

meatup FORUM

For the latest in red meat R&D

Designer genes – breeding away from flystrike

Henry Hickson
NeXtgen Agri

Lucilia cuprina
The Australian sheep blowfly



Breeding fly-free sheep

- Define it
- Establish your baseline
- Make a plan
- Allocate resources
- Reflect and refine





What works here might not work there!

Understanding heritability



The proportion of the variation between individuals that can be explained by genes



Phenotype = Genes + Environment

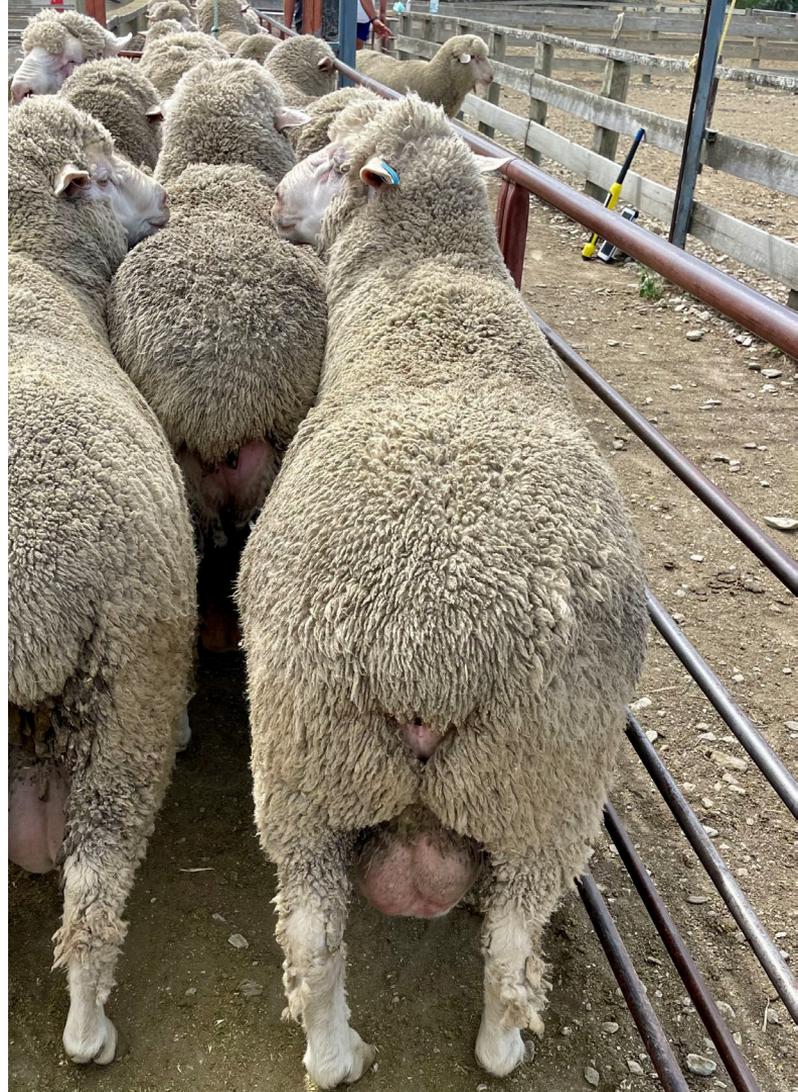
What's a breeding value

- An estimate of an animal's genetic merit
- Original methodology developed in the 1950s
- Now used across multiple breeds and species around the world

