



Internal Parasite Control in Sheep

Trainer Guide

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Internal parasite Control in Sheep—Trainer Guide
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Introduction

This trainer guide has been developed to allow vocational and education trainers to deliver to their students knowledge and skills in the area of internal parasite control in sheep and in particular monitoring and managing worm populations of sheep flocks. It is designed to be used in conjunction with the reference manual and powerpoint presentation also developed by the Sheep CRC on this topic.

This guide has been designed to meet the following national competencies:

- RTE 3115A Implement livestock husbandry practices
- RTE 3402A Implement animal health control programs
- RTE 3712A Administer medication to livestock
- RTE 4119A Supervise animal health programs

This trainer guide is structured to cover for each module:

- training outline including resources, purpose and a suggested approach
- practical exercises including resources, purpose, instructions for trainers and student worksheets
- short answer questions that include both a worksheet for students and the answers for trainers
- assessment sheets

The training is designed to be run with students over a one day period. The total contact required is seven hours. This training covers the following topics:

- types of internal parasites
- parasite damage to sheep
- introduction to WormBoss
- worm egg counting
- drench resistance.

After completing this training, students will be able to:

- use worm egg counts to detect early worm infestations
- conduct a worm egg count test and interpret the results
- undertake drench resistance testing to determine which drenches are effective
- use WormBoss to aid decision making.

Setting the scene

Time: 20 minutes

Resources	Checklist
Whiteboard or butchers paper	
Whiteboard pens	
OHP/power point presentation and equipment	

Purpose

1. To give students an understanding of the material that will be covered during the training.
2. To give students an understanding of the costs of worms to the Australian sheep industry.

Suggested approach

- Explain course aim and outline. PPT1–3
- Outline the cost of worms to the sheep industry in Australia. PPT4–5

INTRODUCTION TO WORMBOSS

Types of internal parasites

Time: 30 minutes

Resources	Checklist
Whiteboard or butchers paper	
Whiteboard pens	
OHP/power point presentation and equipment	

Purpose

1. To give students an understanding of the different types of internal parasites and their life cycles.
2. To give students an understanding of the damage caused by internal parasites.

Suggested approach

- Outline the three different types of internal parasites. PPT 6
- Explain the main types of round worms in different rainfall areas. PPT 7
- Use PPT 8 to show site of invasion, scientific name and common name for roundworms.
- Explain the life cycle of round worms using PPT 9
 - Outline the different larval stages and how the environment may affect them.
- Explain epidemiology of round worms and why it is important. PPT 10
 - Outline the temperature and moisture requirements for egg survival and worm hatching.
 - Use this to show why Barbers Pole is a problem in summer rainfall areas.
- Summarise details on tapeworms and liver fluke. PPT 11–12
- Explain parasite damage to sheep. PPT 13–14
 - Outline four key effects and comment on overall production effects.

INTRODUCTION TO WORMBOSS

Introduction to WormBoss

Time: 20 minutes

Resources	Checklist
Whiteboard or butchers paper	
Whiteboard pens	
OHP/power point presentation and equipment	
Wormboss CD (see reference0	

Purpose

1. To introduce students to WormBoss and educate them how to use it.

Suggested approach

- *Trainers must have a full and working knowledge of WormBoss before starting to deliver this section.*
- Explain why and who developed WormBoss. PPT15
 - Outline the website address: www.wormboss.com.au.
- Demonstrate the operation of Wormboss.
 - Use a live demonstration with the computer and projector to explain how to use WormBoss.
 - Use a live demonstration with the computer and projector on how to use the drop down menu to navigate the site.

INTRODUCTION TO WORMBOSS

Exercise 1—Using WormBoss

Time: 40 minutes

Resources	Checklist
Whiteboard or butchers paper	
Whiteboard pens	
OHP/power point presentation and equipment	
Lap top computers – 1 between 3 students	
Mouse for each computer	
WormBoss CD (see reference section)	
Pens	
Copies of Exercise 1 work sheet	

Purpose

1. To get the students to start using WormBoss for problem solving and research.

Suggested approach

- *Trainers must have a full and working knowledge of WormBoss before starting to deliver this section.*
- Place three students to one lap top computer (students will complete the exercise in these groups).
- Show procedures for loading up WormBoss CD or opening website.
- Contact details to obtain the WormBoss CD are listed in the reference section of this guide.
- Explain that this exercise is to familiarise the students with WormBoss.
- Handout Exercise 1 work sheet and explain. PPT16
- After groups have recorded their answers, ask each group to share their answers and then ask how they found the tasks.
- *Trainers may wish to undertake more examples if deemed necessary for group.*

INTRODUCTION TO WORMBOSS

Exercise 1 work sheet

Name:

1. From the WormBoss homepage select "know your worms".
2. Read this page and list the major worms for both summer and winter rainfall areas.

