MEETING EWE NUTRIENT REQUIREMENTS THROUGHOUT THE PRODUCTION CYCLE

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The development of an adequate nutrition plan for the ewe flock requires knowledge of ewe nutrient requirements that are to be met. Because nutrient requirements change throughout the production cycle, sheep producers are left trying to hit an ever-changing target to optimize their nutrition plan. Stages of the ewe production cycle that require different nutritional management are shown in Table 1 along with typical ewe ADG during each stage of production. Maintenance requirements are for ewes that are non-pregnant and non-lactating and needing to maintain body weight and condition before the next breeding season. Flushing is the practice of increasing ewe plane of nutrition approximately 2 weeks pre-breeding through 3 weeks post-breeding to increase ovulation rate and resulting lambing rate. Ewe nutrient requirements are relatively low during early and mid-gestation (approximately the first 15 weeks of pregnancy). However, meeting ewe nutrient requirements during this time are essential to placental development and fetal development. Nutrient restriction during early gestation negatively affects development of placental membranes, decreasing nutrient flow to the fetus throughout the remainder of gestation. Because the majority of fetal growth occurs during the last third of gestation, ewe nutrient requirements increase substantially during the last 4 weeks of gestation. Nutrient restriction during late gestation can negatively affect lamb birth weight and lamb survivability. However, too high a plane of nutrition during late gestation can result in ewes being in excessive body condition, increased lamb birth weight, and problems with dystocia. It is understood that ewe nutrient requirements are greatest during early lactation with peak milk production occurring approximately 26 day after lambing. If ewes are still nursing lambs after 6 to 8 weeks of lactation, nutrients requirements decrease because milk production is not as persistent and lambs may begin to utilize supplemental feedstuffs.

Typical ewe dry matter intake (DMI) throughout the production cycle is shown in Figure 1. Ewe DMI is heavily dependent on nutrient composition of feedstuffs, forage quality, dry matter of feedstuffs, and feeding method among other factors. Estimating DMI of ad libitum forage is often one of the greatest challenges when devising a nutrition plan. As forage quality, and digestibility, increases, voluntary forage DMI is expected to increase. Ewe DMI of low, moderate, and high quality forages are approximately 1.5%, 2.0%, and 2.5% of BW, respectively.

The main nutrients of interest when formulating ewe rations are TDN (total digestible nutrients), CP (crude protein), and the minerals calcium and phosphorus. The TDN content of many feedstuffs that are fed to sheep have been analyzed to predict their energy values. Other systems to measure energy of feedstuffs and animal requirements exist, notably the net energy system exist; however, TDN remains a proven and relatively easy way to formulate rations to meet ewe energy requirements. Supplements should be formulated to fill the gap between nutrient

requirements and nutrients provided by estimated forage intake. Calcium and phosphorus should be considered during ration formulation because of the high calcium requirement during lactation, their importance to the skeletal system and other bodily functions. The calcium to phosphorus ratio should be maintained between 1.2:1 and 2:1 in ewe rations. Providing salt and a high quality sheep-specific mineral can then be relied upon to meet requirements for the other macrominerals and trace minerals. Requirements for TDN, CP, calcium, and phosphorus during each stage of production are shown in Figures 2, 3, 4, and 5, respectively.

Ewe prolificacy serves to affect nutrient requirements during gestation and during lactation the number of lambs born and reared. The nutrient requirements provided in Tables 2, 3, 4, and 5 are for ewes with ab expected 130 to 150% lambing rate that are nursing twin lambs. A greater expected lambing rate would serve to increase ewe nutrient requirements during late gestation. Increased nutrient requirements corresponding with an increased lambing rate of 180-225% relative to a 130-150% lambing rate are shown in Table 2. Ewes nursing single lambs would be expected to have lower requirements than ewes nursing twin lambs during both early and late lactation (Table 3).

References

American Sheep Industry Association. 2003. SID sheep production handbook. 7th ed. ADS/Nightwing Publishing, Centennial, CO.

National Research Council. 1985. Nutrient requirements of sheep. 6th ed. National Academies Press, Washington, DC.

