

Breech Strike Genetics

This Project is a collaborative research effort of CSIRO Livestock Industries, Armidale, NSW and Department of Agriculture and Food WA funded by AWI

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Wrinkle ASBVs from MERINOSELECT out soon

Wrinkle score data collected from this Project is now being included in the Sheep Genetics database along with data from WA Dept. Ag, Sheep CRC, Sire Evaluation and industry. Across-flock Australian Sheep Breeding Values (ASBVs) for wrinkle score are not far away. By the next issue of this newsletter we should have some further information on that front. But, we do know that you can produce highly productive plain sheep.

In the meantime, I take this opportunity to encourage Merino breeders to score wrinkles on their animals and submit that data to Sheep Genetics - this will speed up the development of, and improve the precision of ASBVs for wrinkle score.



Fig 1. 2008 drop weaners following crutching - with the help of Ben Swain, BCS Agri-business Solutions, a 'time trial' was conducted to measure the difference in crutching time between mulesed and unmulesed sheep (no results yet). These sheep may look like they have quite a wide crutch put on them, but this is to enable us to effectively measure all the traits of interest.

Using indirect selection

In selecting for breech strike resistance, sheep breeders will generally use indirect selection (ie wrinkle and cover) because it is undesirable for economic and ethical reasons to deliberately challenge animals with flystrike in order to work out which ones should be retained for breeding the next generation and which ones should be culled. Indirect selection is reasonably common practice in livestock breeding.

Some other examples are:

- using worm egg count as an indicator for internal parasite resistance;
- ultrasonic backfat as an indicator of carcass leanness;
- weaning weight as an indicator of slaughter weight.

Indirect selection also has advantages which can make the response to selection as fast, or even faster than direct selection. In particular, this is the case when the:

- a) correlated trait has higher heritability and or is more variable;
- b) correlated trait is easier and or cheaper to measure;
- c) correlated trait can be measured earlier in life to enable earlier selection decisions.

All of the above are probably true for breech strike and wrinkles.

Jen Smith

Leader, Breeding For Breech Strike Resistance Project, CSIRO Armidale

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Flystrike rates in the Armidale Breech Strike Resistance flock

Table 1. Flystrike rates by sheep class, mulesing group and breech wrinkle score in the Armidale Breech Strike Resistance flock (2006-2009).

Group	Breech wrinkle	Number animals	Flystrike (%)		
			Body	Breech	Re-strike [#]
Weaners (age during flystrike period 2-8mths; wrinkle scored at 6mths)					
Mulesed	1	294	2	1	0
	2	448	5	4	20
	3	90	6	4	0
	4	6	0	0	0
	5	0	-	-	-
	Total	838	4	3	15
Unmulesed	1	48	0	10	-
	2	310	2	9	7
	3	405	4	21	15
	4	282	3	34	21
	5	54	7	54	41
	Total	1099	3	22	20
Ewe hoggets (age during flystrike period 12-18mths; wrinkle scored at 11 mths)					
Mulesed	1	203	0	1	0
	2	357	3	0	0
	3	68	3	1	0
	4	15	0	13	0
	5	0	-	-	-
	Total	643	2	1	0
Unmulesed	1	48	0	0	0
	2	333	2	5	6
	3	344	3	14	23
	4	141	2	20	21
	5	26	8	54	29
	Total	892	2	12	21
Breeding ewes (maiden) (age during flystrike period 2-2.5yrs; wrinkle scored 21mths)					
Mulesed	1	112	3	1	0
	2	199	5	3	0
	3	51	8	4	0
	4	10	10	10	0
	5	1	-	-	-
	Total	373	5	3	0
Unmulesed	1	16	0	6	0
	2	125	6	8	0
	3	136	2	35	15
	4	73	5	70	16
	5	24	13	108	42
	Total	374	5	36	19

- indicates no data or insufficient data
[#] breech re-strikes as % of breech strikes

Table 1 shows breech and body strike rates in the Armidale flock over the last 4 years. Remember, these sheep receive no preventative flystrike treatment other than crutching in early autumn. These records demonstrate several important things:

