



International
Animal Health Products
THE AUSTRALASIAN COMPANY



Duddingtonia flagrans

WHAT IS IT?

A natural strain of fungus isolated from the environment, found around the world, with application as a biological control for larvae of parasitic nematodes of grazing animals.





International
Animal Health Products
THE AUSTRALASIAN COMPANY

Duddingtonia flagrans

WHY DO WE NEED IT?

- Resistance to anthelmintics is getting worse all the time
- Need for reduced reliance on chemicals to control worms.
- Emergence of integrated parasite management (IPM) programs.





Duddingtonia flagrans

HOW DO WE USE IT?

- Firstly complete Faecal Egg Count (FEC)
- Based on FEC results, treat the animals with an effective chemical wormer/anthelmintic
- Move animals onto low-worm pasture
- Administer *D. flagrans* in daily rations





International
Animal Health Products
THE AUSTRALASIAN COMPANY

Duddingtonia flagrans

HOW DOES IT WORK?

- **By feeding a supplement containing inert fungal spores which pass into the manure, having no effect within the animal.**
- **Breaks the parasites' life cycle by trapping, paralysing and consuming infective larvae within the animal's manure.**
- **Equally-effective against resistant parasites**





Duddingtonia flagrans

- ***D. flagrans* is a natural organism isolated in Australia by CSIRO in early 1990's**
- **Products are safe for animals, people and the environment**
- **Products are palatable, easy to use and have good shelf life.**

