SUMMARIES OF RECENT
JOURNAL ARTICLES (2000 and In Press)
Influences of the number of fetuses and levels of CP and ME in gestation and lactation supplements on performance of Spanish does and kids during suckling and post-weaning


Pregnancy and lactation appear to influence mohair growth via competition for nutrients between skin follicles and other tissues. Conversely, based on research with Australian feral goats, effects on pregnancy and lactation on cashmere fiber growth are due to physiological changes associated with pregnancy and lactation rather than via nutrient competition, which impact times of cashmere cessation and initiation in the growth cycle. Effects of the nutritional plane of does in the last one-third of gestation and of kids during suckling also have not been extensively studied. Objectives of this research were to determine effects of supplement levels of metabolizable energy and crude protein for US Spanish does, from a herd selected for cashmere fiber production, in gestation and lactation on performance of does and kids during suckling and post-weaning. Forty-eight mature US Spanish does (40 kg) were used in the experiment. At 60 days of gestation, does with single or twin fetuses consumed mature bermudagrass hay ad libitum and 1% body weight (dry matter basis) of supplements with 18.6 or 28.5% crude protein and 2.2 or 2.8 Mcal/kg metabolizable energy. The high energy-high protein supplement was offered at 1.5% body weight (dry matter basis) for 15 days after birth, and does received the same supplement treatments as in gestation thereafter until weaning at 50 days after parturition. For a 50-day post-weaning period, kids consumed ad libitum the high energy-low protein supplement. With a moderate plane of nutrition during gestation elicited by ad libitum consumption of low-quality grass hay and a relatively high level of supplemental concentrate, the number of fetuses did not affect cashmere weight of U.S. Spanish does from a herd selected for cashmere fiber production, with shearing in February at 100 days of gestation. Different supplement metabolizable energy and crude protein levels during gestation and lactation periods did not influence birth weight of single or twin kids. Kid body weight and cashmere weight after 50-day suckling and post-weaning periods were affected by an interaction between the number of fetuses and level of metabolizable energy in supplements given to does in gestation and lactation, suggesting possible impact of nutrient demand as influenced by number of fetuses on doe responses to different supplements in milk production and consequent kid body weight. However, because of the limited number of observations in this experiment, these findings warrant further research.

Effects of dietary protein source on fleece and live weight gain in Angora doelings


The US Angora goat, on a BW basis, is one of the highest fleece-producing ruminants. Mohair growth requires little energy but much protein is needed. In particular, requirements for the sulfur-containing amino acids cysteine and methionine are high. However, the array of amino acids needed for fleece-free BW gain is different from that needed for fiber growth. Thus, diets
containing supplemental protein sources promoting high BW gain may not necessarily do so for fiber growth, which would be of special importance for growing, fiber-producing ruminants, such as yearling Angora doelings typically bred for kidding at 2 years of age. Therefore, objectives of this study were to determine if different common supplemental dietary protein sources have similar effects on live weight and mohair growth in yearling Angora doelings. Fifty-one yearling Angora doelings (20 ± 0.6 kg initial BW) were used; diets consisted of approximately 40% roughage and 18 to 19% CP (DM basis), of which two-thirds was supplied by corn gluten meal, cottonseed meal, hydrolyzed feather meal or Menhaden fish meal; DM intake was restricted at approximately 0.7 kg/day. Results of this experiment indicate that dietary characteristics promoting high growth or BW gain may not be those most conducive to high mohair growth. In this particular instance, a diet with supplemental fish meal resulted in greater ADG than diets with feather, corn gluten, or cottonseed meals, whereas corn gluten meal yielded greatest mohair growth. Further research is necessary to fully understand how dietary properties and nutrient status affects BW gain and mohair growth by yearling Angoras.

Effects of season on fleece traits of Angora does in the U.S.

