

LiceSense

get up to scratch



Australian Wool
Innovation Limited

CONTENTS	2
INTRODUCTION	3
Set your goal for lice – sustained eradication or intermittent cost effective control	4
1. FIND LICE EARLY - BEFORE YOU TREAT	
a. Look for lice	5
b. Rubbing without finding lice	5
2. PLAN YOUR FLOCK PROTECTION - BEFORE YOU TREAT	
a. Know the risk of lice from introductions	6
b. Develop a flock protection plan	7-8
c. Form a local lice group	9
3. KNOW WHEN IT IS COST EFFECTIVE TO TREAT	10
4. PLAN A SUCCESSFUL TREATMENT - BEFORE YOU TREAT	
a. Know the risk of a treatment failure	11
b. Plan if not treating all sheep	12
c. Use the right chemical treatment	13
d. Manage chemical resistant lice	14
e. Apply the treatment correctly	15
• Dipping contacts	16
• Plunge dip for saturation	17
• Shower dip for saturation	18
• Backline for even dose delivery	19
CONTROLLING LICE IN LONG WOOL	20
REMEMBER RESIDUES	21
DIAZINON WET DIP ALTERNATIVES	21
WHAT IF THE FLOCK REMAINS INFESTED?	22
EXTRA INFORMATION	23

Introduction

LiceSense is a woolgrowers' guide to managing sheep lice in response to spreading lice infestations in all states. Sheep lice are an insidious and costly pest so it is important to find them early to reduce their impact.

Lice management best practice hasn't changed for decades. There may be some new lice chemicals, bans on old chemicals and spreading chemical resistance, but the management principles remain the same.

LiceSense is produced by Australian Wool Innovation.



This **LiceSense** guide is a refresher for lice management principles, which are:

1. Find lice early.
2. Plan your flock protection.
3. Know the costs and gains.
4. Plan a successful treatment:
 - a. Know the risk of treatment failure.
 - b. Plan if not treating all sheep.
 - c. Use the right chemical.
 - d. Manage chemical resistance.
 - e. Apply the treatment correctly.

The **LiceSense** guide doesn't cover all the details of lice management, so growers should consider attending lice training days and seeking advice when planning flock protection and treatment. For more information on training, contact Australian Wool Innovation on 1800 070 099. For more information on lice management, visit Australian Wool Innovation's LiceBoss website at www.wool.com/Grow_LiceBoss.

Set your goal for lice

Sustained eradication or intermittent cost effective control

Lice reinfestation comes from introduced sheep or lice surviving a failed treatment.

What is the likelihood of reinfestation from:		HIGH RISK	MODERATE RISK	VERY LOW RISK
a. Risky introductions?	purchased sheep			
	agisted sheep			
	stray sheep			
b. Failed treatments?	missed muster/s			
	lambing or lamed ewes			
	split shearing			
	incorrect chemical dose			
	incorrect chemical application			
	chemical resistance			
Goal for lice management		Control	Control	Eradication
Can you reduce all these risks? See flock protection planning (pages 6 - 9) and Planning a successful treatment (pages 11- 19)		If risks can be lowered, consider eradication	If risks can be lowered, consider eradication	

Local lice groups form when it is difficult for neighbours to stop straying sheep (e.g. expense, waterways, public roads) and they are sick of yearly lice control. Removing lice together may be easier than stopping sheep. If eradication is too difficult, local flock protection plans can help protect those that do eradicate (**page 7**).

1. Find lice early

a. Look for lice

Lice are 1-2mm long, have a red-brown head and pale or striped body.

Catching sheep to find lice:

- Get your glasses.
- In a mob look at the sheep's side for pulled wool.
- Watch for rubbing and biting.
- Catch at least 10 suspect sheep.
- Inspect those suspect sheep by at least 10 fleece partings per side.
- Finding one louse means a lice infestation.
- There is an increased chance of finding lice by inspecting more sheep.

