Merino Lifetime Productivity Project Newsletter No.1

Merino Lifetime Productivity Project to address key industry questions

Understanding and maximising lifetime performance is critical to increasing productivity and profits for woolgrowers.

Australian Wool Innovation (AWI) and the Australian Merino Sire Evaluation Association (AMSEA) have teamed up with five sire evaluation sites to deliver the Merino Lifetime Productivity Project (MLP) from 2015 to 2025. The AWI funded project is valued at $7 million with an additional $5 million in support from all project partners.

The MLP project has been designed to capture lifetime Merino ewe data from diverse environments, genetics and Merino types to help the Australian Merino industry better select for and deliver improved lifetime performance outcomes.

2017 Drop MerinoLink F1 Ewes being classed by Bill Walker in the left hand race and Nathan King on the right. Assistants Rich Keniry, Anne Ramsay & Sally Martin.

2017 Drop Pingelly F1 ewes in green spring pastures at 'Ridgefield' UWA, Pingelly WA, September 2018.

The project is an opportunity to answer many of the industry's questions in relation to selection and ewe lifetime performance, such as:

- Is it possible to select for lifetime productivity at a young age using raw data, breeding values, genomically enhanced breeding values, visual classing or a combination of industry approaches?

- What is the impact of selecting for wool, growth, reproduction, welfare and carcase traits on the productivity of Merino ewes over their lifetime?

- Why do some animals perform year in and year out, while others fade over time?

- Are there new ways to better predict superior lifetime performance?

The ewe progeny from 135 industry sires (known as F1 ewes) will be run across five cooperating sites and will be assessed annually for the traits in the table over the page. Field days at each of the sites also provide a chance for producers to inspect the F1 ewes first hand. All ewes are retained in the project for life, with culling for welfare purposes only.
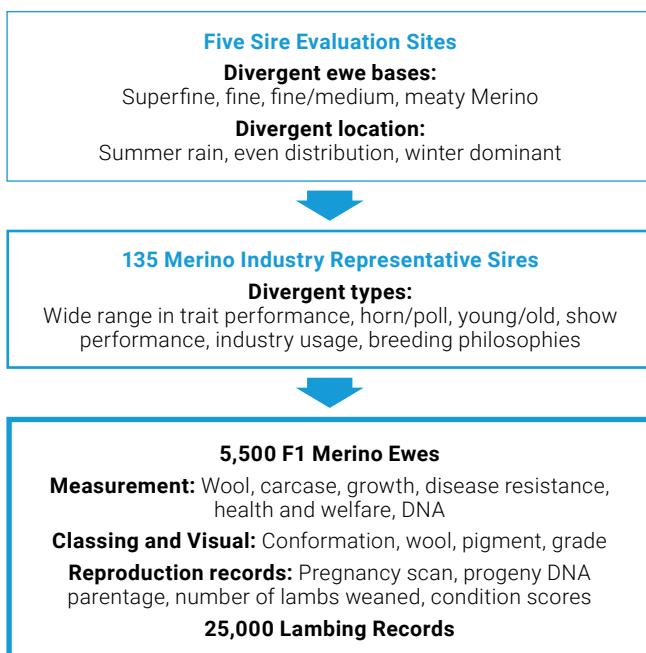
DECEMBER 2018

Traits to be assessed annually

Wool measurements	Fleece weight, yield, fibre diameter, fibre diameter standard deviation (SD), fibre diameter coefficient of variation (CV), staple strength, staple length, comfort factor and curvature
Growth and carcase	Live weight, eye muscle and fat depth
Disease and welfare	Worm egg count, faecal moisture, dag, urine stain, breech cover, crutch cover, breech wrinkle
Visual wool traits	Fleece rot, wool colour, wool character, dust penetration, staple weathering, staple structure, fibre pigmentation, non-fibre pigmentation, recessive black and random spot
Visual conformation traits	Face cover, jaw, legs/feet, shoulder/back, body wrinkle
Classing	Two classings by independent sheep classers
Joining, pregnancy and lambing	Sire, dam, pregnancy scanning, number of lambs weaned, live weight and condition score at pre-joining, pregnancy scanning, pre-lambing, weaning

The F1 ewes will be syndicate joined to Merino sires from 18 months of age and all reproduction data will be recorded through 4-5 joinings and annual shearings.

The MLP sires (sires of the F1 ewes) have been selected from all breeding philosophies including leaders in a wide range of breeding value traits, high performance industry impact sires and major show winners with representation from all wool and skin types.

The resulting comprehensive dataset will fill important data gaps and allow the industry to learn more about the lifetime relationships between wool, carcase, disease resistance, survival and fertility. The process that will lead to the accumulation of data is described in the figure below:

Five Sire Evaluation Sites
Divergent ewe bases:
Superfine, fine, fine/medium, meaty Merino
Divergent location:
Summer rain, even distribution, winter dominant

▼

135 Merino Industry Representative Sires
Divergent types:
Wide range in trait performance, horn/poll, young/old, show performance, industry usage, breeding philosophies

▼

5,500 F1 Merino Ewes
Measurement: Wool, carcase, growth, disease resistance, health and welfare, DNA
Classing and Visual: Conformation, wool, pigment, grade
Reproduction records: Pregnancy scan, progeny DNA parentage, number of lambs weaned, condition scores
25,000 Lambing Records

This information will be used to better understand how current selection approaches relate to lifetime performance and how these approaches might be enhanced to deliver better selection outcomes at increasingly younger ages. This may also lead to the development of new selection tools or help to validate existing approaches.

