Australian Wool Innovation Limited

2018 BREECH FLYSTRIKE RD&E

TECHNICAL UPDATE

Industry Progress in Breeding for Breech Strike Resistance

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Genetic Trends in Key Welfare and Production Traits

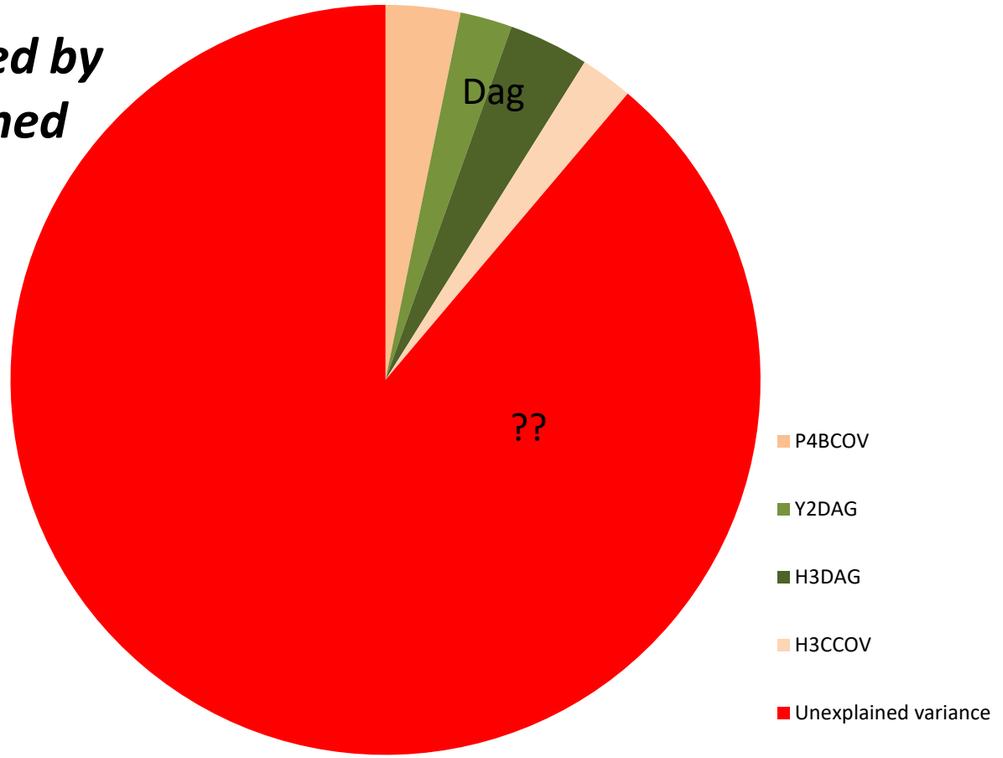
(ASBVs provide the best 'objective' data available)

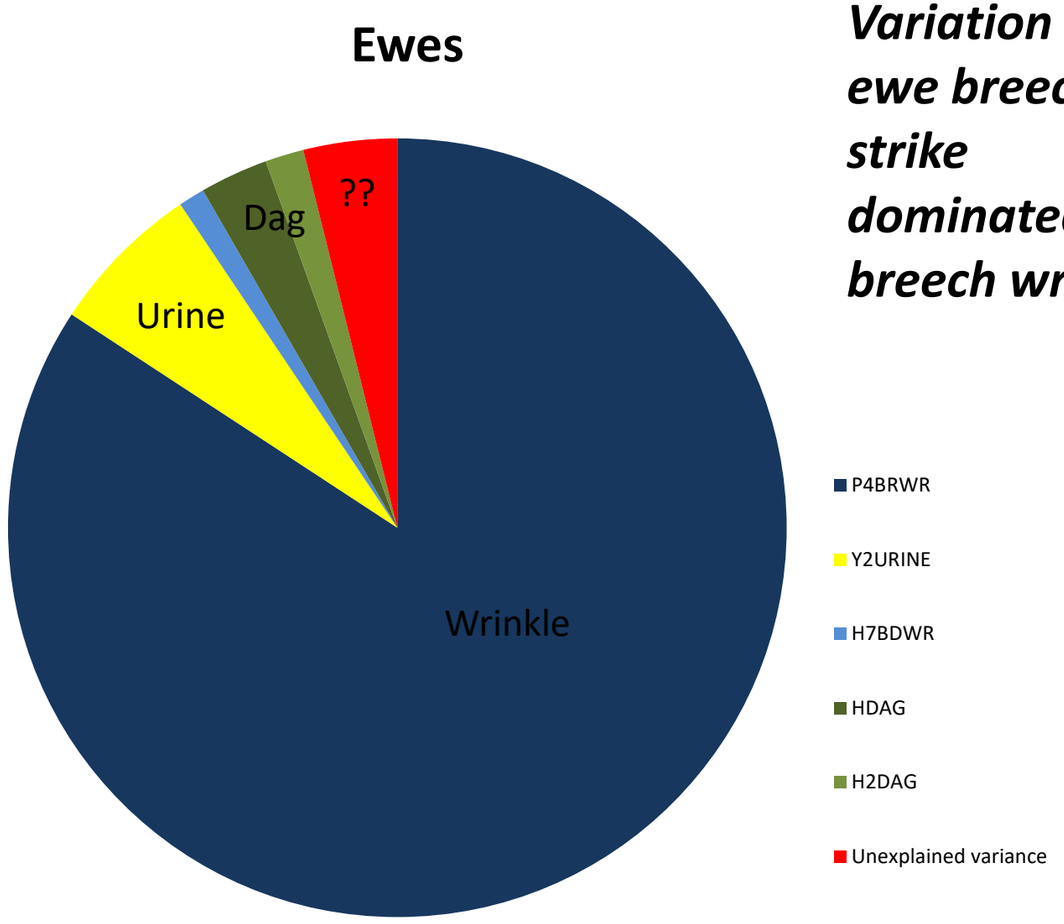
- What are the risk traits
- Merino Breed ASBV trends
- Merino Type ASBV trends
  - Dual Purpose
  - Fine
  - Super Fine
- Dohne Trends
- Other measures