How to do fleece partings:

- Use good light.
- Put your reading glasses on.
- Get a magnifying glass.
- Lay the sheep on its side.
- Make 10x10cm long parts in the wool on the sides from neck, to shoulder, to mid side, then flank.
- Look down near the skin as lice avoid light.
- Turn the sheep over and do the other side.

b. Rubbing without finding lice

Use the www.wool.com/Grow_LiceBoss under **Rubbing** to estimate the chances of different reasons for rubbing

Other causes of rubbing?

- Grass seeds, itchmite, wool break, fleece shedding breeds, brush rub (bracken, scrub country, other vegetation), photosensitivity, fly strike, dermo and exotic diseases
- Sucking lice are larger than sheep lice and are a bluish colour
- Itchmite cannot be seen with the naked eye and are killed by macrocyclic lactone drenches (e.g. ivermectin)

Find information sheets at www.wool.com/Grow_LiceBoss

The growth stages of Lice:



James 1997

2. Plan your flock protection

a. Know the risks of lice from introductions

RISK	EXTREME LICE RISK	HIGH LICE RISK	MODERATE LICE RISK	LOW LICE RISK
Lice history	Never looked for lice. Had lice in last 2 years	Never looked for lice. Doesn't suspect lice this year	Sometimes looks for lice. Doesn't suspect lice	Frequently and regularly looks for lice. No lice found
Fences	Poor fences	Poor fences	Poor fences	Good fences
Neighbours	Have lice and lice common in district	Have had lice	Have had lice	Don't have lice
Lice treatments	Unknown lice treatment history	Treat every year or treat in long wool	Treat every year	None for 2 years
Purchases/ Sales	Sheep dealing	Purchases many classes of stock	Purchases many classes of stock	Closed flock. Provides a Sheep Health Statement for lice
Strays	Has had strays. Does not use a stray sheep policy	Has had strays. Uses a stray sheep policy	Can have strays. Uses a stray sheep policy	No strays
Other risks	Split shearing Cross bred lambs Unable to clean muster Missing sheep			There is always some risk with introducing stock or stock movements

www.wool.com/Grow_LiceBoss has information sheets on flock protection.

2. Plan your flock protection

b. Develop a flock protection plan

	DONE	WHY DO IT?
1. DECIDE WHAT IS POSSIBLE		
Decide which sheep you will let in and which are banned		Influences the choice of eradication or control
Can you get a Sheep Health Statement and lice treatment history for the last 2 years?		Influences the choice of eradication or control
Have you somewhere to isolate mobs for 3 to 6 months?		Influences the choice of eradication or control
Can you afford to maintain stock proof fences?		Influences the choice of eradication or control
2. BRINGING IN NEW SHEEP		
Look for likely suspects (rubbing, biting, pulled wool)		Greater odds of finding lice on rubbing sheep
Catch and inspect at least 10 suspect sheep on arrival		Greater odds of finding lice the more you inspect
If in less than 6 weeks wool, treat or isolate for more than three months		Greater odds of finding lice as lice multiply
If in greater than 6 weeks wool, shear early and treat for eradication or isolate for more than 3 months or until shearing		Greater odds of finding lice as lice multiply
Look and watch for suspects at least every 2 to 4 weeks		Rubbing will appear over time
3. DEAL WITH STRAYS		
Follow the neighbour agreed plan for stray sheep, or if you have no plan, isolate the strays and talk to your neighbour. (see page 9)		Flock protection
Inspect the strays for lice		Inspection results help decision making

2. Plan your flock protection

b. Develop a flock protection plan

	DONE	WHY DO IT?
4. DEAL WITH OTHER RISKS		
Run clean sheep through yards before suspect sheep. Avoid possibly contaminated yards/sheds for 4 weeks.		Lice have been found alive up to 3 weeks after yard use
If you have handled lousy sheep, change clothes before handling clean ones. Microwave or freeze shearers' moccasins if lousy sheep have been handled within the last 10 days		Lice easily transfer to clothing or shearers' moccasins
Clean muster/treat all sheep (all breeds, all classes)		Avoid reinfestation
Maintain fences (boundary and internal)		Avoid reinfestation
Plan for lambing ewe treatment, missed musters, necessary split shearings		Avoid reinfestation
5. KNOW YOU DON'T HAVE LICE		
Only after isolation and monthly checking of the suspect sheep/mob for 3 - 6 months		Lice build up over 3 months. Sheep start rubbing with 100 lice (60% chance of finding lice on inspection). It may take 6 months before there is 100% chance of finding lice in a light infestation

