


Efficacy of Alternative Dewormers





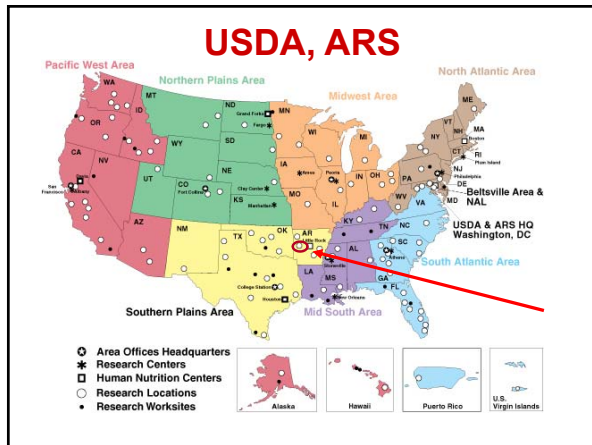
Joan M Burke
 USDA, ARS, Dale Bumpers Small Farms
 Research Center, Booneville, AR
 Joan.burke@ars.usda.gov



Mission: To develop scientific principles and technologies to enhance the profitability of small scale farms.






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




Outline

- Introduction to Parasites
- Biology of the worm
- How did we arrive where we are?
- Dewormer resistance
- What should we do?



Gastrointestinal Nematodes (Worms) of Sheep

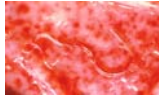
Most Important Species:

- *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.




Haemonchus contortus (Barber Pole Worm)

- Sheep, goats, deer, exotic ruminants
- Blood-sucking worm
 - highly pathogenic
 - anemia
 - hypoproteinemia -- “bottle jaw”
- Most important worm parasite in sheep raised in warm/wet environments



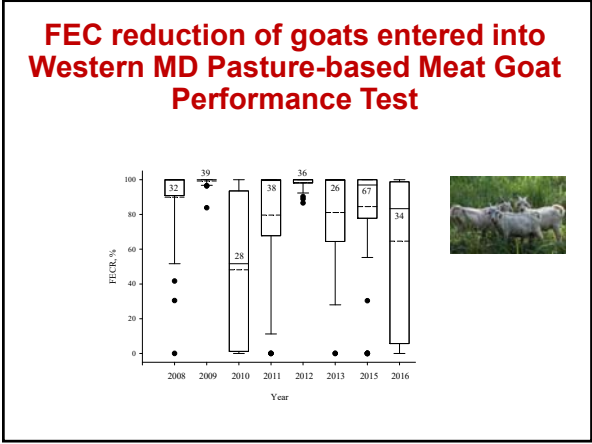
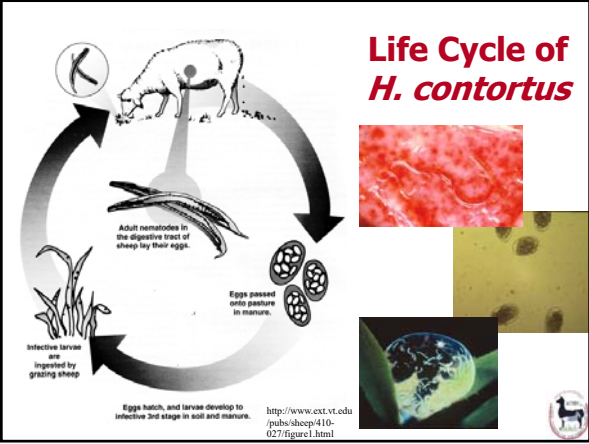
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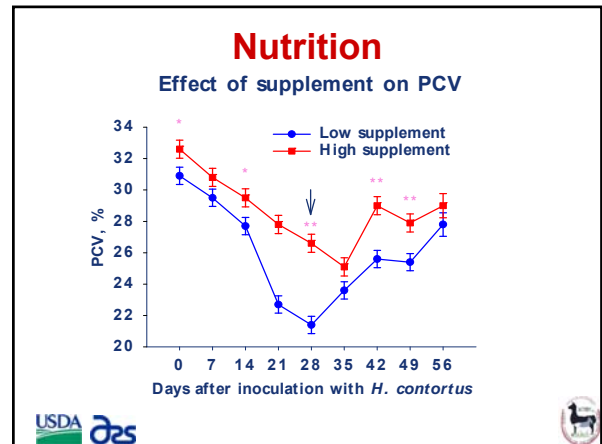
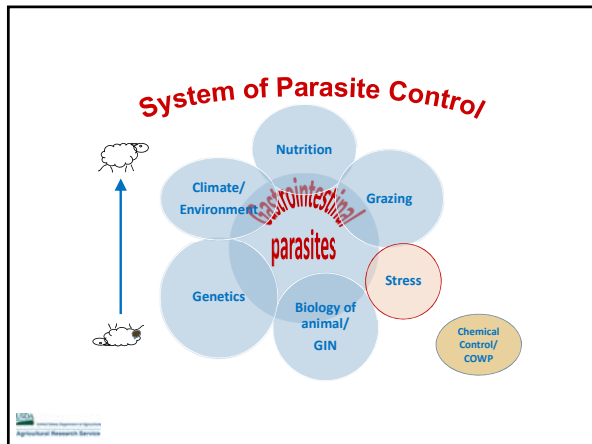