Further information

More information about the project can be found at www.wool.com/MLP and www.merinosuperiorsires.com.au

The MLP newsletter will provide regular updates on the MLP research and results as they come to hand.
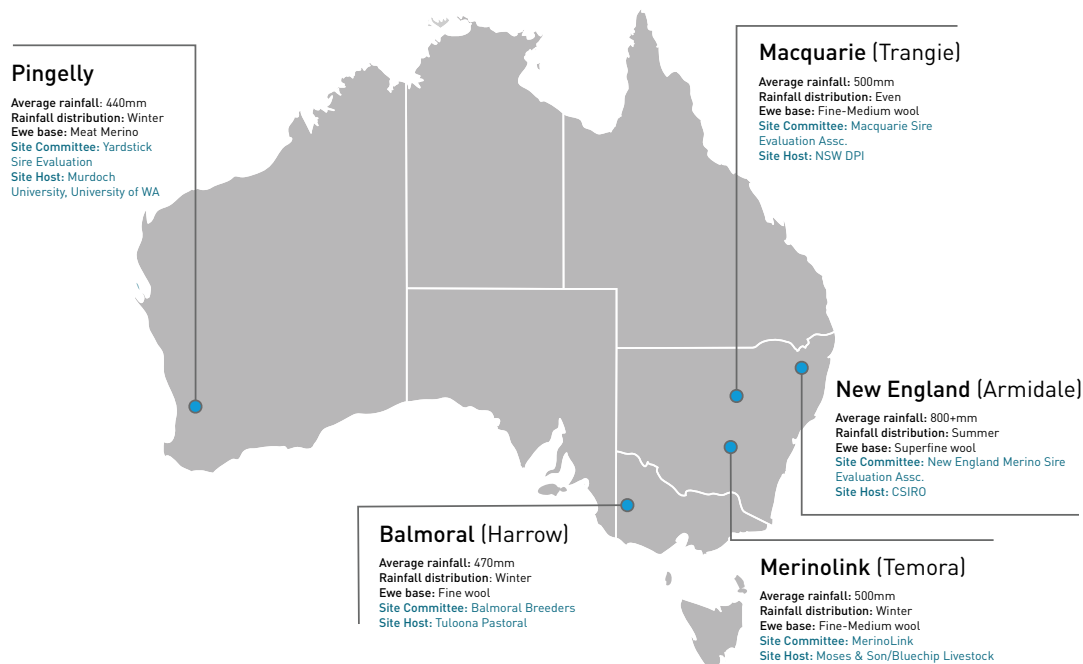
Further details are available through the MLP brochure: click here

Strength in MLP trial site diversity

Collaborating sites from across Australia play a critical role in the Merino Lifetime Productivity (MLP) Project by allowing Merino sires to be compared for a wide range of traits under different environmental conditions and ewe bases.

The five independent sire evaluation sites involved with MLP were selected to represent a range of environmental and production conditions, in particular climatic factors and pasture types. The ewe base was also taken into consideration to evaluate sire performance across diverse genetics and Merino types.

The sites collect and record data according to the Australian Merino Sire Evaluation Association (AMSEA) protocols, thus ensuring rigorous and independent measurement and visual assessment.

Pingelly
Average rainfall: 440mm
Rainfall distribution: Winter
Ewe base: Meat Merino
Site Committee: Yardstick Sire Evaluation
Site Host: Murdoch University, University of WA

Macquarie (Trangie)
Average rainfall: 500mm
Rainfall distribution: Even
Ewe base: Fine-Medium wool
Site Committee: Macquarie Sire Evaluation Assc.
Site Host: NSW DPI

New England (Armidale)
Average rainfall: 800+mm
Rainfall distribution: Summer
Ewe base: Superfine wool
Site Committee: New England Merino Sire Evaluation Assc.
Site Host: CSIRO

Balmoral (Harrow)
Average rainfall: 470mm
Rainfall distribution: Winter
Ewe base: Fine wool
Site Committee: Balmoral Breeders
Site Host: Tuloona Pastoral

Merinolink (Temora)
Average rainfall: 500mm
Rainfall distribution: Winter
Ewe base: Fine-Medium wool
Site Committee: MerinoLink
Site Host: Moses & Son/Bluechip Livestock

Pingelly

The Pingelly site operates at the University of Western Australia's (UWA) mixed enterprise research facility "Ridgefield", a 1,600 ha farm located south east of Perth near Pingelly, WA. The farm receives 425 mm of rain per year, mostly in winter, and has no irrigation. Pingelly is a non-mulesing site and the sheep are run at 10 DSE/ha.

2017 Drop Pingelly F1 Ewes being classed by Preston Clarke, assisted by Murdoch University student Bethany Hooper, at 'Ridgefield' UWA, Pingelly WA, November 2018.

The annual management program involves a February joining and has recently moved to a December shearing.

The ewe base is described as being a large framed, plain bodied, highly fertile animal with moderate wool cut. Over the past five years, there has been a greater emphasis on genetic fat, growth and muscling while maintaining wool cut and micron.

The flock averages 5 kg of 19 µm wool and produces weaning percentages between 100-115%. Ewes for the project were selected from the 'Ridgefield' commercial and Maternal Efficiency Flocks.

The objective guiding the classing of the project sheep is to select for:

- good conformation and constitution for easy care

- medium to large frames

- bright white, stylish wool free from colour and water faults

- a balance between wool production and body size for dual income streams.

The flock is managed by Murdoch University operating in partnership with the UWA and the Yardstick Sire Evaluation group.

Balmoral

The Balmoral Sire Evaluation Group has been managing sire evaluation trials in Western Victoria for over twenty years. This includes the MLP Site at "Tuloona", Harrow, hosted by the Craig family. The site receives predominantly winter rainfall, with an annual average of around 470 mm. Tuloona is a commercial farming business operating 42,000 DSE (plus cropping) and ceased mulesing in 2007.

2015 Drop Balmoral F1 Ewes with their 2nd drop of lambs ready for lifetime assessment at 'Tuloona', Harrow Victoria, November 2018.

Balmoral 2018 MLP Field Day in February 2018 at 'Tuloona', Harrow Victoria.

The objective guiding the classing of the project sheep is to select for animals that are productive and well grown, with sound conformation and carrying heavy fine wool fleeces of good character, colour and nourishment suitable for the western Victorian environment. The annual management program involves August lambing and February shearing.

Base ewes were sourced from the Tuloona commercial flock. Tuloona was a traditional ultra-fine wool flock that has in recent years focussed on improving reproduction, early growth, resistance to fly strike and increasing wool production.

MerinoLink

The MerinoLink site is operated at "The Vale", approximately 20 km from Temora in NSW, by Bluechip Livestock and MerinoLink. "The Vale" is a commercial farming operation owned by Moses and Son. Sheep are run on improved pastures which receive approximately 500 mm of winter effective rainfall.

