



Example

Jimmy Jim Example
Report

DrenchSmart Protocol Information

Protocols

- Starting FEC must be a minimum of 500epg, although recommendation is levels of 700-800epg.
- Starting FEC is validated through the FECPAK Laboratory
- DrenchSmart Agreement is signed by all parties involved (Customer, Contractor and FECPAK)
- All drenches used in trial are within the listed expiry period and batch numbers are provided
- A measured composite mob sample of 12 animals pre drench is used and then 12 individual samples post-drench.
- All treatments are administered orally
- All animals involved in the trial are ear tagged – no exceptions

Drench Resistance – A Definition

“Drench resistance occurs once a population of a species of worm can survive a dose of a drench that would have previously killed it. The currently accepted industry definition of drench resistance, as measured in a Faecal Egg Count Reduction test (FECRT), is a reduction in worm egg count of less than 95 percent.”

Source: www.wormboss.com.au

Detecting drench resistance

The test used to determine the drench resistance status for sheep drenches on your property is called a Faecal Egg Count Reduction Test (FECRT). This test is based around the fact that when parasites are first ingested by grazing animals, it will take 18 - 21 days before it is able to produce eggs and betray its presence. Put another way, if a fully effective drench treatment has been administered, the earliest we would expect to see eggs in faecal samples is 18 - 21 days later. If we drench accurately and see eggs in samples 10 days post-treatment, this is normally accepted as evidence that some worms have survived the treatment, i.e. the drench is not working properly.

FECRT tests are normally expressed as the percentage reduction in eggs counted between the pre and post-drench (10 days) periods. A treatment that is 100% successful would result in all worms being killed and egg counts at day 10 would be 0. In this case, the reduction would be 100%. In other words the higher the percentage (%) figure the better the drug is performing.

While there is some debate as to at exactly what level of reduction resistance is said to exist, most independent writers use a classification similar to the one detailed below.

Reduction	Resistance Status
Better than 95%	No resistance detected – drug still effective
Between 90 and 95%	Resistance suspected – may or may not be the start of resistance
Less than 90%	Drench Resistance confirmed

General notes on testing for drench resistance

- Because sheep and cattle do not generally share the same worms, a drench type that is failing to control sheep worms may still work effectively on cattle worms. i.e. don't extrapolate sheep results to cattle and vice versa.
- There are many different parasite species on each farm and the mix of these species is likely to change through the season. Often when resistance is detected it is to an individual species only. By identifying the times of the year that the species is not present or stock classes the species does not affect, then the use of the drug may still be possible at these times.
- Because DrenchSmart tests work on measuring a percentage reduction, result accuracy is improved when we have a high starting FEC. If the starting FEC is less than 500 eggs per gram (epg) we need to be much more conservative when interpreting results. Sample size is also important. The more valid results we have the more confident we can be with our results.
- A combination of issues such as starting FEC, sample size and other factors are used to assign a level of test confidence.

Confidence Level	Interpretation
HIGH	Can be very confident in results
MEDIUM	Results are good and unlikely to change if we re-tested
LOW	Would need to see a very poor reduction before resistance was declared with confidence. Results indicative only.

The following is a copy of the original contract that was signed at the start of this assessment:

DrenchSmart Agreement

The Parties

"The Customer"

"The Contractor"

"The Service Provider" FECPAK International

Contractor Delivery Address:

Drench Selection

I wish to assess the following drench options on my property (Minimum of four drenches must be selected + a control group)

- | | | |
|---|--|---|
| <input checked="" type="checkbox"/> Control | <input type="checkbox"/> Benzimidazoles | <input type="checkbox"/> Ivermectin – Full Dose |
| <input type="checkbox"/> Moxidectin | <input type="checkbox"/> Levamisoles | <input type="checkbox"/> Ivermectin – Half Dose |
| <input type="checkbox"/> Abamectin | <input type="checkbox"/> Combination (BZ & Levamisole) | |

Report Distribution

I do not want a copy of the DrenchSmart Report to be given to the DrenchSmart Contractor.

