UNITED STATES LAMB RESOURCE CENTER

Increasing Your Lamb Crop Series

Optimal Nutrition

Introduction

Sheep are seasonal breeders with the highest ovulation rates occurring during the middle portion of the breeding season. Successful reproduction of the ewe requires that she has a normal estrous cycle, ovulates one to four eggs, is mated by a fertile ram, and then maintains the fertilized embryos until she delivers healthy, vigorous lambs. This is a very complex reproductive process that becomes more challenging once flocks begin to push the level of productivity to higher and higher levels. Nutrition plays a critical role in the successful reproductive rates that are accomplished in ewe flocks. Figure 1 shows protein and energy changes through the various production phases. Ewes cannot make these nutrient modifications on their own; it is up to the manager to provide rations that meet animals' needs.

Sheep are **seasonal breeders** with the highest **ovulation rates** occurring during the middle portion of the breeding season. **Successful reproduction** of the ewe **requires** that she has a normal **estrous cycle**, **ovulates** one to four eggs, is mated by a **fertile ram**, and then **maintains** the fertilized **embryos** until she **delivers** healthy, vigorous **lambs**.

Energy and protein requirements

by stage and level of production for 150-pound ewes

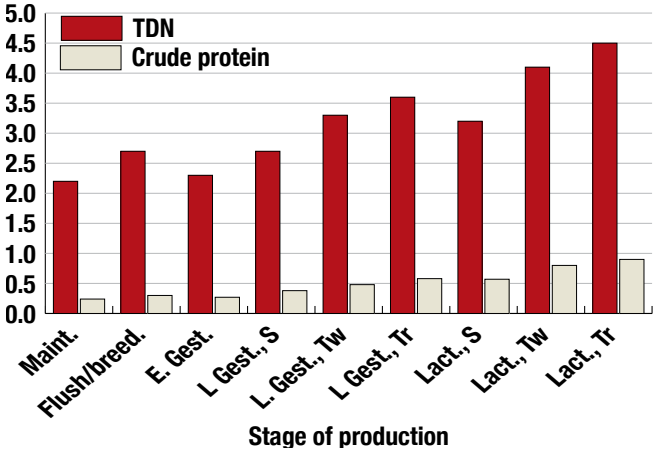

Figure 1. Protein and energy requirement by stage of production. (TDN is total digestible nutrients)

Increasing weight, improving body condition

The most common nutrient required by the ewe is energy. Sheep with a shortage of energy intake will lose weight. This may happen with un-supplemented ewes grazing native range. The ewes cannot consume adequate amounts of forage due to low availability of forage or the slow rate of digestion by poor quality forage. Ewes will respond to improved nutrition by gaining weight and/or body condition. The process of providing this improved nutrition prior to and through breeding season is commonly referred to as flushing.

Flushing works best on ewes that are slightly under conditioned (CS<3) or early in the normal breeding season. Flushing can increase the lambs born by 10 to 30%. Ewes that are already in above average body condition (CS>3.5) do not respond to flushing. Figure 2 demonstrates the response in terms of number born with improved ewe body condition.

Flushing can be accomplished by supplemental feeding of concentrates, which is the standard practice for most farm flock operations. The amount of supplemental grain is dependent on the size of the ewes and the quantity and quality of the forage portion of the diet. The National Research Council (NRC) suggests at least a 10% increase in energy intake. This can be accomplished with .5 to 1.0 pound of grain per day.

The other means of improving the flock's overall body condition prior to breeding is to allow more forage availability to achieve maximum voluntary intake. With more forage available, ewes can increase selective grazing to consume a higher energy and protein diet. Improved nutrition is normally continued through the first three weeks of breeding. Supplemental feeding may need to continue if the breeding season coincides with decreasing forage quality at the end of the growing season.

Lambs born per ewe exposed

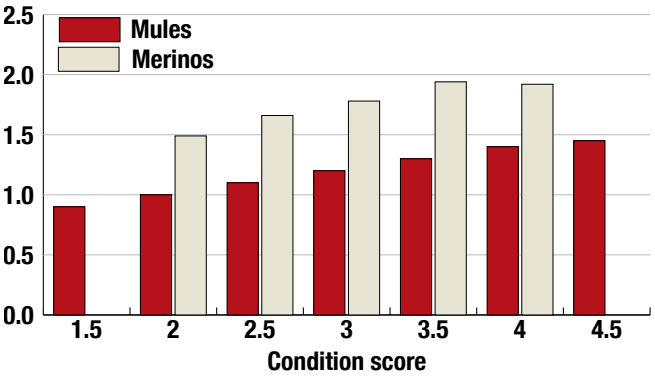

Figure 2. Impact of condition score and lambs born (lifetimewool.com.au and MLC 1983)

Supplementing to meet needs

Ewes bred on dormant range may need protein and/or energy supplementation to meet their nutrient requirements. The quality of dormant range is dependent on the amount of weathering and the quality stage when growth stopped. Active, vegetative growth would be much higher in both energy and protein content compared to plants that were mature at the end of the growing season. The other critical nutrients are minerals and vitamins. Specifically, phosphorous and selenium deficiencies can reduce reproductive rates. Ewes should have access to free choice minerals throughout all stages of production. The mineral source should be formulated to meet the needs of the animals based on the local feed provided. Producers should contact their extension specialist or consulting nutritionist for input regarding a mineral supplementation program.

