

Control of Barberpole Worm in Small Ruminants

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In cooperation with

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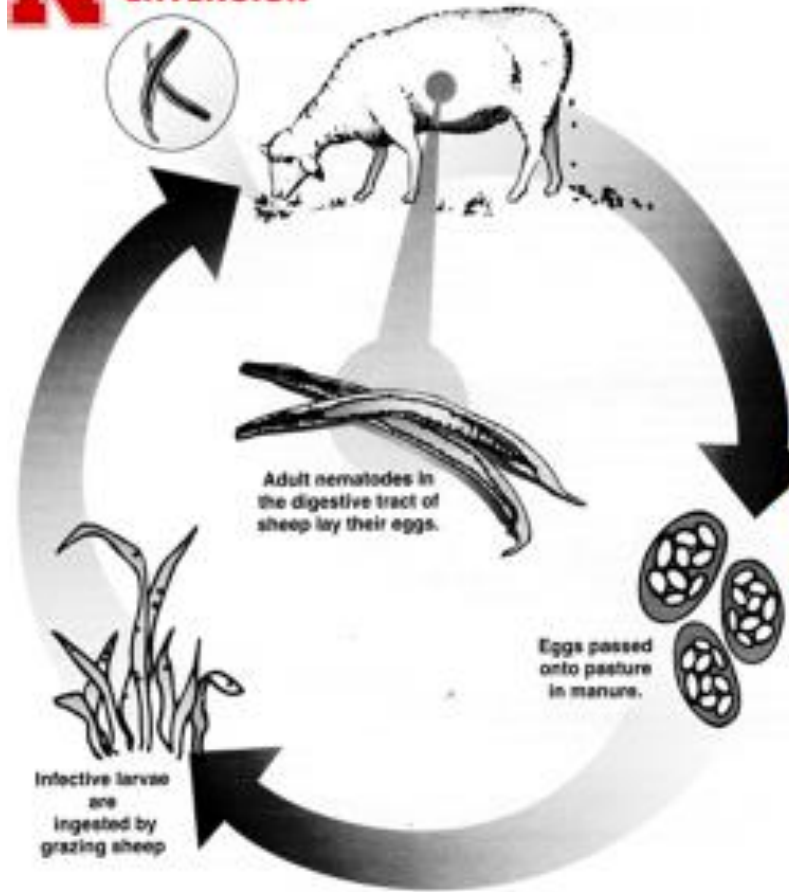
Research Animal Scientist