Agreement Acceptance

I have read and understood all the conditions overleaf and I wish to proceed with the DrenchSmart Service to assess the above selected drenches. I understand that FECPAK International provides the resources and knowledge to produce a Report for the Customer and the Contractor sets up the first sample collection and trains the Customer to complete the second sample collection. All parties recognize the importance of maintaining confidentiality.

..... Customer Name (Print) Customer Signature Date
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..... Contractor Name (Print) Contractor Signature Date
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..... FECPAK Representative Name (Print) FECPAK Representative Signature Date
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DrenchSmart Agreement Particulars

1. Role of all Parties involved
 - 1.1. The “Service Provider” will deliver the equipment, testing services and analysis of the data collected in order to produce a DrenchSmart Report.
 - 1.2. The “Contractor” will deliver the drench products required for assessment. They will also assist in the initial set up of the first sample collection and train the “Customer” to collect the Day Ten samples.
 - 1.3. The “Customer” will provide animals, yards and pens, weigh scales, assistance with the initial collection and will be the sole collector of the 10 day post drench samples.

2. Agreement on Drench Selection
 - 2.1. I, the “Customer”, understand that the selection I make overleaf as to which drench options I would like to assess on my property engages me in an agreement to complete the work outlined and commitment to any associated costs as outlined by the “Contractor”.

3. Confidentiality of DrenchSmart Results
 - 3.1. “Confidential Information” shall mean all information and documentation, which may be disclosed to, or obtained by one party to the other in relation to this agreement.
 - 3.2. Each party agrees to receive, protect and maintain the Confidential Information in confidence and shall only disclose such information to its directors and employees as shall be absolutely necessary for this agreement, and shall otherwise not misuse it in any way without the other parties strict prior written consent. Each party agrees to ensure that any recipient of the Confidential Information is bound by a similar duty of confidentiality as the parties to this agreement.
 - 3.3. Each party shall not disclose any Confidential Information to any third party without the prior written consent of the other party. However, it is agreed that scientific data that does not identify the Customer may be used in any way by FECPAK International or third parties for research purposes only.
 - 3.4. The obligations of confidentiality in this agreement shall continue until the Confidential Information enters the public domain (except to breach or default by either party). The obligations of confidentiality shall not apply to Confidential Information which is:
 - a.) already in the public domain.
 - b.) is already in the possession of either party from a source not in breach of confidentiality obligations,
 - c.) is required to be disclosed by law.

4. FECRT Limitations
 - 4.1. The DrenchSmart protocol for the starting FEC is a minimum of 500 epg, with a preferred starting FEC of 700-800 epg. While all endeavors are made to have all animals involved with the evaluation at 500 epg or higher, due to natural composite mob FEC distribution some animals or treatment groups may have FEC’s lower than the optimal 500 epg minimum. A starting FEC of 500 epg or higher is required to be able to deliver the DrenchSmart Reduction Results with a high level of confidence.
 - 4.2. A Larval Culture involves the hatching of parasite eggs in a sample to identify parasite species present. Intentions are to always identify species where resistance has occurred, however there can be difficulties involved with an egg hatching procedure. As a result it is not always possible to identify the species present.
 - 4.3. Sample collection protocols and equipment have been designed to protect the sample from degradation during collection and transportation. Where equipment or procedures have not been followed, or events beyond the parties control occur, no responsibility can be taken for the sample quality prior to reaching the FECPAK Laboratory.
 - 4.4. All results are based on the conditions and species present at the time of collection. This evaluation will produce a “moment in time” interpretation. Recommendations are that regular monitoring be an integral part of an ongoing parasite management programme.
 - 4.5. The views and interpretations expressed in the DrenchSmart Report are that of FECPAK International and are not claimed to be the only interpretation.

