Selected Tools for Internal Parasite Management in Sheep

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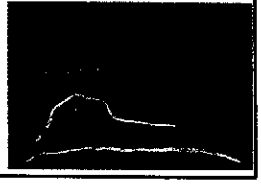
(Acknowledge Dr. Thomas Terrill as source for several pictorial slides and charts)

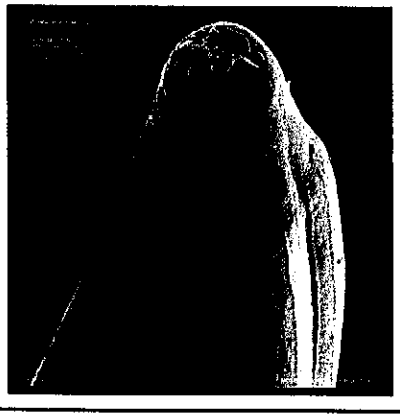
Southern Consortium for Small Ruminant Parasite Control
A Research Group

INTRODUCTION

GASTROINTESTINAL NEMATODES

- *Trichostrongylus colubriformis*
- *Cooperia* spp
- *Ostertagia circumcincta*
- *Haemonchus contortus*



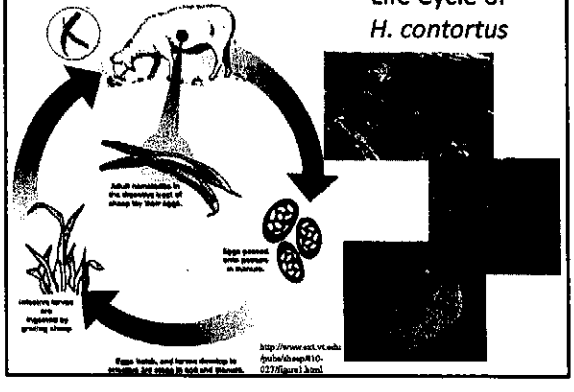


Haemonchus contortus
(Barber Pole Worm)

- Sheep, goats, deer, exotic ruminants
- Blood-sucking parasite
  - highly pathogenic
  - causes severe anemia

  - causes low blood protein -- "bottle jaw"
- Most important parasite in sheep/goats raised in warm/wet (moist) environments such as in the southern US A.

Life Cycle of
H. contortus

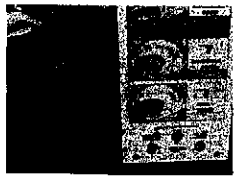


CONTROL MEASURES: Anthelmintics

- Multiple anthelmintic resistance in small ruminant GIN is a major problem in Australia, New Zealand, South Africa, South America, Great Britain, USA
- Cost of anthelmintics
- Concerns over drug residues in meat and milk products
- Environmental concerns

CONTROL MEASURES: Strategic deworming

- Smart drenching
- FAMACHA



ALTERNATIVE CONTROL MEASURES

- Vaccines
- Genetic resistance/tolerance
- Copper oxide wire particles
- Nematode-trapping fungi
- Use of forages/plants

HERBAL MEDICINE

- Plant compounds with *in vitro* and *in vivo* activity against *Haemonchus contortus*
  - Alkaloids
  - Triterpenoids
  - Benzyl isothiocyanate
  - Allicin
  - Oleanolic acid
  - Condensed tannins

HERBAL MEDICINE, cont.

- Condensed tannin (CT) – containing plants and forages
  - Grazed, or cut and fed green
  - Dried, fed as hay
  - CT extracts

BENEFICAL EFFECTS OF CONDENSED TANNINS

- Increased net absorption of (dietary) essential amino acids (EAAs) = protein.
- Increased wool growth and growth rate
- Increased live weight gain
- Higher ovulation rate
- Higher milk yield
- Reduced bloat
- Apparent reduced detrimental effects of internal parasites

CONDENSED TANNINS IN FORAGES

- Vary in concentration
  - Alfalfa (none)
  - Birdsfoot trefoil (2-3 %)
  - Big trefoil (4-5 %)
  - Sericea lespedeza (6-7 %)
  - Canary clover (14%)
- Vary in reactivity
  - Birdsfoot trefoil CT (low reactivity)
  - Sericea lespedeza CT (high reactivity)

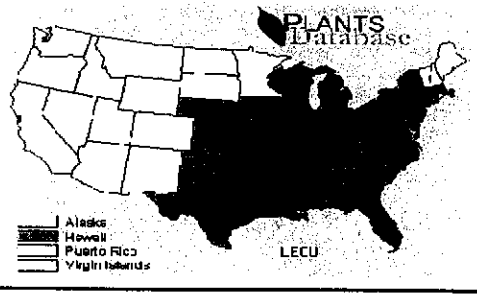
CT-CONTAINING FORAGES

- Cool season legumes
  - Sulla
  - Birdsfoot trefoil
  - Big trefoil
  - Sainfoin
- Warm-season legumes
  - Sericea lespedeza

Sericea lespedeza

- Perennial warm-season legume
- High in condensed tannins
- Tolerant to low pH (4.5)
- Grows well on infertile soils