USDA, Agricultural Research Service

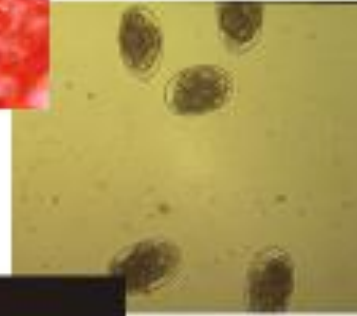
Booneville, AR

<http://www.wormx.info>





Life Cycle of *H. contortus*

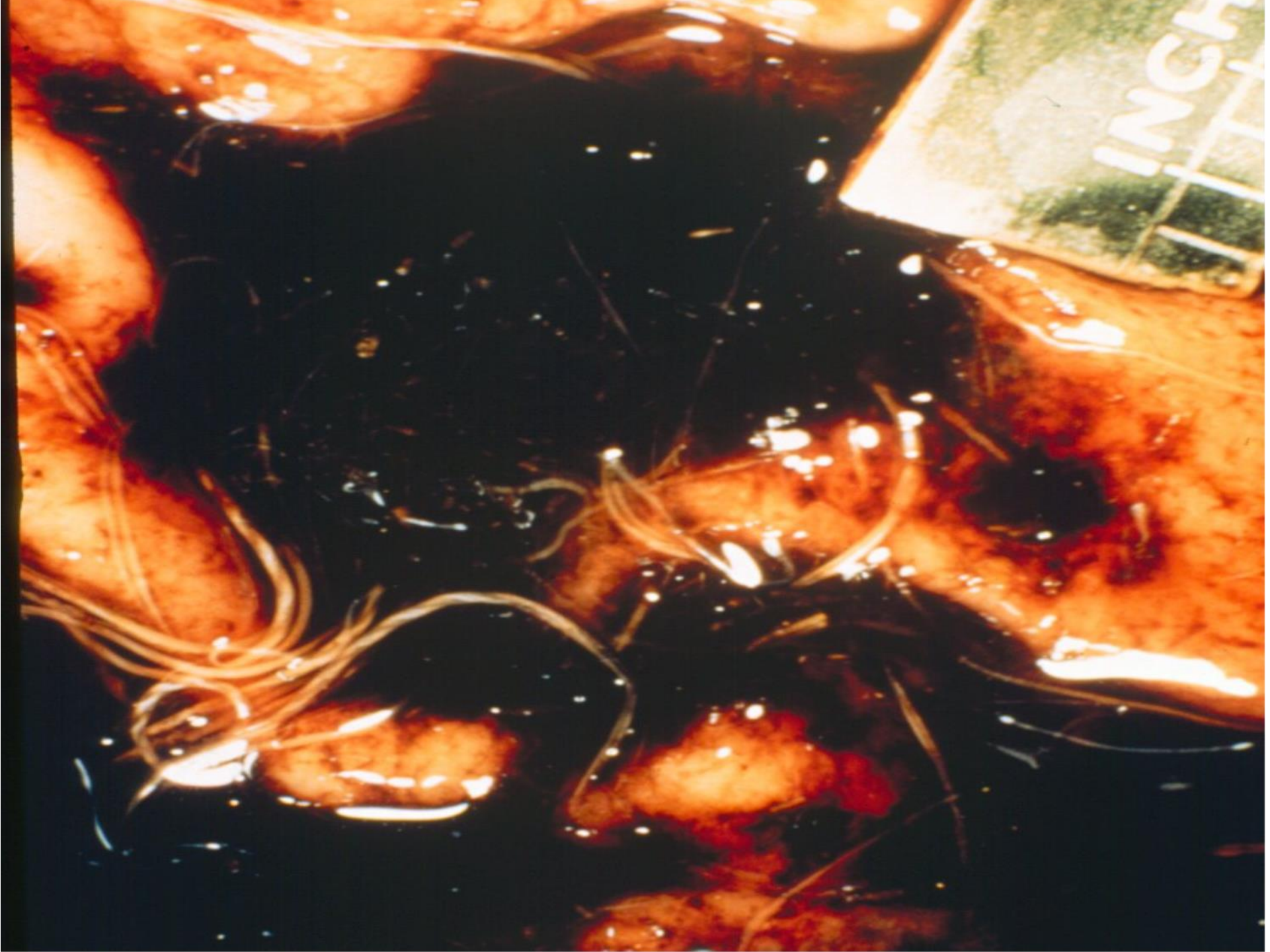


<http://www.ext.vt.edu/pubs/sheep/410-027/figure1.html>

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/goats raised in warm/wet environments (Southern US and during summer in Northern US)









