SUMMARIES OF RECENT JOURNAL ARTICLES

(2001 and In Press)
Effects of dietary tallow level on performance of Alpine does in early lactation

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Dietary inclusion of fat in diets of lactating dairy cattle increases energy density and can enhance milk production without necessitating an increase in the level of cereal grains in the diet. There also have been experiments with dairy goats investigating influences of dietary addition of various fat sources. Fat supplementation has increased milk production and(or) fat concentration in many studies, although there are some reports in which effects did not occur possibly due to factors such as the particular fat source used. Stage of lactation has impact, with greatest potential for positive effects early than late in lactation. Although there has been research with added dietary fat for dairy goats, in many instances the number of dietary fat levels used was low, and there is a variety of commercial fat products presently available. Therefore, 60 Alpine does (47 ± 1.3 kg initial body weight) were used to determine effects of dietary inclusion of different levels of partially hydrogenated tallow on performance in early lactation (weeks 3-11). Treatments entailed a 30% concentrate, negative control diet and diets higher in concentrate (42-46%) with 0, 1.5, 3.0, 4.5 or 6.0% dry matter of partially hydrogenated tallow. Early lactation milk yield increased as dietary tallow level increased up to 3 or 4.5% of the diet, then decreased as the level increased to 6.0%. Milk fat concentration increased linearly as dietary tallow level increased, with no change in milk protein. However, efficiency of energy use for milk production appeared greater with 1.5 and 3.0% tallow compared with higher levels, possibly because of limited ruminal fiber digestion and(or) fatty acid absorption with high dietary tallow levels. Further research is necessary with diets higher in concentrate level to address practical and economical considerations for use of fat sources in diets of confined, high-producing dairy goats, and dietary ingredient costs must be considered in design of most profitable lactating dairy goat diets.

Growth and harvest traits of Boer x Spanish, Boer x Angora, and Spanish goats consuming a concentrate-based diet

M. R. Cameron, J. Luo, T. Sahlu, S. P. Hart, S. W. Coleman, and A. L. Goetsch


The number of Boer crossbred meat goats has been increasing rapidly, although how their growth and harvest traits compare with those of Spanish goats and influences of maternal genotype have not been thoroughly evaluated. This information would be useful to achieve optimal meat goat production systems and yield of goat products desired by consumers. Therefore, postweaning growth (9 to 24 weeks of age) and harvest traits (212 ± 5.0 days of age) of Boer x Spanish, Spanish, and Boer x Angora wethers consuming a concentrate-based diet were compared. Live weight gain was greater for Boer crossbreds than for Spanish wether goats, with little or no difference between Boer x Spanish and Boer x Angora goats. Because of more rapid growth of Boer crossbreds than of Spanish goats, weights of the carcass and primal cuts were greater or tended to be greater for Boer crossbreds. However, relative to carcass or empty body weight, under production conditions similar to this experiment, slaughter and carcass variables should be similar for Boer x Spanish, Boer x Angora, and Spanish goats.
Effects of gender and age on performance and slaughter and carcass characteristics of Boer x Spanish goats

