Housing and feeding effects on the growth and nematode loads in kids under mixed-species grazing system

Antonio Jackson, R. Marshall, L. Gray, and S. Gebrelul

Southern University Agricultural Research and Extension Center
Southern University and A&M College, Baton Rouge, Louisiana 70813

Abstract

Fifty kids that were born and weaned under the mixed-species system were assigned to confinement vs. semi-confinement housings and 13% or 16% crude protein (CP) levels. Following an adjustment period of 2 weeks, an initial measurements of body weight (BW), body condition scores (BCS), (1 = thin, 5 = fat) and FAMACHA scores (FS), (1 = red, healthy, 5 = white, anemic) were taken. These measurements were then taken every 14 d for 8 wk. Data were analyzed using SAS MIXED procedure. Kids under confinement were 1.7 kg heavier than kids under semi-confinement housing. Male kids were 3.0 kg heavier than female kids. No differences in BCS or FS were observed due to housing. Level of CP in the diet had no effect on BW, BCS or FS. Kids from pastures that were grazed with cattle had higher BW (19.1 ± 0.4 vs. 17.9 ± 0.4 kg) and BCS (2.6 ± 0.05 vs. 2.4 ± 0.05), and lower FS (1.8 ± 0.1 vs. 2.4 ± 0.1) than kids that originated from goats-alone pastures. Kids that were confined and fed 16% CP were heavier than any other group. BW was positively correlated (0.48) to BCS but negatively correlated (−0.34) to FS. BCS and FS were negatively (−0.28) correlated. Results showed that kids raised under mixed-species system can be confined and fed for 8 wk. to achieve desirable market weights.

Introduction

Haemonchus contortus **or the "Barber Pole Worm" is considered to be the most important pathogen of goats and cattle in the tropical and subtropical environments. *Haemonchus contortus* has a short life cycle of less than three weeks. With favorable conditions, the eggs hatch and larvae develop to infective 3rd stage larvae in soil and manure. Upon digestion and completion of the life cycle, *H. contortus* is a highly pathogenic, blood sucking nematode causing clinical signs of anemia, edema (bottle-jaw), diarrhea and death. *Haemonchus contortus* causes dramatic economic loss. This loss is due to decreased production , cost of prevention and treatment, and ultimately death of infected animals. The control of *H. contortus* involves the use of anthelmintics, which are used prohylactically rather than therapeutically. Resistance to anthelmintic treatment is the major concern in controlling parasitism in goat and possibly in cattle. The inevitable outcome of anthelmintic resistance is the need to implement strategies to delay the onset and severity of the problem. Worm burdens may be reduced by treating only goats and cattle that are positive for worms in a limited rotational anthelmintic program.**

Materials and Methods

- **The trial was carried in a 2 x 2 factorial arrangement**
- **Forty eight weaned kids were randomly assigned to four treatments through**
- **Every 28 days from March to September, weights, body condition scores (BCS; 1=thin and 5=fat), FAMACHA scores (1=red and 5=white), blood and feces were collected.**
- **Fecal and blood samples from each grazing regiment were analyzed for FEC and PCV.**
- **Data was statistically analyzed using SAS's ANOVA, and correlation coefficients were determined among the measurements.**

Haemonchus contortus

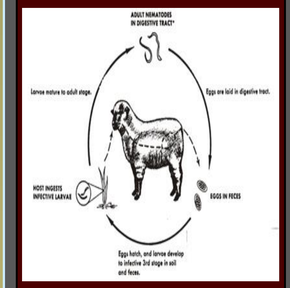


Figure 1: Worms mate in the host and females lay eggs that pass out in the feces. The eggs hatch and develop to infective larvae while remaining in the feces. The infective larvae then move out of the feces onto the surrounding forage where they can be consumed during grazing thus completing the cycle.

Figure 2: *Haemonchus contortus* showing barber-pole appearance with white ovaries twisted around red, blood-filled gut

Figure 3: *Haemonchus contortus* on stomach surface showing areas of hemorrhage

Diagnostic Methods

Figure 4: Collecting feces to evaluate the number of parasite eggs excreted per gram of feces (epg). A rubber glove is used to extract feces directly from the rectum.

Figure 5: Collecting blood for PCV analysis. PCV is the percent of blood that is red blood cells. Normal is > 30%. < 20% = signs of anemia

Figure 6: Determining the FAMACHA scores of goats by observing the color of the mucous membranes of the lower eyelid. FAMACHA© has 5 levels, 1(red, non-anemic) to 5 (white, severely anemic).

Figure 7: 2 gms of feces was placed into a 50 ml centrifuge tube and filled to 30 ml with salt solution. Samples were allowed to soak for a few minutes broken up (fecal pellets) and then mixed.