Anemia

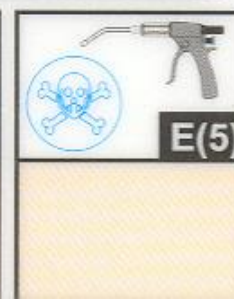
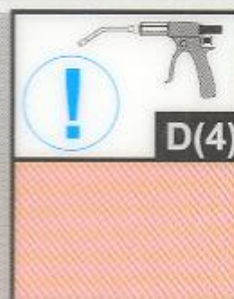
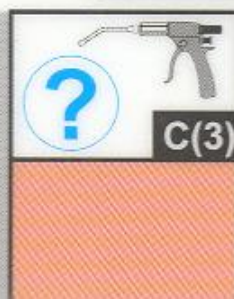
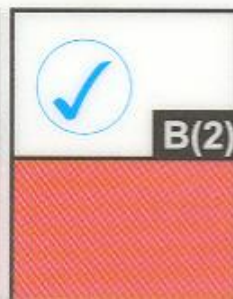
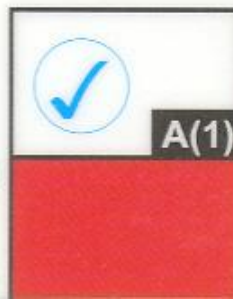
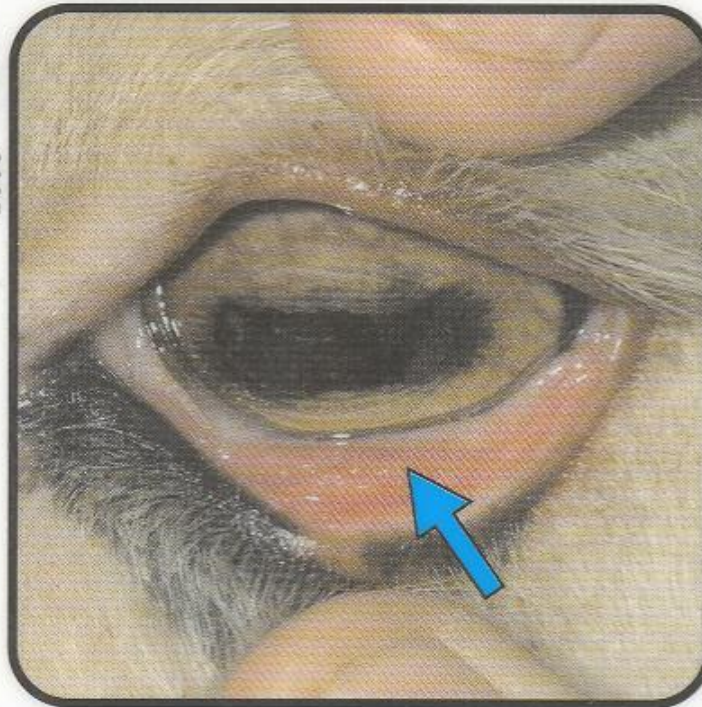
Bottle Jaw



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2005

Anaemia guide
Guide sur l'anémie
Guía de anemia
مرشد فقر الدم
ऐनिमिया संबधि निर्देश
貧血症檢測卡

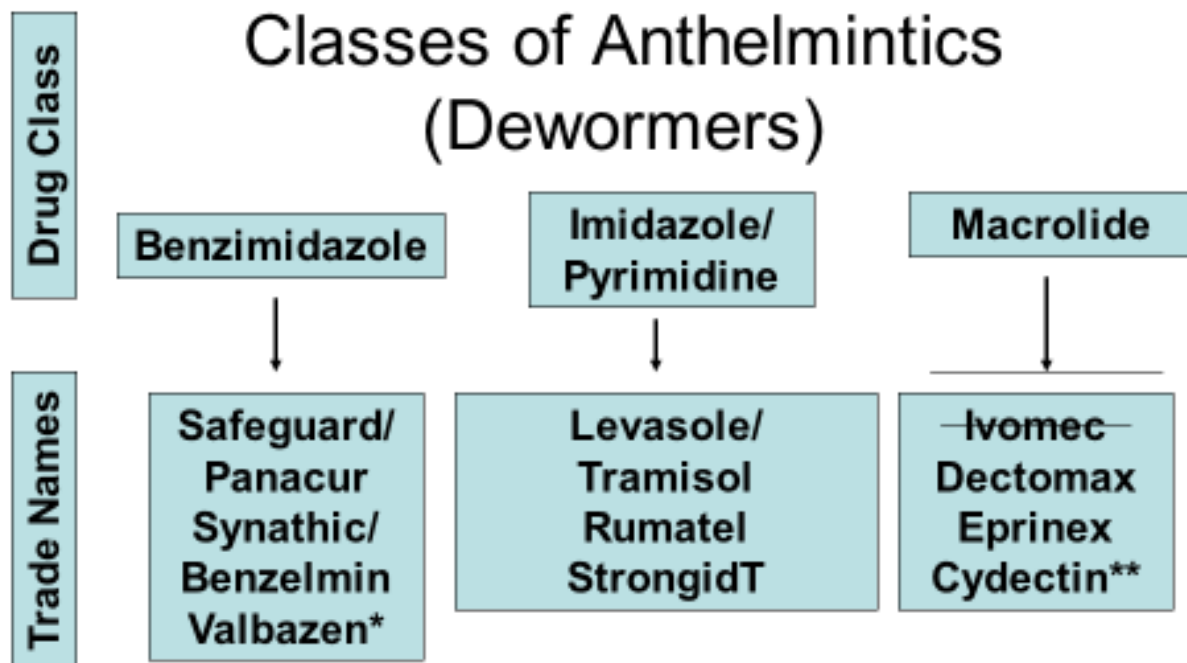


H. contortus Fecundity

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



Classes of Anthelmintics (Dewormers)