Sericea lespedeza Distribution



Forms of Sericea Lespedeza used in Experimental Studies

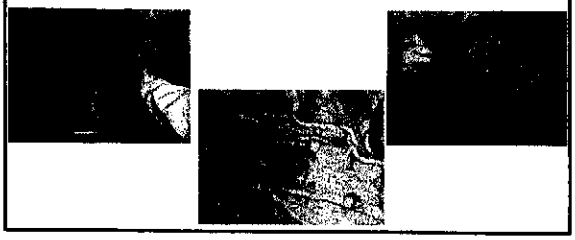
- Hay – long stem and ground
- Pellets
- Grazed forage

MATERIALS AND METHODS in EXPERIMENTS

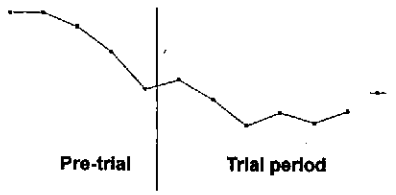
- Samples collected every week or every two weeks
- Fecal samples analyzed for EPG
- Blood sample - PCV

Procedures, cont.

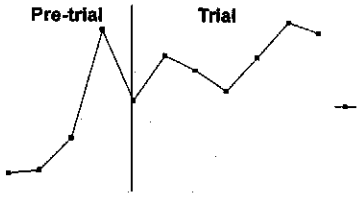
- At the end of each trial animals are slaughtered and worms collected from abomasum and intestines



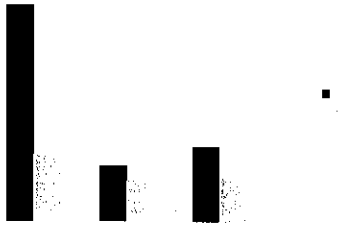
PCV



FEC



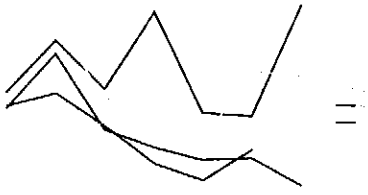
Effects on Adult Worm Species



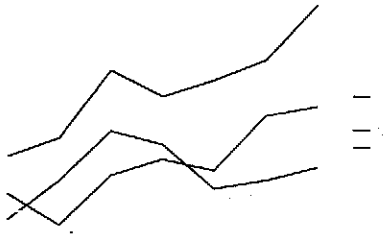
Conclusions

- Feeding SL hay to goats (Terrill et al.) and lambs (Miller et al.) decreased FEC & improved PCV compared to BG hay
- % *Haemonchus* larvae & % larva recovered were lower in lambs and goats fed SL hay
- Feeding SL hay reduced total worm count in both abomasum and small intestine of small ruminants.

Effects on Fecal Egg Counts

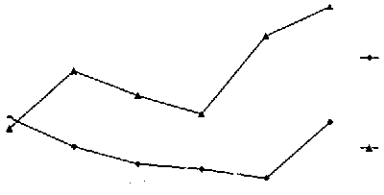


Effects on PCV



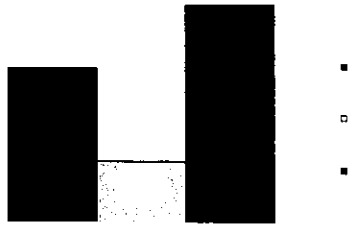
Ground and Pelleted Hay Effects

FEC



PCV

Adult nematodes



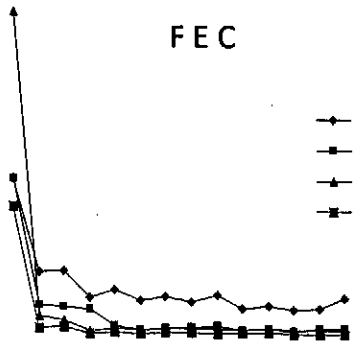
CONCLUSIONS

- Pelleting does not reduce the efficacy of sericea lespedeza hay against parasitic nematodes
- Further research is needed to evaluate CT forage as a component of an integrated parasite control program for small ruminants

Growth Rate

- Bermuda grass – non infected
- Bermuda grass – infected w/ larvae
- Sericea lespedeza – non infected
- Sericea lespedeza – infected w/ larvae

F E C



Blood Urea Nitrogen levels

Growth rate of growing goats

Conclusions

- Sericea lespedeza hay reduced parasitic infection levels and increased animal performance (ADG) of growing goats
- Condensed tannins in SL increased protein utilization efficiency in the animal

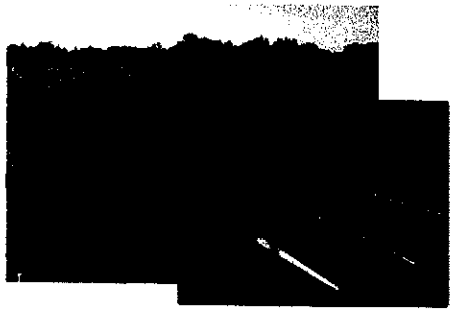
Future Research with Sericea Lespedeza for Parasite Control

- Grazing trials with sheep and goats
  - Pure stands
  - In combination with other forages
  - SL as deworming paddock
- Research with SL as dried feed
  - Leaf meal, pellets
  - Ingredient in complete feeds
  - Pasture supplement
  - Component of TMR for feedlot, confinement feeding

CT Forage/Browse Species

- *Lespedeza*
- *Desmodium*
- *Desmanthus*
- *Neptunia*
- *Acacia*
- *Leucaena*
- *Calliandra*
- *Crotalaria (Sunn hemp)*

Wrong Image of the Crop



Better Image and Correct Grazing Maturity