Umberger, S. H. 2009. Sheep grazing management. Virginia Tech, Blacksburg. https://pubs.ext.vt.edu/410/410-366/410-366.html (Accessed 6 January 2016.)

Table 1. Stages of the ewe production cycle

Stage of Production	ADG, lb./d	
Maintenance	0.02	Non-pregnant, non-lactating
Flushing	0.22	2 weeks pre-breeding through 3 weeks post-breeding
Early and mid-gestation	0.07	First 15 weeks gestation
Late gestation	0.4 – 0.5	Requirements increased substantially
Early lactation	-0.13	First 6-8 weeks lactation
Late lactation	-0.06	Last 4-6 weeks lactation

Table 2. Percent change in nutrient requirements during late gestation for ewes with expected lambing rate of 180–225% relative to expected lambing rate of 130-150%.

Nutrient	Percent change in requirement with greater lambing rate
DMI	106%
TDN	119%
CP	111%
Ca	123%
P	80%

Table 3. Percent change in nutrient requirements during lactation for ewes nursing singles relative to ewes nursing twins.

	Stage of lactation	
Nutrient	Early	Late
DMI	87%	74%
TDN	87%	66%
CP	79%	58%
Ca	85%	66%
P	85%	81%

Figure 1. Typical dry matter intake of ewes.

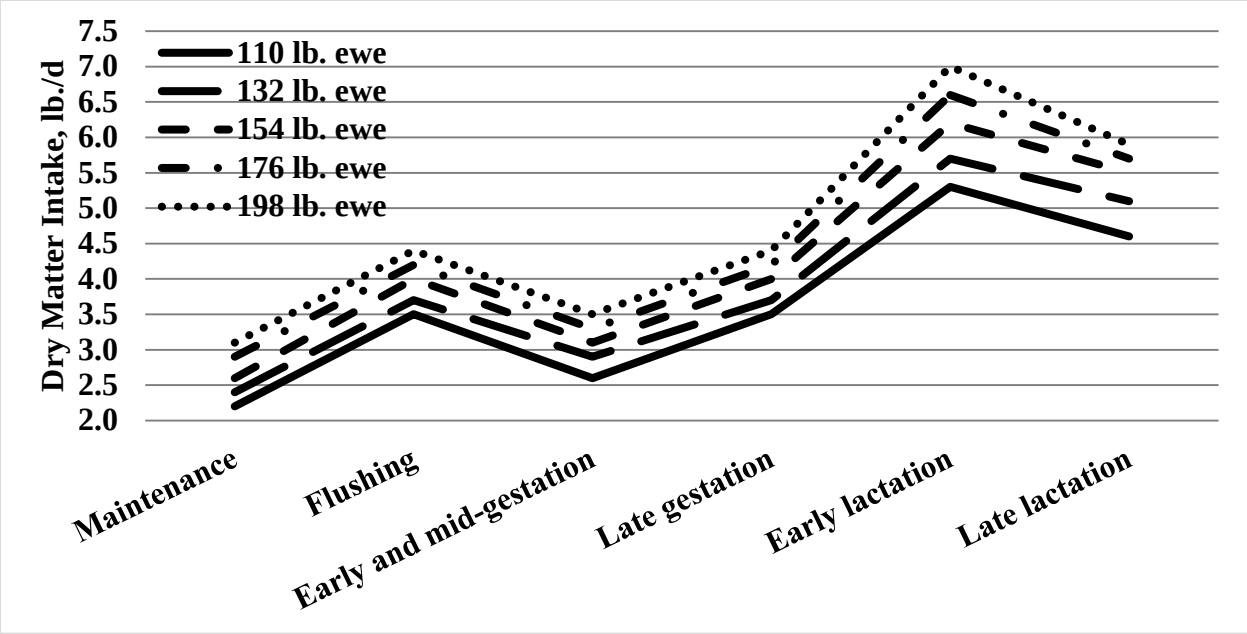

Figure 2. TDN requirements of ewes with expected lambing rate of 130 to 180% nursing twins.