General Information

Customer Details

Farmer Name: Jimmy Jim
Phone: (03) 333 3333
Fax: (03) 333 3334
Email: testcase@xtra.co.nz
Address: 111 Test Case Road, RD 3 Test Case

Collection Details

Submission Lab Number: 000001
Day One Collection Date: 27 January 2006
Day Ten Collection Date: 6th February 2006
Starting FEC: 1200epg
Age of Animals: Lambs - 2 months
Last Treatment Date: N/A
Drench Used: N/A







Contractor Details

Contractor Name: Test Case
Certification Number: DS888
Phone: (03) 555 5555
Mobile: 021 111 111
Email: testcase2@xtra.co.nz




Drench Selection

- Benzimidazoles, Levamisoles, Combination (BZ & Lev), Ivermectin Full Dose, Ivermectin Half Dose, Abamectin, Moxidectin

Drench Summary

Drench Active	Quick Drench Selection	Starting FEC	Percentage Reduction	Resistance Status	Test Confidence	Comments
Benzimidazoles		1095	89%	Resistance Confirmed	High	Only Nematodirus eggs were found in all 12 samples post treatment
Levamisoles		1200	99.8%	No Resistance Detected	High	A Strongyle egg was found in 1 of the 12 samples post treatment
Combination (BZ & Lev)		1245	100%	No Resistance Detected	High	No eggs were found post treatment
Ivermectin Half Dose		1050	82%	Resistance Suspected	High	Strongyle eggs were found in 10 of the 12 samples tested post treatment, Nematodirus eggs were found in 4 of the 12 samples post treatment
Ivermectin Full Dose		1065	93%		High	Strongyle eggs were found in 5 of the 11 samples post treatment, Nematodirus eggs were found in 1 of the 11 samples post treatment
Abamectin		1185	100%	No Resistance Detected	High	No eggs were found post treatment
Moxidectin		1020	99.7%	No Resistance Detected	High	A Strongyle egg was found in 1 of the 12 samples post treatment

Availability Legend

-  Available for Use – this active has not demonstrated resistance at this point in time
-  Use Cautiously – this active may be developing resistance and should be used cautiously
-  Do not use – this active is not working effectively on this property and use should be discontinued

For more detailed explanations on drench use please refer to the recommendations section of this report

Resistance and Species Summary Chart

Parasite Species	Drench Type						
	Benzimidazoles	Levamisoles	Combination (BZ & Lev)	Ivermectin Full Dose	Ivermectin Half Dose	Abamectin	Moxidectin
*Ostertagia	Y	Y	Y	N	N	Y	Y
*Trichostrongylus	Y	Y	Y	Y	Y	Y	Y
*Nematodirus	N	Y	Y	N	N	Y	Y
*Hamonchus							
Cooperia	?	?	?	?	?	?	?
Chabertia	?	?	?	?	?	?	?
Other							

* Species of most significance

Chart Codes

Y = Drench is effective against this species

N =Drench is **NOT** effective against this species

? = Data is inconclusive and active needs to be reassessed (At high FEC levels >500 epg)

Blank = Unable to ascertain status as species not present at time of testing

Recommendations & Discussion Points

Example

DATA RECORDS

Example

Pre-FECRT Larval Culture Results - Day One

STRONGYLE GROUP OF PARASITES					
Scientific Name	Common Name	Site	Importance	Percentage Composition	Comments
<i>Hamonchus contortus</i>	Barbers pole worm	Abomasum	Rare in Otago and Southland		
<i>Ostertagia spp</i>	Small brown stomach worm	Abomasum	Important in spring and summer	50%	
<i>Trichostrongylus axei</i>	Stomach hair worm	Abomasum	Important in late summer and autumn	17%	
<i>Trichostrongylus spp</i>	Black scour worm	Small intestine	Important in late summer and autumn		
<i>Cooperia spp</i>	Small intestinal worm	Small intestine	Common in autumn but rarely important	3%	
<i>Strongyloides papillosus</i>	Threadworm	Small intestine	Common in autumn but rarely important		
<i>Bunostomum trigonocephalum</i>	Hookworm	Small intestine	Rarely important		
<i>Oesophagostomum</i>	Nodule worm	Large intestine			
<i>Chabertia</i>	Large mouth bowel worm	Large intestine		3%	
<i>Trichuris ovis</i>	Whipworm	Large intestine			
NEMATODIRUS GROUP OF PARASITES					
<i>Nematodirus</i>	Thin neck intestinal worm	Small intestine	Important in early spring thru autumn	27%	

DrenchSmart® - Results

Drench tested: Benzimidazoles (COLOUR CODE: WHITE)

