

Some current sheep management strategies for low residue fly and lice control

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Summary

Many wool producers manage their enterprise to minimise chemical usage, and to produce wool with low levels of chemical residue, an increasingly valuable aspect of wool 'quality' to both processing customers and consumers. They do so through the use of a range of non-chemical fly and lice control measures, the majority of which relate to the 'fine tuning' of sheep and general farm management in response to seasonal and market conditions. Many of these strategies seek to take advantage of microclimatic and other characteristics specific to the individual farm. While the impact of any one strategy may be small, together they can have a significant effect not only on chemical residues, but also on the overall management plan and more specifically on fly and lice control.

Keywords

Flystrike, lice, sheep management, residues, Tasmania

Introduction

In Australia, flystrike has been an issue from the earliest days of the Merino, with Elizabeth Macarthur describing it as a problem in New South Wales before 1810 (Day and Jessup, 1984). However, a major change occurred in the 1880's which resulted in a fly problem of far greater severity. *Lucilia cuprina* (Diptera: *Calliphoridae*) developed into an obligate myiasis fly which first appeared in the Riverina region of NSW (Cameron, 1999). In order to combat this threat, practices such as mulesing, pizzle dropping, crutching and jetting were developed and adopted. However, each farm has its own unique sheep/fly ecosystem and the final decision on the most effective control measures for a specific farm is invariably a local compromise involving economics, labour, ethics, animal welfare, occupational health and safety, the requirements of other enterprises on the farm and the personal beliefs of the farmer. This 'farming systems' approach to fly control is required due to the potential for one management activity to be detrimental with respect to the objectives and outcomes of another.

Sheep lice were seldom mentioned in early Tasmania until after Sheep Scab was eradicated by compulsory dipping in the 1880s. When the dipping legislation was removed, lice appeared as an increasing problem, and compulsory dipping was re-introduced and remained in force for over fifty years. Lice were never completely eliminated, but properties which could prove they were lice-free were able to get a permit to avoid the treatment and to shear whenever they wished.

With the availability of the new synthetic chemicals in the 1950s, it was hoped to complete the eradication of lice, but resistance soon developed. The situation now has many Tasmanian properties attempting to maintain a lice-free status without the need to treat, and others who try to minimise chemical usage.

This paper presents a wide range of management strategies used by Tasmanian wool producers to combat lice and flystrike problems without sole reliance on chemical control. Some of the methods may have only been mentioned by one interviewee, while others may be in widespread use. This paper collates some **examples** of the range of strategies mentioned in relation to each specific situation. It is not a statistical summary, and therefore the participant's own words are used to describe the various management practices adopted. Inclusion is not intended as an endorsement of any particular strategy, but to assist with the development of an integrated control system for lice and for flies.

Method

Sixty (60) sheep properties in Tasmania were included in a study of flystrike management (Horton and Champion, 2001). Lice management was included in the investigation because the chemical treatments used for lice control in many cases also affect flies and contribute to wool residues.

On each property, the individual (either property owner or manager) directly responsible for sheep management was interviewed through a semi-structured interview process to gain an overview of the sheep husbandry practices on that property. These interviews generally took place face-to-face on the property, although two were carried out by telephone. Interviews took approximately an hour to complete.

The study began with 24 properties in 1997. The initial interview schedule was modified as the interviewees suggested further topics that might be included. However, in most cases the information was provided without questioning as the participants described in their own words their sheep management strategies and rationale. Many un-prompted comments thus arose on management practices for fly and lice control and the reasons they were used in addition to the intended topics.

Further properties were included in each of the next two years to a final total of sixty. These interviews were carried out between 1998 and 2001. However, for the purposes of this paper, which does not include a quantitative analysis of practices, the use of a changing schedule was ignored and the data has been pooled. All interviews were fully transcribed using Microsoft Word 97[®]. The paragraphs were then transposed into a table format, and coded by subject. The coded quotations all related to current practice at the time of the interview, but usually formed part of a general description of their management practices and beliefs, rather than being in response to a particular question.

When each interview was completely coded, that data was combined into a single Microsoft Excel 97[®] spreadsheet. The subset of that data relating to fly and lice management forms the basis of this paper. The quotes in the results section have in some cases been edited to remove information which might identify the property or owner/manager. The content of the statements with respect to sheep, fly and lice management have not been altered in any way.