2. Plan your flock protection

c. Form a local lice group

	DONE	WHY DO IT?
1. SETTING UP		
Work out why neighbours might work together		Group goals increase success
Meet with locals using an existing network, e.g. footrot, fox baiting, Landcare		Tests the degree of support and taps into existing common ground
Choose a workable group size		If too big, communication is difficult
Define the group and sub-group boundaries on a map		Need a sound lice/sheep barrier
Find a willing facilitator – rural agent or merchandiser, woolbroker, government staff or paid consultant		A driver with independence from neighbourhood
Reality check, then secure individual commitments to the group		Will we just get lice back again?
2. STARTING OUT		
Get technical advice		Make the right decisions
Share information: fencing, isolation areas, introduced and stray sheep protocols, who has lice or suspects lice, who can eradicate, treatment failures, etc.		Helps planning, e.g. the potential to share a common contractor, determining the risk of chemical resistance
3. USE A PLAN		
Use maps and put actions in writing and update it		Helps to keep commitment
Use a facilitator for ongoing meetings and coordination		A driver with independence from neighbourhood


3. Know the costs

Know when it is cost effective to treat

PLAN THE COST OF LICE	
1. What is the lost income if you don't control lice?	<ul style="list-style-type: none">• Reduced clean and greasy fleece weight and price per kg.• The loss depends on the number of lice on the sheep, the number of sheep with lice and the time till shearing. Find information sheets at www.wool.com/Grow_LiceBoss
2. Confirm you have lice before you treat after shearing	<ul style="list-style-type: none">• Use the www.wool.com/Grow_LiceBoss under Short wool lice control tool to assess whether sheep should be treated<ul style="list-style-type: none">-Were lice present at last shearing but not eradicated?-Did lice enter with stock?
3. Plan the cost of eradicating after shearing	<ul style="list-style-type: none">• If you cannot achieve ongoing flock protection, rethink if eradication will be cost effective
4. Plan control in long wool	<ul style="list-style-type: none">• Use the www.wool.com/Grow_LiceBoss under Long wool lice control tool to calculate the lost fleece value and treatment cost. The tool reports the costs of different types of treatments, of doing nothing and of bringing shearing forward
5. Time sheep sales and wool harvesting to avoid treatment withholding periods	<ul style="list-style-type: none">• Always check the wool harvesting interval, meat withholding period and export slaughter interval on treatment labels or on the Flyboss products tool at www.wool.com/Grow_LiceBoss

4. Plan a successful treatment

a. Know the risks of a treatment failure

TYPES OF TREATMENT FAILURE	EVIDENCE (A GUIDE ONLY)	CAUSE	YES	NO
Resistance of lice to products used	<ul style="list-style-type: none"> At least 10% of sheep lousy in most mobs Lousy sheep have less than 8 months wool when first rubbing 	<ul style="list-style-type: none"> Synthetic pyrethroid (SP) resistance is widespread 		
		<ul style="list-style-type: none"> Triflumuron and Diflubenzuron resistance is spreading 		
		<ul style="list-style-type: none"> Yearly use of the same chemical family 		
Not treating all sheep or a new infestation from strays or introduced sheep	<ul style="list-style-type: none"> Only see a few lousy sheep in only one or a few mobs If infestation is introduced some time after shearing, lousy sheep have more than 8 months wool when first rubbing 	<ul style="list-style-type: none"> Missed muster, strays or introductions 		
		<ul style="list-style-type: none"> Lambing/lambd ewes treated 		
		<ul style="list-style-type: none"> Split shearing 		
Ineffective dose or application on some sheep or on the whole flock	<ul style="list-style-type: none"> Only see a few lousy sheep but they could be in all treated mobs Lousy sheep have 5 to 8 months wool when first rubbing 	<ul style="list-style-type: none"> Use the www.wool.com/Grow_LiceBoss under Treatment assessment tool to identify a poor treatment 		

