity during the rainy season. The disease was transient and hoof conditions for all sheep improved as rainfall decreased. One adult ram developed lameness during the study because of an abscess that developed on the right-front foot. This appeared to be the result of hoof damage from foot scald. Moderate to severe foot scald in rams, ewes and lambs was treated using conventional methods.

During the periods of heavy rainfall, 2 to 3 week-old lambs usually developed a dermatitis that resulted in hair loss, primarily on the face and ears. The skin condition would respond favorably to a betadine treatment over several days, but if left untreated the skin would normally recover anyway within 2 to 3 weeks. Sheep seemed to develop a resistance against the causative agent for the dermatitis. Once sheep recovered from the skin condition they usually would not have problems with it again or they would only develop a very, mild transient condition during prolonged periods of rain.

During the two year study only five ewes developed problems with fly strike. These incidences were not necessarily related to rainfall. Several ewes were infested during a drought period in the winter of 1992 when sheep were being fed brush cuttings and silage in dry lot. This infection appeared related to a high population of flies attracted by the odor of the silage. The other incidences of fly strike occurred on ewes that developed areas of matted hair over their shoulders or on their rumps during the shedding process. If these areas remained for an extended period of time, they developed the right conditions attractive to flies. Fortunately, all the cases of fly strike were discovered early enough to prevent excessive harm to the animal.

## **CONCLUSIONS**

St. Croix sheep appear to adapt well to the warm, wet climate of Hilo, Hawaii. Their hair coat seems to shed rain quite well and dry sufficiently to prevent problems with fly strike. Matted hair remaining on St. Croix sheep for prolonged periods predisposes them to fly strike. Similar to most wool sheep, St. Croix sheep are susceptible to foot scald. In wet climates, management practices are needed to maintain adequate hoof health. St. Croix ewes have good mothering instincts and are capable of a high rate of twinning and a high weaning rate. Nutrition appears to be a key factor to sustaining excellent lamb production in St. Croix ewes in a warm, humid environment.

## **ACKNOWLEDGEMENT**

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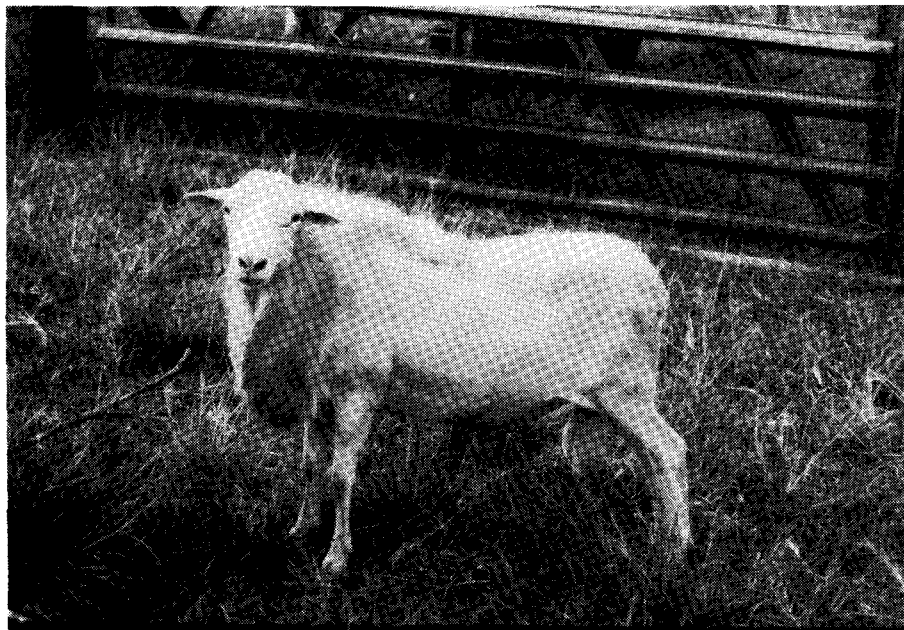


Figure 1. Mature St. Croix ram at the University farm after shedding longer winter hair coat.