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Although Angora goats do not visibly shed fiber, seasonal changes in fiber growth driven by photoperiod have been observed in Australia and New Zealand. Seasonal changes in mohair growth by U.S. Angoras have not yet been characterized, which would be useful information for design of feeding strategies and as affecting mohair quality traits. In this regard, fiber growth in Angora does of the E (Kika) de la Garza Institute for Goat Research was evaluated over a 1-year period, with the conclusion that a seasonal cycle of fiber growth in U.S. Angora goats does exist. Primary follicle activity was lower in winter than summer, and clean fiber growth rate and fiber diameter were lowest in winter, greatest in summer, and intermediate in autumn and spring. Fleece fiber medullation was greatest among seasons in summer, and medullated fiber diameter was greater in spring and summer than in winter. These results should be useful to design optimal feeding programs for mohair production and shearing times for minimal medullated fiber contamination. For example, based on these findings the optimal time of shearing U.S. Angoras for minimal contamination with medullated fibers may be just before spring and autumn equinoxes when it is likely that medullated fibers have been recently shed.

Effects of mimosine on fiber shedding, follicle activity, and fiber regrowth in Spanish goats


Mimosine is a pyridoxal antagonist, which inhibits DNA replication and protein synthesis; thus, it may act mainly by arresting cell division in the follicle bulb. A study on annual patterns of follicle...
activity in Australian cashmere goats indicated that primary follicles were largely inactive during the winter (short daylength); secondary follicles became inactive about 1 mo later and remained so for only a short period of time. This difference between follicle types may provide an opportunity to chemically defleece or remove cashmere fiber with minimal guard hair contamination. In addition, typically, cashmere goats are shorn when the mean temperature is around 10°C in the early spring. Because shorn goats are susceptible to cold stress for up to 3 mo, retention of guard hair would be very useful in cold weather. Therefore, objectives of this experiment were to evaluate the effects of mimosine infusion on fiber shedding, follicle activity, and fiber regrowth in Spanish goats. Ten 2-yr-old Spanish wethers (58.2 ± 7.21 kg BW) were used to determine effects of 2-d intravenous infusion of mimosine (beginning on January 8) on fiber shedding, follicle activity, and fiber regrowth. At 7 to 10 d after the start of infusion, all five goats infused with mimosine exhibited shedding, whereas shedding by controls was not observed. In conclusion, 2-d intravenous infusion of mimosine at 120 mg/(kg BW · d) in the winter induced cashmere shedding but had less effect on guard hairs, suggesting future potential use of chemicals such as mimosine to remove cashmere fiber.

Effects of dietary level of Leucaena leucocephala on performance of Angora and Spanish doelings


Leucaena (Leucaena leucocephala) is a drought-resistant, leguminous tree found throughout the tropics and subtropics. Leucaena leaves are readily consumed and nutritious; however, Leucaena contains toxic compounds such as mimosine. The nutritive value and toxicological effects of Leucaena with fiber-producing goats have not been extensively studied, particularly at high dietary levels. Therefore, objectives of this experiment were to evaluate effects on live weight and fiber growth by Angora and Spanish goats of different dietary levels of Leucaena compared with a diet containing a feedstuff high in ruminally undegraded protein. Thirty Angora (16 ± 2 kg initial body weight) and 20 Spanish doelings (19 ± 2 kg initial body weight), approximately 8 months of age, were used in a 10-week experiment. The control diet (CS) included 9% dry matter of formaldehyde-treated casein; other diets consisted of 15, 30, 45 or 60% DM of Leucaena leaf meal (0.75% mimosine). Results of this experiment indicate that diets containing moderate to high levels of Leucaena, at least up to 45%, can be fed to goats without adverse effects on BW gain or fiber growth or characteristics. Moreover, the lack of interaction between dietary treatment and breed (i.e., Angora vs Spanish) for most variables suggests that differences among animals in fiber production do not have appreciable impact. However, Leucaena used in this experiment was relatively low in mimosine, and factors such as the amino acid composition of ruminally undegraded protein of Leucaena deserve consideration and further study.
Effects of dietary protein concentration on postweaning growth of Boer crossbred and Spanish goat wethers