Anemia

Bottle Jaw

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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

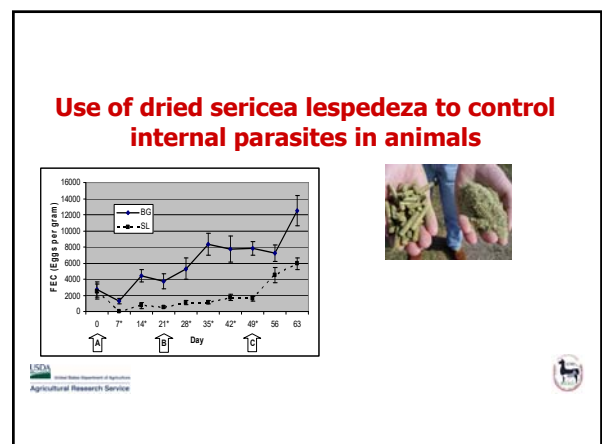
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Adult *H. contortus* affected by sericea lespedeza

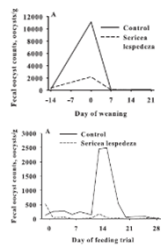
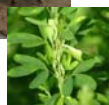
Control group

75% SL leaf meal treatment group

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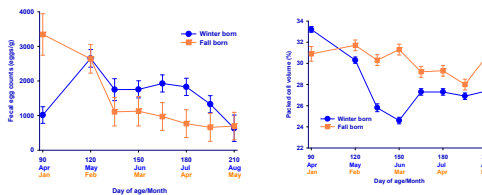
Effect of sericea lespedeza on coccidiosis



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Effect of season of birth on GI infection



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Copper Oxide Wire Particles (COWP)

- A nonchemical approach to control *H. contortus*.



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Mode of action

- Lodges in abomasum and has direct effect on worm.
- Acts like an anthelmintic in that it has a short term effect, even though COWP can be found in abomasum for more than 30 days.
- Can be administered by capsule or in feed.

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COWP

- COWP available in the U.S. as Copasure (Animax) for cattle and goats and Ultracruz (Santa Cruz Animal Health) for goats.



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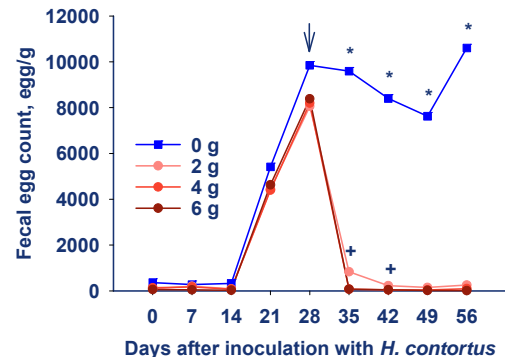
Efficacy against GIN

- COWP effective in reducing fecal egg counts of *H. contortus*.
- Not effective by itself against other GIN.
- Not effective if expelled.
- COWP may not be effective when digestive tract not functioning normally (too fast, pH too high).
- Doses: 0.5 g – 2 g (less is better).