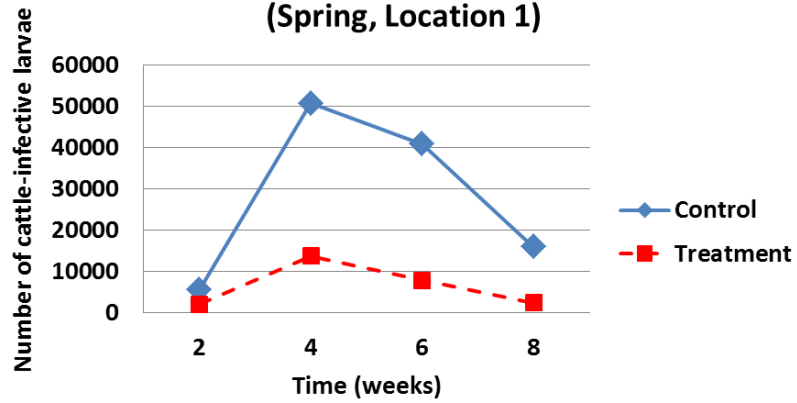


CATTLE TRIALS

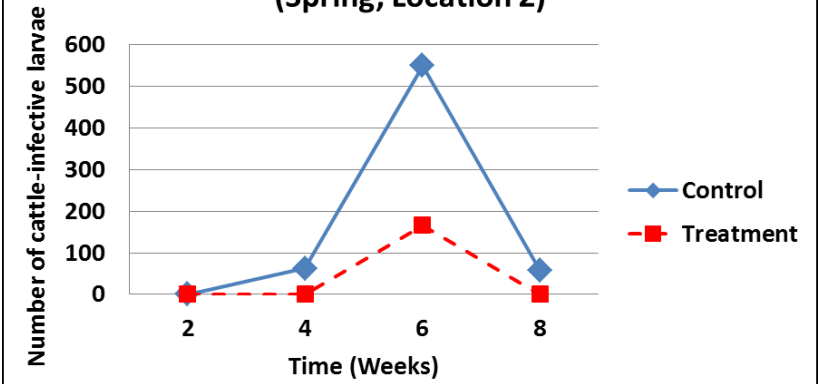


International
Animal Health Products
THE AUSTRALASIAN COMPANY

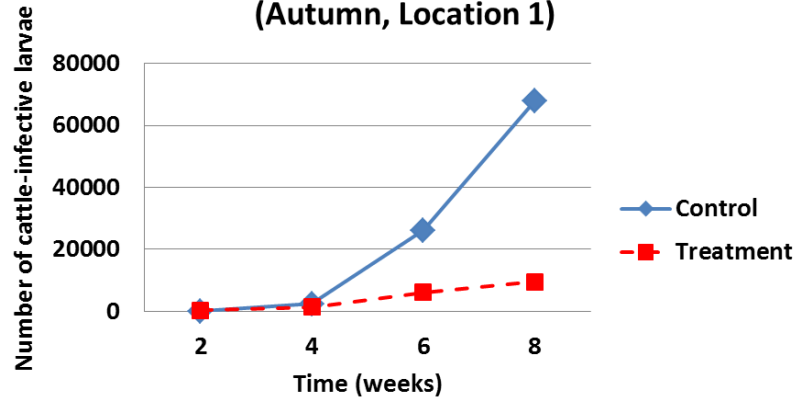
**Cattle Trial 1
(Spring, Location 1)**



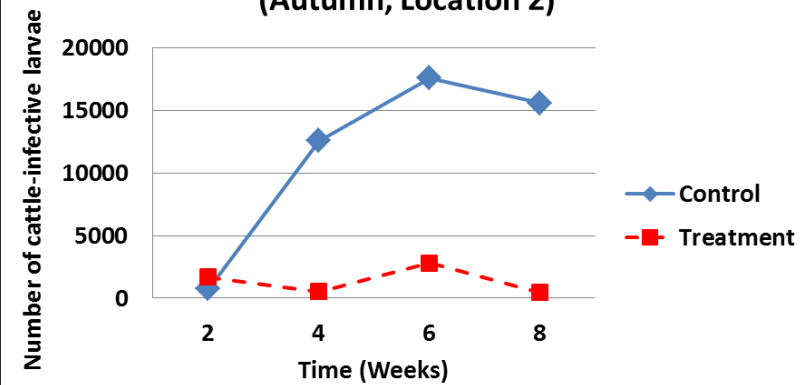
**Cattle Trial 1
(Spring, Location 2)**



**Cattle Trial 2
(Autumn, Location 1)**

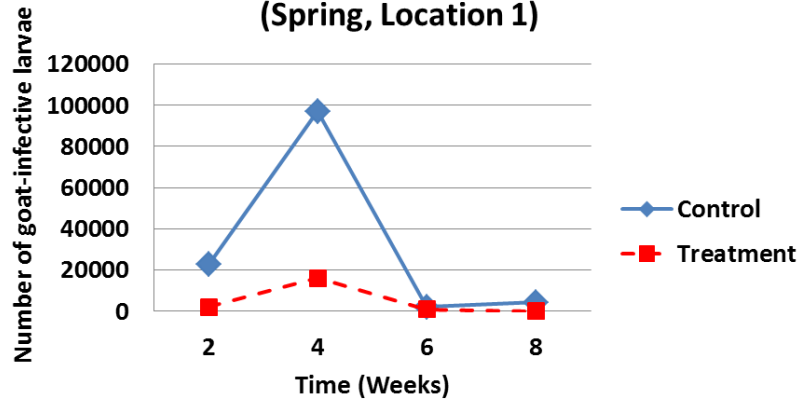


