

Efficient use of BioWorma® for small ruminant parasite control

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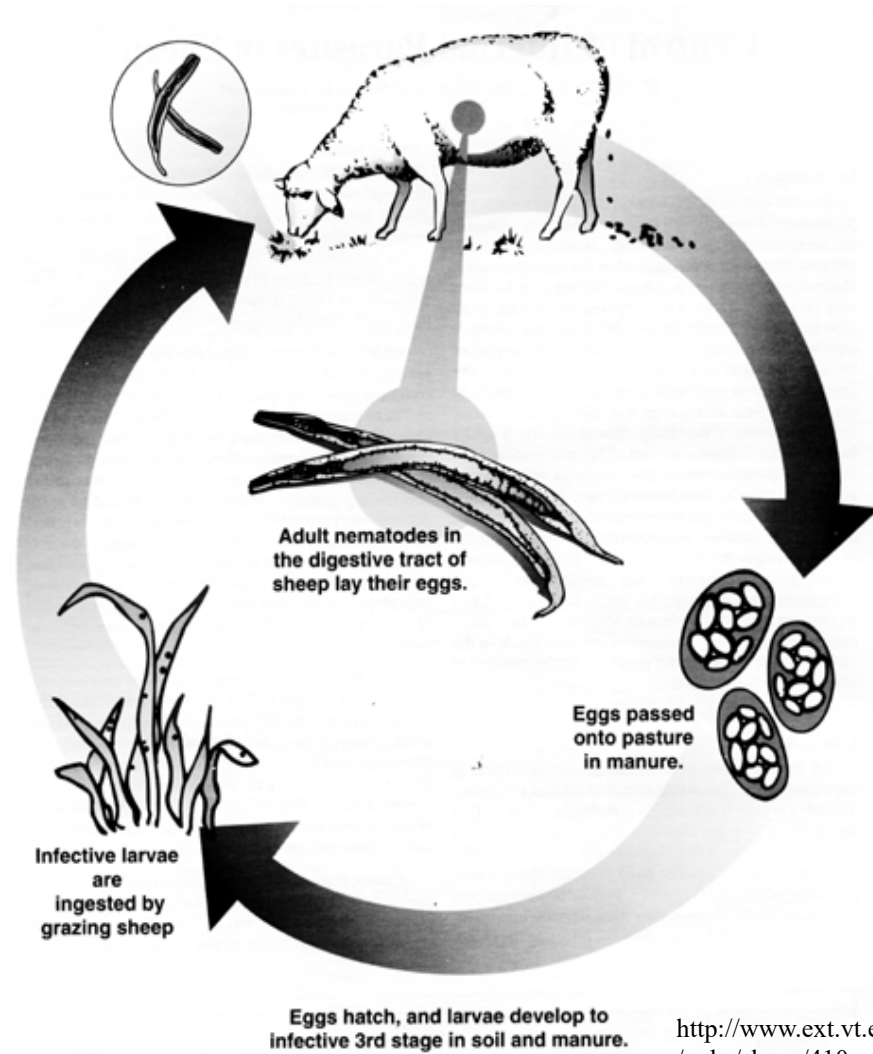
USDA, ARS, Dale Bumpers Small Farms Research Center
Booneville, AR

BioWorma® - *Duddingtonia flagrans*

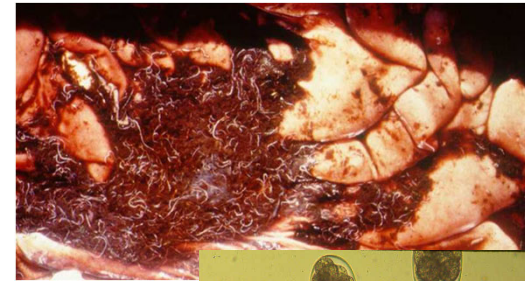
- Brief background to problem – worms!
- Alternative worm control includes nematode-trapping fungus
- Understanding the fungus and worm interaction
- Best use of BioWorma®



