The search for an alternative to mulesing: 2010 and beyond

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Introduction

Mulesing involves removing strips of skin in the breech region of sheep, leading to tightening of the skin and an increased bare area (James, 2006). It is currently the most effective and practical method of preventing flystrike, a problem that costs the Australian sheep industry $161 million annually (McLeod, 1995). Opposition to mulesing has increased in recent years as concerns regarding quality assurance, environmentally friendly production systems and animal welfare escalate. This has led to an agreement that mulesing will be phased out of Australia by 2010 (James, 2006). With this deadline rapidly approaching, Australian Wool Innovation Limited (AWI) has invested more than $10 million in research to find a suitable alternative to mulesing, with methods focussing on reducing the susceptibility of sheep to flystrike through genetics and non-surgical options (clipping or protein injection), or reducing the blowfly population (AWI, 2005b). This paper examines recent developments in the search for alternatives to mulesing.

Discussion

Genetic alternatives to mulesing include selecting sheep with a bare breech or fewer wrinkles, which provides resistance to flystrike. Selection against skin wrinkle has been practised for many years so most Merino flocks today are relatively plain-bodied, and therefore intense selection against breech wrinkle will not significantly reduce flystrike susceptibility (James, 2006). Crossing Merinos with other breeds, such as the Wiltshire Horn (which has a larger bare area and sheds its wool in the perineal region), would rapidly increase breech-strike resistance, but might also compromise other desirable production traits such as fine wool (James, 2006). Currently being investigated is a line of Merino sires that lack wool in the crutch and inner hind leg regions (AWI, 2005a). This research examines whether this extreme phenotype is due to genetic mutation, and aims to find a genetic marker for the trait in order to accelerate genetic gain (AWI, 2005a). Where possible, rams should be purchased from studs that select for breech-strike resistance (including selection against dag formation and diarrhoea), and struck sheep should be culled (Jordan, 2005; James, 2006). Genetics would provide a long-term alternative to mulesing; unfortunately a great deal of research is required before there is a commercially available approach, and it is unlikely to provide widespread relief from flystrike by the 2010 deadline.

Clipping, as described in AWI (2005b), involves attaching a clip to the same section of breech skin where mulesing is performed. The clip's pressure prevents blood flow and causes the skin flap to wither and detach with the clip within a few days. This results in a bare area slightly narrower than that produced by mulesing, but without creating an open wound. Trials have shown that six weeks after treatment, clipped lambs have greater weight gains than mulesed lambs, indicating that clipping is less stressful and therefore improves animal welfare (AWI, 2005b). Further research is being conducted to develop shorter, biodegradable clips and determine the optimal site for clip placement. It is hoped that clips will be commercially available in 2006.

The second non-surgical approach involves applying collagenase, a naturally occurring protein, which results in bare, tightened skin, replicating the effects of mulesing. Researchers are still searching for an appropriate applicator for the protein, with needle-free injection using high

velocity to penetrate the skin appearing to be a promising option at this stage (AWI, 2005c). It is hoped that the final product will be available in 2007 (AWI, 2005c).

Another facet of research has involved reducing the blowfly population, through trapping, biocontrol or genetic mapping. Baited traps (LuciTraps) specific for the blowfly, *Lucilia cuprina*, were developed in the 1990s (Armstrong *et al*., 2005), using a chemical attractant that mimics the odour of rotting flesh (Armstrong *et al*., 2005). LuciTraps are useful to monitor fly activity and will also reduce the blowfly population, particularly when used by neighbouring properties (ASWIT, 2005; Armstrong *et al*., 2005). Properly used, LuciTraps can reduce the incidence of flystrike (Ward, 2001). Biocontrol research by the Queensland Department of Primary Industries is currently investigating a naturally occurring microscopic worm and fungi that will invade and kill blowfly larvae (AWI, 2005a). Furthermore, current research into the blowfly genome aims to determine sites that could be targeted via vaccination of sheep (AWI, 2005a).

While alternatives to mulesing are still being trialled, an integrated pest management program can be adopted, utilising available techniques. These methods, as described by the Australian Sheep & Wool Industry Taskforce (2005) and Wilson & Armstrong (2005) include:

- Increasing surveillance to detect breech strike (however, this does not prevent flystrike, and may be difficult on extensive properties;)
- Conducting an extra crutching to remove excess wool that results in urine and faeces accumulation;
- Timing crutching and shearing to take place prior to the peak blowfly periods in early spring and late summer to autumn;
- Preventing diarrhoea (which predisposes to breech strike) through increased drenching and pasture management;
- Increased hand jetting of the breech with chemical treatments. However, this is not a desirable alternative to mulesing, as it would result in increased chemical residues in wool and meat, increased environmental contamination with insecticides and an increased risk of flies developing resistance to chemicals (The Mackinnon Project, 2005).

In the absence of mulesing, woolgrowers would have higher labour costs because of a need for more handling of sheep, which also leads to increased animal stress. To maintain animal welfare standards while mulesing is still being practised, a national accreditation scheme for mulesing contractors has been developed. A topical anaesthetic agent, Tri-Solfen™, has been approved for application following mulesing. However, it provides only short-term pain relief.

Conclusion

It is imperative that an economically viable and effective alternative to mulesing is found before 2010, to prevent the death of up to 3 million sheep annually, causing major losses to the Australian sheep industry and significant animal welfare concerns (The Mackinnon Project, 2005). Although current research such as clipping or collagenase injection seems promising, further investigation is required to validate recent findings.

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