MLP Project Manager, Anne Ramsay and MerinoLink, Temora MLP Site Manager, Sally Martin.

MerinoLink 2018 MLP Field Day in March 2018, Temora NSW.

The annual management program involves a December joining and March shearing with the longer-term plan to move to an annual shearing in October.

The base ewes used to generate the 2016 and 2017 drops were sourced from five flocks allocated evenly across all sire groups. The foundation ewe base consists of animals from performance recorded flocks including:

• Bluechip (progeny from a previous sire evaluation)

• Pooginook

• Bundilla

• Centre Plus

• A line of ewes from commercial clients of Pooginook.

The site's classing objective is to select for growth rate (in particular to meet a minimum joining weight at 18 months of age), structure and wool quality traits, including long, soft-handling wool with high fleece weight.

Macquarie

The Macquarie site is based at NSW DPI's Trangie Agricultural Research Centre (TARC), 7 km north west of Trangie in central western NSW. The pasture is dominated by native perennial grasses and herbage, with some introduced annual species and lucerne. The site has a non-seasonal rainfall pattern receiving around 500 mm annually.

The annual management program involves a December joining and October shearing.

2018 Drop Macquarie F1 Ewes experiencing the current dry conditions at Trangie Agricultural Research Centre, NSW DPI.

Macquarie Merino Sire Evaluation Association Chairman, Matthew Coddington and NSW DPI MLP Site Manager, Kathryn Egerton-Warburton.

The base ewes were sourced from commercial clients of two bloodlines, Towalba and Centre Plus, representing contrasting skin type and levels of wrinkle. The Towalba ewes average 21 μm and the Centre Plus ewes 18 μm within their home environments. Ewes from the two bloodlines were equally allocated to each sire.

The classing objective for the project sheep is to produce a commercially viable flock suited to the climate and pasture conditions of the western slopes and plains of NSW. This includes sheep that:

- have sound conformation

- do not require high management inputs

- are highly productive (fleece weight) relative to a medium wool type

- have good carcase and fertility characteristics so that ewes may be suitable as first cross or prime lamb dams.

The site is hosted by the NSW Department of Primary Industries in partnership with the Macquarie Sire Evaluation Association.

New England

The New England site operates at CSIRO's "Chiswick" property located between Uralla and Armidale on the New England Highway. The property is an agricultural research station with a long history of pasture and grazing livestock research.

The predominantly improved pastures with a carrying capacity of 9.0 DSE/ha and generally receives over 800 mm of summer dominant rainfall.

The flock is non-mulesed and the annual management program involves an April joining and July shearing.

The ewe base is a typical commercial superfine/fine wool type based on local performance recorded studs with some ewes sourced from the CSIRO's breech strike resistant flock.

The classing objective for the project sheep is to produce sheep that have productive fleeces for the superfine type (14-17.5 μm), are structurally sound and capable of performing under the New England's climatic, pastoral and environmental conditions. Sheep should also:

- be well grown

- have sound conformation

- have wool of excellent white colour, well defined character and be free of fleece rot.

The site is hosted by CSIRO who operate in partnership with the New England Merino Sire Evaluation Association.

New England CSIRO, Chiswick MLP Site Manager, Jen Smith and New England Merino Sire Evaluation Association Chairman, Duncan Lance.

New England 2018 MLP Field Day, August 2018, CSIRO Chiswick NSW.

MLP and sire evaluation

Sire evaluation trials are conducted for the first two years of the MLP project at all five sites. Following the sire evaluation phase, the sites continue to track the performance of the F1 ewe progeny as they proceed through four to five joinings and annual shearings.

Summary of Merino Lifetime Productivity Project sites

SITE	HOSTS	EWE BASE	LAMBING L SHEARING S	SITE CHAIR SITE MANAGER
Balmoral Harrow, Vic	Balmoral Sire Evaluation Association & Tuloona Pastoral Co	17 µm, fine wool base, selecting for growth, fertility and wool cut	L: August S: February	**Mark Bunge** M: 0409 962 248 **Tom Silcock** M: 0419 882 239
MerinoLink Temora, NSW	MerinoLink Moses & Son	19 µm, previous sire evaluation progeny, and studs with ASBVs	L: June S: March (moving to October)	**Richard Keniry** M: 0427 878 541 **Sally Martin** M: 0400 782 477
Pingelly WA	Yardstick Sire Evaluation Association & Murdoch University & University of WA	19 µm, Merino ewes	L: July S: December	**Brett Jones** M: 0428 323 012 **Bron Clarke** M: 0418 957 293
Macquarie Trangie, NSW	Macquarie Sire Evaluation Association & NSW DPI	Two types, 18-21 µm, Centre Plus Poll & Towalba bloodlines	L: May S: October	**Matthew Coddington** M: 0428 635 386 **Kathryn Warburton** M: 0429 943 708
New England Armidale, NSW	New England Merino Sire Evaluation Association & CSIRO	17 µm, ultra-fine flock	L: September S: July	**Duncan Lance** M: 0447 297 135 **Jen Smith** Ph: 02 6776 1381

Further information

The sites conduct annual site field days which provide a chance for producers to inspect the F1 ewes first hand.

Upcoming field days include:

- **Balmoral – 22 February 2019**
  (this will be hosted at a different site to the MLP site but will provide an update on MLP results, MLP sheep will not be on display)

- **MerinoLink – 15 March 2019**

- **Macquarie – 10 July 2019**

More information about the MLP project can be found at www.wool.com/MLP and www.merinosuperiorsires.com.au

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Sire listings by site and year of drop