These quotations were sorted into subjects and used to generate the general headings used in the results section, rather than being applied to a pre-conceived set of topics. This was done as one means of reducing experimenter bias. It is emphasized that these strategies are examples only of the responses from the survey, and are not intended as criticism or endorsement of any method, but as a study of the range of management options being used in Tasmania in relation to lice and fly control. Selected quotations have been used as illustrations only.

Results - Flies

The farmers interviewed frequently mentioned the same flystrike control measures, although a constant throughout the interviews was that no single management practice alone was enough to deal with the problem. It was the integrated management plan that enabled success.

Long term planning for fly control

Some strategies suggested required a very long term plan over many years to have any effect. Flystrike susceptibility was generally considered less important than the wool quality for Tasmanian farmers, though some also tried to include a breeding plan towards a less fly-prone sheep.

"There's some breeds that you get too much suint in the wool, and they are more prone to fly."

Many did cull on factors seen as predisposing to flystrike such as dags or bad backs, and generally those who had persevered for some years felt that it was cost effective as they had very few to cull each year. However, for those only considering the option, the number that needed to be culled was generally seen as prohibitive.

"Any hoggets and that that have a lot of dags, we tend to cull for that."

"We don't get body strike because we've always culled for anything that has got dermo or bad backs or anything like that"

Fly traps have not been widely used in Tasmania, although some people have used various versions with varying degrees of success. However, there was considerable interest in the concept.

"I see a lot less with these traps. But it was very bad here. Very bad. It was worse here than the east coast."

The majority of wethers and many of the young sheep were shorn in spring so that they would be in short wool for the first fly season. However, wool strength, grass seed contamination, and the problems associated with ewes lambing in long wool and in getting the shearers of choice all affected the date of shearing. The quality of the shearers was considered vital for the prevention of injuries causing poor urine flow which were seen as putting the sheep at risk of flystrike for life.

"I am lucky with the quality of shearers I have had. We don't have any snips with the ewe and we don't have much urine stain on the wool."

Only five of the sixty properties in this study did not practice mulesing. The majority of participants had been mulesing for many years and did not really remember managing without the practice.

"I presume that the mulesing is important, because everyone tells me so. But I don't have any evidence. Since we don't have any un-mulesed lambs."

All of the properties in the study practiced tail docking. This was carried out with rings, cold knife or hot knife. Most of the farmers not docking with rings cited them as a source of flystrike, though rings were widely used for castration to avoid the empty scrotum being left as a potential strike site.

"And we used to use rings. It was amazing the number of sheep you get with just a bit of strike the size of a 50c piece on the tip of the tail. So now it is the knife."

Despite a wide awareness of the research that shows the limited importance of carcass strike on sheep strike, many farmers disagree and continue to seek out and destroy any dead stock. However, in Tasmania this is required by law for hydatid control, although in most areas the Tasmanian Devil (*Sarcophilus harrisii*) population was seen as high enough to dispose of most of the carcass overnight.

"I realise that dead carcasses are not initial fly strike, because they seem to be brown bombers. They are the ones that break the carcass down, but they create an environment for breeding. I am religious about picking up dead carcasses."

Medium term fly control strategies

Many of the strategies mentioned were part of their annual management plans.

The interviewees were all aware of the variation between classes of sheep in susceptibility to fly, and most nominated the weaners, two-tooths and rams as the most at risk. This information was used routinely to select grazing area, protective chemical treatment, frequency of checking, and the shearing and crutching regime.

"You have to watch the younger sheep. The wool is greasier or something, and that is what the flies like."

Interviewees were generally aware of the relative fly risk in each of their paddocks. The high risk paddocks were identified as those that were well watered, sheltered, and with improved pastures. The low risk paddocks were the high, windy, treeless areas, or the native pastures and bush runs.

"You don't get sheep flystruck on top of a hill. That's sort of windier and flies just don't go there. Certain paddocks are worse than others. Certain areas of paddocks more than anything else are worse than others."