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Goats in the U.S. are not marketed for meat at a standard age or weight. Previously, all types of goats in the U.S. were used for meat, including cull dairy goats and Angoras, as well as the Spanish goat. Presently, the number of crossbred Boer goats is increasing rapidly. Growth rate and mature size are greater for Boer goats and their crosses compared with Spanish goats and Angoras. There has been very little experimentation concerning factors influencing growth performance and harvest traits of meat goats. Thus, an experiment was conducted to determine influences of gender and age on growth performance and harvest traits of Boer crossbred meat goats. Wether, female, and male Boer x Spanish goats (17, 16, and 17 kg initial BW, respectively) consumed a high concentrate diet from 116 to 340 d of age, with harvest at 56-d intervals. Average DM intake for the entire experiment was lowest among genders for females (674, 534, and 682 g/d), and ADG was greater for males and wethers than for females (119, 89, and 138 g/d for wethers, females, and males, respectively). Dressing percentage was similar among genders and lowest among ages at 116 days (42, 49, 50, 51, and 51% for 116, 172, 228, 284, and 340 d, respectively). Internal fat mass was lower for males vs wethers and females (6.9, 7.0, and 5.1% empty BW for wethers, females, and males, respectively) and increased with increasing age (2.3, 5.4, 6.3, 7.7, and 9.9% empty BW; 0.32, 1.08, 1.60, 2.77, and 4.08 kg at 116, 172, 228 and 340 d of age, respectively). Carcass scores and grades were similar among genders. Among genders, males had the greatest carcass percentages of separable bone (27, 27, and 29%) and lean (50, 50, and 54%) and were lowest in fat (18, 20, and 13% for wethers, females, and males, respectively). Carcasses were 39, 30, 27, 23, and 21% bone; 7, 18, 15, 21, and 22% fat; and 49, 49, 51, 54, and 54% lean at 116, 172, 228, 284, and 340 d, respectively. In summary, with moderate ADG, differences among genders of Boer x Spanish goats in performance and harvest traits were not affected by age from approximately 4 to 11 mo. Carcass composition changed appreciably from 4 to 6 mo but varied much less thereafter. Internal fat mass as a % of BW increased steadily as age increased, with weight at each age being nearly as great as that of carcass fat.

Dairy goat performance with different dietary concentrate levels in late lactation


Small Ruminant Research 41:117-235. 2001

Optimal feeding programs for dairy goats in late lactation and when dry are not well established. Dietary characteristics influence milk yield and body condition of dairy goats, as well as growth of primiparous goats. Hence, objectives of this experiment were to determine effects of dietary concentrate and energy levels in late lactation and the dry phase on performance of Alpine yearling doelings and mature does in late lactation and the subsequent early lactation phase. The experiment consisted of 16 weeks in late lactation, 8 to 13 weeks dry, and 12 weeks in the subsequent lactation. Diets of 20, 35, 50, or 65% concentrate (2.18, 2.34, 2.49 and 2.62 Mcal/kg metabolizable energy [ME], respectively) were consumed free-choice in late lactation, with a 35% concentrate diet (2.18 Mcal/kg ME) in the first 4 weeks of the dry phase and 50% concentrate (2.65 Mcal/kg ME) until kidding. All goats consumed a 50% concentrate diet (2.42 Mcal/kg ME) in the subsequent early lactation. Yearling doelings and mature does differed in milk yield response to dietary concentrate and energy levels in late lactation, with no effect for doelings and increased milk yield for does as
the concentrate level increased to 50% (2.49 Mcal/kg ME). Conversely, a 65% concentrate diet depressed milk yield in late lactation by does compared with 50% concentrate. Dietary concentrate level may have little effect on subsequent lactational performance with adequate nutritional planes in subsequent dry and early lactation phases, for both mature does and yearling doelings incurring significant growth.

**Effects of different management practices on preweaning and early postweaning growth of Alpine kids**

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A concern of many goat producers is feeding management in the first few months of life for kids removed from does soon after birth. A number of factors may influence performance of kids artificially reared on milk or milk replacer. To study these factors, two sets of 40 Alpine kids (3 to 9 days of age) were used to determine effects of group versus individual pens, preweaning access to forage, and different milk feeding restriction regimens on preweaning and early postweaning growth. Treatments in the first experiment were: individual pens, 91 x 91 cm; two kids (one in the experiment and another older) per pen, 182 x 91 cm; group pen (with at least two older kids present), 2.43 x 1.22 m; and group pen plus free access to alfalfa hay. Treatments in the second experiment were: ad libitum milk intake with two meals in weeks 3-8, then 50% of intake on the preceding few days with one meal in week 9 to 10; 75% of intake on the last few days of week 2 with two meals in weeks 3-8, then 50% intake (67% of intake in weeks 3-8) with one meal in weeks 9-10; 75% intake with one meal in week 3-8, then 50% intake with one meal in weeks 9-10; and 75% intake with two meals in weeks 3-6, then 37.5% intake with one meal in weeks 7-10. In the first experiment, neither group pens nor providing access to forage preweaning enhanced growth of Alpine kids. Results of the second experiment indicate that milk consumption can be moderately restricted without impairment of growth in preweaning and early postweaning periods compared with ad libitum milk consumption. Furthermore, there appears potential for effective employment of regimens with only one daily meal of milk, although most appropriate restriction levels deserve further study. Lastly, a second step reduction in milk intake in the latter few weeks of the preweaning phase may be useful in further stimulating dry feed consumption.

