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Increasing The Efficiency of Lamb Production¹

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Opportunities for increasing lamb production efficiency include increased rate of reproduction, more efficient lamb growth to heavier market weights with a higher lean to fat ratio, improved meat quality, and a more uniform distribution of high quality lamb throughout the year.

Increasing the rate of reproduction relates to (1) increasing the number of lambs born per ewe exposed and (2) increasing the frequency of lambing to more than one lambing per ewe per year. Developing breeding and management systems that will result in heavier lambs with less fat at slaughter would (1) reduce the overhead costs per ewe to the producer and (2) reduce processing costs, since studies have shown little difference in the time required to process lamb carcasses ranging in weight from 40 to 75 pounds.

Improving meat quality from lamb relates primarily to improved production practices such as reducing the amount of fat in the carcass, heavier and more attractive cuts from younger carcasses, and proper nutrition and management programs.

One of the major problems with lamb in the United States is the lack of a uniform supply of young lambs for slaughter throughout the year. Not only would accelerated lambing at intervals of less than one year increase reproductive efficiency, but it would also provide a uniform supply of high quality lamb for slaughter and consumption throughout the year.

Accelerated Lambing

A ewe's gestation length is 140-150 days, which suggests that it would be possible to lamb twice a year. Attempts to achieve this frequency have not been successful. When combined with early weaning of lambs at 30-50 days of age, however, success with lambing every 8 months has been achieved.

Continuous lambing at the Agriculture Research Center in Beltsville has shown that lambing frequencies of 10 months in younger ewes and down to 7 months in older ewes are possible. The reproductive rate was 140 percent per lambing and 190 percent on an annual basis in the Beltsville "Morlam" project. No exogenous hormones were used in this study.

¹Prepared for presentation at the South Dakota Sheep Field Day, South Dakota State University, on June 21, 1973.

Twice yearly lambing (fall and spring) at the Fort Reno Research Station in Oklahoma resulted in most of the ewes adjusting to once-a-year lambing in the fall or spring, although lambing rate was increased to 2.07 lambs per ewe on an annual basis for Dorset X Rambouillet crossbred ewes. No exogenous hormones were used in this study.

Larry Arehart from the Colby Branch Station of Kansas State University summarized the results from several experiments that have been conducted on a controlled, 8-month lambing interval accelerated lambing program to achieve 3 lamb crops in two years. Studies have been conducted at Colby, Kansas, Purdue University, Virginia Polytechnic Institute and the University of Illinois. In general, these studies with existing domestic breeds have resulted in an increase in the annual percent lamb crop born of 50 to 70 percent, with several of the flocks producing annual lamb crops of 200 percent.

Multiple Births

The most significant breakthrough in producing more lambs per ewe lambing in the United States was the importation of the Finnsheep breed from Ireland in 1968 and from Canada in 1970. This breed averages up to 3.5 lambs per ewe in its native Finland. Research in Ireland and Canada has confirmed that lambing rates approaching this level are possible with this breed. Research results from several experiment stations in the United States with 1/2-Finnsheep ewes have indicated the following lambing rates:

<u>Ewe Age</u>	<u>Lambs Per Ewe</u>
12 months	1.3 - 1.6
24 months	1.7 - 2.0
36 months	2.0 - 2.2

This is obviously a tremendous increase over the present national average of an approximately 125 percent lamb crop born from all ewes. The extent to which this lambing rate will increase with mature, 4 to 6-year-old ewes is not known. Data from Ireland suggests that mature Finn cross ewes under optimum conditions could produce as high as 2.4 to 2.7 lambs per ewe per lambing.

Research and selection programs in other countries are demonstrating that sheep readily respond to selection for increased fertility. In New Zealand, the Lands and Surveys Department in a commercial Romney breeding scheme involving 4,300 ewes on Crown lands, has shown that tremendous progress can be made within a breed by simple selection of replacement females and rams for fertility. Over 40,000 ewes were screened in 1969 for twin-reared replacement ewes and rams in an area of New Zealand that typically averages an 80 percent lamb crop weaned. The 2,500-ewe flock established in 1969 has evolved into a current 1,000-ewe elite flock averaging over 200 percent lamb crop and a 3,300-ewe breeder flock averaging a 180 percent lamb crop born and a 148 percent lamb crop weaned without any assistance.

Research by Professor John Owen at Cambridge University in England has shown that a 275 percent lamb crop is possible from selection. Professor Owen started in the early 1960's to establish a high fertility flock. Ewes from the Kerry, Ryeland, Llanwenog and Llyn breeds were crossed with rams from the Finnsheep breed. F₂ cross ewes presently being used are 1/4-Finnsheep and 3/4-British breeds. Lambs born per ewe in the flock are averaging over 220 percent as yearlings, 240 percent as two-year-olds and over 275 percent when ewes of all ages are considered. These figures are based on once-a-year lambing in Professor Owen's program.

Improving Lamb Performance

Paralleling the tremendous increases in ewe fertility has been the technological breakthrough of rearing surplus or orphan lambs on milk replacers. Increases in lambing rates above 200 percent would have been pointless without a system for rearing the extra lambs. Milk replacers are now available commercially that promote rapid lamb growth and permit weaning to dry feed at 25-30 pounds. A recent check on the amount of milk replacer sold in the United States indicates that, since lamb milk replacers were first marketed in 1970, sales have increased to where close to 100,000 lambs will be reared on milk replacers in 1973.

Early weaning and confinement feeding have resulted in tremendous increases in efficiency of lamb growth. Research at the U.S. Meat Animal Research Center, the University of Illinois, Virginia Polytechnic Institute and at Cambridge University in England indicate that rates of gain for 0.8 to 1.0 lb. per day and feed efficiencies of 3.0 to 4.5 lb. feed per pound of gain are feasible. These performance levels are being achieved by many commercial producers with early weaned lambs.

Potential

The potential for increasing the nation's lamb crop from these new breeding and management systems is, of course, speculation at this point. The technology required to implement accelerated lambing programs where the resources permit in combination with increased litter size could further increase the production per ewe unit. When combined with specific mating systems that include the use of specialized sire breeds or lines selected for increased rate of growth of lean meat, the potential for increased lamb production is tremendous.

Where do we go from here? Further research is needed with the Finnsheep and other new breeds that may be available, and with nutrition and management systems that synchronize the genetic potential for reproduction and growth with the feed, labor, facility and other resources required for optimum production efficiency.

What is really needed, however, is a change in attitude in all sectors of our industry. We may also need "new blood" in our industry. We need people who are willing to look at the sheep enterprise as a business, with a systematic approach to planning the production, marketing, processing, and merchandising of the products of our potentially new industry. This will require people who are dedicated to making the system work, willing to adapt to new technology, and people who are willing to commit their resources of capital and labor. I have the feeling that we are on the brink of drastic changes in our industry, and these will be changes for the good rather than the doom, disaster and oblivion that I have heard about for the past twenty years.