Many farmers planned to graze the most 'at risk' stock away from the worst fly areas when conditions were expected to be most dangerous for fly. However, an inherent problem was that the stock most at risk were those in greatest need of the high quality nutrition available from the improved pasture areas and unfortunately those were seen to be the high risk areas. Some farmers identified paddocks that they did not use for sheep at all because of the high incidence of flystrike experienced there.

"It's a bad fly paddock so I don't put anything in there. Just cattle."

But flystrike risk was only one of many factors dictating paddock use.

"Most of my flystrike happens when I put them near the hawthorn hedges. But I've got no alternative. I have to use the paddocks."

"Well, usually over those months I have them in a paddock less inclined to be a fly paddock. But this particular year, because it has been so dry, I haven't had the luxury to be able to do that."

The Tasmanian 'bush run' was well understood by farmers to be an ecosystem of low fly risk. This is generally an upland area of native pasture with or without tree cover. The runs have seldom been fertilized, and are often rocky, with shallow soil and short tree growth. In current practice, the runs are a highly valued component of Tasmanian wool sheep properties. Wethers and mature ewes on the runs are well protected, have little dietary variation during the year, and are generally very healthy. They produce a high quality fleece with low management requirements.

"Well, our bush run, we have between a thousand or twelve hundred wethers out there all year, and they basically only get shorn once a year and left for the rest of the time and they don't seem to be suffering flystrike."

Crutching prior to high risk times was mentioned frequently as an option for many of the farmers in the survey as a means to decrease chemical application.

"The cost of chemical treatment for our sheep was probably getting to 50, 60, 70 cents, and it was probably only costing 50 or 60 to get them crutched. Which I thought was probably not a good way about going about labour relations. So we've opted to crutch more."

There was frequent comment on the need to keep the sheep clean. Dagging normally indicates cleaning up the dirty individuals only, as opposed to putting the entire mob across the crutching floor and cleaning them all up. Some farmers had developed a practice of using paddock yards and portable equipment to achieve a quick cleanup in a mob in minimal time.

"There is a little bit of dag about, and we are just getting them in and cleaning up the odd daggy one."

Worm control was seen as a major flystrike management tool. Many interviewees were active participants in the 'WeanerWatch' extension programme when it was conducted through the then Tasmanian Department of Agriculture, and continued to monitor egg counts on a regular basis as a guide for drenching requirements. A

large number either owned their own microscopes or had an arrangement with a neighbour to provide the egg-counting service.

"We try not to jet the wethers. It is often just due to a tiny little bit of an autumn break scour, so they may need drenching, with a relatively low egg count, just to bring the scouring into control."

Most of the farmers were well aware of the potential effects of nutrition on flystrike and strike risk. However, they did differ markedly on the relative risk factors with different plants.

"The problem used to be with predominantly ryegrass pastures. Once the seed goes to head and the lambs and that start to chew the head, and it causes them to scour. It's a smelly kind of scour."

"We wean them onto the marshes. Don't get much strike...But there's quite a few cresses and pennyroyal and stuff like that down there, and I think that might balance their gut. Wireweed is something that seems to stop them scouring."

Many participants did use chemical treatment, but only after assessment of all the risk factors, and only to the stock seen to be most at risk.

"If we had mobs of sheep on the hill all the time, we wouldn't have to jet those. A thousand ewes came in off the hill a couple of weeks ago and they were quite alright. But I knew if they stayed around the paddocks to be mated, they wouldn't stay alright, so we jetted them."

Short term management strategies for times of high fly risk

There were a variety of strategies designed to deal with short term high risk periods during the fly season. Many participants considered it worthwhile to try to take advantage of wind and cold weather to reduce flystrike risk, and to manage sheltered areas where lack of wind could be seen to be a problem.

"We are probably lucky here. It is fairly windy. We have fairly high hills and the sheep tend to dry."

"If there is a bit of strike around, if you get a couple of really cold days, you can almost be assured that that problem will have been fixed."

Sheep were generally checked more regularly when they were seen to be at risk.

"Just go around them every day, probably for a week after those muggy weather conditions."

Some producers felt that it was possible to move sheep with a predisposing factor such as long wool or scouring into a low-fly area in the face of increasing risk such as humid weather.