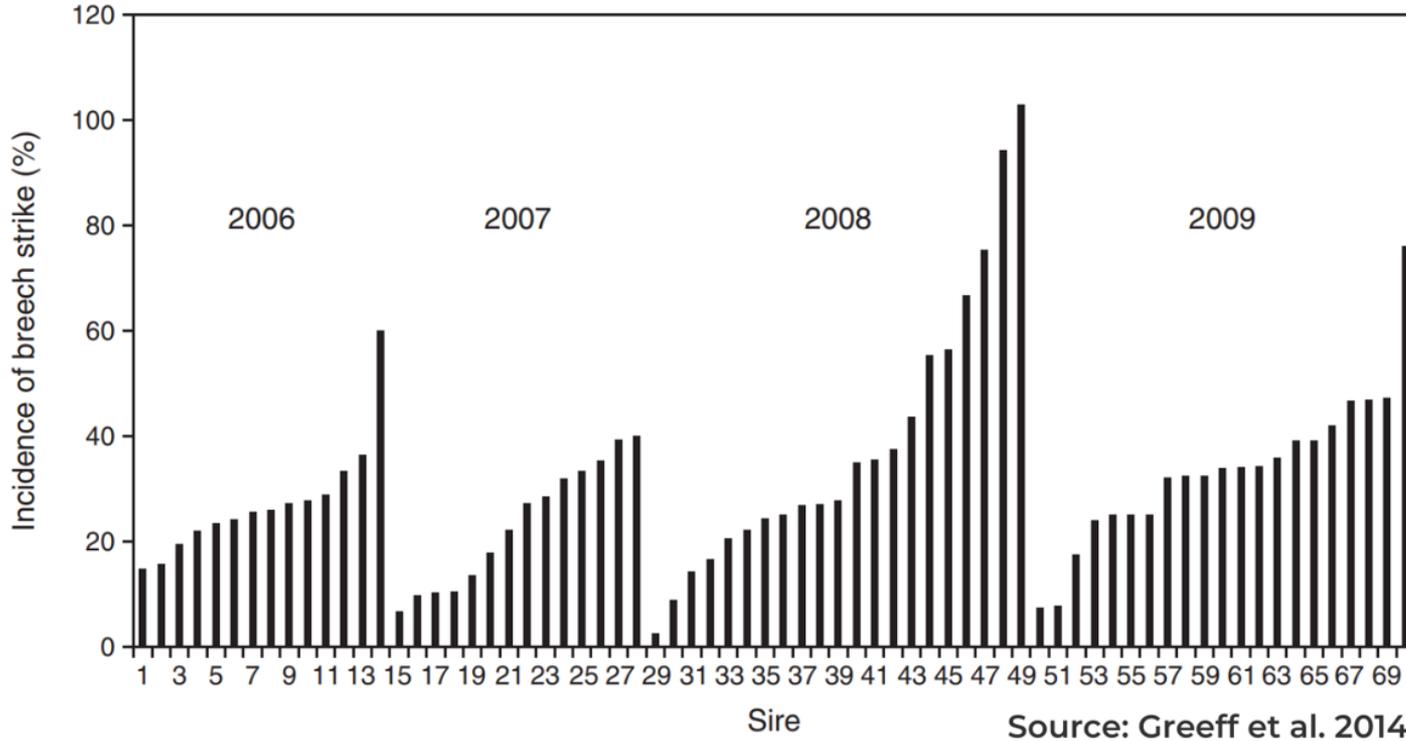
	YWT Yearling Weight (kg)	YCFW Yearling Clean Fleece Weight (kg)	EBWR Early Breech Wrinkle
EBV	6	25	-0.8
ACC	63%	92%	85%

Breecch strike

- Not a breeding value yet.
- Heritability varies between 20% to 50%
- Culling can have an impact over time – no second chances
- Massive variation within the industry



How can genetics play a role?