Life cycle of strongyle worms



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



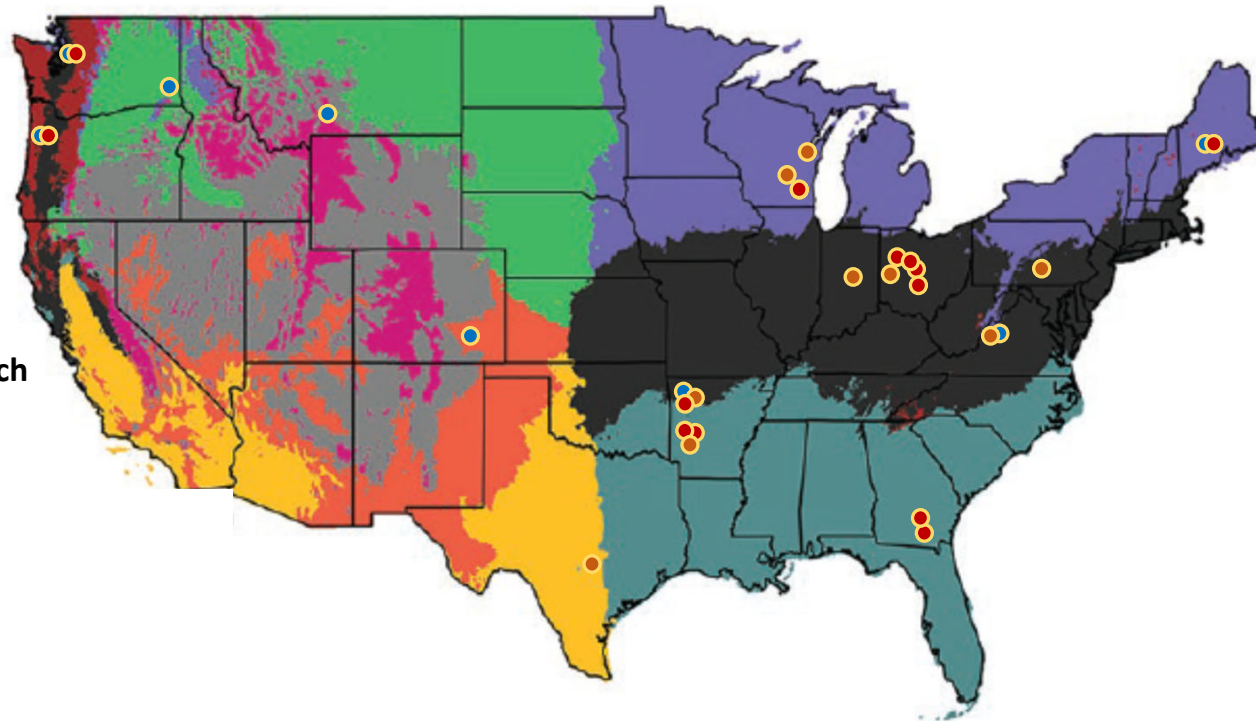
Why not just deworm the sheep?

- Worldwide, dewormers are no longer effective
- Multi-drug resistance widespread
- No new products on the horizon
- Worms found in all U.S. (see next slide); And dewormer resistance.
- Alternatives needed. More info on www.wormx.info (American Consortium for Small Ruminant Parasite Control).

