American Consortium for Small Ruminant Parasite Control

Best Management Practices for Internal Parasite Control in Small Ruminants

COPPER OXIDE WIRE PARTICLES

February 2018

INTRODUCTION

Internal parasites pose a difficult challenge for many sheep and goat producers. Parasites are numerous and adaptable. Some traditional control methods may fail due to parasites having developed resistance to anthelmintics (dewormers). Organic producers usually face even greater difficulties because they are more limited in their control options.

A multi-pronged approach to managing internal parasites is now recommended. This approach includes attention to nutrition, good pasture management, animal selection, and good sanitation. But even with these important measures, some animals will still need treatment.

One treatment that may be effective is copper oxide wire particles (COWP). These tiny metal particles are a slow release form of copper that can be administered in a gel cap. The following provides information about incorporating COWP into a parasite management plan.

GETTING STARTED

- Research indicates that COWP (alone) are only effective against the adult barber pole worm, *Haemonchus contortus*.
- A good way to screen for *H. contortus* levels is to use the FAMACHA© method of assessing anemia.
- As with dewormers, COWP should only be administered to animals that need treatment, as determined by the FAMACHA© system and/or Five Point Check©.
- Some organic certifiers may allow the use of COWP for management of the barber pole worm.

Gel cap containing COWP

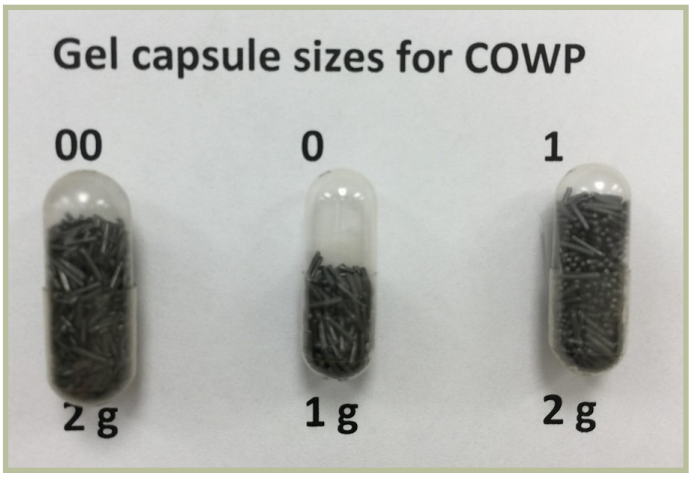
Image by: Susan Schoenian

HOW TO USE

- Find a source of COWP. They are sold as copper supplements for cattle (12.5 and 25 g boluses) and goats (2 and 4 g boluses; g = gram) that are consuming copper-deficient diets.
- Repackage COWP, as necessary, to achieve the desired dose.
- Purchasing cattle boluses and repackaging them into small gelatin capsules will save money. You can weigh the wire particles or fill the capsule to the appropriate level by "eye-balling" it (i.e. half the 2 g for a 1 g dose).
- Gel caps can be purchased from a pharmacy or the web. If you will be using a calf balling gun, a #12 capsule fits, though it is much bigger than needed for the dose. A small bolus will work with pet balling/pilling guns.

DOSAGE

- To prevent possible copper toxicity, especially in sheep, the lowest possible dose of COWP should be used.
- Doses that have proven effective are 0.5 to 1.0 g per lamb or kid and 1 to 2 g per ewe or doe. Dosage is based on age not weight.
- The 2 g goat boluses are okay for adults, but too much for young animals. The 4 g boluses are too much for deworming purposes.



Gel capsule sizes **Image by:** Joan Burke

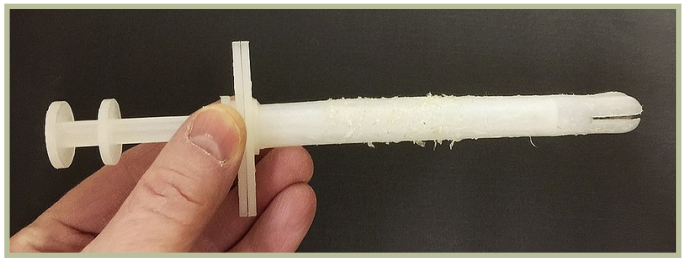
FREQUENCY

- You can administer COWP again after 4 to 6 weeks, if an animal needs treatment.
- You can treat several times; however, it is not known if copper will accumulate to dangerous levels if this is done in several consecutive years. According to research, it is relatively safe to do this for market animals at the 1 g dose (Burke and Miller, 2006).

