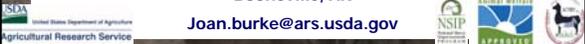


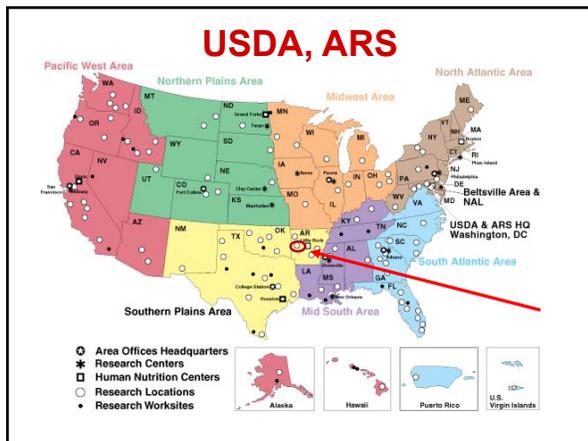


Parasites 101 Myth Busting

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

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




What will we talk about?

- Introduction to Parasites
- Previous recommendations
- Herbal Products, Garlic, Diatomaceous Earth
- Dewormer resistance
- What should we do?




Gastrointestinal Nematodes (Worms) of Sheep

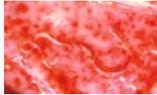
Most Important Species:

- *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



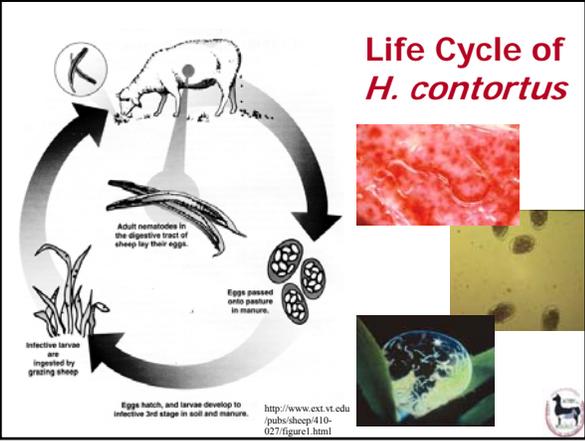
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Anemia

Bottle Jaw

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H. contortus Fecundity

- ~ 5,000 eggs per day
- 300 worms → 1.5 million epd/animal
- 30 sheep → 1 billion eggs over 3 wks

Why is *H. contortus* such a problem?

- Evolved in tropics
 - thrives in warm/wet climates
- Long transmission season - southern US
- Short life cycle -- less than 3 weeks
- Immunity is slow to develop in sheep
 - Immunity wanes around the time of lambing (Peri-parturient rise)



Previous recommendations

- 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



What is Dewormer Resistance?

- The ability of certain worms in a population to survive drug treatments that are generally effective against the same worm species and stage of infection
 - Caused by changes in levels of “resistance” genes carried by worms in a population
 - Result of drug treatment that produces genetic selection of resistant worms in a population of worms



Where Do Resistant Worms Come From?

- Resistance is an inevitable consequence of using any particular drug to kill worms
 - “Resistant” worms – exist prior to the first use of a drug
 - Treatment eliminates worms whose genes render them susceptible to the drug
 - Parasites that are resistant survive and pass on their “resistant” genes to their offspring
 - Over time with continued treatment, more and more resistant worms build up in the population
 - High level of animal movement spreads resistant worms



What Causes Resistance To Dewormers?

- Lack of Refugia
 - Refugia = the proportion of the worm population that is not selected by drug treatment
 - Worms in untreated animals
 - Eggs and larvae on pasture
- Provides pool of sensitive genes
 - Dilutes resistant genes
- Considered the most important factor in the development of drug resistance



Slowing Down Resistance

- Reduce genetic selection pressure by maintaining a pool of sensitive genes – **REFUGIA**
- Treat individuals, not the flock
- Known as Smart Drenching or maximizing the effectiveness of treatments



Use Proper Technique

- Ensure proper dose is delivered
- Proper technique when drenching sheep and goats is very important
 - drench should be delivered over the back of the tongue
 - critical that full dose lodges in the rumen
 - drench delivered to the mouth may stimulate esophageal groove to close
 - If significant drench bypasses the rumen, efficacy is reduced



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Images courtesy of
premier1supplies.com

Myth Busters

- ~~Treat entire flock~~
- ~~Deworm according to the calendar or treat every three weeks~~
- ~~Rotate dewormers regularly~~
- ~~Unknowningly purchase resistant worms~~

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Myth Busters

- ~~One Pasture – may be only option~~
- ~~If multiple pastures, deworm at move to new pasture~~
- ~~Over crowd/graze~~
- ~~Continuous graze~~

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Myth Busters

- ~~Dewormer is cheap, so use often~~
- ~~There will always be a new drug to use~~
- ~~Drugs are effective~~
- ~~Squirt drug in mouth and it will work~~

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Herbal Dewormers

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

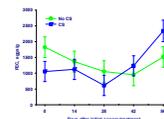
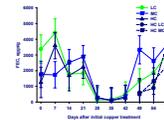


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Copper Sulfate

- 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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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



If current approved drugs not effective against *H. contortus*, what can producers do?

- Good management, including grazing and good nutrition,
- Genetic selection,
- Alternative approaches (tomorrow).



Summary

- Frequent application of dewormers is not a viable approach due to resistance
- Some veterinarians across the U.S. still recommend frequent deworming
- Effective dewormers must be thought of as an extremely valuable and limited resource



Summary

- Use caution with undocumented approaches
- Come back tomorrow to learn about some sustainable approaches to control gastrointestinal worms.



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Acknowledgments