**Digestibility, nitrogen balance and blood metabolite levels in Alpine goat wethers fed either water oak or shining sumac leaves**

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Small Ruminant Research 40:123-127. 2001

Many rangeland/grazing areas possess forage and shrub species that are considered poor quality due to the presence of antinutritive factors such as phenolic compounds and tannins. Goats are known for their ability to consume tannin-containing brush and can utilize forage and shrub species containing tannins and phenolic compounds at levels that prohibit their use as feeds for sheep or cattle. Water oak (*Quercus nigra*) and shining sumac (*Rhus copallina*) are two examples of shrub species present in grazing or woodland areas that may contain antinutritive factors. Therefore eight Alpine wethers 8-9 months of age were fed diets consisting solely of dried leaves of water oak or shining sumac. Feed intake was similar between the two types of leaves, averaging 616 grams or 2.24% of body weight. However, based on higher digestibilities for water shining sumac than for
Effects of small peptides or amino acids infused to a perfused area of the skin of Angora goats on mohair growth


Until recently it was commonly believed that gastrointestinal digestion of proteins is complete and that only free amino acids enter circulation. But, a considerable body of evidence for absorption of peptides from the gastrointestinal tract has accumulated. There are also indications of peptide clearance from the blood, and many tissues appear to utilize peptides as donors of amino acids for protein synthesis. Therefore, the effect of infusing dipeptides or their amino acids on mohair growth of Angora goats was investigated using a skin perfusion technique. Seven Angora wethers were implanted bilaterally with silicon catheters into the superficial branches of the deep circumflex iliac artery and vein and carotid artery. The experiment consisted of three 28-d phases. In the first 14 d of Phases 1 and 3, saline was infused into deep circumflex iliac arteries supplying skin and in Phase 2 a mixture of dipeptides [methionine-leucine (Met-Leu), lysine-leucine (Lys-Leu)] was infused into the artery on one side, while free amino acids were administered on the other side. The studied small dipetides and amino acids similarly increased mohair fiber growth presumably through supplying limiting amino acids directly to the fiber follicle. Similar blood concentrations of various hormones and metabolites suggest that small peptides were utilized by skin for mohair fiber growth via supplying free amino acids for protein synthesis; however the exact mechanism of stimulation is unclear. In this regard, significant amounts of cysteine used in mohair fiber production may have arisen from transulfuration of infused methionine. Future research should consider different types of peptides.

Effects of Bovine Somatotropin and Thyroid Hormone Status on Hormone Levels, Body Weight Gain, and Mohair Fiber Growth of Angora Goats


Thyroidectomy has depressed wool growth and thyroxine administration has had positive effects; however, the exact mode of action of thyroid hormones is unknown and comparable effects on mohair fiber growth by Angora goats have not been established. Growth hormone (GH) and bovine somatotropin (bST) have had variable effects on wool growth. Therefore, 48 Angora goats (24 wethers and 24 doelings; 5 mo old; 16 ± 0.5 kg initial BW) were used to evaluate effects of recombinant bST administration and thyroid hormone status (euthyroid, hypothyroid, and hyperthyroid) on hormone levels, ADG, and mohair fiber growth. The bST was a slow release zinc-based suspension with sustained delivery (100 µg/[kg BW * d]) over a 14-d period. Hyperthyroidism was maintained by daily treatment with thyroxine (150 µg/[kg BW * d]), and hypothyroidism was achieved by feeding 6 mg/(kg BW * d) of propylthiouracil. This experiment
demonstrated a complex interaction between exogenous growth hormone administration and thyroid hormone status in Angora goats. Treatment with bST blocked effects of propylthiouracyl, allowing maintenance of normal concentrations of thyroid hormones. Also, treatment with thyroxine prevented an increase in insulin-like growth factor-I plasma concentration due to bST. Exogenous GH administration does not appear to influence mohair fiber growth, regardless of thyroid hormone status, and, thus, its effects may differ from those on other tissues/organs. The substantial effect of thyroxine administration on mohair fiber growth, despite decreased feed intake and live weight gain, implies a major role of thyroid hormone status.