Where to from here?

Industry Progress in Breeding for Breech Strike Resistance – Risk Traits

Variation in ram breech strike dominated by unexplained factors

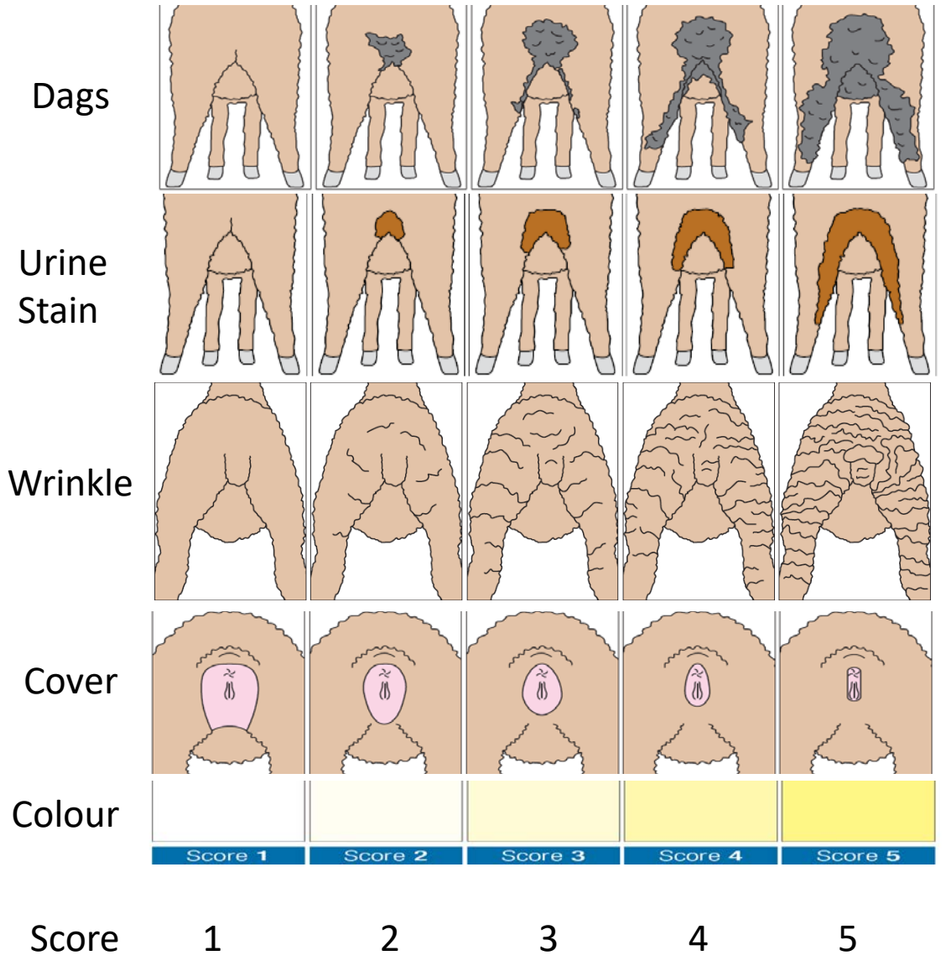




Variation in ewe breech strike dominated by breech wrinkle

Source: AWI Breeding for Breech Strike Resistance Project, DAFWA Mt Barker 2010 to 2013