Figure 8: With the use of a pipet, both chambers of the slide was filled. All eggs inside of the grid area was counted using 10x objective. Only trichostrongyle eggs were counted. Total egg count (both chambers) X 50 = EPG (eggs per gram)

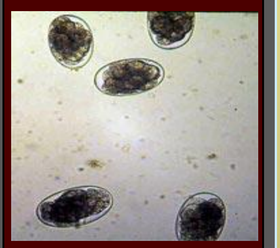
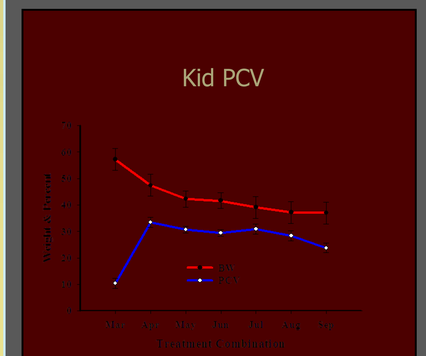
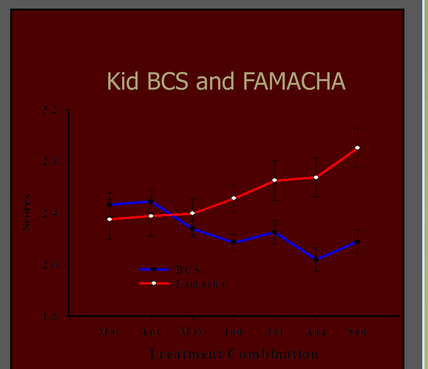


Figure 9: Worm eggs in fecal exam

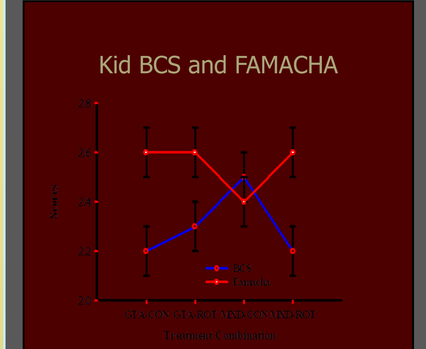
Results



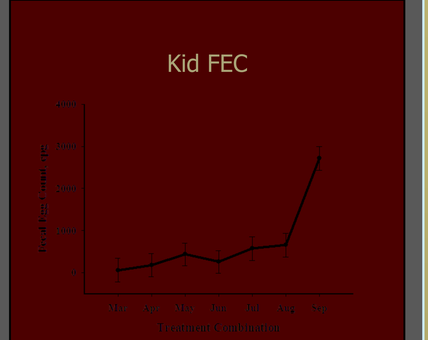
Graph 1: Changes in body weights and percent PCV during grazing period



Graph 2: Changes in BCS and FAMACHA© in kids during the grazing period



Graph 3: BCS and FAMACHA© scores of kids grazing alone or mixed with calves



Graph 4: Changes in fecal egg counts in kids during the grazing period

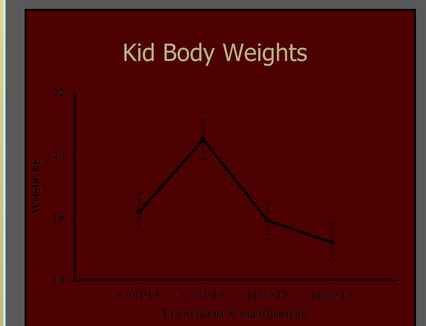


Figure 10 : Body Weight changes in Kids due to housing and protein levels.

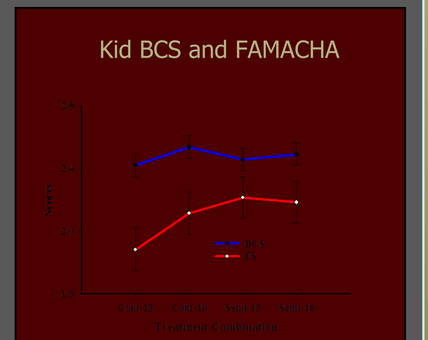


Figure 11 : Body condition and FAMACHA© scores in kids due to housing and protein levels

Summary

- No differences in BCS or FS were observed due to housing effect.
- Level of CP in the diet had no effect (P > 0.05) on BW, BCS or FS.
- Kids from pastures that were comingled with cattle had higher BW (19.1 ± 0.4 vs. 17.9 ± 0.4 kg) and BCS (2.6 ± 0.05 vs. 2.4 ± 0.05), and lower FS (1.8 ± 0.1 vs. 2.4 ± 0.1) than kids that originated from goats-alone pastures.
- Kids that were confined and fed 16% CP were heavier (P < 0.05) than any other group.
- BW was positively correlated (0.48) to BCS but negatively correlated (−0.34) to FS.
- BCS and FS were negatively (−0.28) correlated.

Conclusions

- **Kids raised co-mingled with cattle were heavier in weight, better conditioned and carried less parasitic load as indicated by lower FAMACHA© scores.**
- **Results indicated that mixed grazing can improve performance of kids without any negative effect on cattle.**
- **Mixed species grazing of cattle and goats on the same pastures proves to be beneficial in decreasing the quantity and effects of *Haemonchus contortus* infections of goats.**

References

Langston University Goat Research & Extension

Virginia-Maryland Regional College of Veterinary Medicine

Internal & External Parasites of Goats Jim Miller Louisiana State University

Acknowledgements

The authors would like to thank Mila Berhane, Yemane Ghebreiyessus, Veera Bachireddy, Roosevelt Payne, and Gary Simon for technical assistance with sample collections and data analysis.