"We had a few lambs in one paddock [that] were scouring a bit. We moved them up onto a drier bank, where there is a bit of wind, and that sort of thing."

However, the action of moving them was seen as counterproductive if left too late. The farmers generally had a policy of not working the sheep in 'fly weather'.

"And I find that the more that you dog them around, the more they will get flystrike. So if you can leave them alone altogether, it reduces the risk."

Culling of any struck stock was a common but by no means universal practise. Some killed them immediately, but most were treated and after recovery were either held until dog food was required or sent to the next available sale.

"Every sheep that gets struck, I shear myself and they are put in a paddock and they are either sold at the local sale or they end up as dog food."

"I don't jet here at all. If a sheep gets flystruck, if she's body struck she's shorn and probably killed for the dogs. If it is on the tail, that's my fault, so I treat it."

Risk management for fly control

The overall theme from the interviews was the need to assess risks constantly for good management and to balance labour requirements.

Efficient utilisation of minimal labour was a major concern for most participants. The risk of an uncontrolled timetable in a potential flywave was a serious concern and the major driving factor towards chemical treatment. Many interviewees would risk leaving sheep untreated more often if they had access to enough labour for hand dressing as necessary, but for most properties that was not an option.

"Once you get a few sheep struck it seems to pull the flies in from everywhere. If they are not attended to, well, it makes a big problem for your neighbours as well."

Many of the interviewees felt that flystrike management overall was a matter of assessing the risk continuously, and using experience and the extent of management resources as a guide to make the right decision.

"I take the attitude that I would like not to treat if I didn't have to, but you have got to be ready for quick response. So if you don't treat, you've got to be checking your sheep regularly and be ready to go into action if you need to jet or whatever."

"So I just keep my fingers crossed a bit during that period and get through to weaning the lambs in early to mid-December"

Flystrike was not the only issue for wool producers, and often they had chosen a strategy with a higher fly risk but potentially greater economic benefit.

"We don't breed the type of sheep that is less susceptible to fly, so it is production is the main thing. So we just sort of manage around that."

"We get it on the irrigation the worst. So that's a big area."

Results - Lice

Managing lice is a different process from flystrike management, as the outbreaks develop slowly, are spread by contact with infested animals, and do not cause overt suffering. However, because the same chemicals may be used for protection and treatment, both have to be incorporated into any integrated system. Some managers in the survey saw lice as a part of farm life, something that had to be lived with, especially where they had neighbours with lousy flocks. However, the majority view was that they planned to stay lice free, remain vigilant and expect to have to treat occasionally when an outbreak occurred.

Lice regulations

From about 1870, Tasmanian farmers were obliged to dip annually. Initially this was for scab eradication, but then it was re-introduced for lice control. Therefore many older properties had a history of regular dipping which was continued as a matter of course.

"See, years ago, it was regulation that you had to dip every year, and then they encouraged people not to dip, because I think they wanted to find out just what the incidence of lice was in the district. We'd just get a clearance from dipping every year. We'd have somebody come in and inspect, and then we didn't bother dipping."

The lice-free properties

For some of the properties, lice was not seen to be an issue. They did not remember an infestation, and many felt that their management would ensure that they stayed lice free. They did not treat, and did not expect to need to treat in the future.

"Certainly not since I've been here. I don't know whether they ever had lice before that."

Fencing was practiced where possible as the major defence against lice infiltration. The success of this strategy was seen to depend on the neighbour's co-operation, the terrain, the breed of sheep and the type of sheep operation.

"Keep all neighbour's sheep out and you will never have lice."

"I have got a major problem with neighbours, in the fact that they don't bother too much about it. So my prevention with that is that I just make sure that my fences are AI."

Possible lice infestation was a major concern for all woolgrowers, even when the sheep had been treated. Employees and shearers were in some cases specifically rewarded for vigilance. They were mainly looking for scruffy sheep, or those with a rubbed patch or seen to be rubbing.

"We'd put the shearers and the people in the shed on standby to give us a yell if they see anything."

When sheep were known to have been exposed to risk, quarantine was often used as a containment measure even without lice being found.

"We don't have lice, we believe. We watch it very closely because we have neighbours with lice. If we suspect a contamination with neighbouring sheep then those sheep are isolated and dipped at the best opportunity."