BALMORAL 2015	BALMORAL 2016
Billandri Poll, 130087	Centre Plus Poll, 707115
Bogo, 111424	Glen Holme , 141077 (Dohne)
Bundaleer Poll, 13V741	GRASS Merino, 142194 (R4)
Bundilla, 111265	Greendale, 120012*
Centre Plus Poll, 207316	Greenfields Poll, 140345
Darriwell, 130941	Greenland, 2.366
Glenpaen, 120042	Hannaton Poll, 120046
Greenfields Poll, 130599	Hazeldean, 11.3542 (Hugh)
Hazeldean, 11.43	Kiandra Poll, 140757
Kurra-Wirra, SR5681	Kooringal, 130519
Leahcim Poll, 090918 L*	Kurra-Wirra, SB5585
Leahcim Poll, 123153	Leahcim Poll, 090918*
Merinotech WA Poll, 100081	Melrose, 12UGB060
Mokanger, 120092	Mumblebone, 130389
Moojepin, 100248 L	Mumblebone, 140026
Mumblebone, 130389	Nerstane, 100919
Mumblebone, 130850	One Oak No.2, R56*
Nareeb Nareeb, 130380	Stockman Poll, 090853 (Stilts)
Nerstane, 130467	Terrick West Poll, 122220
One Oak No.2, R56 L*	The Mountain Dam, 11/ESA004*
Roseville Park, 140019	Trefusis, 110482
The Mountain Dam, 11/ESA004	Tuckwood Poll, 131026
Tuckwood Poll, 121021	Wallaloo Park Poll, 120912
Yalgoo, 120043	Woodyarrup, 120175
Yiddinga, 130374	Yiddinga, 141989

PINGELLY 2016	PINGELLY 2017
Billandri Poll, 130641	Anderson Rams, 140474
Boolading Blues Poll, 120708	Barloo Poll, 140027 (Eureka)
Claypans Poll, 130597	Billandri Poll, 151280
East Mundulla, 090137 (Jonty)	Coromandel Poll, 130660
Ejanding Poll, 145096	Cranmore, 13.10
Haddon Rig, 2.715	Edale, 10Z266K
Hazeldean, 11.43*	Ingle Poll, 150087
Ingle Poll, 130387	Mianelup Poll, M00540 (Expo)
Leahcim Poll, 090918*	Moojepin, 120652
Merinotech WA Poll, 100081*	Moorundie Poll, NE73
Moojepin, 140377	Neearra Poll, 110264
One Oak No.2, R56*	Range View Poll, 5-680
Rhamily Poll, 110330 (Benny)	Trigger Vale Poll, 140477*
West Plains Poll, 110004 (Mercenary)	West Plains Poll, 110004 (Mercenary)*
Wyambeh Poll, 140141	Woodyarrup, 150329

MERINOLINK 2016	MERINOLINK 2017
Bella Lana, 130296	Bundilla Poll, 140055
Boyanga, 145112	Centre Plus Poll, 407185
Glen Donald, 120014	Collinsville Poll, 130545 (Apollo)*
Greendale, 120012	DT Kenilworth, WH13017
Leahcim Poll, 090918*	Greendale, 140141
One Oak No.2, R56 *	Lachlan Merinos Poll, 015305
Pastora Poll, 082893	Leahcim Poll, 132624
Poll Boonoke, 120020	Tallawong, 150280
Pooginook Poll, 140632	Toland Poll, 151058
Roseville Park, 140611	Trefusis, 150282
Trigger Vale Poll, 140477	Trigger Vale Poll, 140477*
Wattle Dale, 140754	Wallaloo Park Poll, 150422
Wurrook, 130149	West Plains Poll, 110004 (Mercenary)*

MACQUARIE 2017	MACQUARIE 2018
Centre Plus Poll, 707115 *	Anderson Rams, 150266
Collinsville Poll, 130545 (Apollo)	Centre Plus Poll, 707115*
Darriwell, 130941 *	Charinga, 130240 (Doc)
GRASS Merino, 122190 (P47) L	Glen Donald, 120014*
Gullen Gamble Poll, 120018	GRASS Merino, 141924 (R15)
Hazeldean, 13.4936	Gullen Gamble Poll, 14189
Kerin Poll, 151911	Haddon Rig, 2.715*
Moojepin, 120652 *	Hazeldean, 11.3542 (Hugh)*
Mumblebone, 151367	Kerin Poll, 160137
Roseville Park, 132933	Langdene, 160950
Trigger Vale Poll, 140477 *	Lewisdale Poll, 150010 (Monty)
Wanganella, 130816	Orrie Cowie, 140050 (Trojan)
West Plains Poll, 110004 (Mercenary)*	Roseville Park (Poll), 150039
Wilgunya, 121224	Stockman Poll, 130707 (Pioneer)
Willandra Poll, 140030 (Des)	Wanganella, 150610
	Willandra Poll, 160001

NEW ENGLAND 2017	NEW ENGLAND 2018
Connemara Poll, 140257	Alfoxton, 150430
Conrayn, MVB123	Avington Poll, 160047
Cressbrook, 140055	Bungulla, 160350
Egelabra, HEK 1.36	Clovernook Poll, 160095
Grindon, 150017	Cressbrook, 140055*
Karori, 140188	Eilan Donan, Harvey (5145)
Miramoona, 140012	Europambela, 120101
Mirani, 120021	Hillcreston Park Poll, 110143
Moorundie Poll, NE73*	Hilltop, HT Poll 156
Nerstane, 150073	Karori, 150222
Petali Poll, 150697	Nerstane, 150073*
Trefusis, 150282*	Petali Poll, 160849
Trigger Vale Poll, 140477*	Tallawong (Poll), 150280*
West Plains Poll, 110004 (Mercenary) L*	Wurrook, 130149*
Yalgoo, 150313	Yalgoo, 160070

L= Funded links to sire evaluation,
* = between MLP site linkage

Project Status

Each of the five MLP sites has now completed two years of artificial insemination to generate the F1 ewes that are the core focus of the MLP project.

The F1 progeny at three of the five sites have been naturally joined and all sites will have at least one of their two drops joined in 2019. All F1 progeny are being naturally mated annually to Merino ram syndicates to generate an industry dataset with extensive reproduction and adult records.

SITE	F1 EWE DROPS	F1 EWE STATUS
Balmoral Vic	2015	Three assessments completed Two drops of F2 lambs born and weaned
	2016	Two assessments completed One drop of F2 lambs born and weaned
MerinoLink NSW	2016	Two assessments completed One drop of F2 lambs born and weaned
	2017	One assessment completed, first joining December 2018
Pingelly WA	2016	Three assessments completed One drop of F2 lambs born and weaned
	2017	Two assessments completed, first joining February 2019
Macquarie NSW	2017	Two assessments completed, first joining December 2018
	2018	Weaned, first post weaning assessment in February 2019
New England NSW	2017	One assessment completed, first joining April 2019
	2018	Weaned, first assessment July/August 2019

Given the focus of exploring lifetime Merino performance, final project results will not be available until all 5,500 F1 ewes have been recorded through life. This will be after 2025.

