AGRI MAGAZINE
(International E-Magazine for Agricultural Articles)
Volume: 03, Issue: 09 (September, 2026)
Available online at http://www.agrimagazine.in
©Agri Magazine, ISSN: 3048-8656

Nutritional Flushing and Body Condition Management for Enhanced Reproductive Performance in Ewes

*Dr. Hrishikesh B Gudaghe
PhD Scholar, ICAR-Indian Veterinary Research Institute, Izatnagar, Bareilly, Uttar Pradesh, India
*Corresponding Author's email: hrishi610@hotmail.com

Reproductive efficiency is the single largest determinant of profitability in commercial sheep production, since the number of lambs weaned per ewe exposed drives virtually every downstream economic outcome from feed cost per kilogram of lamb produced to overall flock turnover. Nutrition exerts its influence on reproduction at multiple discrete physiological windows across the annual production cycle, from the pre-breeding period, through early and late gestation, to lactation, and the nutritional management applied at each stage has distinct and well-characterized effects on ovulation rate, embryo survival, fetal growth, and lamb vigor at birth. Two nutritional interventions in particular, pre-breeding flushing and late-gestation energy supplementation to prevent pregnancy toxemia, represent some of the highest-return practices available to sheep producers and are grounded in a substantial body of endocrine and metabolic research.

The Physiology of Flushing

Flushing refers to the practice of increasing the ewe's plane of nutrition, typically through supplemental concentrate feeding, for a period of two to four weeks immediately before and continuing briefly into the breeding season, with the objective of increasing ovulation rate and therefore litter size. The physiological basis for this response lies in the relationship between metabolic status and the hypothalamic-pituitary-ovarian axis: a rising plane of nutrition increases circulating glucose and insulin concentrations, which act both centrally to increase gonadotropin-releasing hormone pulse frequency and peripherally on the ovarian follicle to enhance responsiveness to follicle-stimulating hormone, resulting in recruitment and maturation of a greater number of follicles to ovulation. The magnitude of the flushing response is strongly dependent on the ewe's body condition score at the start of the flushing period; ewes in moderate body condition, typically a score of 2.5 to 3 on a five-point scale, show the largest increase in ovulation rate in response to flushing, whereas ewes already in high body condition show comparatively little additional benefit because their metabolic and endocrine status is already supportive of high ovulation rate, and thin ewes below a body condition score of 2 often fail to respond adequately to short-term flushing and instead require a longer period of nutritional rehabilitation.

Practical Implementation of Flushing Programs

Effective flushing programs typically supply an additional 0.3 to 0.5 kilograms of a moderate-energy, moderate-protein concentrate per ewe daily, introduced approximately two to three weeks before the planned start of breeding and continued through the first two weeks of the breeding period to support early embryo survival, since embryonic mortality in the first two to three weeks after conception is influenced by continued metabolic status. Pasture-based flushing, moving ewes onto higher-quality forage rather than providing concentrate supplementation, achieves a similar physiological effect where forage resources allow and represents a lower-cost alternative in extensive production systems. The economic return on

flushing is substantial in prolific breeds where even a modest increase in ovulation rate translates into a meaningful increase in lambing percentage, though the practice yields diminishing returns in breeds already exhibiting high inherent prolificacy or in flocks where ewe body condition is already optimal heading into the breeding season.