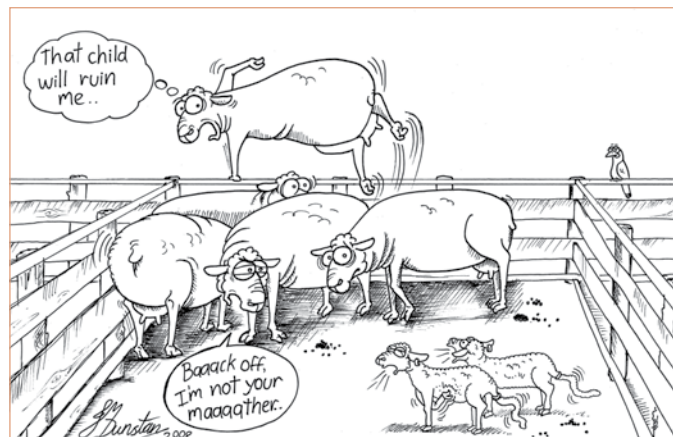
4. Plan a successful treatment

b. Plan if not treating all sheep

- Lice are difficult to eradicate unless you treat all sheep at the same time.
- Plan grazing and yard use to isolate treated from untreated mobs when you have split shearings, lambing ewes or lambs at foot or prime lambs for sale that will not be treated.
- Plan isolation of treated sheep according to the advice on the label of instant kill or prolonged protection treatments.
- Lambing or lambed ewe scenarios affect product and application options.

The following factors should be considered in managing your sheep:

1. Time to lambing.
2. Time to ewe shearing.
3. Age of lamb (wool growth of lamb).
4. Time to lamb shearing.



5. Wool harvesting interval, meat withholding interval and export slaughter intervals for ewes and lambs.
6. Animal welfare considerations of pregnant ewe and lamb treatment.

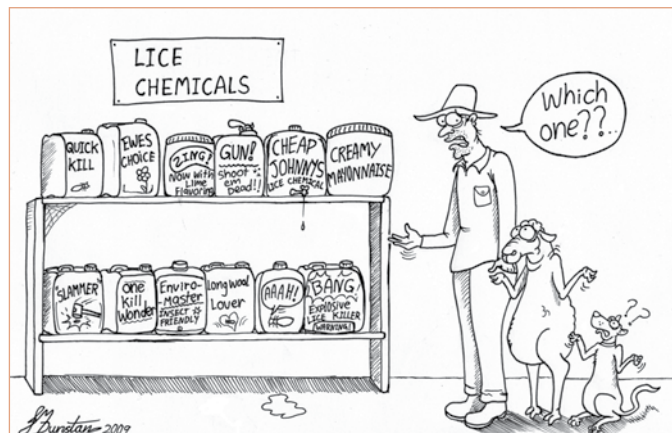
Use the www.wool.com/Grow_LiceBoss under **Ewe-lamb treatments** tool for treatment options.

4. Plan a successful treatment

c. Use the right chemical treatment

Seek help to weigh up the advantages and disadvantages of different products:

- Likelihood of resistance (**page 11**).
- Resistance management by product rotation and method of application (**page 14**).
- Suitability for different methods of application.
- Animal welfare considerations (e.g. dipping).
- Speed of product kill.
- Duration of protection.
- Product wool harvesting interval, international wool residue levels (e.g. EU Eco-label), meat withholding period and export slaughter interval.
- Product rain fastness.
- Dual action for blowflies.
- Occupational Health & Safety needs of operators. (application and exposure).



The www.wool.com/Grow_LiceBoss has most product options and is intermittently updated for products. Seek advice as new products are released.