**Cattle Trial 2
(Autumn, Location 2)**

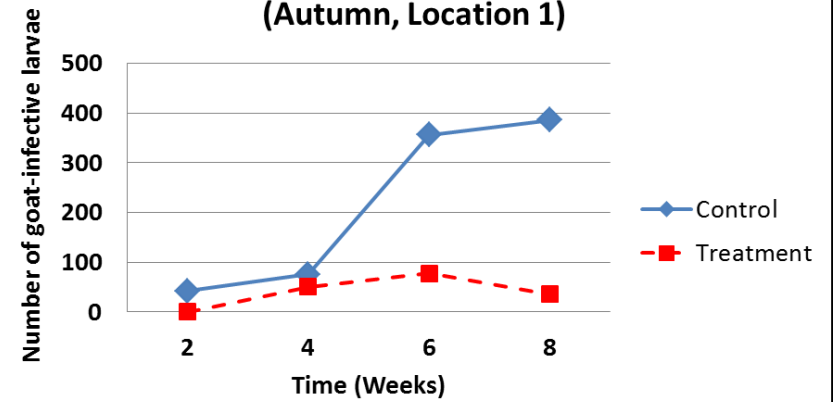


GOAT TRIALS

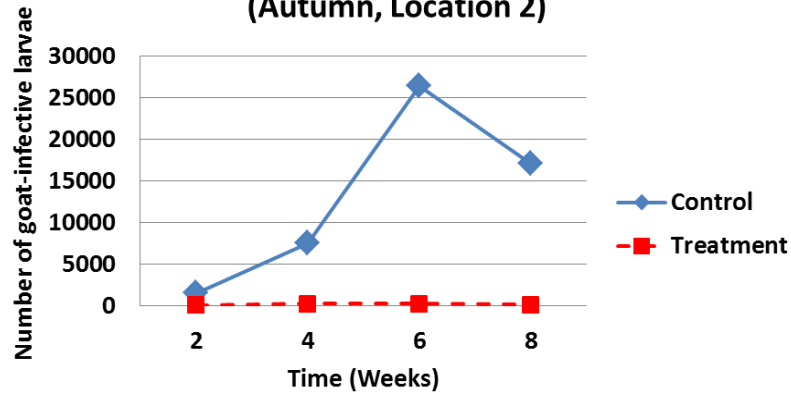
Goat Trial 1 (Spring, Location 1)



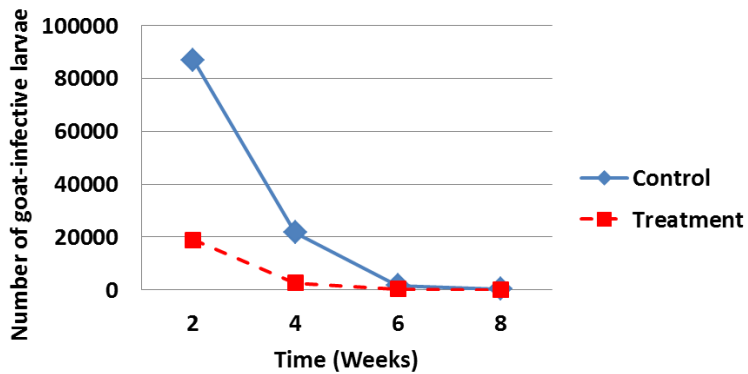
Goat Trial 2 (Autumn, Location 1)



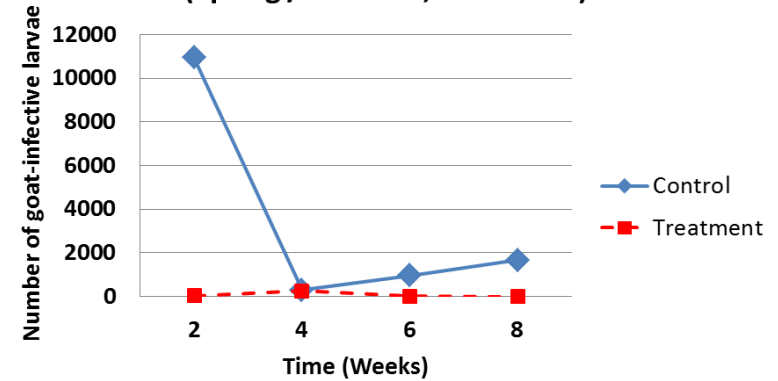
Goat Trial 2 (Autumn, Location 2)



Goat Trial 3 (Spring / Summer, Location 1)



Goat Trial 3 (Spring / Summer, Location 2)