Late Gestation Energy Demand and Pregnancy Toxemia

The nutritional priorities shift dramatically in late gestation, when approximately 70 percent of fetal growth occurs in the final six weeks of the roughly five-month gestation period, coinciding with a period of declining rumen capacity as the gravid uterus, particularly in ewes carrying multiple fetuses, physically compresses the reticulorumen and reduces voluntary dry matter intake at precisely the time energy demand is peaking. This mismatch between rising energy requirement and falling intake capacity creates the metabolic conditions for pregnancy toxemia, also termed twin lamb disease, a condition of severe negative energy balance in which the ewe mobilizes body fat reserves at a rate exceeding hepatic oxidative capacity, generating ketone bodies and, in advanced cases, profound hypoglycemia, hepatic lipidosis, and if untreated, death of the ewe and fetuses. Pregnancy toxemia occurs almost exclusively in ewes carrying twins or triplets, since the combined fetal energy demand of multiple fetuses in the final weeks of gestation substantially exceeds that of a single fetus, and risk is further elevated in ewes that are either over-conditioned, carrying excess intra-abdominal fat that further restricts rumen capacity, or under-conditioned, entering late gestation with inadequate body reserves to buffer any period of reduced intake caused by weather, transport, or other stressors.

Prevention and Nutritional Management of Pregnancy Toxemia

Prevention centers on accurate assessment of fetal number, through ultrasound pregnancy diagnosis where available, to allow differential feeding of ewes according to litter size, since ewes identified as carrying multiples can be preferentially allocated higher-energy diets or separated into distinct management groups during the final six weeks of gestation. Diets for late-gestation ewes, particularly those carrying multiples, should provide increased energy density through inclusion of moderate levels of concentrate or high-quality forage, while maintaining adequate effective fiber to support normal rumen function and avoiding excessively rapid transitions that could precipitate acidosis. Where intake is restricted by extreme weather, transport, or other acute stress, propylene glycol drenching has demonstrated efficacy as a glucogenic intervention to reduce the risk of toxemia onset during the period of compromised intake, functioning through hepatic conversion to glucose precursors in a manner analogous to its use in transition dairy cows. Calcium and phosphorus supply must also be maintained at adequate levels during late gestation, since concurrent hypocalcemia can compound the metabolic disturbance associated with pregnancy toxemia and complicate both diagnosis and treatment in field cases.

Lactation and the Continued Nutritional Demand

Following parturition, the nutritional demand of lactation, particularly in ewes nursing twins or triplets, exceeds even the peak demand of late gestation, since milk synthesis for two or three rapidly growing lambs requires substantially greater energy and protein intake than fetal maintenance alone. Ewes that entered lactation in adequate body condition and receive continued high-plane nutrition through peak lactation, typically the first three to four weeks after lambing, sustain higher milk yield and support faster lamb growth rates, while ewes allowed to mobilize excessive body reserves during this period risk delayed return to cyclicity and reduced conception rates in the subsequent breeding season, illustrating the interconnected nature of the nutritional demands across the full annual reproductive cycle.

Body Condition Scoring as the Practical Management Tool

Underlying all of these stage-specific recommendations is the practical necessity of regular body condition scoring, performed by palpation of the lumbar region over the spinous and transverse processes, as a low-cost, on-farm method of tracking nutritional status without

reliance on laboratory testing. Because wool cover makes visual assessment of body condition unreliable in most sheep breeds, hands-on scoring at key management points, including pre-breeding, mid-gestation, and pre-lambing, allows producers to identify ewes deviating from target condition early enough to intervene nutritionally before the deviation compromises reproductive performance, making body condition scoring the single most practical link between the physiological principles described above and day-to-day flock management decisions.