2022-2023 GEMS Pooled FEC



- FEC < 200 eggs/g
- FEC > 200 eggs/g, Hc
- FEC > 200 eggs/g, Trich



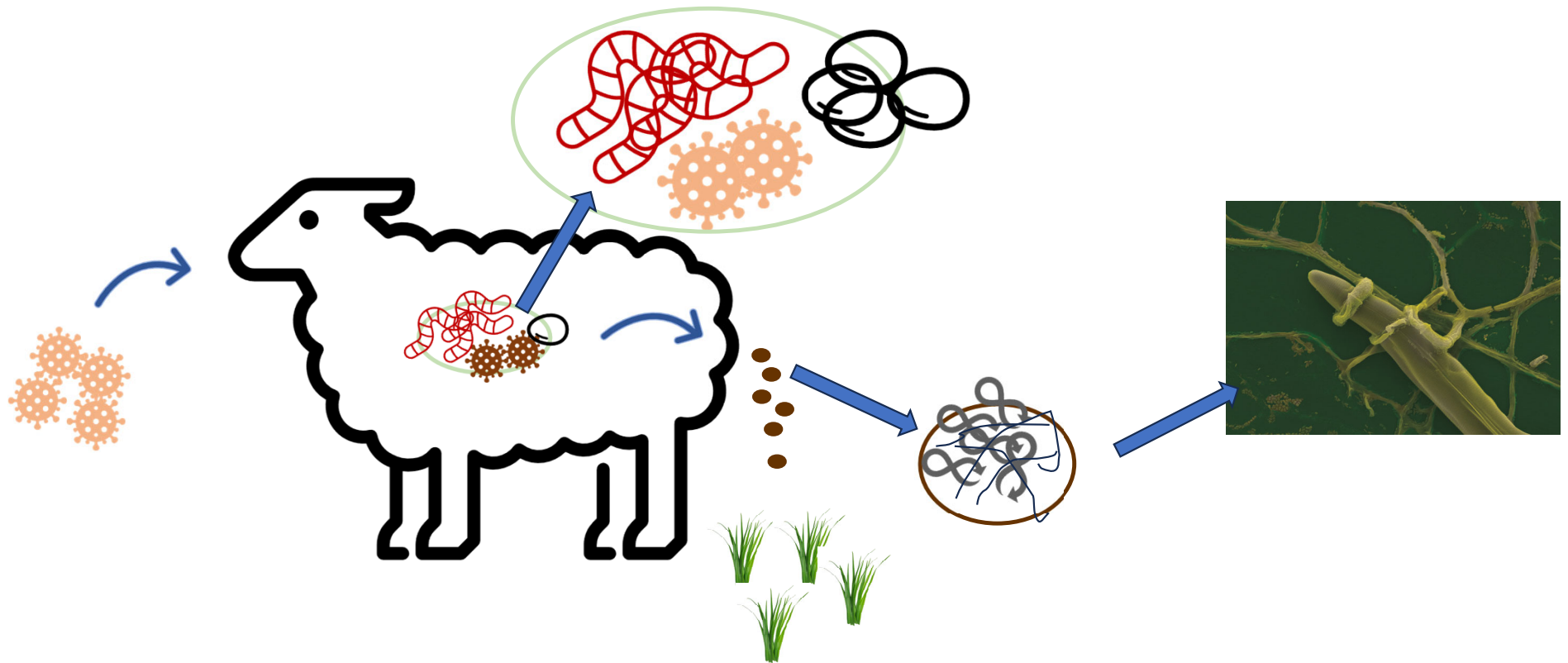
Upper Midwest & Northeast Rainforest High Plains Desert Arid Prairie
 Fescue Belt Forested Mountains Foothills Southeast ¹ One flock location

BioWorma® - *Duddingtonia flagrans* (Df)

- Nematode-trapping fungus
- Fungal spores are fed to animal in feed supplement and pass through to feces (no effect to animal).
- Gastrointestinal nematode or worm larvae develop along with Df. Df trap the larvae, paralyze and consume it.
- Estimated that 10% of GIN in animal, 90% on pasture (Wormboss.com.au)
- Effective against multiple worm species and resistant worms.
- Available through select feed mills, veterinarians, Premier1.
- Df is a naturally occurring fungus in soil and not detrimental to soil nematodes, environment (Faedo et al., 2002; Knox et al., 2002; Yeates et al., 2002; Saumell et al., 2015).



Journey of nematode-trapping fungus (Df)



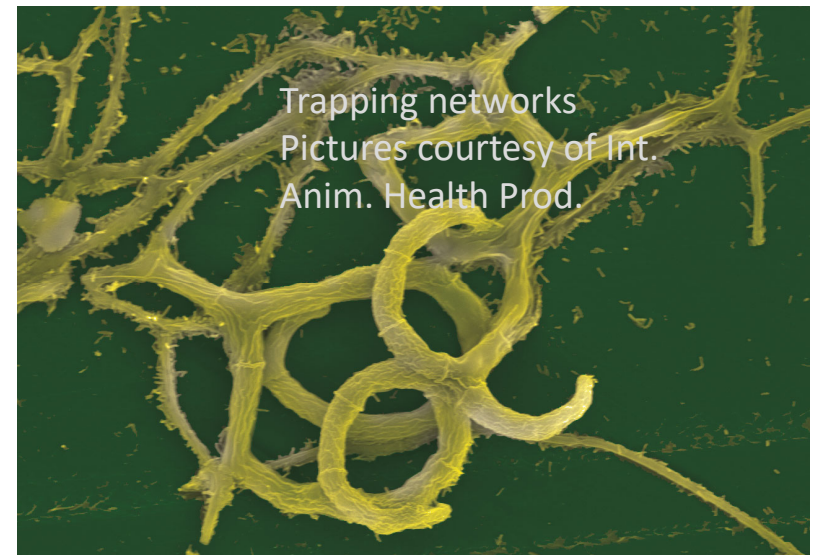


Mature chlamydospore has thick walls that allow survival as passes through GI tract



Trapping net made of loops, traps the nematode

Anterior part of infective larvae captured in a hyphal loop



Examining reduction in infective larvae

- Determine fecal egg count.
- Coproculture – culture of fecal material from +/- Df fed sheep with nematode eggs at ~77°F (in culture oven) to develop infective stage larvae.
- Larvae are counted (and identified to genera) to calculate recovery (compared with FEC).