Industry Progress in Breeding for Breech Strike Resistance – Risk Traits



National Breech Flystrike RD&E Technical Update 2018

Trait Leader	%	EBWR	EBCOV	LDAG
	Top	-1.5	-1.3	-0.7
	Top 1%	-1.0	-0.7	-0.4
	Top 5%	-0.8	-0.5	-0.3
	Top 10%	-0.7	-0.4	-0.3
	Top 20%	-0.5	-0.3	-0.2
	Top 30%	-0.4	-0.2	-0.1
	Top 40%	-0.2	-0.2	-0.1
	Ave 50%	-0.1	-0.1	-0.1
	Bot 40%	-0.1	-0.1	0.0
	Bot 30%	0.1	0.0	0.0
	Bot 20%	0.2	0.1	0.1
	Bot 10%	0.4	0.2	0.2
	Bottom	1.6	1.3	1.0

Source: Sheep Genetics

Industry Progress in Breeding for Breech Strike Resistance – Genetic Trends

Merino Breed ASBVs

Gains

YEAR	Animal No	AWT	FAT	EMD	AGFW	AFD	ASL	ASS	WEC	NLW	EBWR	ECOV	LDAG	FPP	MPP	DPP
Drop	Number	Kg	mm	mm	%	FD	mm	N/Kt	%	%	Score	Score	Score	Index	Index	Index
2001	74,552	-0.3	-0.02	0.11	-0.1	-1.2	-1.4	-0.3	2.2	-1.8%	-0.1	-0.1	0.0	119.1	117.0	115.0
2006	63,286	1.1	0.02	0.25	0.8	-1.2	0.7	0.1	-5.2	-2.0%	-0.1	0.0	0.0	121.9	121.3	119.9
2011	83,674	2.1	0.02	0.34	2.5	-1.1	3.1	0.2	-6.6	-1.7%	-0.2	-0.1	0.0	124.0	125.6	125.1
2016	109,074	3.0	0.02	0.34	5.5	-1.0	5.0	0.3	-11.8	0.8%	-0.2	-0.1	0.0	129.7	135.3	135.8

Source – Sheep Genetics June 2018

Industry Progress in Breeding for Breech Strike Resistance – Genetic Trends

Medium Merino Type ASBVs

YEAR	Animal No	AWT	FAT	EMD	AGFW	AFD	ASL	ASS	WEC	NLW	EBWR	ECOV	LDAG	FPP	MPP	DPP
Drop	Number	Kg	mm	mm	%	FD	mm	N/Kt	%	%	Score	Score	Score	Index	Index	Index
2001	10,756	2.0	-0.2	-0.5	5.5	-0.1	2.5	-0.3	0.8	1.5%	-0.2	0.0	0.1			122.1
2006	9,407	3.8	0.1	0.5	4.3	-0.3	6.1	-0.2	-12.4	2.4%	-0.3	-0.1	0.1			129.3
2011	16,592	4.0	0.1	0.6	3.9	-0.5	8.2	-0.3	-15.6	0.5%	-0.4	-0.1	0.0			129.7
2016	24,870	4.1	0.0	0.4	7.0	-0.6	8.0	-0.6	-26.1	2.9%	-0.7	-0.3	-0.1			137.3

Source – Sheep Genetics June 2018

Industry Progress in Breeding for Breech Strike Resistance – Genetic Trends

Fine Merino Type ASBVs

YEAR	Animal No	AWT	FAT	EMD	AGFW	AFD	ASL	ASS	WEC	NLW	EBWR	ECOV	LDAG	FPP	MPP	DPP
Drop	Number	Kg	mm	mm	%	FD	mm	N/Kt	%	%	Score	Score	Score	Index	Index	Index
2001	50,454	0.2	-0.05	0.03	4.0	-1.0	-0.1	-0.4	4.2	-2.0%	0.0	-0.1	0.0		123.7	
2006	41,476	1.4	-0.02	0.16	4.7	-0.9	2.3	0.2	-5.8	-1.9%	-0.1	-0.1	0.0		126.6	
2011	52,932	2.3	0.01	0.30	4.6	-1.0	4.0	0.4	-2.3	-0.7%	-0.1	-0.1	0.0		130.0	
2016	59,181	3.2	0.01	0.32	7.0	-1.0	5.7	0.6	-8.3	2.7%	-0.2	-0.1	0.0		140.0	