In the interim, early project results are packaged as sire progeny performance reports and are available as standard sire evaluation site reports for the first two assessments in each drop. These reports are complemented by dedicated MLP Reports which include raw data, adjusted sire means and flock breeding values. Other observations will continue to be communicated via the MLP newsletter as they become available.

DNA testing sheds light on parentage

The MLP project opens the door to research into the factors that impact sire performance which may ultimately allow sire performance to be predicted with greater accuracy.

Through the life of the MLP project, all F1 ewes (daughters of 135 industry sires) will be syndicate joined 4-5 times. Syndicate joining is the process of joining a particular group of rams to a particular group of ewes, in this case through a natural mating program rather than via artificial insemination. DNA parentage will then be used to identify the sire and dam of their F2 progeny with the ultimate aim being to generate repeat reproduction records.

Early DNA parentage results for the joinings at three sites conducted through the MLP show that, within a syndicate, there are often rams that dominate.

Research previously undertaken by MerinoLink and co-funded by AWI showed that when the same syndicate was joined for a second time, the dominance patterns often change.
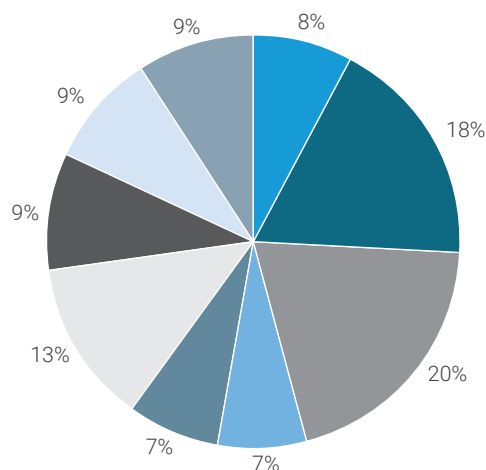
Balmoral 2017 F2 Lambs Per Sire
Range: 6 – 164 lambs
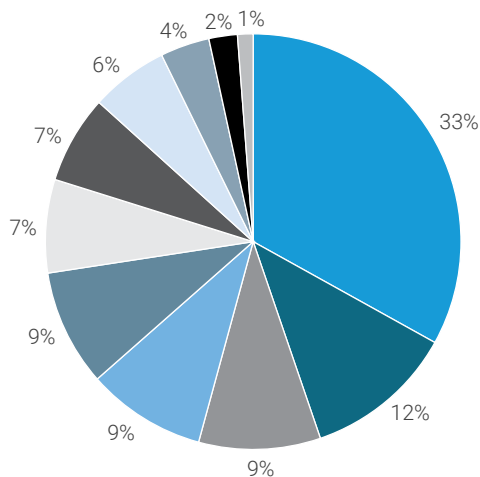
Pingelly 2018 F2 Lambs Per Sire
Range: 27 – 75 lambs

The following figures show the percentage of progeny per sire from maiden joinings at Balmoral (the 2015 F1 ewes in the 2017 joining) with a joining percentage of 1.9%, and MerinoLink and Pingelly (the 2016 F1 ewes, 2018 joining) both with a joining percentage of 2.3%.

These figures demonstrate the disproportionate contribution of dominant (high libido and serving capacity) sires relative to other sires within a syndicate. Of particular note is the sire at Balmoral who produced 33% of the progeny in 2017 amounting to 164 lambs, compared with only six lambs by another sire in the syndicate.

This observation, combined with ongoing assessment of parentage within the MLP syndicates, may have important implications for breeders who routinely use syndicate joinings. Unless the rams in the syndicate are of equal genetic merit, the outcome of the joining will reflect the genetic performance of the dominant rams.

Repeat records over time generated through MLP will provide an insight into whether joining percentages or other factors impact on sire dominance and its repeatability.

Another interesting observation from DNA parentage is that a significant proportion of twins are sired by two different sires. MerinoLink Site Manager, Sally Martin, confirmed that 32% of twins were sired by two

MerinoLink 2018 F2 Lambs Per Sire
Range: 3 – 88 lambs
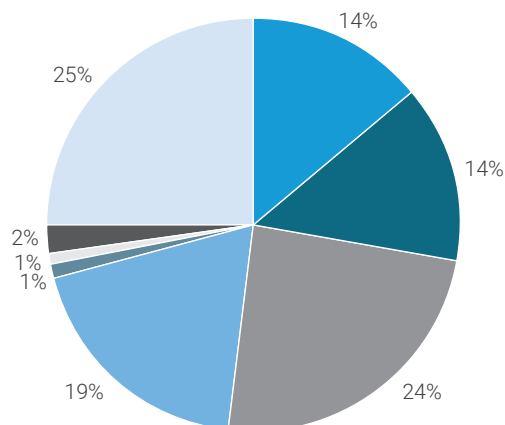
different sires at the MerinoLink site. This increased to 36% at Balmoral and 63% at Pingelly. These figures are consistent with previous research reported by MerinoLink.

While the outcomes of syndicate joinings are not a key focus of MLP, these preliminary results demonstrate the strength of the volume of data being collected during the project as well as the opportunity to leverage this data through additional research.

Maiden Ewe Joining results (Balmoral 2015 F1, Pingelly and MerinoLink 2016 F1)

YEAR JOINED	EWES JOINED	NUMBER OF SIRES	PROGENY TAGGED	SETS OF TWINS	% TWINS BY TWO SIRES
Balmoral 2017	584	11	498	92	36
Pingelly 2018	386	9	368	49	63
MerinoLink 2018	348	8	353	87	32

Strong interest drives Merino Sire Evaluation

Central to MLP is Merino Sire Evaluation and in 2017 the largest joining in the history of Merino Sire Evaluation took place with 131 sires joined across nine sites with 19 new studs contributing 15% of sires.

This record number of joinings coincided with 14,795 downloads of Site Reports in 2017, indicating a strong level of interest in sire evaluation results and building upon important developments in sire evaluation including the recent AMSEA Historical Sire analysis.