The properties with intermittent lice infestations

Most producers were puzzled by the source of lice. They saw it as something inevitable, where the sheep could stay clean for varying lengths of time, and then the lice seemed to reappear. The risk of buying them in was given as a major reason for many to run a totally closed flock, and there was a widespread awareness of the risk when bringing in rams which possibly justified the ram sellers high chemical use.

"Have had lice. I am not too sure that there is not an endemic problem there, that if you don't treat, will appear at some stage in the future."

"We have got a little bit of lice now. I don't know where it has come from. It may well have come from neighbours. That is a big problem."

"We have had lice problems which we know have been introduced with the purchase of rams."

"We lent a ram a couple of years ago which was an expensive exercise. No income from the lending of the ram but probably five or six thousand outgoing as a result of the lending. Lice!"

"You can't blame him, because he's got that many sheep droving through his place all the time, so it could have come from them."

"The ewes that I buy, you can bet they will come in with it, so it doesn't matter what I do, I am going to have lice."

"We bought another place, and bought some crook sheep off that"

The lousy neighbour was generally explained as either a poor manager of a commercial operation, or a hobby farmer. There was no general method suggested to deal with the non-professional sheep owner directly, but those in the survey with a problem generally concentrated on better fencing and a lot of pre-emptive chemical treatment. In one case, the smaller mobs were kept in the boundary paddocks because when they got infested, there were less to treat.

"Because of our proximity to the town we have some part-timers adjoining us that make life pretty miserable as far as getting fences done. And obviously poor fences you tend to get lice, but we do backline everything without exception."

"Because I live in an area where I have got about 28 neighbours and they have nearly all got sheep. They just go to the local sale and buy four or five, and they have probably got lice."

Sometimes neighbours worked together. However, it was difficult to maintain an interest when there were no lice outbreaks.

"A few years ago, a neighbour and myself, we tried to start a lice group. It went alright for a while, but it died after a couple of years. They all started blaming each other for having lice. It's got to come from somewhere. But no, it is not as bad as it was."

In Tasmania, the run country normally is contiguous with other runs and often with state forests and private forests. Fences are difficult to maintain on the rugged terrain with frequent fallen timber and the assistance of wombats to breach them. Unmustered sheep were a serious concern for lice management, and contract shooting was a common option for the strays while the stock were away from the run while being shorn.

"We border onto a hell of a lot of run country. It doesn't take much to miss one out in that sort of stuff."

"Any strays that come on the place, we are a bit anxious. But because of the extent of the property and the bush runs, there is the potential to get the lice."

Properties treating for lice regularly

Despite every effort to remain lice free, some stud properties elected to treat anyway in order to ensure all sale stock were clean. With so much potential for loss if a stud ram carried a lice infestation to a clean property, there was sound business sense in this practice, even though biologically it may be unnecessary.

"We have a stud. We were treating for lice to make sure that those stock we sold were as clean as possible."

"We do backline at shearing time. We have dipped lambs at shearing. As a stud we have got to be squeaky clean."

A large number of the interviewees attempted to remain lice free without chemical usage by maintaining the fences and restricting sheep movement, but accepted that re-infestations would occur and would require eradication on a fairly regular basis. They therefore expected to need to treat whenever the lice re-occurred.

"Yes, we do have problems with it, because we have 38 neighbours. And generally we won't treat sheep for lice unless the problem is there or a neighbour does have a problem and you know the neighbour's sheep have been in your flock so you think you should do it. Just in case."

Some operators simply treated occasionally even when they saw no lice, just for insurance, but not every year.

"We haven't had lice here. What I do is, I generally treat my sheep every couple of years."

In some areas, particular factors such as hobby farm neighbours or adjacent run country were seen to make lice control very difficult. In such areas some producers chose to use a chemical treatment every year to avoid other problems.

"I run a scenario that I can't control lice. As simple as that. I've got a large area of boundary on suburban country town. When the creek dries up, I am going to have their sheep on my place. There is nothing I can do about it, and there is nothing I can do about their lice-control management. I can only concentrate on my own. And my own is to use the growth regulator in November."

