

Small Ruminant Anthelmintics

Three Classes of Anthelmintics

- ◆ **Benzimidazoles**
 - Fenbendazole
 - Albendazole
- ◆ **Macrocyclic Lactones**
 - Ivermectin
 - Doramectin
 - Moxidectin
- ◆ **Cholinergic Inhibitors**
 - Morantel, Pyrantel Salts
 - Levamisole



Approved Anthelmintics

◆ 3 in goats



• 4 in sheep



Anthelmintics Approved for use in Sheep

- ◆ Thiabendazole (no longer marketed)
- ◆ Albendazole (Valbazen™)
7.5 mg/kg (3.4 mg/lb) P.O.
meat WD: 7 days
milk WD: not established
* Can cause early embryonic death if given during 1st Trimester



Anthelmintics Approved for use in Sheep

- ◆ Levamisole
(Tramisol™ Soluble
Sheep Drench)
8 mg/kg (3.6 mg/lb) P.O.
meat WD: 3 days
milk WD: not established

* Can cause abortions if
given during 3rd
Trimester



Anthelmintics Approved for use in Sheep

Ivermectin

(Ivomec™ Sheep Drench)

- ◆ 200 ug/kg (90 ug/lb) P.O.
- ◆ meat WD: 11 days
- ◆ milk WD: not established



Anthelmintics Approved for use in Goats

- ◆ Thiabendazole (no longer marketed)
- ◆ Fenbendazole (Safeguard™, Panacur™)
5 mg/kg (2.3 mg/lb) P.O.
For meat goats only
meat WD: 6 days



Anthelmintics Approved for use in Goats

- ◆ Morantel tartrate
(Rumatel™)

10 mg/kg (4.5 mg/lb)
P.O. in feed

*Approved for use in
lactating goats

meat WD: 30 days

milk WD: 0 day



Anthelmintics

Goats are usually dosed at 2X the sheep and cattle dose. Exception: levamisole (use 1.5X the sheep dose)

- ◆ Toxicity can occur, consult your veterinarian before adjusting dosages



Anthelmintics

- ◆ Extra-label use necessary because of GI parasite resistance issues



Results of Anthelmintic Resistance Testing on 18 Goat Farms in Georgia

- ◆ 17/18 Farms: ivermectin resistance
- ◆ 14/15 Farms: benzimidazole resistance
- ◆ 6/18 Farms: levamisole resistance
- ◆ 1/18 Farms: moxidectin resistance



Animal Medical Drug Use Clarification Act of 1994 (AMDUCA)

- ◆ Provides guidance for extra-label drug use

AMDUCA Guidelines

- ◆ Veterinarian/patient/client relationship must exist
- ◆ Drugs approved for people or animals in the United States
- ◆ Use to save life, not enhance production
- ◆ Not in feed *
- ◆ Keep records for ≥ 2 yrs.

Extra-label Fenbendazole Use in Goats

- ◆ 10 mg/kg (4.5 mg/lb)
P.O.
- ◆ Meat WD: 14 days
- ◆ Milk WD: 96 hrs
- ◆ These WD guidelines from FARAD for 5 mg/kg dosage. Add an extra 7 days if 10 mg/kg dose used?



Extra-label Albendazole Use in Goats

- ◆ 20 mg/kg (9 mg/lb)
P.O.
 - ◆ Meat WD: FARAD
suggests meat WD of 7
days for 10 mg/kg dose.
Add another 7 days for
higher dose?
 - ◆ Milk WD: not established
- * Can cause early embryonic
death if given during 1st
Trimester



Extra-label Ivermectin Use in Goats

- ◆ 400 $\mu\text{g}/\text{kg}$ (182 $\mu\text{g}/\text{lb}$)
P.O.
- ◆ FARAD: meat WD is 35 days, and milk WD is 7 days for the 200 $\mu\text{g}/\text{kg}$ dose in goats!
- ◆ Add at least 7 days when using the 400 $\mu\text{g}/\text{kg}$ dose?



Extra-label Use of Levamisole in Goats

12 mg/kg (5.5 mg/lb) P.O.
Weigh animals and dose
accurately to avoid toxicity

- ◆ FARAD offers no WD guidelines. Add 7 days to 3 day meat WD established for sheep?
- ◆ Milk WD: not established
- * Can cause abortions if given during 3rd Trimester



Moxidectin (Cydectin[®]) Extra-label Use in Sheep

- ◆ 200 µg/kg (90 µg/lb)
P.O.

meat WD: 14 days
milk WD: not
established

- ◆ *Use only in salvage situations, or if testing shows it is the only choice



Moxidectin (Cydectin[®]) Extra-label Use in Goats

- 400 $\mu\text{g}/\text{kg}$ (182 $\mu\text{g}/\text{lb}$) P.O.

