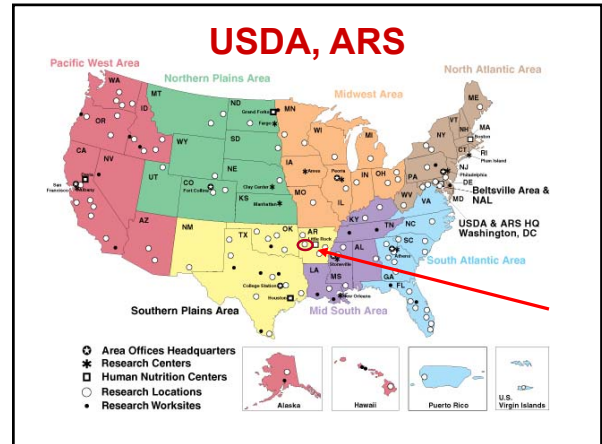


**Parasites 201  
The Future**

Joan M Burke  
USDA, ARS, Dale Bumpers Small Farms Research  
Center, Booneville, AR  
joan.burke@ars.usda.gov

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Animal Health  
NSIP  
U.S. Virgin Islands



**American Consortium for Small Ruminant Parasite Control (wormx.info)**




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**What will we talk about?**

- Important Parasites
- Current Issues
- Available Tools
- Genetic Control
- Integrated Approach



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**Gastrointestinal Nematodes (Worms) of Sheep**

**Most Important Species:**

- *Haemonchus contortus* \*\*\* or barberpole worm
- *Teladorsagia (Ostertagia) circumcincta* or Brown stomach worm
- *Trichostrongylus colubriformis* or bankrupt or black scour worm
- Lesser importance: *Cooperia*, *Nematodirus*, *Trichuris*, *Oesophagostomum* spp.

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**Bottle Jaw**



**Anemia**

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## Parasites

- *Haemonchus contortus* or barber pole worm is one of the greatest challenges for small ruminants in warm, humid climates.
- Control is difficult because of dewormer resistance.
- An integrated approach is necessary.

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## Background To The Problem

- Abomasal and intestinal worms are the most important pathogens of sheep and goats
- Worm control has relied almost exclusively on the frequent use of anthelmintics
- Prevalence of multi-drug resistance is extremely high

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## We Created Our Own Problems with Anthelmintic Resistance

- Parasitologists recommended strategies that maximized benefits of treatment, but ignored resistance issues
- Over-use of anthelmintics
  - Therapeutic vs. prophylactic
  - Loss of common sense approaches
- Many have no effective anthelmintics to use

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## New Strategies are Needed

- Frequent application of dewormers is no longer a viable approach
- Effective dewormers must be thought of as an extremely valuable and limited resource
- Reduced chemical and non-chemical approaches are needed

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## What is our future for parasite control?

- Selective deworming
- Grazing management and good nutrition,
- Alternative approaches,
- Genetic selection.



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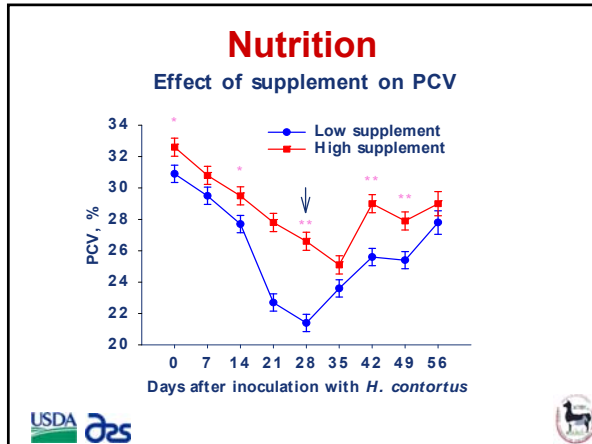
## FAMACHA

- A tool used to decide which animals to selectively treat for worms
- Developed by Fafa Malan, South Africa
- Based on degree of anemia judged by FAMACHA card
- Specific for *Haemonchus contortus*



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### Forage Systems

- Organic forage systems rely on diverse forages, reduce impact of worms
- Animal performance increases with increased protein in pasture
- Rotational grazing

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### Condensed tannin-rich forages

- Sericea lespedeza reduces FEC and need for deworming
- Birdsfoot trefoil
- Desmodium or tickseed trefoil
- Condensed tannins react with worm cuticle; leads to more protein absorption in intestine