Day One Result

Strongyle	Nematodirus	Total	EPG
20	16	36	1080
22	15	37	1110

Starting Average FEC

1095

Ten Day Results

Strongyle	Nematodirus	Total	EPG
0	6	6	180
0	10	10	300
0	4	4	120
0	2	2	60
0	4	4	120
0	0	0	0
0	3	3	90
0	2	2	60
0	1	1	30
0	4	4	120
0	3	3	90
0	7	7	210

Number of Ten Day Samples Collected:

12

**IMPORTANT That multiplier is changed to match the number of samples collected*

Ten Day Average FEC

115

REDUCTION PERCENTAGE:

89 %

Larval Culture Results - Tenth Day

Species	Percentage Composition	Comments
Nematodirus	100%	

DrenchSmart® - Results

Drench tested: Levamisoles (COLOUR CODE: YELLOW)

Day One Result

Strongyle	Nematodirus	Total	EPG
32	7	39	1170
33	8	41	1230

Starting Average FEC

1200

Ten Day Results

Strongyle	Nematodirus	Total	EPG
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
1	0	1	30
0	0	0	0
0	0	0	0
0	0	0	0

Number of Ten Day Samples Collected:

12

Ten Day Average FEC

3

REDUCTION PERCENTAGE:

99.8 %

Example

DrenchSmart® - Results

Drench tested: **Combination (BZ & Lev) (COLOUR CODE: RED)**

Day One Result

Strongyle	Nematodirus	Total	EPG
35	7	42	1260
33	8	41	1230

Starting Average FEC

1245

Ten Day Results

Strongyle	Nematodirus	Total	EPG
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

Number of Ten Day Samples Collected:

12

Ten Day Average FEC

0

REDUCTION PERCENTAGE:

100 %

Example

DrenchSmart® - Results

Drench tested: Ivermectin - Half Dose (COLOUR CODE: BLACK)

Day One Result

Strongyle	Nematodirus	Total	EPG
29	5	34	1020
32	4	36	1080

Starting Average FEC

1050

Ten Day Results

Strongyle	Nematodirus	Total	EPG
22	6	28	840
3	0	3	90
0	0	0	0
5	0	5	150
2	1	3	90
5	5	10	300
0	0	0	0
12	3	15	450
3	0	3	90
1	0	1	30
4	0	4	120
3	0	3	90

Number of Ten Day Samples Collected:

12

Ten Day Average FEC

188

REDUCTION PERCENTAGE:

82 %

Larval Culture Results - Tenth Day

Species	Percentage Composition	Comments
Ostertagia	80%	Low Larval Yield
Nematodirus	20%	

DrenchSmart® - Results

Drench tested: Ivermectin - Full Dose (COLOUR CODE: GREEN)

Day One Result

Strongyle	Nematodirus	Total	EPG
32	4	36	1080
28	7	35	1050

Starting Average FEC

1065

Ten Day Results

Strongyle	Nematodirus	Total	EPG
2	0	2	60
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
1	0	1	30
15	0	15	450
0	2	2	60
1	0	1	30
7	0	7	210
		0	0

Number of Ten Day Samples Collected:

11

Ten Day Average FEC

76

REDUCTION PERCENTAGE:

93 %

Larval Culture Results - Tenth Day

Species	Percentage Composition	Comments
Ostertagia	93%	Low Larval Yield
Nematodirus	7%	

DrenchSmart® - Results

Drench tested: Abamectin (COLOUR CODE: BLUE)

Day One Result

Strongyle	Nematodirus	Total	EPG
35	8	43	1290
30	6	36	1080

Starting Average FEC

1185

Ten Day Results

Strongyle	Nematodirus	Total	EPG
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

Number of Ten Day Samples Collected:

12

Ten Day Average FEC

0

REDUCTION PERCENTAGE:

100 %

Example

DrenchSmart® - Results

Drench tested: Moxidectin (COLOUR CODE: ORANGE)

Day One Result

Strongyle	Nematodirus	Total	EPG
33	2	35	1050
30	3	33	990

Starting Average FEC

1020

Ten Day Results

Strongyle	Nematodirus	Total	EPG
0	0	0	0
0	0	0	0
1	0	1	30
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

Number of Ten Day Samples Collected:

12

Ten Day Average FEC

3

REDUCTION PERCENTAGE:

99.7 %

Example