*Do not use in first trimester pregnancy

**Minimize use to preserve efficacy

Commonly used dewormers in goats (Oral route of administration only)

Dewormer	Approval	Dosage/100 Lbs	<u>Withdrawal Time</u>	
			Meat	Milk
Fenbendazole (Safeguard/Panacur)	Approved	2.3 ml	14 days	4 days
Morantel tartrate (Rumatel)	Approved	1 ml / 10 lbs	30 days	0 days
Albendazole (Valbazen)	Extra-label	8 ml	7 days	5 days
Levamisole (Levasol, Tramisol)	Extra-label	12 ml	10 days	4 days
Ivermectin (Ivomec for Sheep)	Extra-label	24 ml	14 days	9 days
Moxidectin (Cydectin)	Extra-label	4 ml	23 days	56 days

Source: Meat Goat Production Handbook

Extra label use requires a veterinarian-client-patient relationship and an appropriate medical diagnosis has been made by the veterinarian.

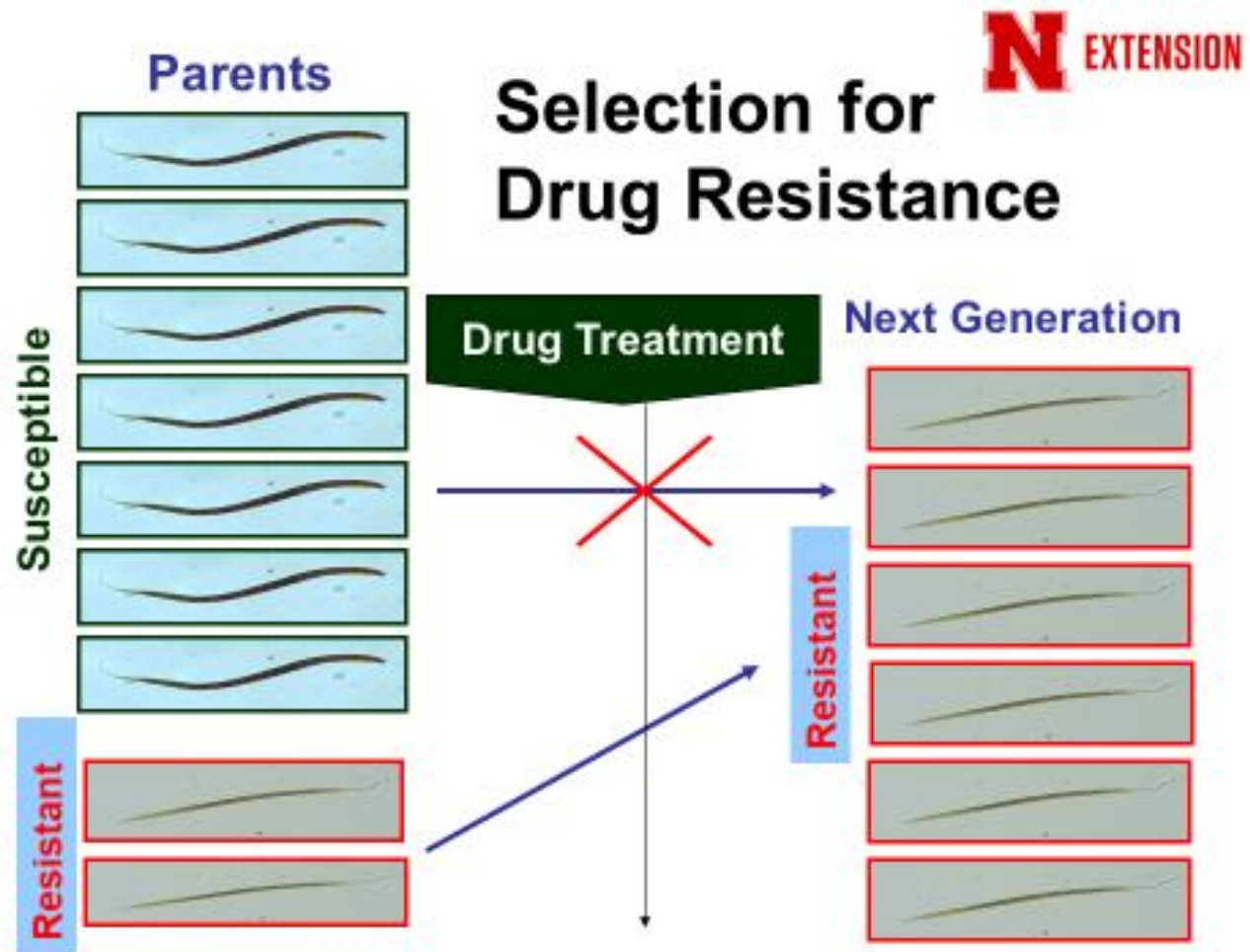


Table 1: Impact of using dewormers in combination on the efficacy of treatments.

The increases in efficacy are due to a simple additive effect as per the equation below:

Where D1 = efficacy of dewormer 1, D2 = efficacy of dewormer 2, D3 = efficacy of dewormer 3, C2 = efficacy of D1+D2, and C3 = efficacy of D1+D2+D3

$$C2\% = D1\% + (100-D1\%)*D2\%$$

$$C3\% = C2\% + (100-C2\%)*D3\%$$



