Session 4: Integrated Parasite Management

Learning Exercise/Homework

Let the participants know that the purpose of the exercise is to stimulate discussion to reinforce the information that they obtained during the session and that they will not be assigned a grade or score. Hand out the participant learning exercise and give participants 10-15 minutes to complete it. Then ask the group for answers to the questions, and facilitate discussion of the answers as noted below.

1. True or  **False** (Circle one) Small ruminant gastrointestinal nematodes (worms) have developed resistance to only one of the classes of anthelmintics (deworming drugs) available in the U.S.

False. Although resistance varies by geography and farm, resistance to all of the available deworming drugs has been found in the U.S.

1. How many approved classes/families of dewormers are available for use in sheep and/or goats in the U.S. (Circle one)
	1. One
	2. Two
	3. **Three**
	4. Four

There are three classes/families available for us in the U.S., the:

* Benzimidazoles (albendazole, fenbendazole, oxibendazole; Safeguard, Panacur, Valbazen, Synanthic)
* Macrocyclic lactones (end in ‘ectin’, ivermectin, eprinomectin, dormactin, moxidectin; Ivomec, Eprinex, Cydectin)
* Nicotinics (levamisole, pyrantel, morantel; Prohibit, Strongid, Postiive Pellet, Goat Care 2X).
1. Which dewormers are least likely to be effective in small ruminants for barberpole worm when administered at the appropriate single dose for the species?
	1. Moxidectin (drug in Cydectin)
	2. **Albendazole, fenbendazole, oxibendazole (Safeguard, Valbazen, Synanthic)**
	3. **Ivermectin, Eprinomectin, Doramectin (Ivomec, Eprinex, etc.)**
	4. Levamisole, Pyrantel, Morantel (Prohibit, Leva-Med, Goat Care 2X, Positive pellet)

B (or B and C) - According to research, the white drenches are least likely to be effective in small ruminants at appropriate single dose levels. However, there is also widespread resistance to ivermectin, eprinomectin and dormectin (the ‘-ectin’ drugs other than moxidectin), so it can be considered correct to have answered both b and c. Resistance to moxidectin is rapidly growing.

1. What is refugia and what are some methods to help maintain it?

Refugia are worms that have not been exposed to dewormers; you can improve refugia in the following ways:

* Decrease frequency of anthelmintic treatments. Overuse of dewormers has caused resistance. **Decreasing the number of times you use dewormers can allow more worms to go without exposure to the drugs.**
* Do not treat everyone; leave some animals untreated (use targeted selective treatment) **so there are worms not exposed to dewormers at that time still left in some animals.**
* Do not move treated animals to a clean pasture **because they will only spread (and re-infect themselves with) the worms that were 'dewormed' but did not die**
* Do not deworm when there is a low level of pasture contamination or infection in animals **because there will not be enough worms left in untreated animals to spread refugia.**

The overall goal is to breed worms on your farm that die when dewormed.

1. What is the ‘worst’ worm for small ruminants in the Southeastern U.S. and what is the main symptom?

***Haemonchus*** (Ha-mon-cuss) ***contortus***, or Barberpole worm – anemia is main symptom, may have weight loss but diarrhea/scours, weight loss and poor hair coat are usually the signs of other worms.

1. Worm resistance on a farm can be directly measured through (circle all that apply):
	1. **Sending fecal samples in for a DrenchRite test**
	2. Checking to see if FAMACHA scores improve after deworming or not
	3. Checking to see if animals gain weight after deworming
	4. **Conducting a fecal egg count reduction test (FECRT)**

A and D - Although unimproved FAMACHA scores or lack of weight gain after deworming may indirectly indicate that dewormers may not be working, there could be other causes of these conditions. A DrenchRite or fecal egg count reduction test (with correctly administered dewormers) will directly test if there is dewormer resistance in the farm worm population.

1. **True**  or False (Circle one). The best use for alternative/natural parasite treatments may be to complement integrated parasite management methods and chemical dewormer use.

True. There are alternative or natural treatments that have been proven by research to reduce fecal egg counts or have other dewormer-like activity such as copper oxide wire particles (COWP), serecia lespedeza and pine bark. However, any natural or alternative treatments are likely best used in conjunction with or to complement other integrated parasite management methods, including targeted deworming with an effective anthelmintic (dewormer) drug.

1. Which are the animals most susceptible to (most likely to get) worms/internal parasites?
	1. Mature males
	2. Dry (non-lactating) females
	3. **Weanlings**
	4. Pets
	5. **Lactating, high producing females**
	6. **Really old animals**

Animals that are under physical stress and/or with a compromised immune system are most likely to get worms, including young, growing animals (especially those just weaned), lactating females, especially if they milk a lot/have multiple offspring nursing, and those that are geriatric.

1. List at least 3 integrated parasite management methods you can use on your farm. (Encourage participants to think about ones they might actually use/be able to use)

Refer to the slides for more detail, but using the following can all help to manage parasites:

* Host immunity – manage animals that are more susceptible much more carefully
* Birth/wean management – time breeding (thus birthing and weaning) when worms are not as bad; house animals indoors during these times; consider increasing weaning age
* Nutritional management – animals fed properly and in good body condition are more likely to be able to fight of worms (and other issues), extra protein has been shown to help; in many cases, pastures are deficient in energy
* Pasture and grazing management – use ‘safer’/cleaner animals for more susceptible animals, use strip, rotational, delayed or management intensive grazing; multi-species grazing; browsing, alternative forages, manage grazing height (over 4-6 inches), night penning, or zero grazing (house indoors, be careful with cocci if do this)
* Genetic selection – chose animals that do not need to be dewormed often or that have low FEC compared to all the other animals in their contemporary group (when there are high infection levels so you will be able to see differences)
* Proper use of anthelmintics, including Targeted Selective Treatment (TST)
	+ FAMACHA©
	+ Five Point Check©
* Testing for anthelmintic resistance – so you can use effective dewormers; do not rotate wormers, use the same (at least moderately) effective one until it no longer works but save the most effective for ‘life-saving’ purposes
1. Circle all of the following that should be considered when deciding if/when to deworm individual animals:
	1. **FAMACHA eyelid score**
	2. Time of the year
	3. **Dag score (if have diarrhea/scours, soft stool or normal)**
	4. **If have bottle jaw or not**
	5. Last deworming time/schedule
	6. **Nose – Clear or snotty**
	7. **Hair coat condition - rough looking or not**
	8. If you have time
	9. **Body condition (level of fatness)**
	10. If it is lambing or kidding season
	11. What type of forage is being grazed

A, C, D, F, G and I. The 5-Point Check (which includes FAMACHA) should be used to decide when individual animals need to be dewormed. Time of the year, last deworming time, your resources (time/labor), production level of the animals and other farm plans can help you decide how often to perform the checks (and perhaps if FAMACHA “3s” are dewormed).