Source – Sheep Genetics June 2018

Industry Progress in Breeding for Breech Strike Resistance – Genetic Trends

Super Fine Merino Type ASBVs

YEAR	Animal No	AWT	FAT	EMD	AGFW	AFD	ASL	ASS	WEC	NLW	EBWR	ECOV	LDAG	FPP	MPP	DPP
Drop	Number	Kg	mm	mm	%	FD	mm	N/Kt	%	%	Score	Score	Score	Index	Index	Index
2001	22,485	-2.5	0.04	0.31	-10.0	-2.1	-5.3	-0.3	3.3	-2.4%	-0.1	-0.1	0.1	114.7		
2006	17,767	-1.8	0.05	0.20	-8.2	-2.3	-4.8	-0.0	-2.3	-5.0%	-0.1	0.0	0.0	120.0		
2011	15,033	-0.8	-0.01	0.09	-4.8	-2.3	-4.1	-0.1	-6.1	-5.3%	0.0	0.1	0.1	124.8		
2016	15,039	0.5	-0.02	0.14	-0.1	-2.1	-1.7	0.1	-20.8	-3.9%	0.2	0.1	0.0	131.8		

Source – Sheep Genetics June 2018

Industry Progress in Breeding for Breech Strike Resistance – Genetic Trends

Dohne ASBVs (not comparable to Merino ASBVs)

YEAR	Animal No	AWT	FAT	EMD	AGFW	AFD	ASL	ASS	WEC	NLW	EBWR	ECOV	LDAG	FPP	MPP	DPP
Drop	Number	Kg	mm	mm	%	FD	mm	N/Kt	%	%	Score	Score	Score	Index	Index	Index
2001	16,457	0.9	0.02	0.25	0.0	-0.3			3.7	0.5%	-	0.0	0.0			107.1
2006	34,296	1.9	0.04	0.34	-0.0	-0.4			3.8	0.6%	-	0.0	0.0			111.6
2011	20,306	2.7	0.05	0.50	0.4	-0.3			6.1	1.3%	-	0.0	0.0			115.9
2016	13,495	3.8	0.07	0.75	1.5	-0.4			6.1	3.0%	-	0.1	0.0			127.2

NM studs have difficulty collecting Wrinkle data given “no or little variation”

Source – Sheep Genetics June 2018

Industry Progress in Breeding for Breech Strike Resistance – Genetic Trends

Summary 1

- Trends are responding to clear market forces, worms, fleece weight, body weight
  - On farm cost of worms 2.5 times the cost of fly strike
  - Improved wool market has increased demand for higher fleece weight
  - On going demand for bigger Merinos

- **Mediums type showing impressive gains for improved breech traits** (Due to NM and demand for ewes suited to prime lamb production)

- No significant trend for Merino fat & muscle in the last 10 years (part linked to fleece weight)

Source – Sheep Genetics June 2018

Industry Progress in Breeding for Breech Strike Resistance – Genetic Trends

Summary 2

- Dohne; strong muscle and body weight trend
- Large gain in fleece weight for Super Fines (to stay viable) impacting on breech traits
- New ram breeders who join the “Breeding Value” system can favourably or unfavourably impact on genetic trends and do mask the gains that can be made at the individual ram breeder level. Breeders in the top 25% percentile for an Index are collectively making higher annual gains than those in the lower percentiles, (due mostly to deeper pedigrees with information and knowledge in how to best create and use breeding values.)
- **Breech traits are still new in genetic terms (first released late 2009)**

Source – Sheep Genetics June 2018

Industry Progress in Breeding for Breech Strike Resistance – Sire Web Search

	%	EBWR	EBCOV	LDAG
	Top	-1.5	-1.3	-0.7
	Top 1%	-1.0	-0.7	-0.4
	Top 5%	-0.8	-0.5	-0.3
Trait Leader	Top 10%	-0.7	-0.4	-0.3
	Top 20%	-0.5	-0.3	-0.2
	Top 30%	-0.4	-0.2	-0.1
	Top 40%	-0.2	-0.2	-0.1
	Ave 50%	-0.1	-0.1	-0.1
	Bot 40%	-0.1	-0.1	0.0
	Bot 30%	0.1	0.0	0.0
	Bot 20%	0.2	0.1	0.1
	Bot 10%	0.4	0.2	0.2
	Bottom	1.6	1.3	1.0

Source: Sheep Genetics

What are target ASBVs for NM without undue reliance on chemicals?