Drug 1 (%)	Drug 2 (%)	Drug 3 (%)	Combination (%)
80	80		96
80	80	80	99.2
90	90		99
90	90	90	99.9
60	95		98
60	60	95	99.2
99	99		99.99
60	60	60	93.6
50	50	50	87.5
40	40	40	78.4



Table 2: Impact of combinations on percent of resistant worms that survive.

Table shows the % of worms killed by a single dewormer vs a combination treatment with two dewormers both with the same efficacy, ranging from 80% to 99%. The last column shows the magnitude of the difference between % of worms killed and % surviving when one or two dewormers in combination are used. Note that the higher the efficacy of the drugs, the smaller the difference in efficacy when used in combination, but the greater the difference in the % of resistant survivors.

Efficacy of Dewormer		Single Dewormer	2 Dewormers in Combination	Fold Difference
99	% Killed	99	99.99	1.01x
	% Surviving	1	0.01	100x
98	% Killed	98	99.96	1.02x
	% Surviving	2	0.04	50x
95	% Killed	95	99.75	1.05x
	% Surviving	5	0.25	20x
90	% Killed	90	99	1.1x
	% Surviving	10	1	10x
80	% Killed	80	96	1.2x
	% Surviving	20	4	5x

Recommendations for Pasture Management

- DECREASE STOCKING RATES
- Provide browse-type forages
- 6 weeks between rotations