Major worms summer rainfall
Major worms winter rainfall

INTRODUCTION TO WORMBOSS

1. Select one worm from each rainfall group and list its:
 - a) scientific and common name
 - b) distribution
 - c) location in the sheep
 - d) effect on the sheep.

Summer rainfall	
Worm scientific and common name	
Distribution	
Location in sheep	
Effects on sheep	

Winter rainfall	
Worm scientific and common name	
Distribution	
Location in sheep	
Effects on sheep	

WORM EGG COUNTING

Worm egg counting and typing

Time: 20 minutes

Resources	Checklist
Whiteboard or butchers paper	
Whiteboard pens	
OHP/power point presentation and equipment	

Purpose

1. To give students an understanding of worm egg counting and typing.

Suggested approach

- Explain worm egg counting and why it is useful. PPT 17–18
- Display worm eggs. PPT 19
- Explain worm egg typing. PPT 20

WORM EGG COUNTING

Collecting the dung sample

Time: 20 minutes

Resources	Checklist
Whiteboard or butchers paper	
Whiteboard pens	
OHP/power point presentation and equipment	
CD on "Collecting the sample" (see reference section)	

Purpose

1. To give students an understanding of the correct way to collect dung samples for the purpose of worm egg counting.
2. To give students an understanding of the two methods of dung sampling and when to use them.

Suggested approach

- Show students CD on "Collecting the sample" to:
 - Demonstrate the correct way to collect dung samples for worm egg counting.
 - Explain what the two methods to collect dung samples are and when to use them.
 - Contact details to obtain the 'Collecting the Sample" CD are listed in the reference section of this guide.

WORM EGG COUNTING

Exercise 2—Worm Egg Counting

Time: 2 hours

Resources	Checklist
Whiteboard or butchers paper	
Whiteboard pens	
OHP/power point presentation and equipment	
Lap top computers – 1 between 3 students	
Mouse for each computer	
WormBoss CD (see references)	

Required per student:

Resources	Checklist
Suitable containers for faeces	
Surgical gloves	
60ml volumetric container	
Scales to weigh 2g samples or volumetric container	
Ten faecal samples	
Spatula for mixing samples	
Mixing bowl	
Small strainer	
Pipette or small syringe	
Saturated salt solution	
Compound microscope x4 objective and x10 eyepiece	
Worm egg counting slide	
Fresh water	
Paper towel	
Buckets for waste and rinsing if required	
Pens	
Calculators	
Copies of Exercise 2 work sheet	

Purpose

1. To give students an understanding of the operation of a microscope.
2. To give students the necessary skills to conduct a Worm Egg Count Test using the Modified McMaster Technique.
3. To give students the necessary skills to identify worm egg species.
4. To give students the necessary skills to interpret Worm Egg Count Test results using WormBoss.

WORM EGG COUNTING

Suggested approach

- *Trainers must have an understanding of the use and care of a microscope; how to conduct worm egg counts using the Modified McMaster Technique; and how to use the "Ask the Boss" feature of WormBoss.*
- Explain the steps of the Worm Egg Count Test. PPT 21
- Explain and demonstrate the use and care of a microscope. PPT 22
 - Trainer to give a practical demonstration.
- Explain and demonstrate the Modified McMaster Technique for conducting a Worm Egg Count Test. PPT 23
 - Trainer to give a practical demonstration of the method.
- Explain and demonstrate the process of doing the egg count. PPT 24–26
 - Note that this worm count does not differentiate between roundworm species except Nematodirus. Liver Fluke eggs will not float to the surface using a saturated salt solution.
- Students to follow the method for the Modified McMaster Technique for conducting a worm egg count.
- Students to count and record eggs seen for each worm species, as well as the total number of eggs counted in the sample, on work sheet 2.
- Explain and demonstrate how to calculate eggs per gram of faeces. PPT 27
- Students to complete these calculations and record their workings, on work sheet 2.
- Explain and demonstrate how to interpret results using WormBoss. PPT 28
 - Use live demonstration to explain how to use "Ask the Boss".
- Students to then use their results from the calculations for the Worm Egg Count Test to enter into "Ask the Boss" on WormBoss.
- Students to record the key points from the report, on work sheet 2.
- After students have recorded their answers, ask each group to share their answers and to comment on them.