Breech strike

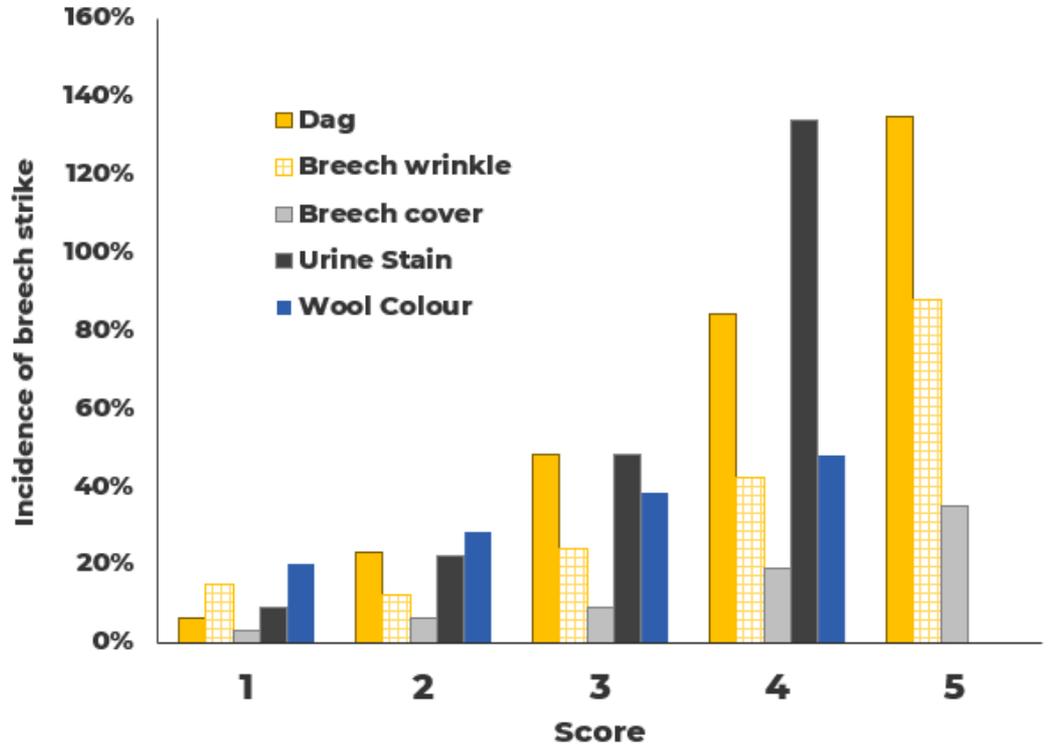
- Not currently a breeding value but the correlated traits are:

- **LDAG** – Dag
- **EBWR** – Breech wrinkle
- **URINE** – Urine stain (coming soon)
- **EBCOV** – Breech cover
- **LCOL** – Colour

Trait	Heritability
Dag	30%
Breech wrinkle	40%
Urine stain	40%
Breech cover	30%
Wool colour	50%

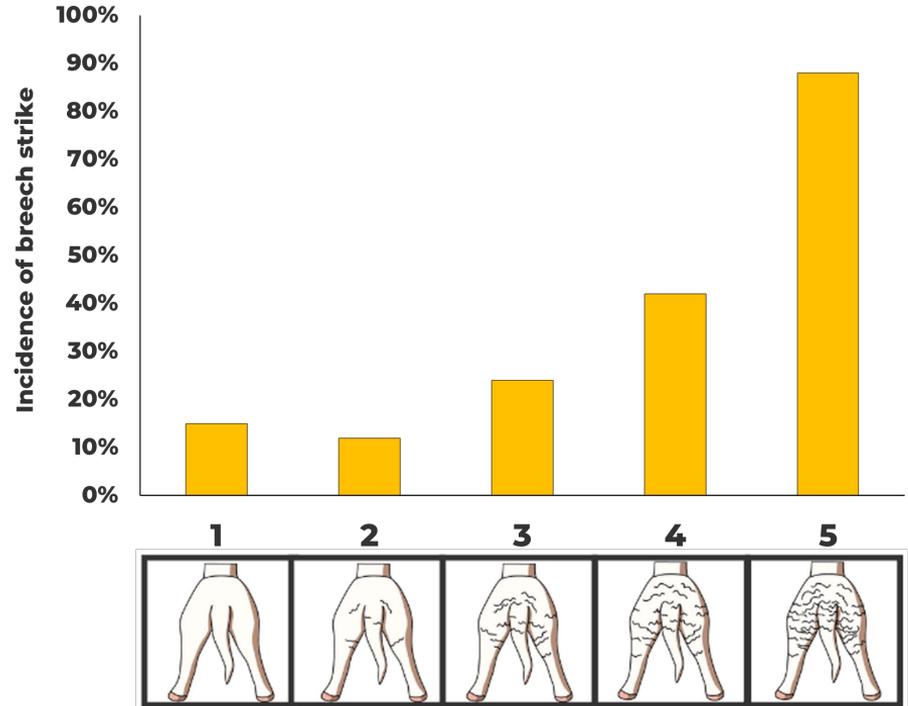
Source: Greeff , Karlsson, AWI and Brown et al. 2010

What influences breech strike?