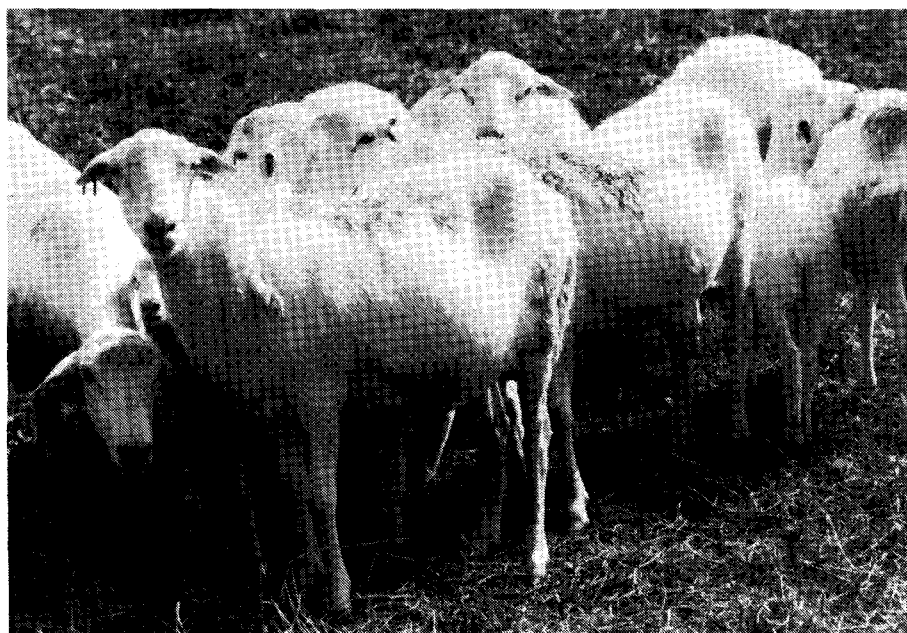


Figure 2. Mature St. Croix ewes with lambs at the University farm. Ewe on the left has completed shedding her longer winter coat. The other ewes are still in transition.



Figure 3. St. Croix lambs near weaning age.

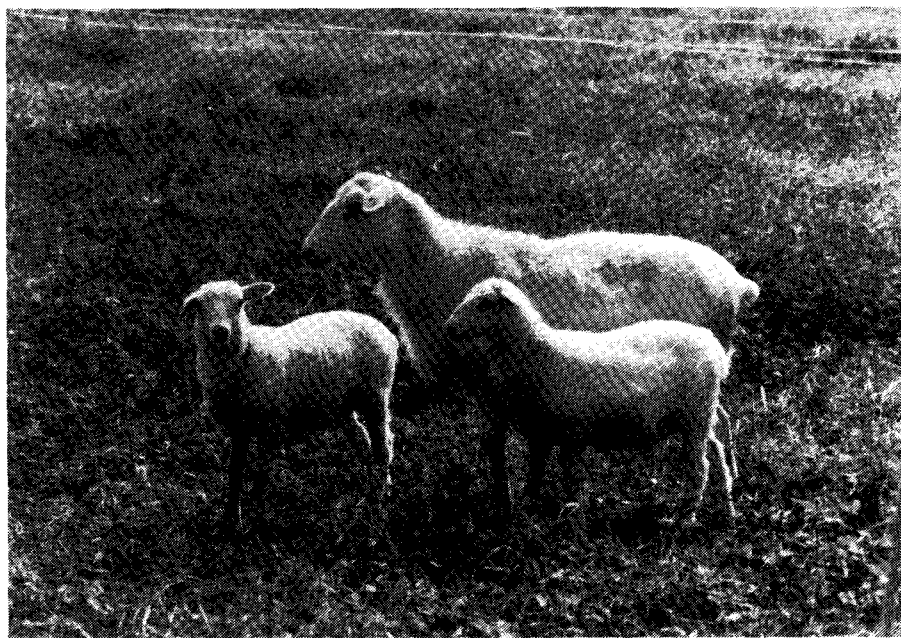


Figure 4. Mature St. Croix ewe with lambs at the University farm. Ewe has a longer, more finely textured hair coat than ewes shown in previous figures.

Table 1. Lambing performance of St. Croix ewes.

Item	Spring lambing <sup>a</sup>	Fall lambing <sup>b</sup>
Mature ewes (≥ 2 at lambing)	23.0	13.0
Yearling ewes (1 yr at lambing)	2.0	2.0
Ewes lambing/ Ewes exposed (%)	100.0	66.7
Lambs born/ Ewe lambing	2.0	1.7
Lambs born/ Ewe exposed	2.0	1.2
<u>Lambs Survival:</u>		
Alive at birth (%)	93.4	94.0
Alive at weaning (%)	89.1	88.2
<u>Types of Birth:</u>		
Singles (%)	9.1	7.1
Multiples (%)	90.9	92.9
Lamb born/ Ewe lambing (kg)	7.2	6.6
Lamb weaned/ Ewe lambing (kg)	24.2	19.3

<sup>a</sup> Average for spring lambing, 1992 and 1993

<sup>b</sup> Average for fall lambing, 1993

Table 2. Birth weights, weaning weights and preweaning average daily gain for St. Croix lambs.

Item	Spring lambing <sup>a</sup>	Fall lambing <sup>b</sup>
Birth weights (kg)		
Male	3.69	3.72
Female	3.23	3.41
Single	3.36	3.64
Multiples	3.48	3.40
Weaning weights (kg)		
Male	14.7	15.0
Female	14.0	13.9
Single	14.7	15.8
Multiples	13.7	13.6
Average daily gain (g/day)		
Male	245.0	204.0
Female	222.0	259.0
Single	198.0	209.0
Multiples	229.0	232.0

<sup>a</sup> Average for spring lambing, 1992 and 1993

<sup>b</sup> Average for fall lambing, 1993