Wrinkle; -0.3 to -1.0?

Dag? Important in high dag country, ….. irrelevant in low dag country

Every 0.1 reduction improves welfare.
The lower the initial score, the more effective mulseing is in reducing risk.

Industry Progress in Breeding for Breech Strike Resistance – Sire Web Search

MERINOSELECT WEBSITE CURRENT SIRE SEARCH				
Web Search Criteria Number of Current Sires Top 10%	**Merino Breed MP+ Index**	**Medium Type DP+ Index**	**Fine Type MP+ Index**	**Super Fine Type FP+ Index**
Index Trait Leader (ITL)	**541**	**139**	**336**	**90**
ITL & Wrinkle Trait Leader	**32 (6%)**	**32 (23%)**	**20 (6%)**	**0 (0%)**
ITL & Wrinkle & Cover	**8**	**5**	**7**	**0**
ITL & Wrinkle & Cover & Dags	**3**	**3**	**2**	**0**

Source: Sheep Genetics

Very difficult to find sires in top 10% for index and breech traits

Industry Progress in Breeding for Breech Strike Resistance – Sire Web Search

MERINOSELECT WEBSITE CURRENT SIRE SEARCH				
Web Search Criteria Number of Current Sires Top 20%	**Merino Breed MP+ Index**	**Medium Type DP+ Index**	**Fine Type MP+ Index**	**Super Fine Type FP+ Index**
Index Top 20%	**839**	**247**	**508**	**149**
Index and Wrinkle	**109 (13%)**	**90 (36%)**	**50 (10%)**	**4 (3%)**
Index, Wrinkle & Cover	**24**	**20**	**20**	**0**
Index, Wrinkle, Cover & Dags	**11**	**4**	**10**	**0**

Source: Sheep Genetics

Still difficult to find sires in top 20% for index and breech traits, especially for Super Fine Type, need to outcross with Fine Types

Industry Progress in Breeding for Breech Strike Resistance – Sire Web Search

MERINOSELECT WEBSITE CURRENT SIRE SEARCH				
Web Search Criteria Number of Current Sires Top 20%	Merino Breed MP+	Medium Type DP+	Fine Type MP+	Super Fine Type FP+
Index	839	247	508	149
Index and Wrinkle	109 (13%)	90 (36%)	50 (10%)	4 (3%)
Index, Wrinkle & Cover	24	20	20	0
Index, Wrinkle, Cover & Dags	11	4	10	0

Source: Sheep Genetics

Add in YWEC @ top 20% and No. of sires fall from 90 to just 2
Not easy even in Mediums in high worm and dag country.
So top 20% still too high, need to lower to top 30% or 40%

Value in index selection approach rather than independent culling over time, if welfare enhanced indexes are possible in future

Industry Progress in Breeding for Breech Strike Resistance – Other

Other Trends

- Increasing breech trait records; Records per year in MERINOSELECT

DROP	WRINKLE	COVER	DAG
2001	7,689	2,230	2,817
2006	12,784	10,819	8,147
2011	38,418	33,451	23,002
2016	33,575	27,887	22,859

Source Sheep Genetics

- Swing to Polls, reduction in Poll Strike
- Anecdotal reduction in Body Strike (reduced FD & FDCV over the last 30 years)

Source – Sheep Genetics June 2018

Industry Progress in Breeding for Breech Strike Resistance – Where to from here

Where to from here

- Increase number of animals assessed for breech traits, increase finding curve benders
- Add neck & body wrinkle to breech wrinkle ASBV (assist NM Merino & Dohne Studs, **)
- Create Urine Stain and Faecal Consistency ASBVs
- Find unexplained factors, may reduce emphasis on wrinkle and dags
- Create welfare enhanced indexes, an improvement on using independent culling levels
- Increase focus on increasing the number of adult age records
- Improve worm egg count monitoring at lower burdens
- Promote high fleece weight, low breech trait sires **
- Publish ram breeder average ASBVs for all traits, similar to wether trials

Source – Sheep Genetics June 2018

Industry Progress in Breeding for Breech Strike Resistance – Where to from here

Where to from here

- Improve genomic enhanced breech and flystrike traits
- There is an ASBV advantage where breeding objectives have major antagonistic traits
- More objective classification of “Merino Types”
- Complication of differing genetic parameters between Types (Super Fine)
- Improve results from AI, cheaper AI, sexed semen

- **An “alternative” has been commercialized; further fine tuning needed**

Source – Sheep Genetics June 2018

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