- Yes, in all 3 sheep classes (weaners, hoggets and breeding ewes) mulesed animals have only about 10% or less of the flystrike rate of unmulesed animals.
- Weaners and breeding ewes are the more flystrike susceptible classes of sheep in this environment
- In unmulesed animals the breech wrinkle scores have a frequency distribution that approximates a standard normal curve—the breech wrinkle distribution of animals in the flock is represented by a bell-shaped curve and this is good for within-flock selection. It means there are some ‘really good’ animals at one end to take advantage of. Or, perhaps more importantly, you can change the average of the flock by removing the few at the ‘bad’ end (i.e. by culling any score 5’s)
- Breech strike rates of animals with breech wrinkle score 4 and 5 are excessive
- Body strikes are not **closely** associated with breech strikes
- In unmulesed sheep, those with breech wrinkle score 2 have much lower breech strike rates than those of score 3. This suggests that selective breeding to change flock average breech wrinkle from 3 to 2 would have a big impact on breech strike rate
- Animals that get re-struck tend to have higher breech wrinkle scores—another reason to cull them.

Tim Dyall's visit to AgResearch, NZ

As a recipient of funding from CSIRO Livestock Industries (CLI) technical exchange program I travelled to Christchurch New Zealand in late October 2008 to work with researchers at AgResearch. AgResearch is New Zealand's largest Crown Research Institute.

AgResearch's mission is to underpin the New Zealand pastoral sector's sustainability and profitability. AgResearch conducts research at a number of sites in New Zealand.

My time was spent working with Dr David Scobie and his research team at the Lincoln site just out of Christchurch. More than 10 years ago David and his team set up a breeding program to breed an easy care flock of mixed breed crossbreds that did not get fly struck and so didn't require mulesing.

They have achieved their aims by selecting and breeding for sheep with less dags, shorter tails, and no wool on the legs, belly or breech.

They are now trying to breed a "self-crutching" sheep that sheds the wool off its tail and around the tail area. While I was there I inspected the hogget progeny of the first mating and a few of them had indeed shed the wool from their tail. The tails are not docked in this experiment.

I also visited their field station at Winchmore (one hour south of Christchurch) and helped with measuring tail length and the bare area length under the tail at marking time.

At Winchmore they are also running an experiment with Wiltshire sheep in 2 lines to see if there is more flystrike in the Low shedding High fleece weight line versus the High shedding Low fleece weight line.

Other research into flystrike that David Scobie is investigating is whether the choice of pasture that the sheep graze on can reduce the incidence of flystrike. For example there may be a lower incidence of flystrike in sheep run on pastures with lowered ryegrass endophytes.



Fig 2. Dennis O'Connell AgResearch measuring hock and tail length at Winchmore Research Station.



While I was in Christchurch I met with Dave Maslen of New Zealand Merino. New Zealand Merino is a privately run company which is a joint partnership between the merino breeders of New Zealand and PGG Wrightson Limited (a pastoral trading company).

Dave was very keen to hear about our work with breeding for breech strike resistance in Merinos and how far we had progressed.

Tim Dyall

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Fig 3. Tim Dyall helping with breech trait scoring at AgResearch's Winchmore Research Station south of Christchurch, New Zealand.

Wool cover on points - relationships with breech & fleece traits

Background

We imagine many people have a view on the relationships among breech traits, wool coverage on the points, and fleece weight. At shearing last year (2008) we decided to take a look at what was happening among these traits in 2 of CSIRO's breeding flocks.

- The Breech Strike Resistance (BSR) flock which is a 600 ewe, multi-bloodline flock representing the 3 breech trait selection lines (unselected control (UC), commercial improvement (CI) and plain breech (PB)). These were 2 and 3 yo ewes with only very limited pedigree information so the analysis conducted was phenotypic only. Replacement ewes in this flock are selected almost entirely on breech traits - there is little, if any consideration of fleece traits. **Half the flock is mulesed, half is unmulesed.**
- T13 is essentially a closed flock of 400 ewes selected for fleece traits with a wide age structure (2 to 10 years). There is no consideration of breech traits in this flock. This flock is fully pedigreed so genetic analysis was conducted. **All the flock is mulesed.**