Development of the Boer goat in South Africa focused on selection for attributes such as size, muscling, and growth rate. Greater body weight and growth rate for Boers and Boer crossbreds than for other goat breeds and types have been documented at a number of locations. However, though Boer goats can grow more rapidly than other types of goats, growth rates are less than for sheep, implying that nutrient requirements may not be markedly different from other goats. Furthermore, ad libitum feed intake by goats relative to BW is frequently greater than for cattle and sheep. Thus, the objective of this experiment was to estimate the protein requirement by determining effects of protein concentration in high concentrate diets on growth of weaned, confined Boer crossbred and Spanish wethers. Boer (3/4) × Spanish (1/4) and Spanish goat wethers, 4 to 4.5 mo of age and 17.6 and 19.4 kg initial BW, respectively, were fed 70% concentrate diets provided ad libitum for 30 wk in confinement. The concentration of crude protein in consumed dry mater was 9.3, 13.8, 17.1, and 22.1% (P1, P2, P3, and P4, respectively); supplemental protein was from soybean meal for P1 and P2 and from soybean meal plus a blend of blood, fish, and feather meals for P3 and P4. Results of this experiment indicate a similar dietary protein requirement relative to dry matter intake for growing Boer × Spanish and Spanish wethers consuming high concentrate diets in confinement. Diets with a protein concentration of 14% or greater may support greater live weight gain than a diet with 9% protein. A ruminally degraded protein concentration of 11.5% of total digestible nutrients seems adequate for unimpaired microbial digestion and protein synthesis. However, further research on protein requirements of growing meat goats is warranted, such as with dietary protein concentrations between 9 and 14% and other diet natures and production settings.

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)
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 × Spanish, Boer × Angora, and Spanish goats consuming a concentrate-based diet**

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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 × Spanish, Spanish, and Boer × Angora wethers consuming a concentrate-based diet were compared. Over the 16-week performance period, average daily gain (ADG), dry matter intake (DMI), and the ratio of ADG:DMI were greater for Boer crossbreds than for Spanish goats (ADG: 154, 117, and 161 g; DMI: 646, 522, and 683 g/day; ADG:DMI: 263, 235, and 261 g/kg for Boer × Spanish, Spanish, and Boer × Angora, respectively). Dressing percent (46.3, 47.3, and 47.0% of body weight) and quality grade score (11.17, 9.67, and 11.17 for Boer × Spanish, Spanish, and Boer × Angora, respectively; 12 = Choice +; 11 = Choice; 10 = Choice -; 9 = Good +) were similar among genotypes. Weights of some noncarcass components were greater for Boer crossbreds than for Spanish goats, but relative to empty BW, noncarcass component weights were similar among genotypes. Concentrations of moisture, ash, fat, and protein in carcass and noncarcass components did not differ among genotypes. Contributions to the carcass of different primal cuts were similar among genotypes, and there were few differences in concentrations of separated lean, bone, and fat in primal cuts. In conclusion, with consumption of a concentrate-based diet, postweaning growth from 9 to 24 weeks of age was greater for Boer crossbreds than for Spanish wether goats, with little or no difference between Boer × Spanish and Boer × 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 × Spanish, Boer × Angora, and Spanish goats.
Effects of gender and age on performance and slaughter and carcass characteristics of Boer × Spanish goats