Breech wrinkle

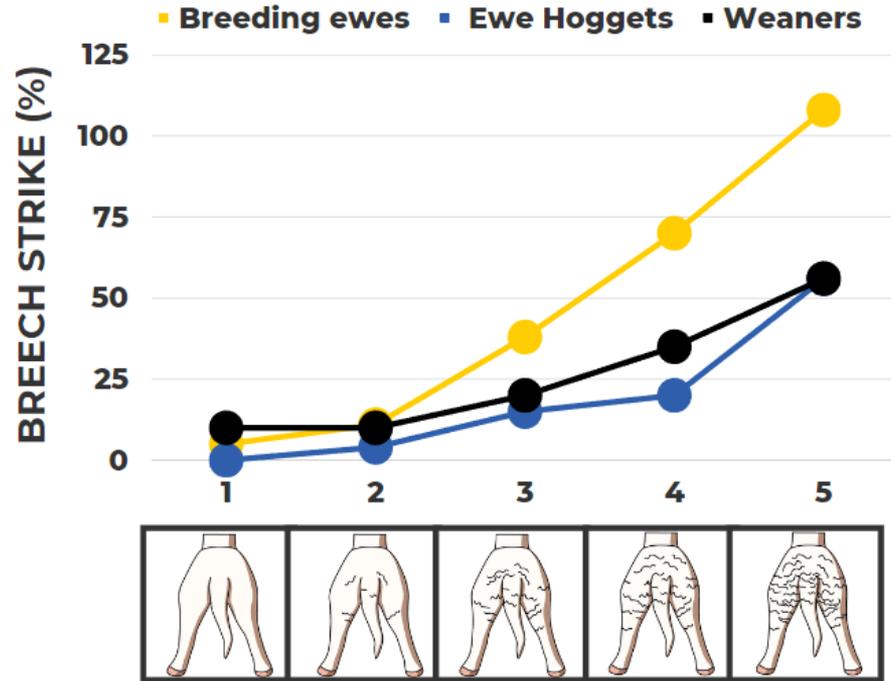
- EBWR
- Leading cause of breech strike in Australia
- Correlated with reproduction



Source – AWI Breeding for Breech Strike Resistance Project, CSIRO Armidale, 2005-2014

Breech wrinkle

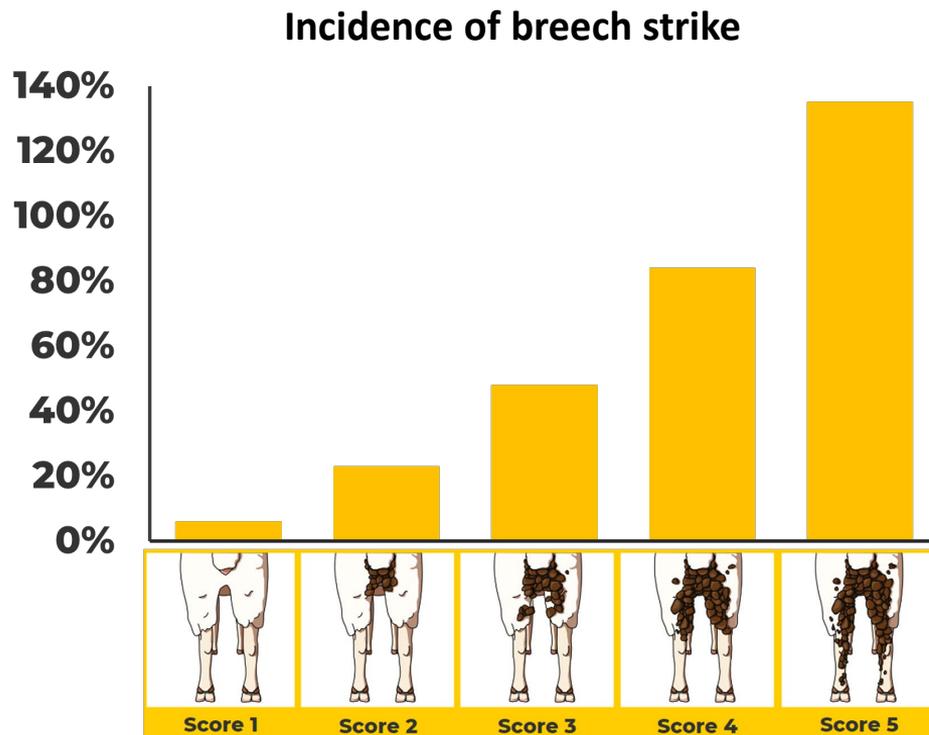
- The influence of breech wrinkle on breech strike varies between
 - Environment
 - Age groups
- Non-genetic impacts of wrinkle score
 - Birth type
 - Dam age
 - Dam nutrition during pregnancy