Risk management for lice control

Chemical treatment costs were a major factor in the decision making, as the losses associated with not-treating were also perceived to be high.

"We've used a product for the past three or four years which has been very very good. But it was getting very very expensive."

"Every year we used a backliner, and some years ago it was decided it was costing \$3000, \$4000, \$5000. Why spend that money? We dropped it and we ended up with a bit of lice."

Lice management was seen generally as a matter of risk taking. For most Tasmanian wool producers in the survey, it was a matter of balancing all the factors, of which the likely residues in the wool were just one. Others include cost of chemicals and application, health issues with using the chemicals, possible lice damage to wool quality, time and labour needed for treatment, and the perceived possibilities of reinfestation. In recent years, there has been a considerable decrease in purely routine annual treatment.

"We didn't this year. I don't think we did last year, but up until then we had dipped with Diazinon each year, straight after shearing. I've tried the last couple of years to get away without doing that."

Discussion

This survey focussed on a group of Tasmanian wool producers who were originally selected from a pool of perceived 'good managers'. Half of them were selected because of their low chemical residue test, and the remainder were from the same survey but with average residue levels. The management tools mentioned are therefore those which could possibly be useful in any future IPM programme for sheep.

There was a strong desire to minimise sheep chemical use amongst the interviewees, and not only because they were well informed on the potential impact of possible market demands for lower residue wools. Many

of the participants in this survey had personal experience of ill effects from fly and lice applications and were therefore keen to limit their use both on behalf of themselves and family, and also because of a perceived risk of liability for the health of others. The expense of the chemicals, the equipment and labour required for treatment were also a serious consideration for many of the farmers.

Low chemical flystrike control measures

Tasmanian farmers use a wide variety of techniques to minimise flystrike other than by chemical use. However, it was seen as a balance of risk versus expenditures of time and money. The core of much of the sheep management was a solid understanding of the farm eco-system and successful forecasting of future condition. This information is often a matter of experience on a particular property and with the specific type of sheep being managed. However, there was little apparent sharing of information on the fly situation with others in the area who might have been able to benefit from it and help reduce the overall fly population for everybody.

The participants did not expect a simple strategy in the near future, but there was a general wish for a permanent solution to the problem. In the meantime, there was a very strong desire to reduce chemical fly treatments, and a considerable willingness to take risks in order to achieve this.

Low chemical lice control measures

Lice management is very much a factor of location. The majority of farmers in this study do attempt at least some degree of isolation to control lice, and many are seriously attempting to avoid any stock movement onto the property at all. Those few properties which accepted lice as a permanent factor were generally in close proximity to a town or hobby farm area with many small groups of untreated sheep and felt that the situation was totally untenable without regular chemical treatment.

Like fly management, the decision to use a chemical treatment for lice was a matter of risk taking. For some, and especially the stud ram breeders any risk at all was seen as too dangerous for the economic viability of the operation. For most interviewees however, treatment decisions were based on individual knowledge of the likely risk factors for that property at that time, and these were fairly well understood. However, many did have a somewhat fatalistic approach, and felt that if not this year, then next year perhaps. And that sooner or later, whatever they did, they would see lice again.

For the many farms without lice, the interviewees often found it difficult to understand how anyone could have a problem. These were generally in relatively isolated areas where neighbours either did not have sheep, or were equally fastidious about quarantine and fencing.

Conclusion

There is the basis of an integrated fly and lice control system in the strategies used by professional wool producers to minimise chemical use while fulfilling all other obligations for animal welfare, environmental concerns, human health and economic survival.

A wider education of the entire community, with a particular focus on the importance of anyone with any sheep at all of being a good neighbour may be the most important direction for further extension work on lice control.

Farmers would benefit by discussing flystrike with each other, and sharing their own problems and solutions as these are often specific to local conditions.

References

Cameron, A. W. (1999). "Unwelcome partner: The blowfly's pursuit of the Merino sheep," A.W. Cameron, Dundee, NSW.

Day, G., and Jessup, J. (1984). "The history of the Australian Merino," William Heinemann Australia, Melbourne.

Horton, J. D., and Champion, S. C. (2001). Wool producer perceptions of flystrike issues. (*these proceedings*)