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Meat goat production is rapidly expanding in the U.S., in large part because of the increasingly diverse ethnicity of the population. There are many ethnic minorities that consume goat meat, particularly at holidays and special social events. As a result, goats are not marketed in the U.S. at a standard age or weight, but may be sold at particular times when prices are high. 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. Spanish goats have been primarily employed for brush control in low input production systems and have not been selected for meat production, which has contributed to variable market weight and carcass characteristics. Presently, the number of crossbred Boer goats marketed 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. Such research is necessary for goat producers to design production systems matching market demands, and also for consumers to make appropriate purchasing decisions. 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 × Spanish goats (16.8, 15.6 and 16.9 kg initial body weight, respectively) consumed a high concentrate diet from 116 to 340 days of age, with harvest at 56-day intervals. Average dry matter intake for the entire experiment was lowest among genders for females (674, 534 and 682 g/day), and average daily gain was greater for males and wethers than for females (119, 89 and 138 g/day for wethers, females and males, respectively). Dressing percentage was similar among genders and lowest among ages at 116 days (41.7, 48.5, 49.9, 51.3 and 50.9% for 116, 172, 228, 284 and 340 days, respectively). Internal fat mass was lower for males vs wethers and females (6.9, 7.0 and 5.1% empty body weight for wethers, females and males, respectively) and increased with increasing age (2.3, 5.4, 6.3, 7.7 and 9.9% empty body weight; 0.32, 1.08, 1.60, 2.77 and 4.08 kg at 116, 172, 228 and 340 days of age, respectively). Carcass scores and grades were similar among genders. Among genders, males had the greatest carcass percentages of separable bone (27.1, 27.0 and 29.4%) and lean (50.1, 49.7 and 54.1%) and were lowest in fat (18.0, 19.5 and 12.7% for wethers, females and males, respectively). Carcasses were 38.9, 29.9, 27.0, 22.6 and 20.7% bone; 6.7, 18.3, 15.1, 21.0 and 22.4% fat; and 49.4, 48.5, 50.9, 53.9 and 53.8% lean at 116, 172, 228, 284 and 340 days, respectively. In summary, with a moderate rate of live weight gain, differences among genders of Boer × Spanish goats in performance and harvest traits were not affected by age from approximately 4 to 11 months. Carcass composition changed appreciably from 4 to 6 months but varied much less thereafter. Internal fat mass as a percentage of body weight increased steadily as age increased, with weight at each age being nearly as great as that of carcass fat.
Effects of dietary sulfur level on amino acid concentrations in ruminal bacteria from ruminal fluid of goats


Mohair production by Angora goats can be affected by plane of nutrition, including dietary sulfur (S) concentration. Cysteine is the primary S-containing amino acid in animal fiber protein. The high concentration of cysteine in keratatin relative to that in plant material suggests that wool- and mohair-producing ruminants could require greater quantities of S-containing amino acids than other ruminant classes. Most protein and S-containing amino acids available for digestion and absorption by ruminants are derived from dietary protein escaping ruminal fermentation and microbial protein synthesized in the rumen. The former is determined by the quantity of protein fed and susceptibility to degradation by ruminal microorganisms. Microbial protein formed in the rumen depends on the quantity of OM fermented and availability of required nutrients such as ammonia. Low ruminal S concentration can also depress microbial growth and fiber digestion, and nutrient availability can impact composition of microbial cells as well. Therefore, an experiment was conducted to determine the effect of dietary S on amino acid concentrations in ruminal fluid bacterial cells of goats. Twelve Angora and 20 Alpine goat wethers consumed diets (14.3% crude protein and 1.67-1.80 Mcal/kg of metabolizable energy, dry matter basis) with 0.11, 0.20, 0.28 or 0.38% S (supplemental S: CaSO₄; N:S ratio: 21, 12, 8 and 6, respectively) for 10 weeks. The concentration of cysteine in bacterial dry matter changed quadratically (curvilinear) as dietary S increased (3.28, 3.77, 3.80 and 3.65% for 0.11, 0.20, 0.28 and 0.38% S, respectively). However, dietary S did not alter methionine concentration in bacterial dry matter or total amino acids, and for the few amino acids whose concentrations were affected, magnitudes of change were relatively small. In conclusion, with diets moderate to low in metabolizable energy concentration, levels of S greater than 0.20% and N:S ratios less than 12:1 had very little effect on amino acid concentrations in ruminal fluid bacteria of growing goats, which supports the contention that the primary potential influence of inorganic dietary S on absorbed S-containing amino acids is through the quantity of microbial protein synthesized in the rumen.