Source – Johan Greeff AWI breech strike flocks

Dag

- LDAG
- The most significant influence on increasing the risk of breech strike.

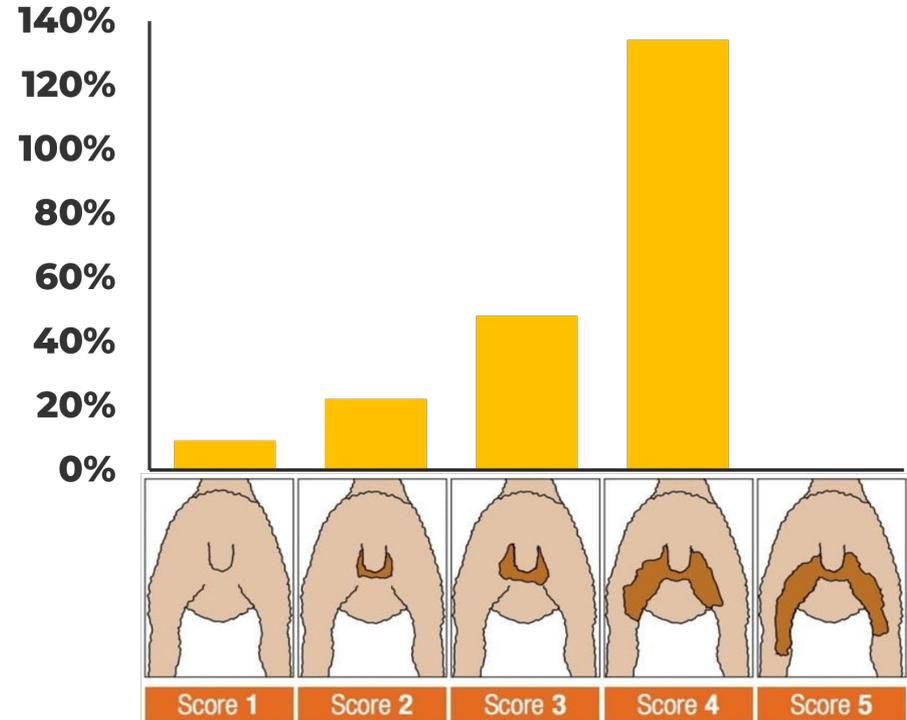


Source – AWI Breeding for Breech Strike Resistance Project, CSIRO Armidale, 2005-2014

Urine stain

- URINE
- Not a breeding value yet
- Can still cull ewes that exhibit high urine stain