WORM EGG COUNTING

Exercise 2 work sheet

Name:

1. Follow the method for the Worm Egg Count Test to prepare samples for counting.
2. Follow the steps for counting worm eggs in the faeces and use the photos in the accompanying sheet to identify the different worm species.
3. For the faecal sample, record information in the table below, including the number of eggs seen for each worm species as well as the total egg count.

Name/Property:	
Mob	
Date	
Paddock name	
History last 12 months	
Sheep class	
Worm species	Count
TOTAL NO. EGGS COUNTED	

4. Calculate the total number of eggs per gram of faeces using the following equation:

$$\text{Number of eggs/gram of faeces} = \frac{\text{number of eggs counted} \times \text{total volume of mix (ml)}}{\text{volume of counting chamber (ml)} \times \text{wt of faeces in mix}}$$

WORM EGG COUNTING

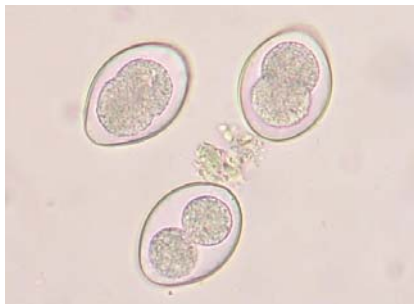
Egg Identification Sheet



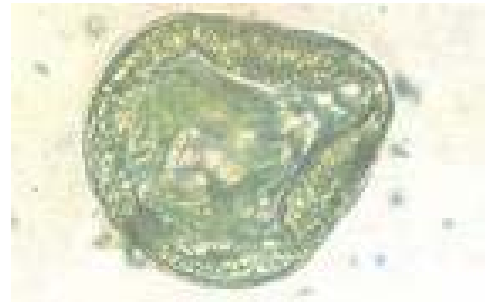
1. Trichostrongylus (Black scour worm)



2. Haemonchus (Barbers Pole worm)



3. Coccidia



4. Moniezia (Tapeworm)



5. Trichuris (Whipworm)



6. Nematodirus (Thin necked Intestinal worm)



7. Fasciola (Liver Fluke)



9. Dictyocaulus (Lungworm)

The images on this page were sourced from:

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2. www.sheepandgoat.com/HairSheepWorkshop/parasitism.html
3. commons.wikimedia.org/wiki/Image:Coccidia.JPG
4. www.medata-systems.co.uk
5. w3.ufsm.br/parasitologia/arquivospagina/ovosdebovinos.htm
6. www.stanford.edu/class/humbio103/ParaSites2005/Trichostrongyliasis/agent.htm
7. cal.vet.upenn.edu/projects/parasit06/website/lab6.htm
8. www.medicalvetonline.com.br/atlas.php

WORM EGG COUNTING

- Use the results from the calculation in question 4 to enter into “Ask the Boss” on WormBoss.
- Record the key points from the WormBoss report below.

Name/property:

DRENCH RESISTANCE TESTING

Drench resistance

Time: 30 minutes

Resources	Checklist
Whiteboard or butchers paper	
Whiteboard pens	
OHP/power point presentation and equipment	
Copies of NSW DPI Agnote DAI/87 Sheep Worm Control and Drench Resistance – No Worries? (find on NSW DPI website)	

Purpose

1. To give students an understanding of drench resistance and the factors that can influence its development.
2. To give students an understanding of the development and prevalence of drench resistance in Australia.
3. To give students an understanding of drench resistance testing.