Effects of level of broiler litter in diets containing wheat straw on performance of Alpine doelings


Small Ruminant Research. In Press. 2002

Residues from cereal grain production are important feedstuffs for ruminants throughout the world. They are, however, low in protein and high in fiber, which limit voluntary intake and digestibility. The nutritive value of cereal crop residues can be improved by various processing methods, such as treatment with alkalis such as sodium hydroxide or ammonia. Another means of improving nutritive value of cereal crop residues is supplementation with other feedstuffs, particularly ones high in crude protein. Broiler litter is a low-cost agricultural byproduct available in many areas of the world. The N concentration in broiler litter is usually between 2.4 and 5.6% of DM, and the available energy concentration in broiler litter is moderate. Thus, objectives of this experiment were to compare feed intake, ADG, and efficiency of feed conversion of growing Alpine doelings (32; 15 wk of age; 12 kg initial BW) consuming diets based on wheat straw supplemented with different levels of broiler litter to wheat straw supplemented with a conventional protein source or ammoniated through urea treatment. Treatments were feeding of a corn-based concentrate at 1.5% of BW (DM basis) with treated wheat straw and this supplement plus approximately 0.4% BW of soybean meal or 0.8 or 1.6% BW of broiler litter with untreated wheat straw. Soybean meal supplementation of wheat straw supported ADG as great as urea-treated wheat straw, and with less total feed consumption. Dietary inclusion of broiler litter also resulted in ADG similar to that with urea treatment of wheat straw and soybean meal supplementation of untreated straw, but with greater feed input particularly for the highest level of litter. Availabilities and costs of urea for ammoniation and N supplements such as soybean meal and broiler litter, along with practical considerations including labor and facilities, would dictate the choice among urea treatment and different supplemental N sources.

Performance effects of preweaning concentrate supplementation of meat goats

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The market weight for meat goats in the US is quite variable; however, sale weights near those typical of weaning time are common, possibly relating to the amount of disposable family income and yield of a quantity of meat suitable for consumption in a convenient period of time such as 1 or 2 wk. Also, some consumers may prefer meat from young animals. Thus, means of enhancing growth of meat goat kids preweaning and in the early postweaning period is of interest to increase income for meat goat producers. Sixty-four Spanish does with 104 Boer x Spanish or Spanish kids were used to determine effects of preweaning feeding of concentrate-based supplement on
preweaning and early postweaning growth. In mid-April, from approximately 6 to 14 wk after birth, animals grazed wheat forage (Phase 1), followed by 5 wk on native grass pasture (Phase 2) and an 8-wk postweaning period with a moderate level of supplemental concentrate (Phase 3). Treatments were no supplementation in Phases 1 and 2 (C), ad libitum consumption of a concentrate-based supplement in Phases 1 and 2 (A), no supplementation in Phase 1 and ad libitum consumption of supplement in Phase 2 (A-2), and limit feeding of supplement (approximately 1% of BW, DM; L). Supplement intake averaged 30, 74, 90, 157, and 158 g/d for L and 36, 87, 192, 240, and 229 g/d for A in wk 2-4, 5-6, and 7-8 of Phase 1 and wk 1-2 and 3-5 of Phase 2, respectively; supplement intake averaged 171 and 249 g/d for A-2 in wk 1-2 and 3-5 of Phase 2, respectively. Kid live weight gain was similar among treatments in Phases 1 (108, 133, 118, and 113 g/d) and 2 (82, 40, 43, and 78 g/d), and lower (P < 0.05) for C than for A and A-2 in Phase 3 (44, 59, 90, and 83 g/d for C, L, A, and A-2, respectively). In summary, preweaning supplementation of meat goat kids of Spanish does with a concentrate-based diet did not enhance preweaning growth while grazing wheat forage or later when on warm-season grass pasture, regardless of growth potential as influenced by Spanish and Boer sires. However, preweaning supplementation generally did improve growth in the early postweaning phase with a greater level of supplementation than previously. Nonetheless, within genotype preweaning supplementation did not impact overall pre- and postweaning live weight gain. Future research should consider other types of preweaning supplemental feedstuffs with which kids might more quickly achieve high levels of consumption, as well as influences of litter size on response to preweaning supplementation.

