

Why control sheep lice?

Economic effects of lice on production

Peter James

Department of Primary Industries and Fisheries, Queensland

Sheep lice are one of the three main parasite diseases of sheep in Australia. They have a significant economic impact on the sheep industry, both in lost production and costs of control (Sackett *et al.* 2006). Below is a brief summary of information available on the effects of lice on fleece and body characters.



Wool damage from lice in a heavily infested mob

Fleece value

Wilkinson *et al.* (1982) in Western Australia found a reduction in fleece value per head in a flock with 25 micron wool valued at 240c/kg clean ranging from \$0.72 for light infestation to \$1.92 for heavy infestation.

At prices for May 2007, for light – heavy infestations this translates to:

18 μ wool @ 1200c/kg	= \$3.60 - \$9.60 per head
20 μ @ 1000c/kg	= \$3.00 - \$8.00 per head
22 μ @ 950c/kg	= \$2.85 - \$7.60 per head
24 μ @ 800c/kg clean	= \$2.40 - \$6.40 per head

(NB: The above estimates assume that lice devalue different micron wools to equivalent degrees.)

Niven and Pritchard (1985) reported a reduction in wool value per head of up to 30% from lice in Queensland. Elliott *et al.* (1986), who introduced a lousy sheep into a mob of sheep with 9 months wool in Tasmania, found reductions of fleece value of up to 31% and 38% in years 2 and 3, once the infestation had established, but notably no measurable loss at the first shearing. In the study of Cleland *et al.* (1989) at Minnipa in South Australia, two moderately infested sheep were introduced to a flock of 50 clean sheep, the lice allowed to spread naturally and the sheep shorn at 20 weeks and 72 weeks after introduction of the infested animals. There was no measurable loss at the first shearing but an average reduction in fleece value of 13% at the 72 week shearing.

Greasy fleece weight

Most studies show a reduction in greasy fleece weight from lice. Wilkinson *et al.* (1982) found a reduction of 0.2 to 0.9 kg reduction in a study repeated in 3 years (Table 1) and Niven and Pritchard (1985) found a reduction of from 0.4 to 1.1 kg depending on level of infestation. Elliott *et al.* (1986). and Cleland *et al.* (1989) in the later years of their studies found reductions from 0.3 to 0.9 kg and 0.35 kg, respectively. Kettle and Lukies (1982a) in New Zealand found no significant effect on greasy fleece weight, but the mean yield was slightly lower in infested sheep. The New Zealand studies were conducted with Border Leicester x Romney cross ewes, not Merinos.

Table 1. Effect of lice on greasy fleece weight (from Wilkinson *et al.* 1982)

Year	Level of louse infestation				
	No lice	Very light	Light	Med	Heavy
Yr1	5.1		4.9	4.7	4.5
Yr2	5.7		5.8	5.5	5.6
Yr3	4.5	3.6	4.1		3.8

Clean fleece weight

Most studies where clean fleece weight has been measured show reductions resulting from lice. Wilkinson *et al.* (1982) found a decrease of 0.3 - 0.8 kg (Table 2). Niven and Pritchard (1985) found a reduction of 0.3 to 0.9 kg, and Cleland *et al.* (1989) a reduction of 0.7 kg.

Table 2. Effect of lice on clean fleece weight (from Wilkinson *et al.* 1982)

Year	Level of louse infestation				
	None	Very light	Light	Medium	Heavy
Yr1	3.4	-	3.1	3.0	2.8
Yr2	3.9	-	3.6	3.5	3.5
Yr3	3.2	2.4	2.6		2.4

Fibre diameter

Lice have no effect on fibre diameter (Wilkinson *et al.* 1982, Niven and Pritchard 1985, Cleland *et al.* 1989). Below are the figures from the study of Wilkinson *et al.* (1982).

Table 3. Effect of lice infestation on fibre diameter (from Wilkinson *et al.* 1982)

Year	Level of louse infestation				
	None	Very light	Light	Medium	Heavy
Yr1s	24.9µ		24.7µ	24.3µ	25.0µ
Yr2	24.4µ		24.7µ	25.5µ	25.5µ
Yr3	24.6µ	25.0µ	24.9µ		24.4µ

Yield

Niven and Pritchard (1985) found yields of 74% for sheep with light lice, 72% for sheep with medium lice and 68% for sheep with heavy lice.

Reductions were generally about 4% to 5% in the study of Wilkinson *et al.* (1982). The decrease in the different groups can be calculated from Tables 1 and 2 above. Kettle and Lukies (1982a) found a reduction of 2.6% and the reduction was 6% in the study of Cleland *et al.* (1989)

Colour

Kettle and Lukies (1982b) objectively measured colour (yellowness and brightness) in 7 trials using a reflectance colourimeter:

- In 7/7 trials wool from the louse infested sheep was more yellow.
- In 6/7 trials the wool was less bright

Fibre length

Wilkinson *et al.* (1982) found that mean fibre length of the top was reduced by louse infestation. Cleland *et al.* (1989) found no significant effect on the staple length measured in raw wool.

Staple strength

Sheep with low lice numbers produced significantly more sound fleece wool (3.0 vs 1.7 kg/head) and less cast wool (0.1 vs 0.4 kg/head) than moderately to heavily infested animals (Niven and Pritchard 1985).

Tasmanian Dept of Agric studies quoted by Hansford (1987) found a reduction from 41 N/Ktex in control sheep to 34 N/Ktex in infested sheep, but noted that this was unlikely to be statistically significant. Cleland *et al.* (1989) found no significant effect on staple strength.

Processing

Lipson and Bacon Hall (1976) and Wilkinson *et al.* (1982), report studies from the same group of sheep in which they found that louse infestation:

- Reduced top yield
- Reduced the mean fibre length of the top
- Increased carding loss
- Increased noil (short broken fibres removed during combing of the carded wool into top)

Lice had no effect on the fibre diameter of top wool or of the number of neps (knotted fibres).

Table 4. Effect of lice on wool processing performance (Wilkinson *et al.* 1982)

	Level of louse infestation				
	No lice	Very light	Light	Medium	Heavy
Scouring yield (%)	66.8	68.6	63.0	62.0	62.6
Card loss (%)	9.8	10.9	12.3	12.4	13.3
Noil (%)	4.1	3.4	4.8	5.2	5.4
Top and noil yield (%)	60.5	61.4	55.7	53.7	53.3
Mean fibre length of top wool	8.3	7.4	7.7	7.7	7.2

Body weight and reproduction

Wilkinson *et al.* (1982), Niven and Pritchard (1985), Kettle and Lukies (1982a) and Kettle and Pearce (1974) all found that lice had no effect on body weight.

Kettle and Lukies (1982a) found that lice had no effect on lambing percentage or lamb growth rate. However, sheep with low weight gains because of poor nutrition or other stress may be more susceptible to lice and develop heavier infestations (James *et al.* 1998).

Skin value

Louse infestation can cause a disorder known as 'cockle' in sheep skins manifest as small lumps or nodules that, among other effects, do not allow dye to be taken up evenly during tanning leaving the pelt with an unattractive appearance (Heath *et al.* 1995). This can lead to significant downgrading of high value skins. Although recognized as a significant problem in New Zealand, the importance of the problem in Australia is unclear.

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