Effects of dietary levels of forage and ruminally undegraded protein on early lactation milk yield by Alpine does and doelings


Increased dietary levels of ruminally undegraded protein (RUP) in early lactation has in many instances improved milk yield by dairy cows. However, in the few studies with goats conducted in this area, added RUP has not enhanced performance. Thus, there is need for experimentation to determine what, if any, experimental conditions are conducive to milk yield responses by dairy goats to added RUP. Hence, a group of Alpine does and doelings were fed diets with 40 or 80%
forage in weeks 3 to 19 of lactation. Diets were 18-19% crude protein, with or without added RUP, which was supplied by a mixture of blood, fish, and feather meals that provided two-thirds of the protein from soybean meal in control diets. Milk yield and protein concentration for these doelings and does, which were in low to moderate body condition, were greater with 40 vs 80% forage throughout the 16-week early lactation period. RUP affected milk production only in the first few weeks, and numerically the response to RUP early in the experiment was greater with 40 vs 80% forage. Over the entire 16-week period, body weight gain was greater with 40 vs 80% forage, and doelings increased in body weight slightly more than did does. Responses to dietary forage and RUP levels were similar between doelings and does. In summary, with low to moderate body condition, moderate dietary concentrate levels may support greater milk production by Alpine goats throughout early lactation, whereas there appears potential for short-term performance benefit from added RUP only very early in the lactation period.

The effect of restricted consumption of water and(or) dry matter in milk replacer on growth by male and female Alpine kids


Current management systems for kids fed milk or milk replacer do not facilitate rapid transition at weaning to dry feeds. In some instances, liquid feeds are offered at relatively high levels, which may limit dry feed consumption, particularly with abrupt weaning. To investigate other feeding options, Alpine male and females at 3 to 9 days of age were fed a commercial sheep/goat milk replacer for 8 weeks, with free-choice intake or with slight restrictions in consumption or water or water and dry matter. Levels of restriction in weeks 4-8 were approximately 70% of free-choice intake. Restriction treatments did not improve performance after abrupt weaning, and restricting intake of water alone did not enhance growth. Growth rate of males was greater than that of females, but an adverse effect of restricting both water and dry matter intake only on growth of males suggested less susceptibility of females to nutrient intake restriction.

Growth and cashmere production by Spanish goats consuming ad libitum diets differing in protein and energy levels


Most previous research concerning effects of nutritional plane on growth and characteristics of cashmere fiber has been with feral goats. This work has shown than nutritional plane has relatively small effects on cashmere fiber growth and quality other than when the nutritional plane is very low. Effects of protein and energy levels in diets consumed free-choice on cashmere fiber growth have
not been thoroughly studied. Thus, an experiment was conducted with 36 Spanish goat wethers (averaging 196 days of age and 17.5 kg body weight at the start of the experiment) from a herd previously selected for cashmere growth. Wethers consumed (free-choice) diets with 10 or 15% crude protein and 40, 60, or 80% concentrate, providing ME concentrations of 2.00, 2.35, or 2.70 Mcal/kg dry matter. Cashmere fiber diameter was greater for 15 versus 10% dietary crude protein regardless of metabolizable energy level. Diet composition did not impact cashmere fiber length. Dietary concentrations of crude protein and metabolizable energy did not alter guard hair weight but interacted in weight of cashmere fiber. These results imply that fiber characteristics of goats selected for cashmere production might be relatively more susceptible to nutritional plane effects than is the case for feral goats.

