

Genetics update

New Merino genetics R&D

The AWI Board has approved a new \$1 million, four-and-a-half-year project with the Animal Genetics and Breeding Unit (AGBU) to fund Merino Lifetime Productivity project analysis and Merino genetic benchmarking R&D.

Merino Lifetime Productivity R&D

The Merino Lifetime Productivity (MLP) Analysis and Reporting Plan Version 2 has been established in consultation with industry and is available on the AWI website at wool.com/mlp.

The MLP project is creating a very extensive dataset which will be used to address many future issues; however the initial focus will be assessing sire differences in lifetime productivity and profitability.

- How well do the current indexes reflect profitability?
- How important is it to add mature ewe weight, survival and resilience/robustness traits to the indexes?

- At what age(s) can accurate assessments of lifetime productivity be made?
- How important is it for ram breeders to collect repeat adult fleece, carcass, health and reproduction data? Can short cuts be made to reduce data collection costs?
- Can we improve the very early in life predictions of lifetime productivity, with and without DNA genotypes?
- What is the right balance (cost and accuracy) of visual assessments and objective assessments for both accuracy and cost effectiveness?
- What impact did the different site environments/ewe bases have on the expression of traits?
- Inclusion of welfare, resilience and feed efficiency outcomes into indexes.
- Creation of visual trait, faecal consistency and urine stain ASBVs.
- Lower average worm burden protocols for ASBVs.
- DNA Flock profiling and impact on wether trials.
- Genomics of dark fibre and flystrike.
- Investigate the collection of genomic reference flock data using R&D and MERINOSELECT member flocks.

The prioritisation of this work will be done in consultation and collaboration with MLA and Sheep Genetics, OVIS owners and AGBU.

AGBU have commenced advertising for a new full time postdoctoral position to increase the AGBU staff numbers to conduct the above work.

Merino Genetic Benchmarking R&D

The focus of this work will be on R&D involving MERINOSELECT, sire evaluation, wether trials and flystrike genomics:

- Adoption of the outcomes of the MLP project.

Footrot ASBVs

New Zealand has been running a Central Testing Program for Footrot (see www.perfectsheep.co.nz/central-progeny-test) for nearly a decade, and ASBVs for footrot for the tested sires are published on the MERINOSELECT website. (Contact Sheep Genetics at info@sheepgenetics.org.au.)

There is interest to determine if this New Zealand data is relevant to Australian conditions. The 2016 wether progeny of the Pingelly MLP sires were assessed last spring in south-western Victoria, with the work funded by Murdoch University and Animal Health Australia (AHA). Three of the MLP sires already had progeny tested in New Zealand and they provide a valuable link to the New Zealand data. This spring, the wether progeny of the sires used for the Pingelly 2017 drop will be assessed and further validated. Several high profile MLP sires used in 2016 sires have performed well for footrot resistance.

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Table 2: Annual genetic trend of key MERINOSELECT ASBVs and record numbers for three breech traits

Year of birth	YGFW ASBV	ACFW ASBV	YFD ASBV	ASL ASBV	ASS ASBV	ACUV ASBV	ADCV ASBV
2005	1.8	3.4	-1.2	0.3	0.1	0.1	-0.3
2006	2.5	3.9	-1.2	0.8	0.2	0.0	-0.3
2007	3.3	4.4	-1.2	1.1	0.2	0.1	-0.3
2008	4.1	5.0	-1.2	1.6	0.4	-0.2	-0.4
2009	4.3	5.1	-1.2	1.8	0.6	-0.3	-0.4
2010	5.2	6.3	-1.1	2.7	0.3	-1.4	-0.4
2011	5.3	6.4	-1.1	3.2	0.4	-1.8	-0.4
2012	5.8	7.2	-1.1	3.5	0.5	-1.9	-0.4
2013	7.0	8.2	-1.1	3.7	0.6	-2.1	-0.4
2014	7.7	9.0	-1.1	4.2	0.6	-2.4	-0.4
2015	9.0	10.1	-1.0	4.5	0.7	-2.8	-0.5
2016	9.6	10.7	-1.0	4.6	0.7	-3.0	-0.5
2017	11.0	12.0	-1.0	5.1	0.5	-3.5	-0.4
2018	11.7	12.6	-1.0	5.3	0.6	-3.7	-0.5
2019	13.3	14.1	-0.9	5.7	0.6	-4.2	-0.4
2020	15.0	15.5	-0.9	7.0	0.7	-5.1	-0.5

Source Sheep Genetics June 2021.
Note, there are still outstanding records for the 2020 drop.



MERINOSELECT genetic trends

Table 2 below shows the recent Merino Breed MERINOSELECT genetic trends for a range of key traits. It shows that fleece weight, staple length, staple strength, fibre diameter variability, muscle, worm resistance, number of lambs weaned, wrinkle and MP+ index are all improving.

The table also shows a large increase in the number of records being collected for the three breech traits: wrinkle, cover and dag. The large increase in breech trait recording will assist the industry find rams and ewes that are trait leaders for fleece weight, index as well as the breech traits. The increasing number of records is hiding the advances being made by individual breeders and also the breech trait variation that exists in the Merino (see Table 1).