Breed, Litter Size, and Individualized Feeding Considerations

The magnitude of nutritional response described throughout this discussion is not uniform across all ewes within a flock, and breed-associated differences in prolificacy meaningfully shape how flushing and late-gestation feeding programs should be applied in practice. Highly prolific breeds and crossbreds, which are genetically predisposed toward higher ovulation rates and a greater proportion of multiple births, derive comparatively less incremental benefit from flushing, since their baseline ovulation rate is already elevated by genetics rather than nutrition, whereas breeds with more moderate inherent prolificacy typically show a proportionally larger flushing response, making the practice a more cost-effective intervention in those genetic backgrounds. This same genetic variation in prolificacy directly amplifies the practical importance of pregnancy toxemia prevention in highly prolific flocks, since a greater proportion of the ewe population will be carrying multiple fetuses in any given lambing season, correspondingly increasing the proportion of the flock at elevated metabolic risk during late gestation and justifying greater investment in pregnancy diagnosis infrastructure to identify and differentially manage those higher-risk animals. Age and parity introduce a further layer of individual variation relevant to feeding program design: yearling ewes lambing for the first time are still allocating a portion of their nutrient intake toward their own skeletal growth in addition to the demands of pregnancy and lactation, meaning that maintenance and production nutrient requirements calculated using mature ewe reference values will systematically underestimate the needs of young, still-growing ewes, a consideration that becomes particularly important in flocks that breed ewe lambs to lamb at twelve to fourteen months of age. Older ewes, conversely, may show reduced dentition efficiency and forage intake capacity in later parities, sometimes requiring diet adjustments toward more digestible or processed feedstuffs to maintain adequate intake despite declining bite efficiency. Environmental and management factors, including stocking density, competition at feed troughs in confinement or supplementary feeding systems, and weather exposure during late gestation, further modulate individual ewe response to a nominally well-formulated flock-level diet, meaning that flock average performance metrics, while useful for evaluating overall program success, should be interpreted alongside body condition score distribution across the flock rather than relying on the average alone, since a favorable flock mean can mask a meaningful subset of ewes falling well below target condition and therefore at elevated individual risk despite an apparently adequate flock-level feeding program.

Economic Impact of Nutritionally Driven Reproductive Loss

The financial consequences of suboptimal reproductive nutrition compound across the production cycle in ways that are easy to underestimate at the level of any single management decision. A modest reduction in ovulation rate attributable to poor pre-breeding body condition, a single untreated or late-detected case of pregnancy toxemia, or a period of inadequate lactation nutrition that delays postpartum return to cyclicity each individually appear as relatively small losses, yet across an entire flock and repeated over successive breeding seasons, these effects accumulate into a substantial constraint on the number of lambs marketed per ewe exposed, which remains the primary driver of flock-level profitability in most commercial production systems. Because the nutritional interventions described throughout this discussion, targeted flushing, litter-size-adjusted late-gestation feeding, and adequate lactation nutrition, are comparatively low-cost relative to the value of the additional lambs they are designed to protect or generate, the return on investment for

disciplined, stage-appropriate reproductive nutrition management is generally favorable even in extensive, lower-input production systems, provided the practices are implemented consistently rather than applied only sporadically or in response to already-manifest problems.

Conclusion

Reproductive success in sheep flocks depends on nutritional management that is responsive to the distinct physiological demands of each stage of the reproductive cycle, from the ovulation-enhancing effect of pre-breeding flushing in moderate-condition ewes, through the substantial and multiple-fetus-dependent energy demand of late gestation that underlies pregnancy toxemia risk, to the sustained high nutritional demand of early lactation. Producers and veterinarians who integrate body condition scoring, pregnancy diagnosis for litter size, and stage-appropriate feeding programs are positioned to capture the substantial productivity gains available through nutritional management of the reproductive cycle while minimizing the metabolic disease risk inherent to high-prolificacy sheep production.

References

1. National Research Council. (2007). Nutrient requirements of small ruminants: Sheep, goats, cervids, and New World camelids. National Academies Press.
2. Robinson, J. J., Ashworth, C. J., Rooke, J. A., Mitchell, L. M., & McEvoy, T. G. (2006). Nutrition and fertility in ruminant livestock. *Animal Feed Science and Technology*, 126(3–4), 259–276.
3. Rattray, P. V., Garrett, W. N., East, N. E., & Hinman, N. (1980). Growth, development and composition of the ovine conceptus and mammary gland during pregnancy. *Journal of Animal Science*, 51(3), 610–624.
4. Scott, P. R. (2011). Sheep medicine (2nd ed.). CRC Press.
5. Sargison, N. (2008). Sheep flock health: A planned approach. Blackwell Publishing.
6. Schoenian, S. (2016). Flushing ewes for increased reproductive performance. University of Maryland Extension.