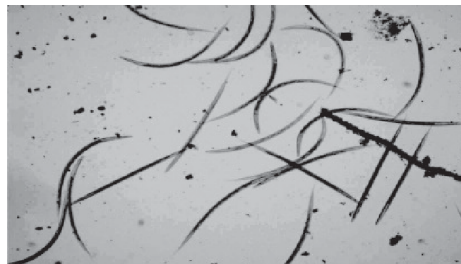
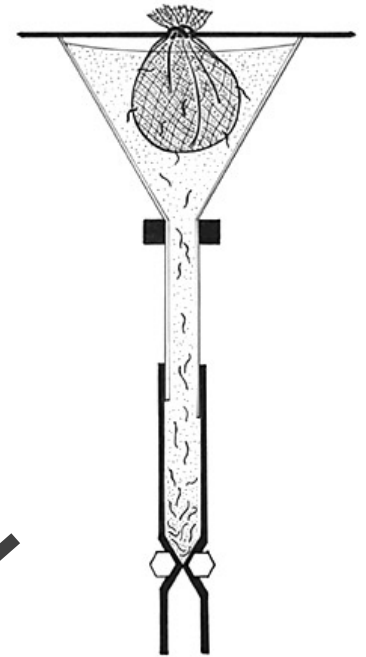


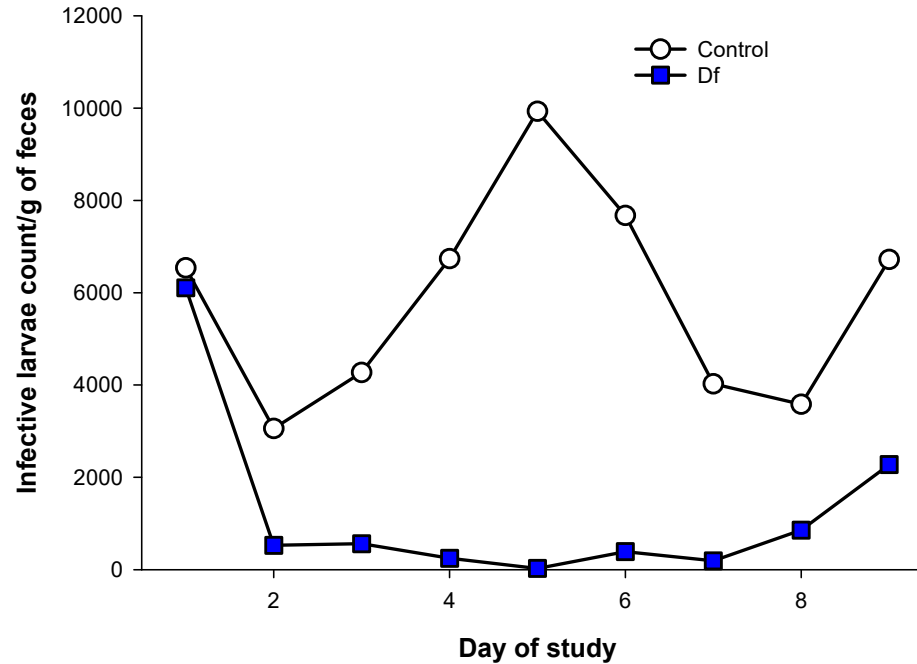
Fig 1. Infective third stage larvae of strongyles (10X)