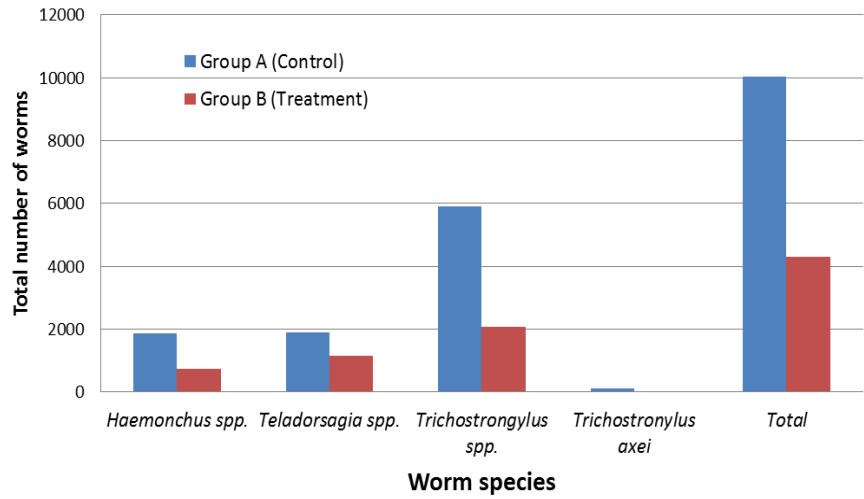
International
Animal Health Products
THE AUSTRALASIAN COMPANY

SHEEP TRIALS

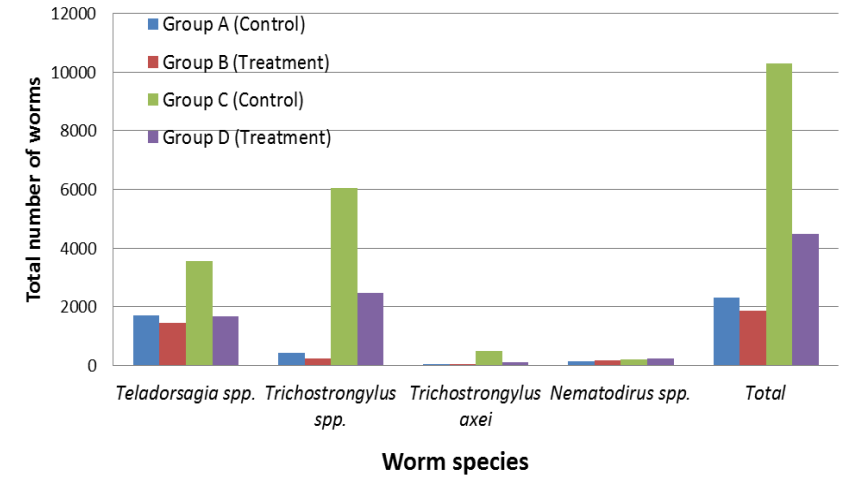


International
Animal Health Products
THE AUSTRALASIAN COMPANY

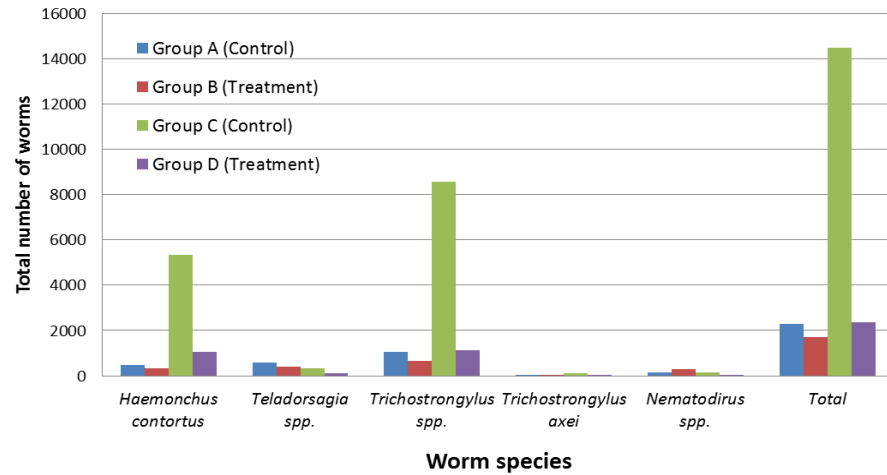
Total Worm Counts (arithmetic mean)