Sire evaluation classing being completed on the 2017 drop Macquarie Ewes by Allan Casey on the left and Greg Sawyers on the right, with Ben Swain assisting, September 2018 at NSW DPI Trangie

Merino Sire Evaluation explained

Merino Sire Evaluation was established in 1989 to provide an independent comparison of the breeding performance of rams by evaluating their progeny relative to the progeny of other sires, as well as to link sires.

The program currently evaluates progeny for a large number of traits that are important to commercial producers. All evaluation sites use consistent protocols for flock management to reduce the influence this may have on the comparison.

The evaluation results are used by ram breeders to benchmark their genetics against others at a specific site. They are also used by ram breeders and buyers to assist them to select genetics that are likely to add the most profit to their enterprises.

Through the MLP project, Merino Sire Evaluation has been expanded to include lifetime production records, particularly reproduction records.

Sites and link sires

Sire evaluation sites are located throughout the major wool growing regions of Australia, with between 12 and 20 evaluation sires at each site. Sires are joined to ewes using artificial insemination (AI) to produce the F1 ewes.

Link sires are used at all sites so that the differences between sites, years and seasons can be determined. This difference is then removed from the data, leaving only the genetic variation to be evaluated.

Ewes

The ewes at each site are selected to provide an even, classed line representative of sheep typically run in that environment. An equal number of ewes are joined through AI to each sire. The minimum number of ewes joined to each sire is 50.

Progeny

Progeny are generally managed together under the same conditions throughout the trial, with the exception that single and twin bearing ewes can be separated prior to lambing and managed accordingly up until weaning. Ewe and wether progeny can also be managed separately. All progeny are evaluated with no culling, except if required for welfare purposes.

Evaluation

All progeny in the drop are are evaluated at multiple stages during the trial. These include:

- post lambing

- early post weaning (120-210 days)

- post weaning (210-300 days)

- yearling (300-400 days)

- hogget (400-540 days)

- adult (>540 days).

Many sites complete evaluations at two or more additional stages.

Evaluation involves both measured traits and visual assessment. The measurement of traits is conducted by experienced site committee members and specialised service providers.

Visual assessment is completed by independent sheep classers and involves evaluating a comprehensive list of visual traits for:

- tops and culls

- wool quality, breech and conformation characteristics

- an overall classer's grade.

All data collection and classing is carried out randomly and each animal is unidentifiable, so the data collector and classer is not aware which sire's progeny they are assessing.

Results and reporting

AMSEA Site Reports are published for each site and provide information on traits including:

- measured wool, growth and carcase traits

- wool quality, breech and conformation traits

- internal parasite resistance

- growth and carcase traits.

The reports present the results as Adjusted Sire Means, which adjusts the raw data for effects such as single or twin births or raising, as well as Flock Breeding Values (FBVs). Site Reports can be downloaded from either of the Sites or Reports pages of the Merino Superior Sires website www.merinosuperiorsires.com.au.

The Merino Superior Sires Report is also available from the website. This report presents the Australian Sheep Breeding Values (ASBVs) generated using data from Merino Sire Evaluation, as well as other data submitted to MERINOSELECT.

The Merino Superior Sires Report also provides:

- visual classing results

- the Top 50 leading rams for each index

- contact details for sire owners and breeders.

Merino Superior Sires Report is produced annually with the support of AWI. The latest edition (Number 24) was published in October 2018.

> **More information**
>
> visit www.merinosuperiorsires.com.au

Merino Sire Evaluation proves its worth

A recent study involving Merino Sire Evaluation, which is at the core of the MLP project, has demonstrated how genetics has increased the productivity of Merino flocks over the past 20 years.

As reported recently in AWI's Beyond the Bale magazine, this study, which involved the use of historical sires via artificial insemination (AI), delivered an interesting insight into the accuracy of linkage and genetic gain over a twenty-year period.
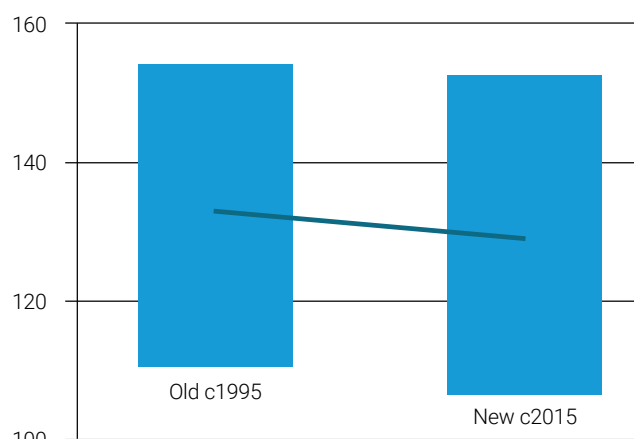
Historical sire evaluation

Linkage allows sires to be compared across years and environments and is a critical element of Merino Sire Evaluation. Linkage is achieved by using the same sire across a number of sites and years to allow environmental differences to be accounted for in genetic assessment.

To determine how well the system of linkage in MERINOSELECT is working, 16 industry leading "historical" sires, first tested in mid 1990s, were re-entered in Merino Sire Evaluation sites between 2013 and 2015. Evaluation of their progeny was completed in 2017. This also allowed the productivity gains due to MERINOSELECT made over the last 15 to 20 years to be assessed.

If linkage is working, the historical sires should have similar Australian Sheep Breeding Values (ASBVs) now to the breeding values they had when they were originally entered. To generate ASBVs, the historical sires were given 'dummy identities' in the database.

And the results are in...

Merino Production Index; range of indexes and the average index of the 16 sires.

The new average ASBVs of the historical sires were very close to the breeding values assigned to the same sires based on the data available from 20 years ago. This showed that the results for the sires were repeatable 20 years apart, demonstrating that the evaluation methods are effective.

Furthermore, the approach that involves using Link Sires between sites and years holds true over a 20-year time period.