Incidence of breech strike

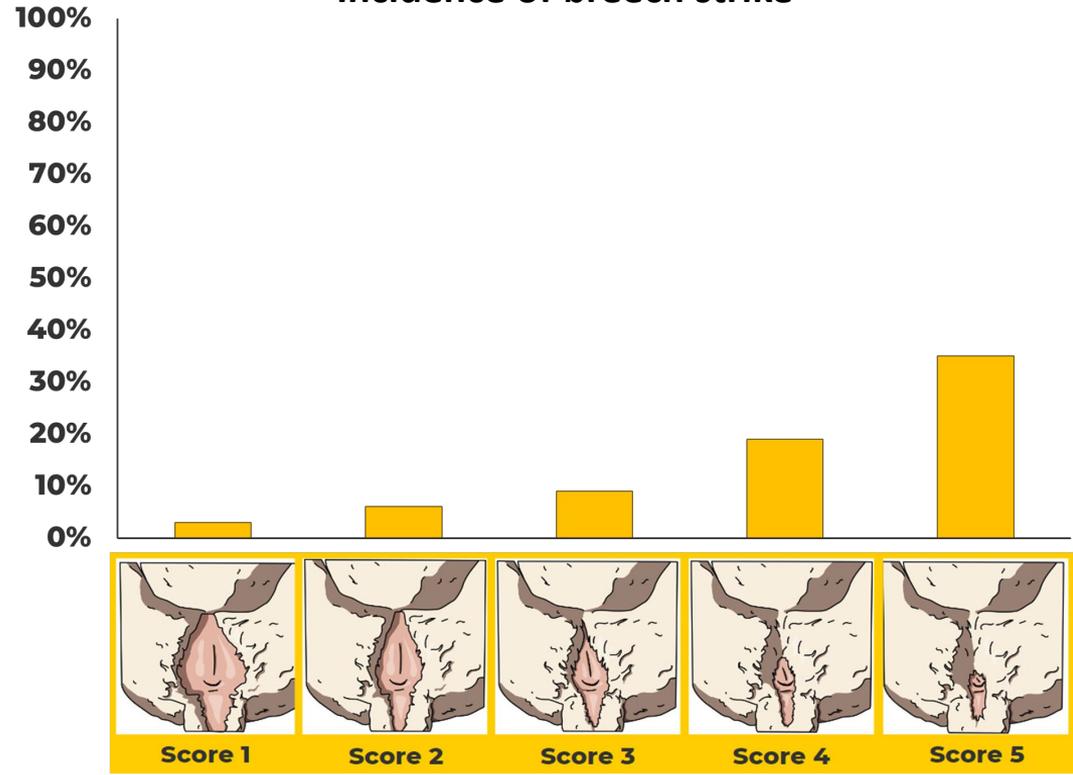


Source – AWI Breeding for Breech Strike Resistance Project, CSIRO Armidale, 2005-2014

Breech cover

- EBCOV
- Correlated with reproduction

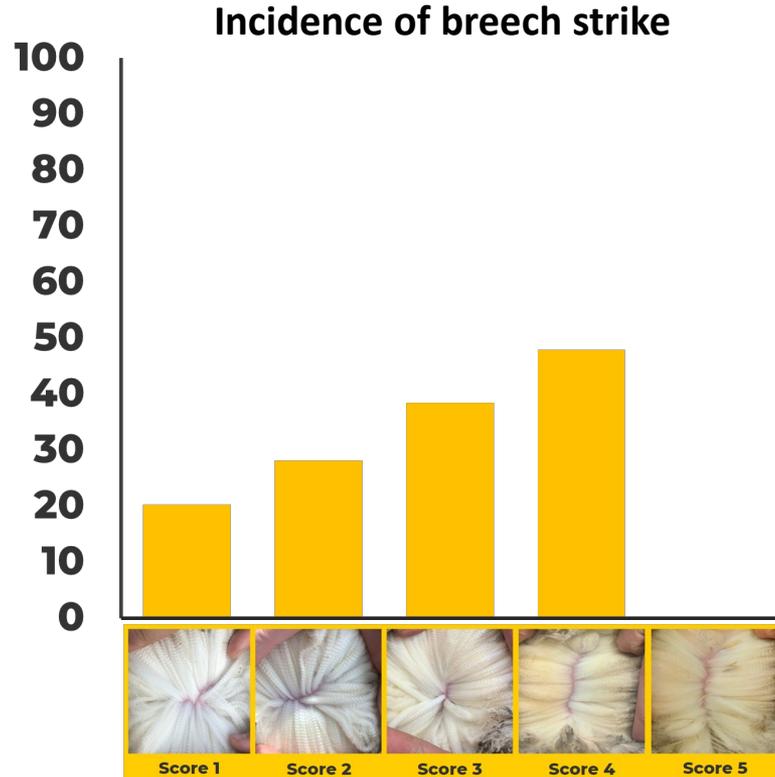
Incidence of breech strike



Source – AWI Breeding for Breech Strike Resistance Project, CSIRO Armidale, 2005-2014