4. Plan a successful treatment

d. Manage chemical resistant lice

Resistance to synthetic pyrethroids is widespread. Resistance to insect growth regulators is spreading.

If you suspect resistance:

1. Discuss with the chemical manufacturer opportunities for investigating chemical resistance using a laboratory test from NSW and Qld primary industry government agencies.
2. Report the suspected resistance to the Australian Pesticides and Veterinary Medicines Authority adverse experience website:
<https://services.apvma.gov.au/AerpWebApp/>
3. If you have Insect Growth Regulator (IGR) resistant lice don't use another IGR. All Triflumuron and Diflubenzuron IGR products belong to the same chemical family and are cross resistant. Resistance to one IGR brand name means resistance to all the other IGRs.
4. If you have Synthetic Pyrethroid (SP) resistant lice, don't use another SP. All SP products belong to the same chemical family. Resistance to one SP brand name means resistance to all the other SPs.

To delay resistance:

1. Use a different chemical family to the one used at the last treatment.
2. Ask an advisor or look at www.wool.com/Grow_LiceBoss for products listed by chemical family.
3. Get a lethal dose to susceptible lice by applying the treatment correctly (**pages 15 – 19**).

Look for www.wool.com/Grow_LiceBoss information sheets on resistance.



NSW DPI

4. Plan a successful treatment

e. Apply the treatment correctly

Under-dosing sheep wastes money spent on chemical and labour, so apply the treatment correctly.

Application for eradication or control:

- Plunge dipping is the method recommended for eradication because it is easiest to get the fleece saturated with the product.
- Shower dipping for eradication must get fleece saturation to be effective.
- Backliners (either high or low volumes), can be hard to get the correct dose on the right part of the sheep.
- Hand jetting does not get a good enough fleece saturation for eradication and is used only for lice control until a treatment can be done after shearing.

www.wool.com/Grow_LiceBoss has information sheets on plunge and shower dipping, backlining and hand jetting.

Follow occupational health and safety instructions on the label and read the information sheets on safety at:

www.wool.com/Grow_LiceBoss



4. Plan a successful treatment

Dipping contacts (correct as at August 2011)

WESTERN AUSTRALIA					
Brendan Chipp	0428 777 907	Gus McKay	0409 101 688	Mark Ward	08 9681 1390
Ronald Reeve	08 9777 1249	Peter Longmuir	08 9684 1058	Brad Earl	0427 574 546
Graham Slade	08 9064 7398	Eric Webb	08 9841 3057	Anthony Long	0427 920 350
Andrew Biddulph	08 9847 2087	Aaron Piper	0428 364 395	Sam White	08 9076 7095
Doug McLeod	0428 282 068	Dennis Knill	0428 711 747	Temby White	08 9834 1045
John Morgan	08 9641 2163	Mark Faidough	08 9643 1049		
Ken Sprigg (Hire)	08 9767 1248	Bryan Trezona (Hire)	08 9825 1114		
VICTORIA					
David Pannan	0418 584 308	Greg Richards	0408 539 473	Trevor Edson	0438 117 151
Mick McLoughlan	0417 013 598				
NEW SOUTH WALES					
Phil King	0428 677 100	R G Adams	02 6862 5200	Peak Hill Industries (Purchase)	1800 65 99 96
SOUTH AUSTRALIA					
Peter Jacka	08 8587 4117	Gary Kuhl	0429 446 790	Mick Kessel	08 8626 6905

Livestock Contractors Association Dipping Rep.:

Phil King

Ph: 0428 677 100

www.livestockcontractors.com/pages/contact-us.php.