Other Pasture Recommendations

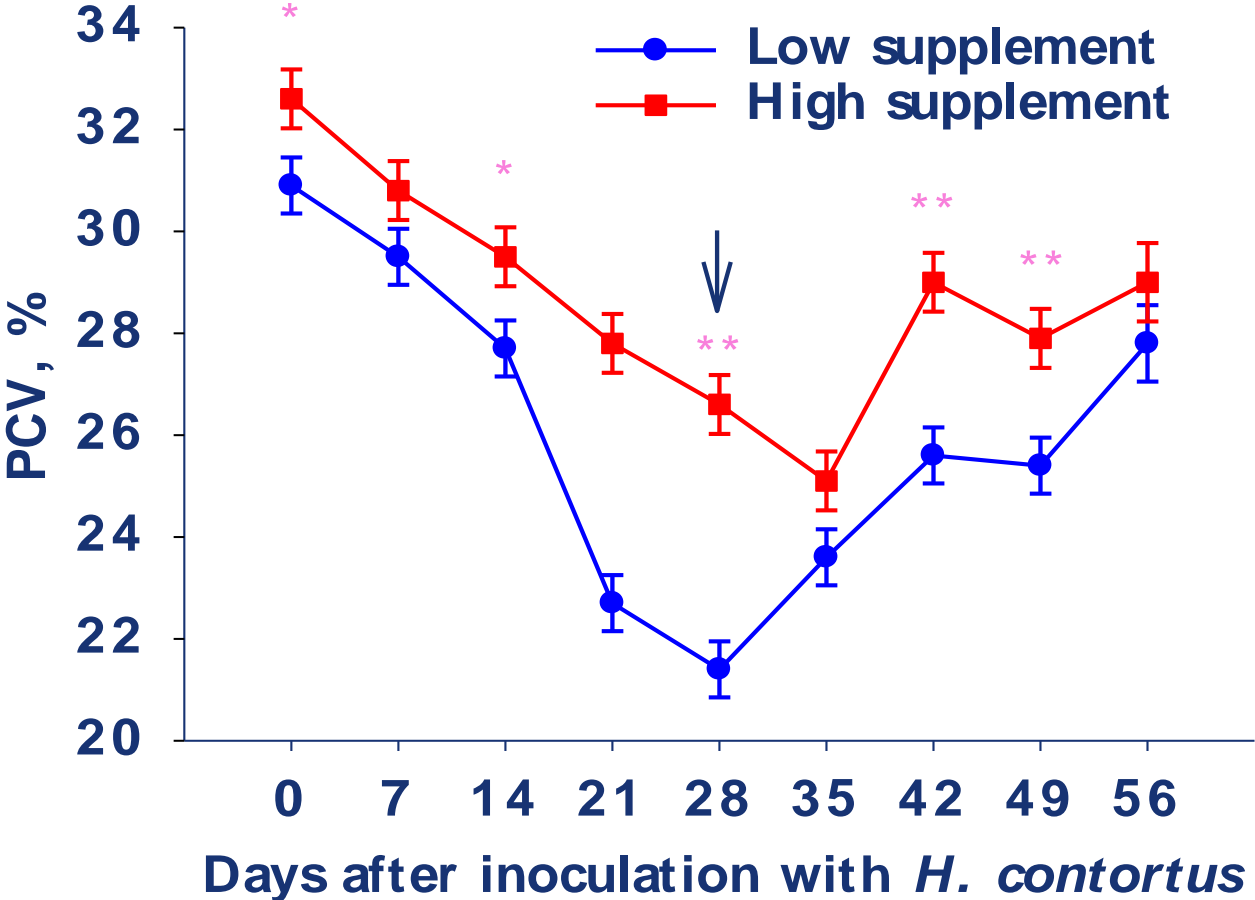
- Use dilution strategies – mix two or more species on same or rotate pastures between different species
- Forage height
 - Most larvae crawl only 2 inches from the ground
 - Don't let animals graze pastures too short
- Fix water leaks around troughs
- Avoid grass in pens
- Fence off moist areas

Do Not Buy Resistant Worms

- All new additions should be quarantined and aggressively dewormed upon arrival
- Deworm with 3 anthelmintics from different drug classes
- Should remain in quarantine for 10 – 14 days – perform FEC to confirm no eggs

Nutrition

Effect of supplement on PCV



Diet – Complete Ration

37% corn

16% wheat middlings

14% sbm

13% cottonseed hulls

10% alfalfa pellets

4% molasses

4% soybean hulls

1% calcium carbonate

0.5% sodium chloride

0.5% ammonium chloride

0.15% vitamin premix

27.5 mg/kg lasalocid

Control: 0.25% calc carb

MS: 74.9 mg/kg sodium molybdate, 0.21% sodium sulfate,
0.25% calcium carbonate

Fed at 2.2 lbs/d; Free choice bermudagrass hay and water



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Use of Oxidized Copper

Purchase copper boluses from Copasure©
Information may be found at
www.attra.ncat.org/attra-pub/copper_wire.pdf
Should not be the only control method used.

Trace element bolus



Copper oxide wire particles (COWP)

Effect of COWP on FEC