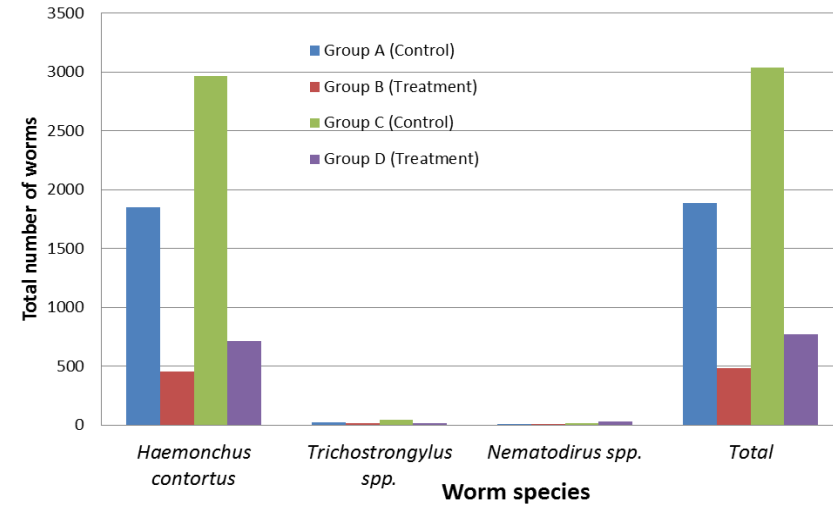
Total Worm Counts (arithmetic mean)



Total Worm Counts (arithmetic mean)



Total Worm Counts (arithmetic mean)





International
Animal Health Products
THE AUSTRALASIAN COMPANY

Commercially, the most important roundworms/nematodes for cattle, sheep & goats are:

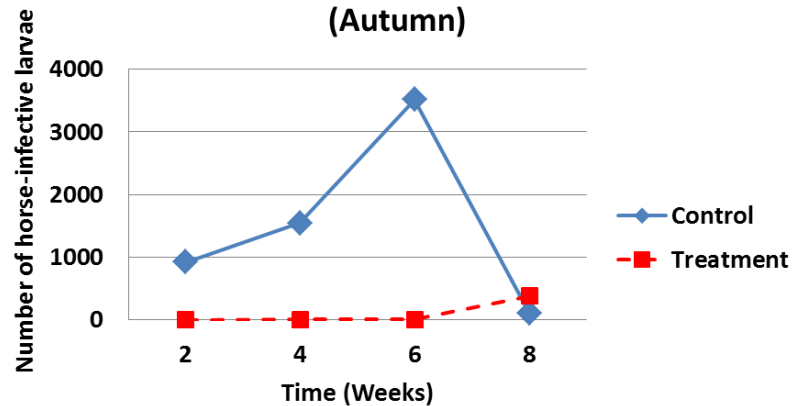
- ***Haemonchus* spp.** - No.1 in the world and occurs in warm and moist regions, mostly mixed infections and occurs globally
- ***Teladorsagia (Ostertagia)* spp.** - No.1 in the world in temperate climates, mostly mixed infections and occurs globally
- ***Trichostrongylus* spp.** - Mostly in mixed infections, globally
- ***Nematodirus* spp.** - Mainly temperate climate, mostly mixed infections, globally
- ***Cooperia* spp.** - Mainly in warm and moist regions, mostly mixed infections, globally

Mixed infections = several worm species, as above infecting the host animal at the same time.