So what about genetic gain over the period?
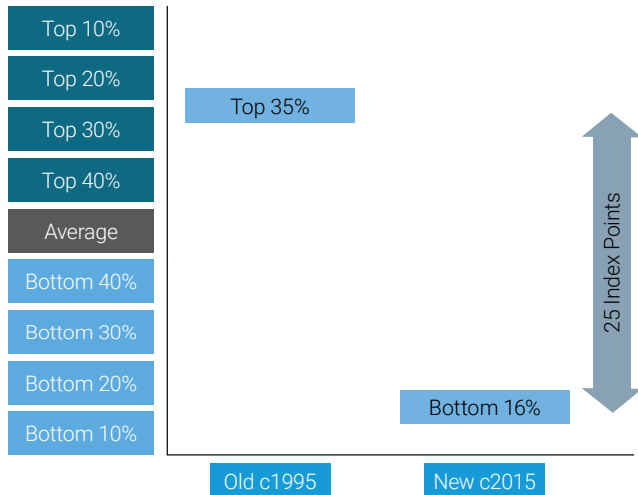
Merino Production Index

When considering genetic gain, the historical sires showed greater superiority compared to other sires used in the 1990s, but are now well below average compared to current sires.

For example, in 1995 the historical sires were in the top 35% for the Merino Production Index (on average), but are now in the bottom 15% compared to sires evaluated in 2015.

In addition:

• fleece weights of current sires are 11% greater

• fibre diameter is down 0.7 μm

• body weight is up 3.3 kg.

Key messages from the study are:

• linkage over time is sufficiently high to ensure accurate estimation of genetic trends

• users can have confidence in breeding values across flocks and years

• there have been considerable genetic and productivity gains in the sires entered into Merino Sire Evaluation.

Sire evaluation made easy via new website

The recently updated Merino Superior Sires website makes it easier to identify and compare Merino sires for a wide range of traits and provides access to detailed information regarding Merino Sire Evaluation in Australia.

The improved website available at http://www.merinosuperiorsires.com.au provides useful information on the Merino Sire Evaluation program and allows ram breeders and buyers to easily identify and compare sires based on the breeding performance of their progeny.

The website has enhanced interactive search functions and uses intuitive navigation to create an easy and rewarding user experience.

The Australia Merino Sire Evaluation Association (AMSEA), with the support of AWI, collates and analyses the data from sire evaluation sites and publishes Site Reports and Merino Superior Sire Reports on the website.

AMSEA is a not-for-profit organisation that oversees Merino Sire Evaluation across ten independent sites
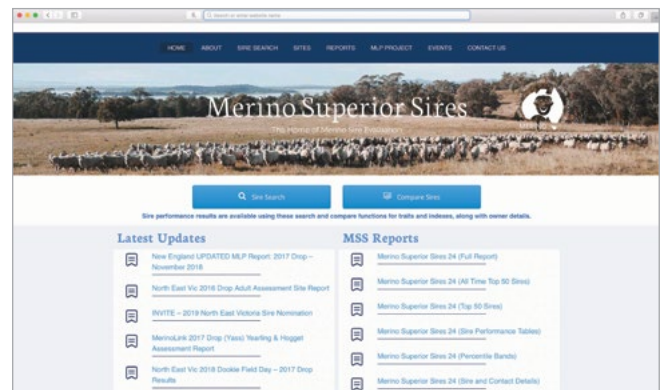
The homepage showing the Sire Search and Compare Sires buttons.
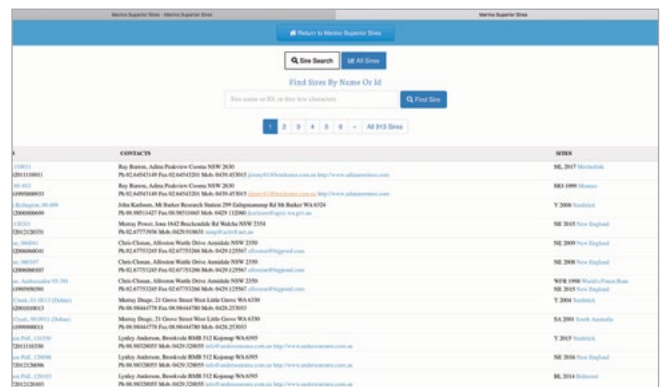
First page in the Sire Search function with sires listed alphabetically. Sire and stud names or ID can be entered in the highlighted search box.

located throughout Australia. These sites provide unique opportunities for ram breeders and buyers to compare the genetic performance of individual rams with other leading sires.

The website also includes reports from the Merino Lifetime Productivity (MLP) Project.

Useful information available on the website includes:

- detailed sire performance data with greater search and comparison functionality

- AMSEA Site Reports

- MLP Reports

- Merino Superior Sire Reports

- descriptions of the ten sire evaluation sites

- event information including Merino Sire Evaluation and MLP field days.

The AMSEA Site Reports detail:

- adjusted sire means

- within-site (flock) breeding values (FBVs)

- visual classing results.

MLP Reports include sire results packaged in three ways:

- raw data

- adjusted sire means

- within-site (flock) breeding values (FBVs) and indexes.

MLP Site Reports also contain reproduction records and additional classing results.

Merino Superior Sire Reports:

- cover all AMSEA and MLP sites

- list the top 50 sires for indexes

- provide Australian Sheep Breeding Values (ASBVs) for wool, carcase and breech traits

- provide visual classing assessments.

Further information

Visit the Merino Superior Sires website at www.merinosuperiorsires.com.au

Or contact AMSEA
Ben Swain, Executive Officer, 0427 100 542

Leveraging the MLP research

All of the MLP sites are involved in additional research projects that add value to the core MLP project. These projects, funded by both AWI and other project supporters, utilise the F1 ewe and wether progeny from the MLP project to address other compelling research questions facing the Merino industry.

Projects currently underway are exploring the resilience of Merinos and the potential to breed sheep that can better respond to a range of environmental challenges, as well as ways to better predict the differences in feed intake between sires and improve estimations of profitability per hectare.

The data captured through these add on projects will, in many cases, enhance the MLP research and provide a valuable insight into other issues facing the Merino industry.

2017 Drop Pingelly F1 Ewes onsite at 'Ridgefield' UWA, Pingelly WA, October 2018.

Improving resilience in Merinos

Tim Lawrence (scanner) and Annika Alexander (student) fat and muscle scanning 2017 drop New England MLP wethers.