Suggested approach

- Explain the definition of drench resistance and why this level of efficacy is important. PPT 29
- Explain what factors can influence the rate of development of drench resistance. PPT 30
- Explain the development and prevalence of drench resistance in Australia. PPT 31
 - Use the NSW DPI Agnote DAI/87 Sheep Worm Control and Drench Resistance – No Worries? to explain in more detail.
- Explain importance and method of drench resistance testing. PPT 32

DRENCH RESISTANCE TESTING

Exercise 3—Setting up a drench resistance test (using an FECRT)

Time: 2 hours

Resources	Checklist
Transport to property if required	
Access to sheep yards	
A mob of sheep (minimum of 10 per drench type plus an undrenched control group) older than 12 weeks of age but under 6 months with an egg count >300epg	
A selection of drench types to be tested	
Drench gun and pack or appropriate volume syringes	
Measuring glass	
Sheep weighing scales	
Sheep tags with a different colour for each drench group and tag applicator	
Spray mark with a different colour for each drench group	
Suitable containers for faeces	
Surgical gloves	
60ml volumetric container	
Scales to weigh 2g samples or volumetric container	
Spatula for mixing samples	
Mixing bowl	
Small strainer	
Pipette or small syringe	
Saturated salt solution	
Compound microscope x4 objective and x10 eyepiece	
Worm egg counting slide	
Fresh water	
Paper towel	
Buckets for waste and rinsing if required	
Pens	
Handouts with instructions for setting up a FECRT	
Copies of an example report from a previous FECRT	
Copies of Exercise 3 work sheet	

Purpose

1. To give students an understanding of how to set up a drench resistance test using a Faecal Egg Count Reduction Test (FECRT).
2. To give students an understanding of how to interpret the results of a FECRT.

DRENCH RESISTANCE TESTING

Suggested approach

- *Trainers need to have access to a property with sheep. For the purposes of this demonstration the sheep can have a worm count of less than 300 epg.*
- Outline and demonstrate the procedure for constructing a FECRT. PPT 33–35 or handouts for onsite instructions.
 - Trainer should demonstrate correct drenching technique.
 - Trainer may also allow students to practice correct drenching technique.
- Demonstrate how to collect samples and if required fill out appropriate paperwork. PPT 36
 - Trainer may also allow students to practice collecting dung samples.
- Explain to students how to interpret the results. PPT 37 or handouts for onsite instructions.
 - Use example report from a previous FECRT.
- Students to complete calculations using example figures on work sheet 3.
- After students have recorded their answers, ask some of them to share their answers and discuss.
- *Trainer may wish to undertake more examples if deemed necessary for the group.*

DRENCH RESISTANCE TESTING

Exercise 3 work sheet

Name/Property:

1. Using the information provided below complete the calculations for a FECRT.

- Control group = 500 epg
- Drench 1 = 10 epg
- Drench 2 = 25 epg
- Drench 3 = 100 epg

$$\% \text{ efficacy} = (\text{control} - \text{treatment}) / \text{control} \times 100$$

Drench 1: % efficacy =

Workings:

Drench 2: % efficacy =

Workings:

Drench 3: % efficacy =

Workings:

Resources

Equipment supplies

Microscopes

Australian Instrument Services Pty Ltd
2/21 Stud Road
Bayswater VIC 3153
Phone: 1800 625 008
Web Address: www.ausinst.com.au

AIS – MIDO FL Objective 4x10x40x, Eye piece 10x

Slide Supplier

JA Whitlock
PO Box 51
EASTWOOD NSW 2122
Phone: (02) 9638 1142
Web Address: www.whitlock.com.au

Learning Material

'Collecting the Sample" CD
Rob Woodgate B.Sc. B.V.M.S.(Hons) Ph.D.
Veterinary Officer — Albany
Department of Agriculture and Food, Western Australia
WormBoss National Project Leader
www.wormboss.com.au for the latest about sheep worm control
Ph: (0429) 66 33 41

"Wormboss" CD
Rob Woodgate B.Sc. B.V.M.S.(Hons) Ph.D.
Veterinary Officer — Albany
Department of Agriculture and Food, Western Australia
WormBoss National Project Leader
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Ph: (0429) 66 33 41

General

Fecpac International
Web Address: www.fecpac.com

Ocean Systems
Web Address: www.oceansys.net

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Ph: 0429 663 341
WormBoss CD