Methods

The traits examined were:

- Face cover - scored 1-5 as per AWI standards (1 is bare and 5 is very muffled), 2 weeks before shearing
- Leg cover - wool coverage on the front legs and back legs, both scored 1-5 (see below) immediately the sheep was dragged out onto the shearing board.
 - 1 = no wool below knee/hock
 - 2 = up to approx. 25% wool coverage between knee/hock and fetlock
 - 3 = approx. 50% wool coverage between knee/hock and fetlock
 - 4 = approx. 75% wool coverage between knee/hock and fetlock
 - 5 = complete wool coverage below knee/hock, extending below fetlock
- Body wrinkle (1-5, as per AWI standard)
- Breech wrinkle, breech and crutch cover were scored in the BSR flock only (1-5, as per AWI standard).
- Greasy fleece weight and fibre diameter at the 2008 shearing. Ewes were shorn 5 weeks pre-lambing.

In the statistical analysis, the Breech Strike Resistance data were adjusted for flock of origin (as the 2005 drop were sourced from industry) and selection line (UC, CI and PB), both of which were significant effects on all traits. All flocks of origin were approximately equally represented in each of the 3 selection lines.

The T13 data were adjusted for age. In 2008 the age structure of the breeding flock was 24% 2yo; 21% 3yo; 16% 4yo; 19% 5yo; 10% 6yo; 11% >6yo. Age had an effect on all traits except front leg cover. Pregnancy status (based on scanning data) was also tested, but had no effect on

any of the traits in either flock.

Key results

- (not unexpectedly), face cover was moderately correlated with leg cover (0.28-0.41) - ewes with more wool on their face also tend to have more woolly legs
- Face and leg cover are not really correlated with fleece weight (0.01-0.11)
- Face and leg cover are also not really correlated with wrinkles (0.01-0.11) (**do you mean breech and or body wrinkle**)
- There is some suggestion that face and leg cover are (unfavourably) correlated with fibre diameter where animals with less points cover have broader fibre diameter (-0.10 - -0.18).

These results are in sound agreement with those of Mortimer and Atkins (1993) where genetic evaluation of components of fleece weight and wool quality traits (including face and leg cover), was conducted on a larger group of mainly medium wool sheep at Trangie, NSW.

[Mortimer, SI and Atkins, KD (1993) *Aust. J. Agric. Res.* 44: 1523-1539.]

Conclusion

The relationships between points cover and fleece traits, and between points cover and breech traits are not particularly strong. If selecting for low breech and/or crutch cover, you will also probably observe a reduction in points cover. The changes in fleece traits are unlikely to be dramatic, but you do need to keep an eye on what is happening to all traits of interest. If your breech trait



Fig 4. Examples of the

The first issue (No. 1) of this newsletter outlined the project background, objectives, design and breech strike incidence and results for the previous summer (2006-07). Issue 2 contains flystrike results for the 2007-08 summer and preliminary results on associations between breech and fleece traits. If you didn't receive a copy and would like one, please contact Tim Dyall using details below.

Staff Profile—Ray Honnery

Ray has, until recently been the one that spends much of the Spring, Summer and Autumn chasing flies in this Research Project.

After more than 38 years of service to CSIRO, in Nov 2008 Ray was re-trenched from the organisation following budget realignment. Ray spent most of his time in CSIRO as a member of the farm staff, but (among other responsibilities) in the last couple of years he was a member of the Breech Strike Resistance Project team and had primary responsibility for the sheep husbandry and health as well as the blowfly population monitoring.

This is an unenviable job as it includes checking for, treating and recording the multitude of flystrikes - no mean feat in this flock of 1200 to 1500 animals; half of them unmulesed and a third unselected for breech strike resistance; a single crutching per year; and no use of preventative chemical treatment.

Ray has done an admirable job at looking after the sheep. No doubt his ability to spot a flystrike 'a mile away' has helped. His skill as a stockman; the talents of Connie, Bandy and Tammy (his dogs); and his friendship within the Team will be sorely missed and we wish him well in the future. At least now, he has more time for golf!



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welcome.

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