Coproculture

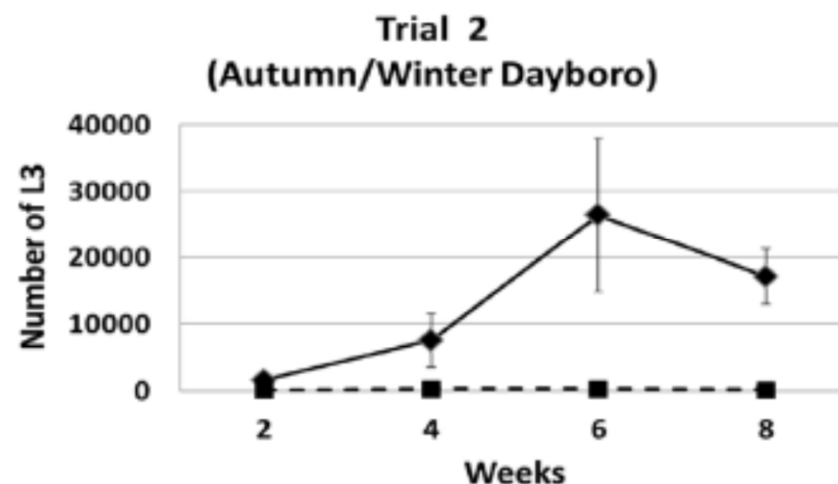
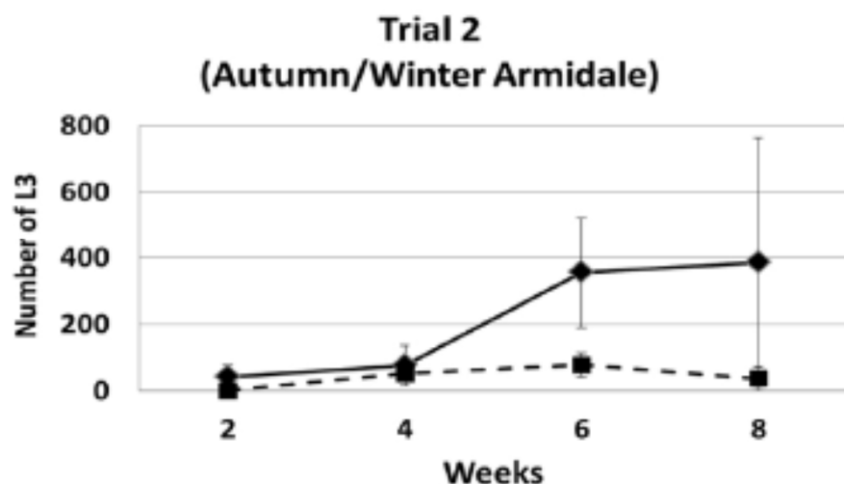
- Conduct fecal egg count (FEC)
- Fecal samples incubated at 25°C for 7 – 12 days to grow infectives stage larvae
- Larval recovery: (L3/g)/avg FEC



Effect of Df fed to lambs on larvae counts over time (Peña et al, 2002)

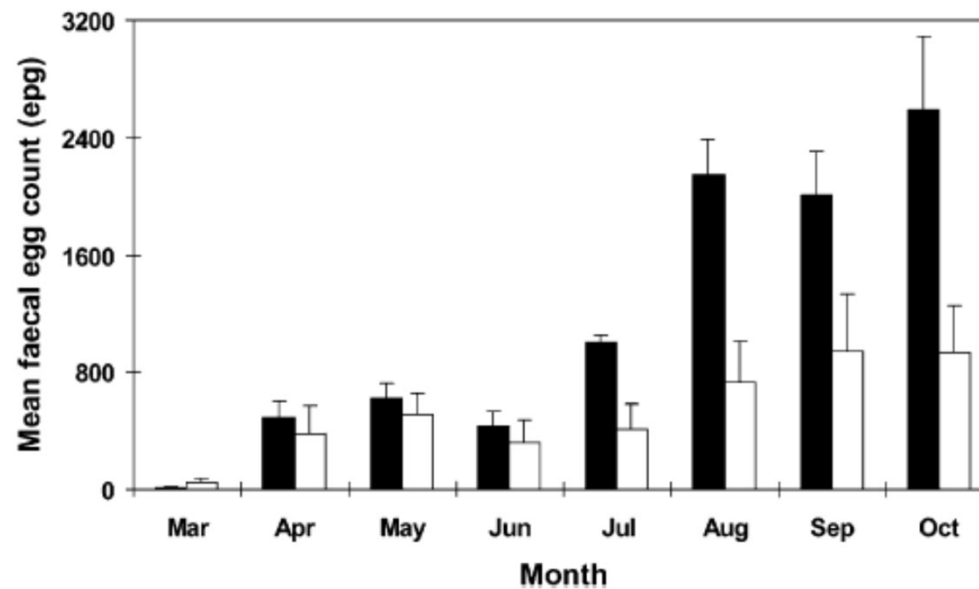


Effect of Df fed to goats on larval recovery from herbal samples (Healey et al., 2018)



Effect of Df fed to lambs on fecal egg counts over time (Knox and Faedo, 2001)

M.R. Knox, M. Faedo/Veterinary Parasitology 101 (2001) 155–160



Research trial:

Determine efficacy of Df included in feed supplement as recommended or mixed into trace mineral mix

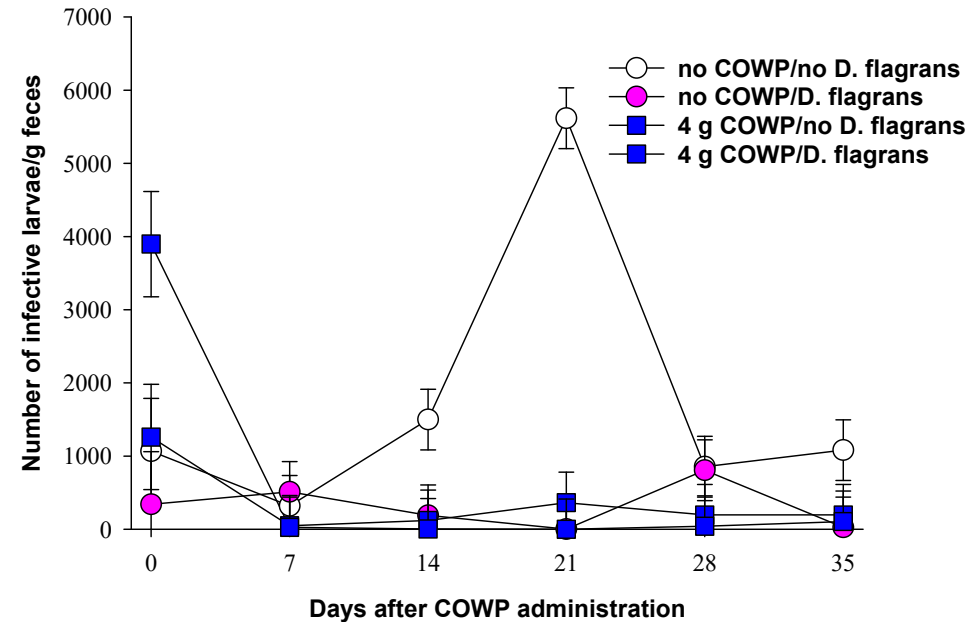
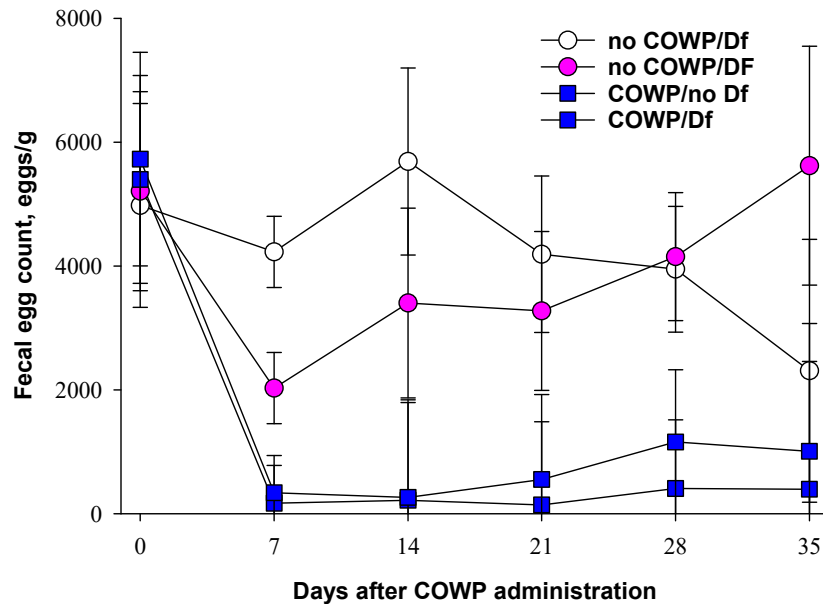


Effect of Df on feed or loose mineral on larval recovery

Including in the mineral mix worked as well or better than mixing in feed according to manufacturer's recommendation.

Use of Df and copper oxide wire particles (COWP)

(Burke et al., 2005)





Considerations and cost of providing BioWorma®

- >\$0.20 to \$0.60 per 100 lb. animal per day.
- Imperative to use strategically based on biology of worm and risk of worm infection in animal.
- Peri-parturient dams and young animals are most susceptible to worms.
- No need to feed when animals off pasture, when pasture is dry (drought), or when risk is low.
- Use alongside resistant genetics, good nutrition, good pasture management to minimize worms on pasture.
- More information at www.wormx.info.

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