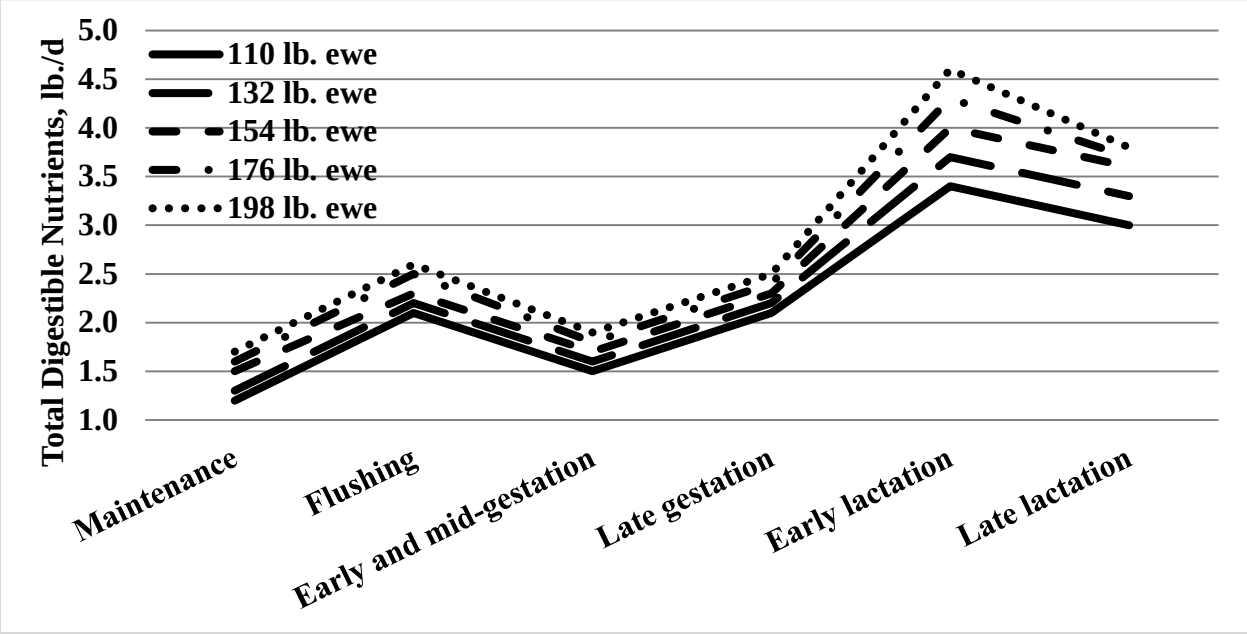

Figure 3. CP requirements of ewes with expected lambing rate of 130 to 180% nursing twins.