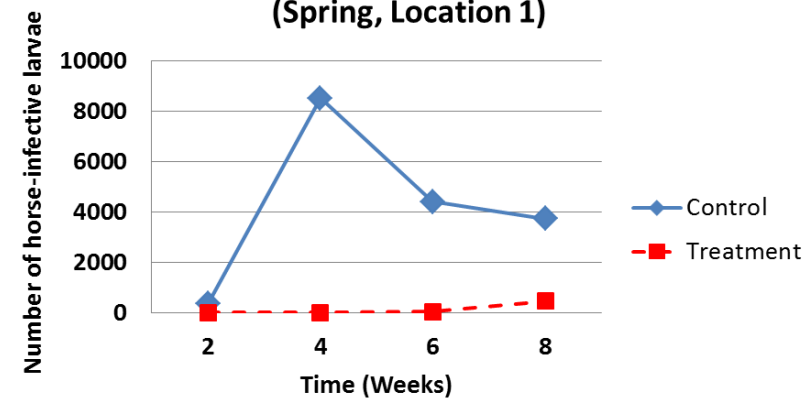


HORSE TRIALS

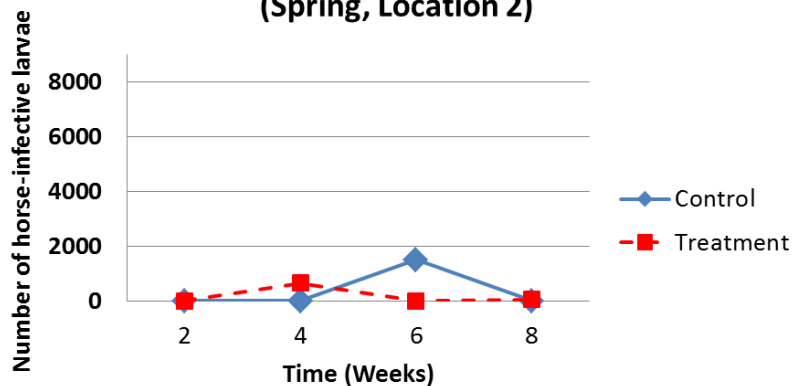
Horse Trial 1 (Autumn)



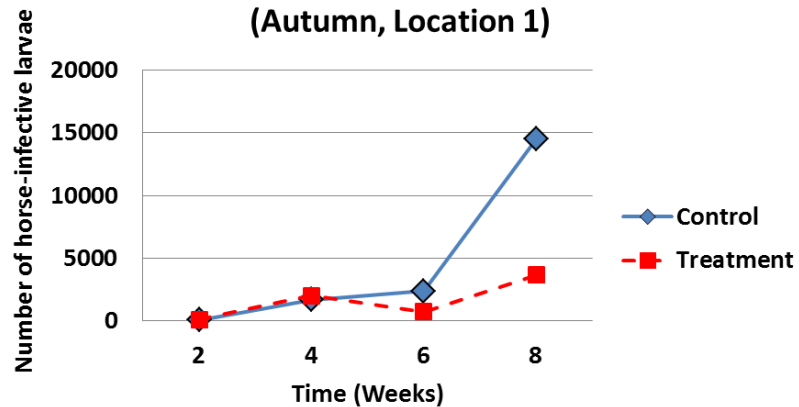
Horse Trial 2 (Spring, Location 1)



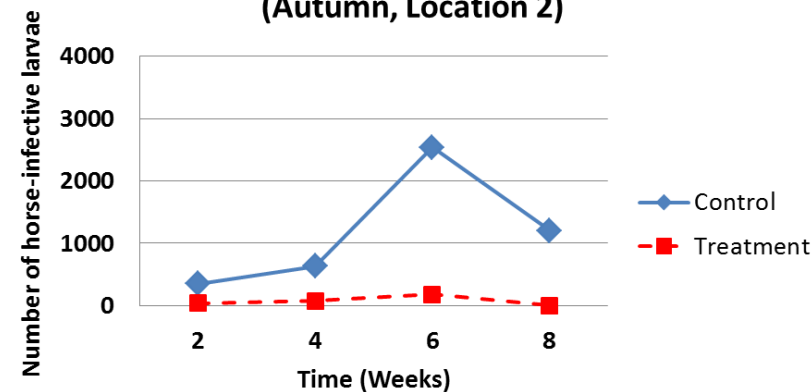
Horse Trial 2 (Spring, Location 2)



Horse Trial 3 (Autumn, Location 1)



Horse Trial 3 (Autumn, Location 2)



International
Animal Health Products
THE AUSTRALASIAN COMPANY

Commercially, the most important roundworms/nematodes for horses are:



International
Animal Health Products
THE AUSTRALASIAN COMPANY

- ***Cyathostomins*** (small strongyles (small red worms or cyathostomes) - No.1 problem in horses worldwide. Mostly in mixed infections.
- ***Parascaris equorum***. Ascarids - A serious problem, particularly for young animals, globally.
- ***Strongylus spp.*** - One of the most harmful parasites of horses. Mostly in mixed infections.
- ***Strongyloides westeri*** - A serious threat for young foals, mainly in warm and moist regions, globally.
- ***Trichostrongylus axei*** - A serious problem worldwide, particularly for young animals.
- ***Habronema spp.*** - Can be regionally quite important. Found globally.