By leveraging the progeny produced through the MLP project, CSIRO researchers Dr Brad Hine and Dr Jen Smith are investigating if targeted breeding can improve the ability of Merino sheep to respond to a range of environmental challenges.

'Resilience' in sheep is the ability of the animal to cope with different challenges while maintaining their health

and productivity. Livestock are exposed to a variety of challenges in any production environment including:

• pathogens (parasites, bacteria and viruses)

• climatic and weather extremes

• social mixing

• management-induced stress.

Animals react to these challenges with a range of behavioural and physiological responses, including immune responses, and often employ a combination of responses.

Under the Merino Lifetime Productivity (MLP) Add On project, several hypotheses about breeding, resilience and the ability of animals to cope with challenges posed by their production environment are being tested.

The research, which is jointly funded by AWI and the CSIRO, will use progeny from the MLP's New England site over four years and address a number of questions including:

Are immune competence, stress responsiveness and temperament correlated?

Immune competence (the ability of an animal to mount an immune response), stress responsiveness and temperament are important traits which can contribute to an animal's resilience. In beef cattle, these traits are genetically correlated, meaning they tend to be expressed together.

Whether or not this correlation also occurs in Merino sheep will be tested through this research in the hope that this will assist producers to select animals that are more likely to express these traits.

Does immune competence benefit the health, welfare and productivity of animals?

Investigations into the immune competency of beef cattle have demonstrated that animals identified as 'immune competent' are less likely to suffer disease-related mortalities and incur significantly lower health-related costs for producers.

The research will investigate whether similar health and welfare benefits are associated with 'immune competent' Merino sheep, which in turn will help to reduce production costs.

Does immune competence improve the vaccine effectiveness?

Vaccination is routinely used in the Merino industry to protect animals against common diseases that can cause significant economic losses.

It is common for a proportion of Merinos not to develop sufficient immunity after being vaccinated. While these animals are more susceptible to disease, they can also significantly reduce the ability of producers to protect their entire flock against disease.

The research will investigate if Merinos that are 'immune competent' are more responsive to vaccination programs.

Can selecting for immune competence improve eating quality?

Favourable genetic correlations between immune competence and carcase traits related to tenderness (shear force), intra-muscular fat (IMF) and fat cover have been observed in meat breed sheep.

A proportion of 'resilience tested' lambs will be finished in a feedlot and then slaughtered at a commercial abattoir to obtain detailed feedlot performance and carcase data, with funding from MLA.

Project updates from this MLP research will be provided in future newsletters, and the final report will be available in December 2021.

> ### More information
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Feed intake drives per hectare profitability

A new MLP research project to be undertaken by Murdoch University aims to better predict the differences in feed intake between sires and improve estimations of profitability per hectare.

Farm consultants and economists have long argued that the real driver of profitability in a Merino enterprise is per hectare productivity.

Per hectare productivity is most commonly calculated from per head productivity figures using liveweight. This relies on estimating the higher energy requirements of heavier animals based on body weight alone and assumes all animals have the same grazing ability.

This approach results in lower stocking rate estimations and lower profit per hectare for production systems with heavier genotypes. While it has long been acknowledged that there are likely to be more factors than just body weight that determine the number of

animals carried per hectare, data has not been available to support this approach.

This is now set to change.

Murdoch University, with funding from AWI will soon start a large-scale, feed intake trial to more accurately estimate profit per hectare. This will be achieved by measuring feed intake and energy reserves of progeny from 29 different Merino sires, representing many different sheep types.

Prior research has shown that when different genotypes are run together, a range of body composition, fatness and productivity will be observed, indicating the variation in genotypes to utilise the feed resource. As a result, animals that are fatter can be fed less supplementary feed during periods of feed shortage or more animals can be run on the same pasture.

Estimations that recognise the differences in feed intake and body energy stores are likely to be better predictors of productivity per hectare. This approach, if successful and practical, will be superior to calculations based on the current assumptions.

This new research will demonstrate the importance of more accurately estimating profit per hectare and improve the profitability estimations of the MLP sire groups.

The animals in the trial will be wethers born in 2016 and 2017 at the MLP Pingelly site. Since weaning, these wethers have been assessed and visually classed for a number of growth, productivity, structural and performance traits. The following traits have been recorded for each animal:

- time of teeth eruption

- fat and eye muscle depth

- monthly weight and condition score

- wool quality and quantity based on AWEX-IDs.

After shearing in January 2019, the 2016 drop wethers will be introduced to pelleted feed and then moved to the Department of Primary Industry and Regional Development's Katanning research facility and housed in single pens. After acclimatising, they will undergo intensive animal house studies to quantify key components of the feed intake and energy equations.

This will include two 35-day feeding periods. During the first period, the wethers will be fed to maintain liveweight. For the second period, the wethers will be fed one of two diets. These groups will be balanced for sire, fasting liveweight and condition score.

Andrew Thompson, Murdoch University, collecting data to better predict the differences in feed intake between sires and improve estimations of profitability per hectare.

Liveweight and condition scores will be recorded during both feeding periods and all animals will be assessed using Dual X-ray Absorptiometry (DXA). This will enable changes in fat and muscle components due to energy intake to be quantified. In turn, this will provide an understanding of the efficiency of energy use during each feeding period.

Wethers will be measured by ultrasound for fat and muscle depth at the C site by an industry specialist. Mid-side sample wool patches will be collected from each wether and dye bands will be applied every 4-6 weeks to assess wool growth rates.

The trial will also investigate if respiration can be used as an indicator of feed intake, by enclosing animals in portable accumulation chambers and measuring CO_2 production.

Wethers will be fitted with sensors to measure feeding and rumination behaviour for approximately half the time during both feeding periods. It is anticipated that this behaviour will be well correlated with feed intake.

After these two feeding trials, wethers will be moved to a feedlot and monitored for liveweight and gross feed intake. Sensors will again be fitted to assess their usefulness in predicting feed intake in a less controlled environment. The sensors will also be used to investigate feedlot behaviour.

This program will be repeated in 2020, with the 2017 drop wethers.

This research will lead to a clearer understanding of the differences in feed intake between sires that can be used with currently available measures of live weight, fat and muscle to provide better estimations of stocking rate and thus profitability per hectare.

More information

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www.wool.com/MLP