COWP gel caps Image by: Susan Schoenian

ADMINISTERING COWP CAN BE TRICKY

- Never put your fingers in the animal's mouth. The molars are strong and can administer a very painful bite.
- Use the appropriate size balling gun for the size of capsule you are using. This will lessen the problem of boluses falling out before you have dosed them. A bit of peanut butter will help to keep the bolus in place until dosing.
- Because of those strong molars, plan to have extra balling guns. If an animal clamps down hard enough, it may destroy the plastic gun.
- You may also improvise a balling gun using a very small PVC pipe, combined with a small wooden dowel and a rubber band.
- Remember to be gentle. Try to be patient. You will grow more proficient with practice, but expect your first efforts with COWP boluses to be awkward and frustrating. If you lose patience and use too much force, you may injure the animal.



Balling/pilling Gun Image by Susan Schoenian

WHAT RESULTS CAN I EXPECT?

- Deworming effects are rapid (within 7 days), but short-lived, because only the adult worm is killed by COWP.
- Fecal egg counts may climb again after 3 to 4 weeks, even sooner if animals are carrying a large load of immature larvae (Vatta et al., 2012). Use the FAMACHA© system to monitor.
- When COWP were combined with albendazole (Valbazen®) or levamisole (Prohibit®), worm control was more effective, as there was a reduction in both immature and adult barber pole worms and intestinal worms, even in a population of resistant worms (Burke et al., 2016).
- Similar results can be expected from the different commercial sources of COWP: Copasure® (Animax Ltd), Ultra-Cruz® (Santa Cruz Animal Health) or Pharmplex (Australia) (Burke et al., 2016).
- While there is scientific evidence that COWP reduce barber pole worm infection in sheep and goats, effectiveness is impacted by factors such as the ratio of barber pole worms to other parasite species and digestive function or gut pH (diarrhea may reduce effectiveness). (Burke, 2018).

PRECAUTIONS

- Copper may accumulate to unsafe levels in the liver, especially in sheep. It is important to know the copper status of your animals. Liver samples of animals that die or are harvested for meat can be analyzed for copper levels. This information can be used to see if COWP can be used safely in your flock or herd.
- Once you start using COWP for worm control, you should periodically check livers to see if copper levels are still at safe levels (20-100 mg/kg wet for sheep, 20-150 mg/kg wet for goats). (Puls, 1988).
- While checking livers is the best way to determine the copper status of your animals, it is also important to know all the dietary sources of copper. You can check soil, water, and feedstuffs to determine the amount of copper and other minerals your animals are consuming and the risk of copper toxicity. The levels of molybdenum and sulfur are also important as they affect the absorption of copper.
- The maximum tolerable copper concentration for sheep is 15 mg/kg (ppm) dry matter when diets contain normal molybdenum (1-2 mg/kg DM) and sulfur (0.15-0.25 percent) (NRC, 2007). The ratio of copper to molybdenum should be 10:1 or less to prevent copper toxicity. The maximum tolerable copper level for goats has not been established (NRC, 2007). Until further research has been done, it is recommended that the cattle level (40 mg/kg) be used. (NRC, 2007).

WHAT IS COPPER TOXICITY?

When copper exceeds safe levels, it accumulates in the liver. Sulfur and molybdenum in the diet impact the amount of copper that is safe. Sheep are known to accumulate copper more than other animals. In simplistic terms, when the liver is "full", and more copper is ingested, the excess copper can "spill" into the bloodstream, causing death of red blood cells, thus resulting in anemia, weakness, and death. The urine may appear red, tissues may appear yellow. Treatment is difficult and if one animal is suffering from copper toxicity, it is likely that others in the herd or flock will soon follow.

FOR MORE INFORMATION

For more detailed information on using COWP, go to www.wormx.info. Select Copper Oxide Wire Particles from the Topics drop-down menu.

LITERATURE CITED

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Smaller doses can be made from larger boluses.

Image by Susan Schoenian

You can weigh the capsules or eyeball them.

Image by Susan Schoenian

Fact sheets in the *Best Management Practices for Internal Parasite Control in Small Ruminant* series were written and reviewed by members of the American Consortium for Small Ruminant Parasite Control. They are for educational and informational purposes only. No practice described in the fact sheets stands alone as a method to control internal parasites. Each producer needs to implement the appropriate combination of practices that will achieve satisfactory control of internal parasites in their flock or herd. The fact sheets are not meant as a substitute for professional advice from a veterinarian or other animal science professionals. Some treatments described in the fact sheets may require extra label drug use, which requires a valid veterinarian-client-patient relationship. For a complete list of fact sheets, go to https://www.wormx.info/bmps.

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