meat WD: 23 days

milk WD: not
established

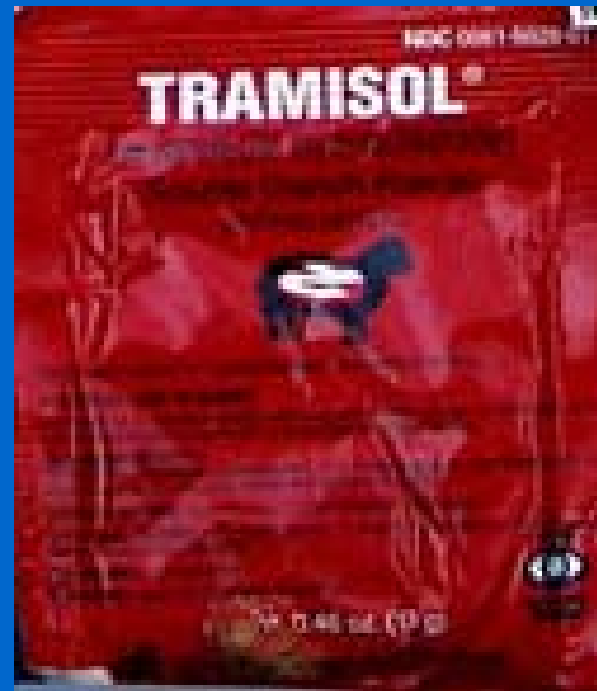
- Use only in salvage situations, or if testing shows it is the only choice



Strategies to Improve Drench Effectiveness

Drenching Tips

- ◆ Use anthelmintics within expiration dates
- ◆ Observe proper storage and handling
- ◆ Levamisole: mix up fresh solution every 90 days



Drenching Tips

- ◆ Weigh the animal and deliver the correct dose



Dosing by Weight

- ◆ Keep a chart that helps you determine the amount of anthelmintic to give each animal

ANTHELMINTIC DOSE SCHEDULE FOR GOATS -- all drugs administered PO

WEIGHT (LB)	WEIGHT (KG)	LEVAMISOLE ¹	MOXIDECTIN ²	ALBENDAZOLE ³	IVERMECTIN ⁴
		12 mg/kg 3 ml per 25 lb	400 ug/kg 1 ml per 25 lb	20 mg/kg 2 ml per 25 lb	400 ug/kg 6 ml per 25 lb
10	4.5	1.2	0.4	0.8	2.4
11	5.0	1.3	0.4	0.9	2.6
12	5.5	1.4	0.5	1.0	2.9
13	5.9	1.6	0.5	1.0	3.1
14	6.4	1.7	0.6	1.1	3.4
15	6.8	1.8	0.6	1.2	3.6
16	7.3	1.9	0.6	1.3	3.8
17	7.7	2.0	0.7	1.4	4.1
18	8.2	2.2	0.7	1.4	4.3
19	8.6	2.3	0.8	1.5	4.6
20	9.1	2.4	0.8	1.6	4.8
21	9.5	2.5	0.8	1.7	5.0
22	10.0	2.6	0.9	1.8	5.3
23	10.5	2.8	0.9	1.8	5.5
24	10.9	2.9	1.0	1.9	5.8
25	11.4	3.0	1.0	2.0	6.0
26	11.8	3.1	1.0	2.1	6.2
27	12.3	3.2	1.1	2.2	6.5
28	12.7	3.4	1.1	2.2	6.7
29	13.2	3.5	1.2	2.3	7.0
30	13.6	3.6	1.2	2.4	7.2
35	15.9	4.2	1.4	2.8	8.4
40	18.2	4.8	1.6	3.2	9.6
45	20.5	5.4	1.8	3.6	10.8
50	22.7	6.0	2.0	4.0	12.0

Drenching Tips

- ◆ Anthelmintics should be given by mouth



Drenching Tips

Deliver the deworming dose to the back of the mouth to insure delivery into the rumen



Rotation of Anthelmintics

- ◆ Stay with the same class of anthelmintic for at least one entire grazing season



Drenching Tip That Increases the Efficacy of the Benzimidazoles

- ◆ Repeat the full dose 12 hours after the first dose
- ◆ Efficacy of Panacur increased from 50% to 92% when two doses given

Zajac, Gipson; Vet. Parasitology,
2000



Drenching Tips

- ◆ Withhold feed for 24 hours prior to dosing
- This strategy slows the flow of digesta, thereby allowing more contact time between the drug and the gut



Drenching Tips

- ◆ Use two or more anthelmintics (with different mechanisms of action) at the same time!



Keep Performance Records

- ◆ Identify animals that need less frequent treatment
- ◆ Keep them and breed them!





THE END