4. Plan a successful treatment

How to - plunge dip for saturation

	DONE	WHY DO IT?
1. CHOOSING METHOD		
Plunge dip with a 9 metre swim length		Aids skin saturation
Choose between a mobile contractor or your own dip		Costs versus risk of failure
2. PREPARING DIP WASH		
Measure the volume of water		Correct dosing
Calculate chemical volume as directed by label		Correct dosing
Premix chemical with 20 times its volume in water (e.g. 20L bucket)		Aids even mixing
Pour premixed chemical along length of dip		Aids even mixing
Mix dip with a paddle/hoe/fire pump/circulating pump		Aids even mixing
3. SHEEP HANDLING		
Clean muster - dip all eligible sheep 2 to 6 weeks after shearing		Avoid reinfestation
Avoid dip overcrowding and dunk each sheep twice		Aids skin saturation
Don't hold wet sheep in yards		Avoids disease spread
4. DIP WASH QUALITY		
Don't drain sheep too long in draining pen and occasionally clean entry race		Avoids fouling dip wash
Follow label directions for reinforcing or topping up and dipping out		Correct dosing
Clean out dip at the end of each day or after a total of one sheep for every two litres of initial dip capacity. Allow dip to dry out over night		Avoids disease spread and chemical binding to the sludge

4. Plan a successful treatment

How to - shower dip for saturation

	DONE	WHY DO IT?
1. PREPARING THE DIP WASH		
Know volume of the sump/supply tank, calculate chemical volume as per the label		Correct dosing
Premix chemical with 20 times its volume in water (e.g. 20L bucket)		Aids even mixing
Add premixed chemical to sump/tank, mix with pump/fire pump or run dip for 3 mins		Aids even mixing
Pump pressure at least 142 kPa, 2 litres/min through nozzles		Aids skin saturation
Check top rotating arm is centred, level and greased - 5 RPM		Aids skin saturation
2. SHEEP HANDLING		
Clean muster - dip all eligible sheep 2 to 6 weeks after shearing		Avoid reinfestation
Avoid overcrowding		Aids skin saturation
Set constant replenishment tank valve		Keep sump level full
Shower for 12 minutes		Aids skin saturation
Don't hold wet sheep in yards		Avoids disease spread
3. DIP WASH QUALITY		
Don't over-drain sheep in draining pens and occasionally clean entry race		Avoids fouling dip wash
Follow label directions for reinforcing or topping up and dipping out		Correct dosing
Prepare a new dip wash each day		Avoids disease spread and chemical binding

4. Plan a successful treatment

How to - backline for even dose delivery

	DONE	WHY DO IT?
1. CHOOSING METHOD		
Use the recommended applicator		Correct dose delivery
2. SHEEP HANDLING		
Clean muster – shear and treat all eligible sheep at the same time		Avoid reinfestation
Plan treatments for lambing ewes or ewes with lambs at foot		Avoid reinfestation by lambs
No wool tufts left on badly shorn sheep		Lice can avoid chemical in longer wool
No 'dermo' or 'lumpy wool' (dermatitis)		Lice can avoid chemical in longer wool
3. PREPARING THE TREATMENT		
Mix thoroughly		Correct dosing
Dose for the heaviest sheep – weigh sheep		No under-dosing heavy sheep
Check applicator is in good working order		Correct dosing
Check the correct dose is delivered		Correct dosing
4. APPLYING THE TREATMENT		
Apply according to the picture on the label – parallel to or along midline (depending on product) and from poll to tail		Correct dosing for head, shoulders, sides, flanks, rump, tail

Controlling lice in long wool

Long wool treatments don't eradicate lice, they only control lice.

Hand jetting:

- Only a stop-gap measure to minimise damage in long wool before shearing.
- A thorough off-shears or short wool treatment must be applied after shearing to achieve eradication.

Long wool treatment:

- Used for sheep with over 6 weeks wool or lambs with over 3 months.
- Doesn't eradicate lice so an off-shears treatment will be needed.
- www.wool.com/Grow_LiceBoss under **Long wool lice control** tool compares the lost income with the costs of treatment and an early shearing and lists most treatments.

Lambs:

- Wool length and withholding periods limit the product treatment options.
- Get help to identify the treatment scenarios and assess the match with product withholding periods and the property sales schedule.