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### Adult *H. contortus* affected by sericea lespedeza

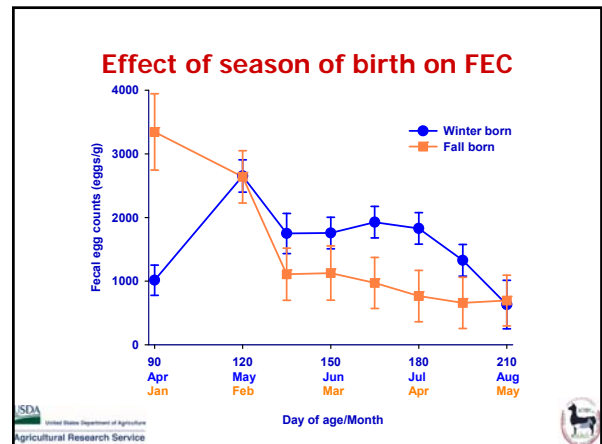
Control group

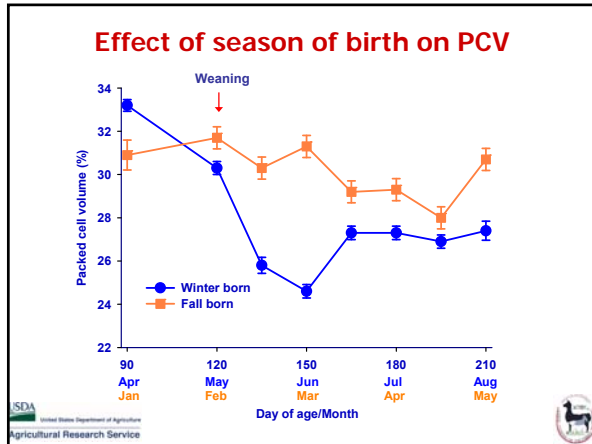
75% SL leaf meal treatment group

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### Pollinator Habitat Associated with Livestock Pastures

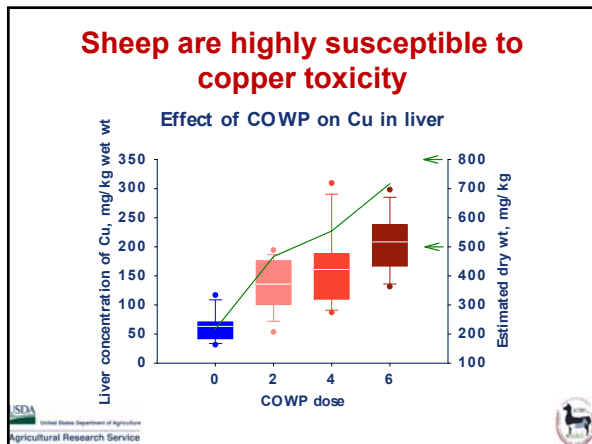
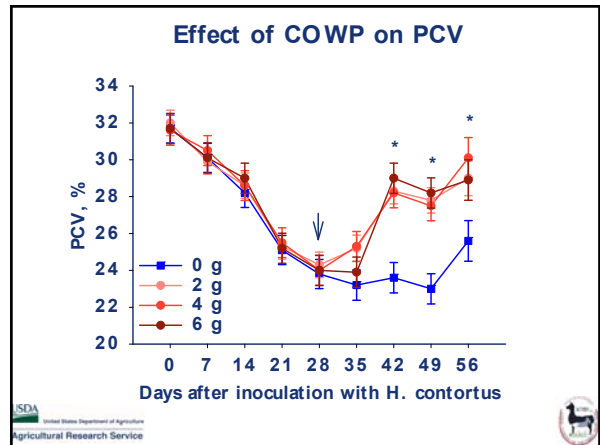
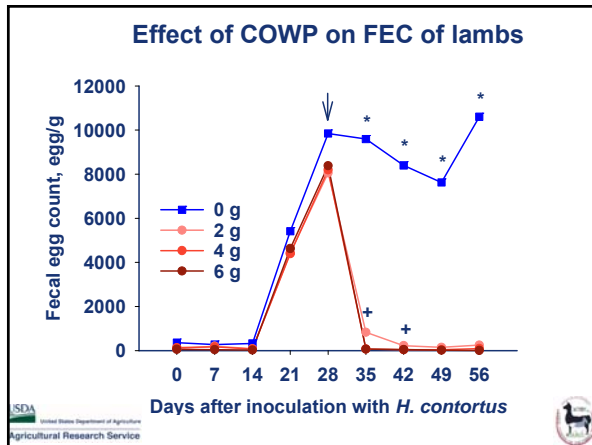
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### Copper Oxide Wire Particles

- A nonchemical approach to control *H. contortus*
- When used in combination with levamisole or albendazole, effective against other worms
- COWP available in the U.S. as Copasure or Ultracruz



### Effect of albendazole + COWP on FEC

- FEC reduction with COWP alone was 58.9% on d 7.
- FEC reduction with COWP + alb was 95.7% on d 7.