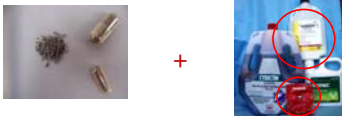
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Effect of COWP on FEC of lambs



Copper Oxide Wire Particles

- When used in combination with levamisole or albendazole, effective against other worms (by itself, only barber pole worm).
- Increased efficacy by ~30%.



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Safety Concerns

- Important for both sheep and goat producers to understand about risks of COWP before consideration as an anthelmintic.
- Sheep (and maybe goats) are susceptible to copper toxicity. If exposed to other forms of copper (mineral, poultry litter spread on pasture, soils/forages), COWP should NOT be used.
- Also, Copasure and Ultracruz labeled as a supplement for copper deficiency, not an anthelmintic.

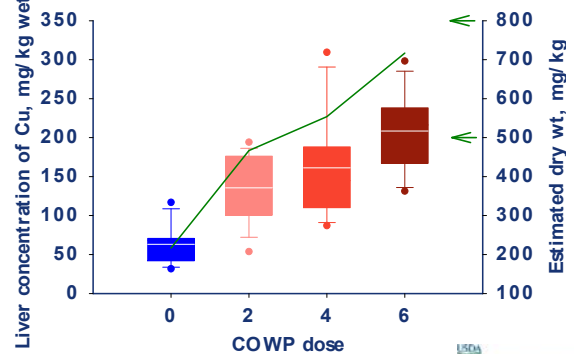
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More is NOT better

- Whether a sheep or a goat, when using COWP to control *H. contortus*, use smallest effective dose (0.5 – 1 g if < 12 months of age; 1 – 2 g > 12 months of age).
- COWP increased copper in dairy goat milk and muscle tissue.

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Effect of COWP on Cu in liver



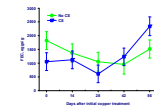
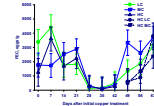
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We developed a publication for producers:
www.wormx.org or www.attra.org



Copper Sulfate

- Recommended by a popular, non-science based book (Australia)
- We examined CS in feed or in mineral in goats
- No differences in FEC or PCV
- Can be toxic!

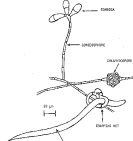
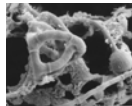


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Future Control Method

- *Duddingtonia flagrans* or nematode trapping fungus



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Herbal Dewormers

- Molly's and Hoeggers examined according to manufacturer recommendations
- No reduction in barber pole or mixed worm population in goats



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Other Methods

- Garlic – no effect (ARS, LSU)
- Papaya – no effect (ARS, Heifer Ranch)
- Diatomaceous earth – no effect
- Ginger – No good evidence
- If it sounds too good to be true, do not count on it



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Management and Breeding

- Good management, including grazing and good nutrition
- Condensed tannin forages (sericea lespedeza, birdsfoot trefoil)
- Genetic selection

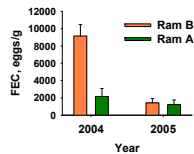


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Using genetics for individual selection

- An animal's ability to resist parasites is heritable ($\sim 0.2 - 0.5$)
- USDA, ARS progeny of sires have been evaluated since 2004 for parasite resistance (FEC) and tolerance (PCV and FAMACHA), growth, and maternal traits.



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Summary

- Rely on Systems Approach
- Management/nutrition
- Forages/condensed tannins
- Copper oxide wire particles
- Genetics



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Resources

- American Consortium for Small Ruminant Parasite Control: www.wormx.info
- University of Maryland: www.sheepandgoat.com
- ATTRA publications: <https://attra.ncat.org/>



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