Remember residues

Use the www.wool.com/Grow_LiceBoss under **WoolRes module** to calculate the wool residue status for European Eco-label and the **Products tool** which lists wool handling intervals, meat withholding periods and export slaughter intervals. www.wool.com/Grow_LiceBoss also has information sheets on residues.

Diazinon wet dip alternatives

Diazinon wet dip is now only for use by an Australian Pesticides and Veterinary Medicines Authority approved submersible cage dip contractor permit holder.

Alternative chemical treatments (without known emerging, spreading or widespread resistance)

- Imidacloprid pour on.
- Spinosad dip, hand jetting fluid or pour on.
- Ivermectin hand jetting fluid.
- Organophosphate.
 - Diazinon spray on
 - Temephos dip
- Magnesium fluorosilicate dip.
- Keep watch for new chemicals entering the market and get advice for suitability as a diazinon wet dip alternative.



See **pages 13 – 14** to help choose your diazinon alternative.

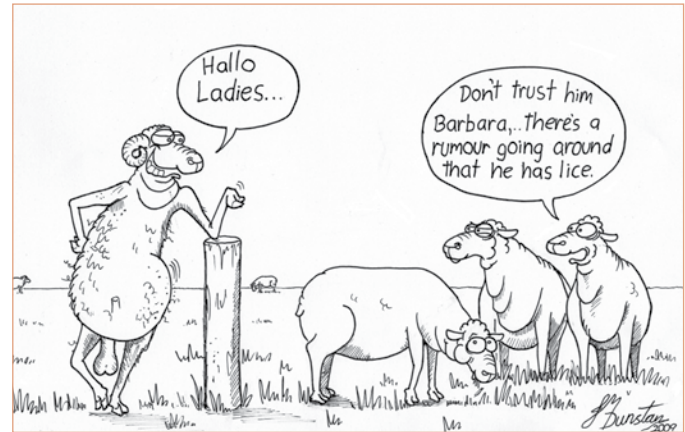
See www.wool.com/Grow_LiceBoss for a diazinon information sheet.

What if the flock remains infested?

Most people struggle to eradicate lice from their flock in one year.

1. Find out what went wrong with the flock protection plan or the treatment.
2. Find out what to do to salvage the wool clip in the short term.
3. Find out how to improve the flock protection plan and the next treatment.
4. Reconsider the resources needed to implement the plan.
5. Seek advice.

If intermittent cost effective lice control is chosen instead of eradication, a flock protection plan is still needed to make the most from the chemical treatments used and to avoid resistance development.



Extra information

Access sources of information

1. Attend a lice training day.
2. Chemical manufacturer sites for essential label and safety information and some provide product choice and lice information.
3. Other sources of information include:

SOURCE	WEB ADDRESS	CONTACT	PHONE	MOBILE
Australian Wool Innovation's LiceBoss	www.wool.com/Grow_LiceBoss			
Making More From Sheep Module 11. Healthy and Contented Sheep	www.makingmorefromsheep.com.au/healthy-contented-sheep/index.htm			
Queensland Government Primary Industries and Fisheries	www2.dpi.qld.gov.au/sheep/10042.html		13 25 23 (cost of a local call within Qld) or 07 3404 6999	
NSW Primary Industries	www.dpi.nsw.gov.au/agriculture/livestock/sheep/health/sheep-lice	Gemma Turnbull	02 6872 2077	
NSW Livestock Health and Pest Authorities	www.lhpa.org.au/contact			
Department of Food and Agriculture WA	www.agric.wa.gov.au	Jenny Cotter	08 9892 8444	
Victorian Department of Primary Industries	www.new.dpi.vic.gov.au/agriculture/beef-and-sheep/sheep	Linda Fahy	136 186 (cost of a local call) or 03 5336 6856	
Primary Industries and Resources SA	www.pir.sa.gov.au/livestock/sheep	Kym Hebbberman	08 8762 9149	
Tasmanian Institute of Agricultural Research	www.tiar.tas.edu.au/extensive/sheepconnect	Andrew Bailey		0408 129 373
		Catriona Nicholls		0427 571 199



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