Wool colour

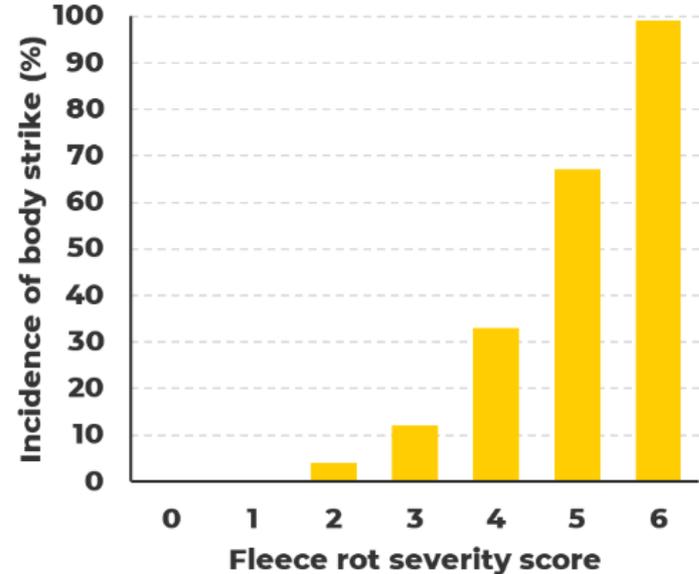
- Wool colour has a small correlation with breech strike
- Wool colour is also correlated with fleece rot



Source – AWI Breeding for Breech Strike Resistance Project, CSIRO Armidale, 2005-2014

Breeding out body strike

- Fleece Rot - **LFROT**
- Fleece rot is the main cause of body strike



Data from Raadsma et al. 1988

Establish your baseline

- Where are you now?
- Benchmark your genetics
- Compare to your breeding objective

Band	EBWR	EBCOV	LDAG	LFROT	LCOL
1	-1.4	-0.97	-0.74	-0.84	-1.57
5	-1.17	-0.74	-0.55	-0.6	-1.15
10	-1.01	-0.61	-0.45	-0.5	-0.9
20	-0.8	-0.45	-0.33	-0.36	-0.62
30	-0.64	-0.33	-0.25	-0.27	-0.43
40	-0.5	-0.24	-0.18	-0.19	-0.28
50	-0.36	-0.15	-0.12	-0.12	-0.15
60	-0.21	-0.07	-0.05	-0.05	-0.02
70	-0.04	0.03	0.03	0.02	0.12
80	0.15	0.13	0.13	0.11	0.28
90	0.42	0.28	0.29	0.23	0.51

Your Flock Profile Results



Sire team average

- Average the ASBVs of your sire team
 - Purchased rams
 - Tested rams



Your genetic plan.



Make a plan

Buying rams to improve Fly Strike.



Negative breeding values for **dag**.



Negative breeding values for **breech wrinkle**.



Rams that are from ewes that had low **urine stain**.



Low breeding values for **breech cover**.



Negative breeding values for **Fleece Rot and Fleece Colour**.



Take home messages

- Define your fly free sheep and determine what traits are most important to you
- Establish your baseline
- Make a plan

Tools and resources

- Fly Boss - <https://flyboss.com.au/>
- AWI Flystrike Extension Program - <https://www.wool.com/sheep/welfare/breech-flystrike/flystrikeresources/>
- Sheep Genetics - <https://www.sheepgenetics.org.au/>
- NeXtgen Agri Hub - <https://www.nextgenagri.com/the-hub>