There are considerable differences between the three main types of Merino for the breech trait ASBVs. For the 2019 drop animals, the average wrinkle ASBV for medium wool type Merinos is -0.44, for fine wool type Merinos is -0.10 and for superfine type Merinos is +0.17. The Merino breed average for 2019 is -0.19.

From a national trial across 200 sites, mulesing reduced wrinkle by 1.0 score and dags by 0.4 score, the higher the natural starting score the larger the reduction. There are two current sires that are -1.0 for wrinkle and -0.4 for dag, both are strong wool sires (+0.0 YFD). There are nine current sires that are trait leaders for Wrinkle, Dag and MP+ Index; they are also high micron sires averaging -0.2 YFD.

In country that promotes the expression of wrinkle (high wrinkle country), target ASBVs for Breech Wrinkle are -0.8 to -1.0, in moderate wrinkle country -0.7 and in low wrinkle country around -0.3.

For some woolgrowers, breeding can largely replace mulesing; for others, a much greater reliance on other tools will be required to do so.

More information www.wool.com/genetic-evaluation

Table1: Merino percentiles for 2020 drop year

PERCENTILE RANGE	BREECH WRINKLE	BREECH COVER	LATE DAG	YEARLING FIBRE DIAMETER
TOP 1%	-1.3	-0.8	-0.5	-3.2
TOP 10%	-0.9	-0.5	-0.3	-2.2
TOP 20%	-0.7	-0.3	-0.2	-1.7
AVERAGE	-0.2	-0.1	-0.1	-1.0
TOP 70%	0.1	0.1	0.1	-0.5
TOP 90%	0.5	0.2	0.2	0.2

Source MERINOSELECT website July 2021

YWT ASBV	AWT ASBV	YFAT ASBV	YEMD ASBV	YWEC ASBV	NLW ASBV	EBWR ASBV	EBWR Records	EBCOV ASBV	EBCOV Records	LDAG ASBV	LDAG Records	MPP Index
1.2	0.7	0.0	0.3	-1.3	-1.7%	-0.14	1,110	-0.07	1,036	-0.05	2,347	121.7
1.6	1.1	0.1	0.3	-7.0	-1.4%	-0.13	2,654	-0.05	3,223	-0.04	2,731	123.0
1.7	1.2	0.1	0.3	-6.8	-1.0%	-0.08	3,398	-0.06	3,715	-0.03	6,214	124.8
2.0	1.4	0.1	0.3	-6.0	-0.8%	-0.07	13,687	-0.04	16,621	-0.03	6,075	126.5
2.3	1.7	0.1	0.4	-7.2	-0.2%	-0.12	19,813	-0.06	15,147	-0.04	6,390	127.4
2.6	2.0	0.1	0.4	-8.1	-0.7%	-0.11	19,284	-0.06	15,270	-0.05	5,164	128.6
2.8	2.1	0.1	0.4	-7.9	-0.5%	-0.15	24,059	-0.08	18,611	-0.04	6,511	128.6
3.0	2.3	0.1	0.4	-8.2	-0.4%	-0.13	26,219	-0.07	20,884	-0.02	7,914	130.5
3.1	2.4	0.1	0.4	-9.2	-0.6%	-0.12	19,845	-0.07	18,310	-0.05	10,806	132.1
3.3	2.6	0.1	0.4	-10.2	-0.2%	-0.14	20,465	-0.10	15,314	-0.03	10,491	133.8
3.7	3.0	0.1	0.4	-12.2	-0.1%	-0.11	19,203	-0.10	15,753	-0.04	11,420	136.2
4.0	3.2	0.1	0.4	-12.1	-0.2%	-0.14	23,229	-0.09	21,502	-0.04	10,300	137.6
4.4	3.6	0.1	0.4	-10.4	0.2%	-0.16	28,708	-0.11	24,550	-0.06	11,359	140.4
4.6	3.8	0.1	0.4	-11.7	1.1%	-0.17	28,141	-0.09	23,323	-0.06	10,277	142.6
5.0	4.1	0.1	0.4	-10.5	1.8%	-0.19	41,059	-0.10	30,161	-0.06	20,926	146.3
5.7	4.7	0.2	0.6	-11.1	3.6%	-0.26	52,789	-0.12	36,897	-0.07	7,606	150.4

YGFW Yearling Greasy Fleece Weight ACFW Adult Clean Fleece Weight YFD Yearling Fibre Diameter ASL Adult Staple Length ASS Adult Staple Strength AUCV Adult Curvature ADCV Adult Fibre Diameter CV YWT Yearling Body Weight AWT Adult Body Weight YFAT Yearling Fat YEMD Yearling Eye Muscle Depth YWEC Yearling Worm Egg Count NLW Number of Lambs Weaned EBWR Early Breech Wrinkle EBCOV Early Breech Cover LDAG Late Dag MPP Merino Production Plus