Vitamins A and E are both associated with reproduction. In general, if ewes have access to green feed during breeding, then supplementation of A and or E is probably not required. Ewes bred in a dry lot system or on dormant range probably need supplemental E at 200 IU per day. This level would require the mineral source to contain 3200 IU of E, with a one-ounce daily consumption level. The majority of sheep minerals available are formulated with much lower levels of vitamin E.

Monitoring gestational condition

During mid-gestation the placenta is developing and inadequate feeding can retard development resulting in smaller birthweights. Research has shown that younger ewes are more prone to fetal loss during mid-gestation (Raasch 1997). Since most ewes will be in full fleece during this stage of production, it is critical that they are closely monitored to prevent excess losses in body condition. Condition score changes should be held to less than one half condition score. For example, a ewe in BCS of 3 should not lose more than 0.5 BCS during gestation, as this increases the risk of twin lamb disease. Ewes in light condition at birth do not lactate well, regardless of nutrition. One condition score is approximately 11% change in bodyweight. For 150 pound ewes, a half a condition score would be equivalent to losing eight pounds, which is not very much weight loss. And, be aware that ewes can lose BCS and still gain weight during gestation.

It is likely that there will be more ewes carrying twins and triplets. This requires better feeding in late gestation to ensure ewes are in good body condition (CS>3) for lactation and adequate birthweight of the multiples. Fetal counting can be used to subdivide the flock into high and low feeding groups depending on multiples or singles.

Flocks that are really pushing their reproductive capacity may see an improvement with the inclusion of omega-3 fatty acids in the flushing ration. This work was conducted in the United Kingdom and found providing omega-3 fatty acids, such as flax oil, increased both embryo quality and survival (Smith 2013).

Late gestational needs

Late gestation nutrition requires increased energy intake to allow for the rapid fetal growth. Fetal scanning and aging can be used to allot increased nutrients to ewes carrying multiples. If sorting the flock into drop groups by fetal count is not possible, then they should be phased in to a late-gestation ration. Ewes carrying triplets could be fed the late gestation ration starting 6 to 8 weeks ahead of lambing; ewes carrying twins, 4 to 6 weeks ahead; and singles, 2 to 3 weeks ahead of lambing. Nutrient intake in late gestation requires grain feeding for winter lambing flocks. Pasture or range lambing flocks can generally meet the nutrient demand with lush spring growth.

Demand increases during lactation

The greatest nutrient demand for the ewe is during lactation. Twin-rearing ewes require 50% more energy and protein to ensure adequate milk production for growth and survival of the lambs. Peak milk yield occurs around week four of lactation and begins declining after week eight of lactation. Nutrient requirements are drastically reduced in late lactation. Underfed lactating ewes will wean lambs with 10% lighter weaning weights. Ewes should not lose more than one half condition score during lactation. During the drying off period, the last week before weaning, additional weight loss can occur without lamb weaning weights.

crossbred ewes in the Midwest appear in good body condition at the end of breeding season.

Author & reviewers

Author: Dan Morrical, Ph.D., Iowa State University, Ames, Iowa

Reviewers: Reid Redden, Ph.D., Texas A&M AgriLife Extension, San Angelo, Texas; Dan Morrical, Ph.D., Iowa State University, Ames, Iowa; Susan Schoenian, M.S., University of Maryland Extension, Keedysville, Maryland; and Rodney Kott, Ph.D., Former Montana State University Extension Sheep Specialist, Fredericksburg, Texas

More information

U.S. Lamb Resource Center
http://lambresourcecenter.com/production-resources/productivity/

National Sheep Improvement Program
http://www.nsip.org

U.S. Sheep Industry Roadmap
http://lambresourcecenter.com/reports-studies/roadmap/

Literature cited

Lifetimewool, Ewes in better condition at joining conceive more lambs, lifetiemwool.com.au

Meat and Livestock Commission Sheep Improvement Services, 1983. Feeding the ewe, page 14.

NRC. 2007 Nutrient requirements of small ruminants. National Academies Press, Washington, D.C.

Raasch, G., D. Morrical and C. Youngs, 1998, Effect of supplemental vitamin E and A reproductive performance and serological profiles of ewes managed in dry lot. ASL R1468

Smith, M. 2013, Omega 3 for sheep – boost embryo survival to boost margins, "Farmers Guardian." August 2013