Effects of different feeding methods on growth and harvest traits of young Alpine kids

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Small Ruminant Research. In Press. 2002

Compared with beef, lamb and pork, chevon, particularly from young dairy kids, is quite lean, with little subcutaneous or intramuscular fat. Prior to the introduction of Boer goats, male kids from dairy goats harvested at a very young age provided much of the goat meat consumed in the U.S. In addition to feeding for early age slaughter, effective and economical feeding systems for dairy kids are needed for development of replacement doelings and with slaughter for meat at heavier weights and greater ages. Therefore, objectives of this experiment were to compare effects of ad libitum milk intake and limited milk consumption, with or without supplemental concentrate, on growth and carcass traits of Alpine kids at two harvest ages (10 and 13 wk). Thirty wether kids (2 wk of age) were given ad libitum (A) or limited (1 kg/d) access to milk, with (LC) or without (L) ad libitum supplemental concentrate. ADG was lowest among dietary treatments for L and similar between A and LC at 10 wk but greater for LC at 13 wk (151, 55, and 149 g at 10 wk and 110, 49, and 144 g at 13 wk for A, L, and LC, respectively). Similar differences were observed in carcass weight (7.0, 3.7, and 6.1 kg at 10 wk, and 6.8, 4.4, and 7.9 kg at 13 wk for A, L, and LC, respectively). The ratio of kidney and pelvic fat to bone-free muscle was lowest among dietary treatments for L, similar between A and LC at 10 wk, and lower for LC vs A at 13 wk (2.1, 0.5, and 2.0 at 10 wk and 2.7, 0.5, and 1.8 at 13 wk for A, L and LC, respectively). In summary, up to 10 wk of age, either ad libitum consumption of milk or restricted milk intake with supplemental concentrate can be used to raise Alpine kids. However, with slaughter at ages greater than 10 wk, BW and carcass weight may be greater when concentrate is supplemented compared with ad libitum milk intake alone. Likewise, internal fat deposition can be elevated with extended ad libitum milk intake without supplemental concentrate.
Recent perspectives in using goats for vegetation management in the USA

S. P. Hart


Although considerable research has demonstrated the usefulness of goats in controlling undesirable plant species like shinnery, blackjack, and post oak, sericea lespedeza, and many others, this method still is not widely employed. Environmental concerns and increasing costs of chemical and mechanical means of vegetation management, however, are providing impetus for greater utilization of such biological management techniques for removal of unwanted vegetation. Goats have an advantage over other biological controls in that a saleable product results from their consumption of brush and weeds, and they can be co-grazed with cattle. Moreover, goats increase cycling of plant nutrients in undesirable vegetation, typically increasing prevalence of grasses. A significant limitation to use of goats for vegetation management is the social stigma attached to goats by cattle producers. However, constraints of a small number of animal markets, few sources of large numbers of adapted animals, and little producer experience and knowledge of production practices are gradually being overcome as the goat industry grows. Most appropriate production systems need to be developed for specific environments, which entails proper kidding date, parasite management, predator control, fencing, and marketing strategy. In summary, there appears a bright future in use of goats for vegetation management because environmental conditions have become more conducive to growth of weedy plant species and, in most cases, goats are the most cost-effective, nontoxic, and nonpolluting solution available.