



What's New in Internal Parasite Management

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Fecal Fungus

- There are over 100 species of *Nematophagus* (nematode eating) fungi
- These fungi are normally present in the feces and parasitize the nematodes.
- Most researched species is *Duddingtonia flagrans*
- Research in 6 countries on this fungus

Fecal Fungus

- By feeding moderate levels of fungal spores (10,0000 spores/lb of bodyweight) L3 infective larvae in feces were reduced by 80-90%.
- Problem is fungal spores have to be fed every day.
- Other problem is no source of fungal spores.
- Technology to produce fungal spores is well worked out.

Fecal Fungus

- Great potential, just no source of fungus.
- Would be nice to have a slow delivery capsule in the rumen.

New Class of Dewormer

- Zolvix (monepantel) by Novartis in Australia and New Zealand.
- In the FDA approval process here in the US for 3 years.
- In amino-acetonitrile derivative class.
- Kills almost all worms resistant to current dewormers.

New Class of Dewormer

- Worms can develop resistance to it like other classes of dewormers.
- First new class of dewormer in over 25 years.
- Fairly expensive; Australians have found that using a 3 way combination of old dewormers costs $\frac{1}{4}$ of using new dewormer.
- The only use of this dewormer should be used for replacing resistant worms with susceptible worms.

Replacement of Worms

- Highly resistant worms can be replaced with worms susceptible to dewormers.
- A few sources of worms such Georgia and South Africa worms are susceptible to all dewormers, only Haemonchus.
- Requires resting of pasture 6 months for most larvae and eggs to die on pasture.

Replacement of Worms

- Requires effective dewormer to clean your animals out of worms.
- Reinfect with 5,000-10,000 infective larvae.
- Will require working with parasitologist in some capacity to source worm larvae and to work on cleaning pastures.
- May be best to rent pasture and graze rented pasture to let larvae die off.

Vaccines

- Have been working toward vaccines for 25 years.
- Have working vaccine, but it takes cutting the gut out of 200 worms and homogenizing them to have enough vaccine for one animal.
- Ten years of genetic engineering to try to produce the antigen have failed.
- A vaccine would also require a booster and last 3-6 months.

Vaccines

- If you have to give 2 injections 3 weeks apart and pay the cost of two doses of vaccine, it is not likely to be any more cost effective than two doses of an effective dewormer.

Tannins

- Tannins are a group of compounds and the tannins of some plants have been found to be effective for controlling worms.
- Several tannin containing plants have been shown effective for controlling worms:
 - ▣ Sericea lespedeza, birdsfoot trefoil, sainfoin, Chicory, Panicked tick clover and willow have been shown to be effective against worms .

Tannin Containing Plants



Sericea lespedeza

[sericeaLepedeza.jpg](#)



Birdsfoot trefoil

[Birds-Foot Trefoil 191 MED.jpg](#)



Sainfoin

[2584044538_c9cf78d45c.jpg](#)

Tannins

- We were able to graze Angora goats and their kids (very susceptible to worms) the whole summer without deworming. When grazing sericea lespedeza.
- Some tannins have been shown to be ineffective such as Oak and peanut skins.
- Sericea lespedeza tannins have also been shown to be effective in controlling coccidiosis and reducing methane emission.

Tannins

- Tannins reduce egg output of worms by 50-80% and under some cases gradually kills the worms.
- Tannins reduce the ability of eggs to develop to infective larva by 50-80%.
- Tannins reduce the ability of larva to develop to adult worms in the rumen and reduces infection from infective larva.

Tannins

- We do not know how much of the diet needs to be tannins to be effective.
- One study indicated that lambs selected more tannin when they were parasitized than when they were not.
- Maybe animals will select an adequate amount of tannins from a mixed pasture.

Tannins

- West Virginia just got a large study funded to investigate the use of birdsfoot trefoil tannins for parasite control.
- As part of that study, Tatiana is coordinating a set of field studies to investigate how to best utilize birdsfoot trefoil in the field.
- Field studies have great potential to learn how birdsfoot trefoil can be incorporated into grazing systems and control parasites.