## Tarantula spider venom

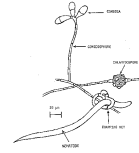
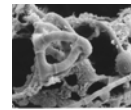
- *Selenocosmia crassipes*
- Australia ([www.abc.net.au/news](http://www.abc.net.au/news)).
- Venom active against *H. contortus*.



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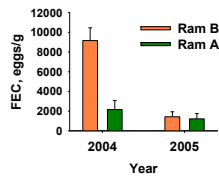
## Other Future Control Methods

- *Duddingtonia flagrans* or nematode trapping fungus (LSU)
- Vaccine (LSU, UK)

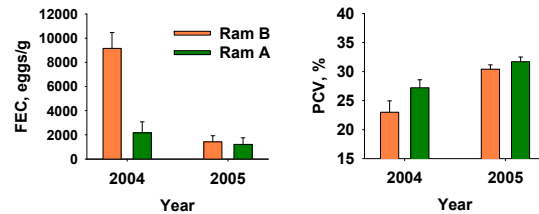


## Genetics

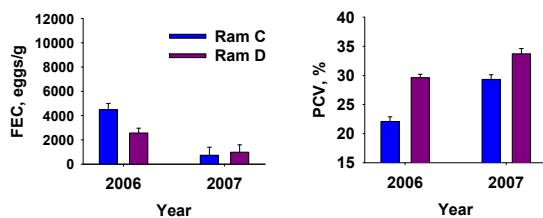
- An animal's ability to resist parasites is heritable (~0.2 – 0.5)
- USDA, ARS sires are selected based on parasite resistance (low FEC) and tolerance (lack of anemia; low FAMACHA scores)



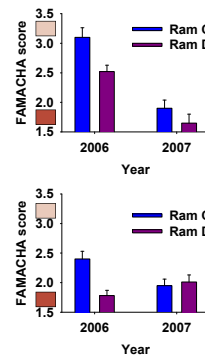
## FEC and PCV of lambs sired by Rams A (Wwec = -21) or B (Wwec = 178) at 120 d of age

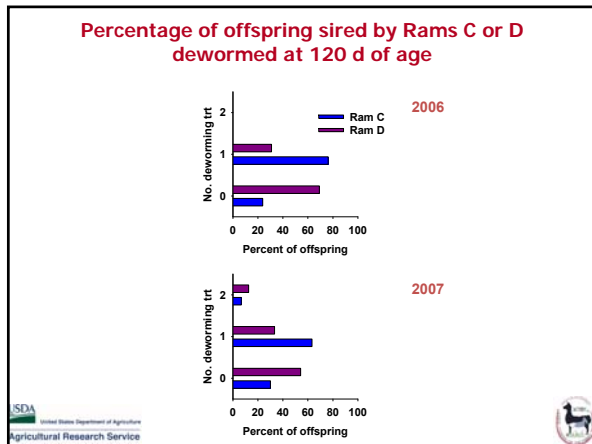


## FEC and PCV of lambs sired by Rams C (Wwec = 108) or D (Wwec = -55) at 120 d of age



## FAMACHA scores of lambs sired by Rams C or D at 120 and 150 d of age





### Development of estimated breeding values for parasite resistance

- NSIP coordinates data calculation using LambPlan/Sheep Genetics (Australia)
- FEC collected from lambs at first rise and 30 days later are entered by producers
- Currently examining the peri-parturient rise period in dams

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### Return value to farmer

- Improved genetics for GIN resistance leading to better control or fewer treatments
- Value added breeding stock that sell for a premium

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### Summary

- Conserve dewormers; selectively deworm
- Rely on good management, nutrition, pasture systems
- Copper oxide wire particles
- Genetics!!!
- Other new technology???
- Use integrated approach

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### Acknowledgments

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**Farmers!**