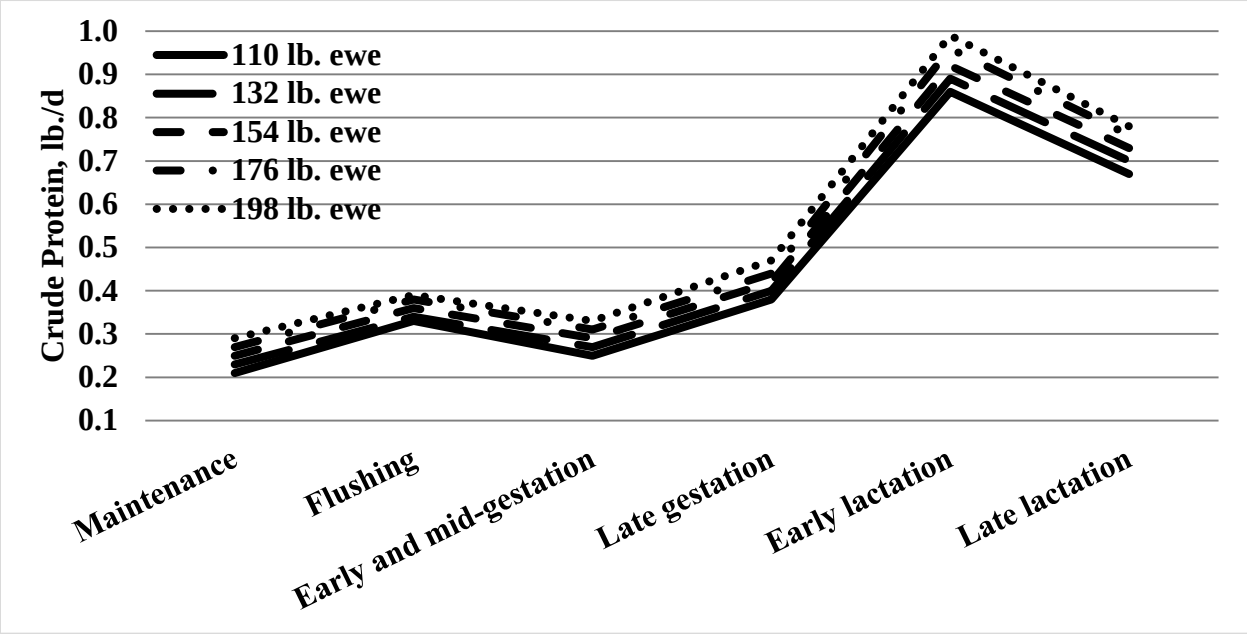

Figure 4. Calcium requirements of ewes with expected lambing rate of 130 to 180% nursing twins.

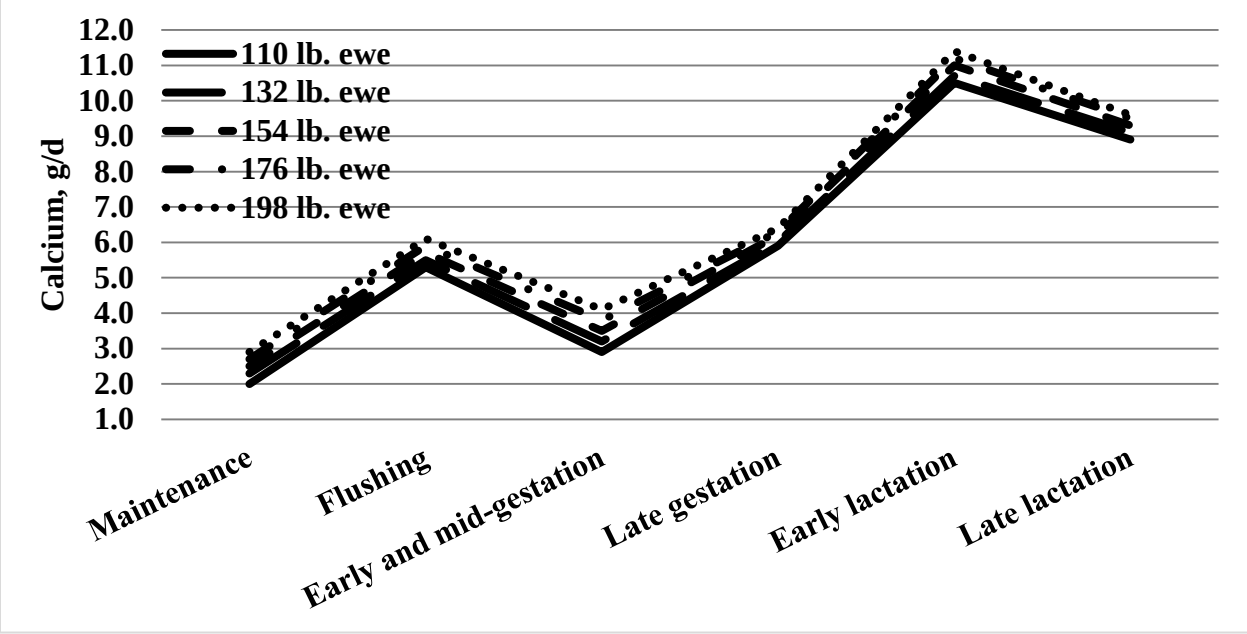

Figure 5. Phosphorus requirements of ewes with expected lambing rate of 130 to 180% nursing twins.