Mixed infections = several worm species as above infecting the host animal at the same time.





International
Animal Health Products
THE AUSTRALASIAN COMPANY

Duddingtonia flagrans reduces the number of gastrointestinal nematodes (GIN) larvae on pasture, which is significantly greater than a chemical wormer can do within the animal (overall averages below):

84%

HORSES

81%

CATTLE

86%

GOATS

68%

SHEEP





International
Animal Health Products
THE AUSTRALASIAN COMPANY

There is widespread chemical resistance and multi-resistance in production animals (sheep, cattle & goats) including:

**Haemonchus (Barber's Pole or wire worm),
Teladorsagia (Brown stomach worm),
Trichostrongylus (Black Scour or Hair worm),
Cooperia spp. (Intestinal Worm),
Nematodirus (Thread-necked Worm)**





International
Animal Health Products
THE AUSTRALASIAN COMPANY

The extent of resistance is best documented in production animals and a recent survey of sheep in Australia (Playford *et al.*, 2014) found widespread resistance in the common sheep parasites (*Teladorsagia*, *Trichostrongylus* and *Haemonchus*) to broad-spectrum anthelmintics:

96% prevalence for **benzimidazoles**

96% prevalence for **levamisole**

87% prevalence for **ivermectin**

77% prevalence for **abamectin**

54% prevalence for **moxidectin**



Study published by Meat & Livestock Australia Limited
(Lane *et al.*, 2015) estimates the total losses per annum due
to internal parasites:



International
Animal Health Products
THE AUSTRALASIAN COMPANY

- **Sheep \$A436 million (\$US327m/\$EU305m)** with production losses ranging from \$1.29 - \$28.29 per animal
- **Cattle \$A93.6 million (\$US70m/\$EU66m)** with production losses ranging from \$0.44 - \$3.59 per animal
- **Goats \$A2.54 million (\$US1.9m/\$EU1.8m)** with production losses ranging from \$0 - \$5.34 per animal

Separately there is no production loss data for horses but the estimated annual costs of worming ranges from **\$A15.00 - \$120.00** per animal.





International
Animal Health Products
THE AUSTRALASIAN COMPANY

Duddingtonia flagrans

Did you know: It has been estimated 10% of the parasite population is within the host animal vs 90% is on the pasture.

<http://www.wormboss.com.au/tests-tools/management-tools/drench-resistance/using-refugia-to-prolong-drench-life.php>





International
Animal Health Products
THE AUSTRALASIAN COMPANY

Duddingtonia flagrans

- If 10% of worms are within the animal and a wormer is 95% (?) effective: $10 \times 0.95\% = 9.5\%$ reduction
- If 90% worms are on pasture and Df is 70% effective: $90\% \times 0.70 = 63\%$ (7 times more) via manure





International
Animal Health Products
THE AUSTRALASIAN COMPANY



Active Constituents: Each gram contains:
a minimum of 500,000 chlamydospores

Daily feeding rates: 6g/100kg bodyweight

Available: Premixers, Feedmills and
Veterinarians

Withholding periods: Meat & Milk: 0 days

Packsizes: 7.5kg, 15kg, 25kg and 1000kg





International
Animal Health Products
THE AUSTRALASIAN COMPANY

Active Constituents: Each gram contains: a minimum of 30,000 chlamydo spores

Daily feeding rates: 100g/100kg bodyweight

Available: Stores & End users

Withholding periods: Meat & Milk: 0 days

Packsizes: 7.5kg and 15kg pails
10kg and 20kg bags (late 2018)





International
Animal Health Products
THE AUSTRALASIAN COMPANY

More Information:

www.bioworma.com