**Growth of Spanish, Boer × Angora and Boer × Spanish goat kids fed milk replacer**

*J. Luo, T. Sahlu, M. Cameron, and A. L. Goetsch*


Contributions of heterosis for economically important traits have been well documented in other species. The Boer goat has long been recognized for its superior meat producing ability and is widely used to improve growth and carcass traits of local breeds through crossbreeding. Milking ability of the dam can greatly influence the opportunity of kids to express growth potential; therefore, hand-rearing eliminates such maternal effects. However, information is lacking on how performance of Boer crosses compares with Spanish goat kid performance during the preweaning period under identical feeding and management conditions, such as with feeding of milk replacer. Acidified milk replacer has been widely used in rearing young calves and kids, with advantages of reducing milk feeding and labor costs and simplifying management. Kids fed cow milk replacer can grow as rapidly as kids given goat or cow milk. Therefore, the objective of this study was to compare preweaning performance of two Boer crossbreds and Spanish goats under standardized nutritional conditions - feeding acidified milk replacer in an intensive management system. Boer × Angora kids consumed more milk replacer from birth to 3 weeks of age than did Boer × Spanish and Spanish kids, although intake was similar among genotypes in weeks 4 to 8. Starter diet intake was greatest among genotypes for Boer × Spanish, and the feed conversion ratio was 13% greater for Boer cross kids than for Spanish kids. This study reflects that Boer crosses exhibit superior growth and feed efficiency during the preweaning period compared with Spanish kids under intensive management conditions.

**Growth and carcass traits of Boer × Alpine wethers slaughtered at the ages of 31 and 50 weeks**

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The Alpine goat has high milk production but low rates of carcass fat and protein deposition compared with traditional meat goat breeds. Thus, crossbreeding Alpines with a meat goat breed is a means of increasing profit potential from sale of kids for meat production. Boer goats are more muscular and larger in mature size than other breeds of goats; thus, crossing the Alpine goat with the Boer could produce a genotype with high growth rate and carcass characteristics suitable for goat meat market specifications. Changes in body weight gain, feed efficiency, and carcass characteristics with advancing age are well understood for cattle and sheep. Briefly, efficiency of feed utilization and body weight gain decrease with advancing time as adipose tissue accretion increases and lean tissue deposition declines, although degrees of change vary with factors such as particular stages of maturity, diet composition, and previous nutritional plane. Concomitantly, whole body fat content increases with age, again with magnitudes of change for different depots or sites depending on aforementioned conditions. For goats, presently high carcass fat levels are not desired by U.S. consumers. Thus, there is need to evaluate differences in efficiency of production and carcass characteristics between meat goats of different ages, in order to determine optimal ages and times for slaughter. In this regard, 14 Boer × Alpine wethers were used to determine effects of feeding from 15 to 31 weeks (Phase 1) and from 38 to 50 weeks (Phase 2) on feed intake, body weight gain, feed efficiency, plasma constituents, internal organ mass, and carcass traits. All wethers consumed diets free-choice with 20 and 16% crude protein and 33 and 40% neutral detergent fiber diet in Phase 1 and 2, respectively. Body weight after Phase 1 and 2 was 42 and 57 kg, respectively; body weight gain was greater in Phase 1 than in Phase 2 (228 vs 118 g/day); and the ratio of BW gain to dry matter intake differed between phases (0.19 in Phase 1 vs 0.10 in Phase 2). Cold carcass weight (20.4 vs 29.6 kg), dressing percentage (50.1 vs 56.5%), and percentage of carcass fat (16.4 vs 20.2%) were greater after Phase 2 than Phase 1, and leg cut percentage (30.5 vs 28.3%), carcass bone percentage (23.7 vs 20.6%), and backfat thickness (0.44 vs 0.30 cm) were greater after Phase 1. However, carcass lean percentage (58.3 and 57.1%) and the percentage of noncarcass fat (6.39 and 7.07% for Phase 1 and 2, respectively) were similar between phases. In conclusion, Boer × Alpine male castrates had appreciably greater BW gain and FCR in Phase 1 (14 to 31 wk of age) than in Phase 2 (38 to 50 wk of age). Most important carcass characteristics favourably affected by the lengthy feeding period were carcass weight and dressing percentage. In general, age did not have appreciable effects on other carcass characteristics, although the carcass fat percentage was 3.8 percentage units greater after Phase 2 than after Phase 1. Overall, it would appear that considerably more desirable marketing opportunities after Phase 2 than after Phase 1 would be required to justify the high feed costs of Phase 2 for Boer × Alpine wethers.