Tannins

- Recent research has shown that sericea lespedeza hay is effective for controlling parasites as is Sainfoin.
- Some work with making sericea lespedeza pellets for controlling worms looks good.
- Pelleted sericea lespedeza may be available next spring.
- Recent research indicates that sericea lespedeza is effective against coccidia.

Copper Oxide Wire Particles

- ❑ Copper oxide wire particles were developed as a slow release source of copper for sheep on copper deficient soils.
- ❑ Observed a reduction in fecal egg counts on a trial.
- ❑ Much research shows the efficacy of copper oxide wire particles.



[COWP.jpg](#)

Copper Oxide Wire Particles

- Only effective against Barberpole worm (*Haemonchus contortus*) and not effective against arrested worms.
- 1-2 g dose for lamb or kid and 2-4 gram dose for doe or ewe.
- Will need to limit to 2 doses/year for sheep depending on copper status. Will likely need to limit to 3-4 doses/year for goat.

Copper Oxide Wire Particles

- ❑ Mechanism is unknown.
- ❑ Seems to work poorly in animals that are stressed or run down.
- ❑ Not effective in just weaned kids or lambs.
- ❑ Very effective, killing 75-95% of worms.
- ❑ Cornell just got a grant to develop guidelines on the use of Copper Oxide Wire Particles in the Northeast.

Selection of Animals for Resistance to Worms

- Very large study in Australia 10 years ago was very effective in developing a resistant line of sheep. Some studs are now selecting resistant animals. They have ewes grazing pasture for 10 years that have never been dewormed.
- Goats have a weaker immune response to worms because they originated in the desert where there were no worms.

Selection of Animals for Resistance to Worms

- All research on selection of animals for resistance to worms has utilized several fecal egg counts over the season.
- The Katahdin hair sheep organization has a protocol for taking one fecal egg count during the summer on lambs as part of their animal improvement program.
- One of the Kiko organizations is adopting a similar program.

Selection of Animals for Resistance to Worms

- Only about 3 research studies exist on selecting goats for parasite resistance as compared to more than a dozen for sheep, some of them very comprehensive.
- There are \$5.00 fecal egg counts available or you can do your own.
- An alternative is to keep track of FAMACHA scores and number of times dewormed.

Selection of Animals for Resistance to Worms

- When using FAMACHA, some individuals will be resistant and others will be resilient, ie. Make blood faster than other animals but have a higher fecal egg count.
- Using FAMACHA for selection will still improve resistance of the herd.



[3rd eyelid sm.jpg](#)

Selection of Animals for Resistance to Worms

- Langston University just received a grant to study the use of a buck/ram test as a tool to select for parasite resistance. There is a field part of the study where does will be selected based on FAMACHA and fecal egg count to increase parasite resistance.
- We will attempt to identify genetic markers so that a blood test could be used to identify resistant animals.

Herbal dewormers

- ❑ Some research with herbal dewormers.
- ❑ None consistently effective.
- ❑ May depend on stimulating immune system which may not be able to respond due to some stress such as worms.
- ❑ Most research investigates a single herb.
- ❑ There are over 300 plants effective against parasites in literature.

Herbal dewormers

- A large study in Pakistan where they interviewed local bush “doctors” and identified plants used for parasites.
- Tested 30 plant species in vitro and identified 8 with most activity.
- Three of the 8 were effective in animals, and the top two worked very well.
- Need more research, but funding is not available.

Herbal dewormers

- Several plants have anthelmintic activity.
- Lots of hype and little evidence for most herbal dewormers.
- If you use them, back them up with FAMACHA and/or fecal egg counts.
- Great potential for herbal dewormers, but it will not be realized without a great expenditure of research effort.

Conclusion

- Genetic selection and pasture management are the two most effective tools in the near future to control worms.
- Some may have to resort to replacing their resistant worms with susceptible worms.
- Copper oxide wire particles are useful to control resistant worms.
- Fungus and herbs have a lot of development before we have consistently effective product.