

Australian Dairy Herd Improvement Report 2017





DataGene is an independent and industry-owned organisation responsible for driving genetic gain and herd improvement in the Australian dairy industry and is an initiative of Dairy Australia and industry.

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About this report

This Herd Improvement Report has been compiled from detailed production records collected from more than 2.6 million test days (during 2016/17). When combined with DataGene's genetic evaluation dataset, the information provides a unique, long-term view of the national dairy herd.

At the individual farm level, routine herd recording enables managers to make informed management decisions, by providing insights into the production and cell count of cows, groups of cows and herds. For example, herd testing can help identify individual cows that are sick, under-performing, candidates for drying off or culling and high performers for breeding. The results are also useful for monitoring trends such as whole herd production and mastitis and the impact of management programs.

NHIA and DataGene are grateful for support from their member organisations and farmers in compiling this report. It wouldn't be possible without the herd test data (supplied by HICO, NHD, TasHerd, Dairy Express, FarmWest, Nu Genes, Yarram Herd Services and Australian Herd Recording Services) and type data supplied by breed associations.

2017 snapshot

The average milk solid yield of Australian herd recorded cows declined by 2% in the 2016/17 season. As reported in Dairy Australia's Situation and Outlook (June 2017), the 2016/17 operating environment was difficult for farmers and led to production declines in many areas. The average size of recorded herds slipped from 241 to 236 cows, a level that is similar to 2014/15 (Table 1a).

The challenging season and relatively strong livestock trading conditions meant a contraction in the size of the national herd from 1.66 to 1.51 million dairy cows. Interestingly, the percentage of cows in the national herd that are enrolled in herd recording has remained stable over the past four years. However, the percentage of herds has slipped from 45% to 44%.

In the 2016/17 season, herd recorded cows produced 25% more litres of milk than non-recorded cows. While there are likely to be many reasons that explain the difference, access to good information is one of them.

Using herd recording information to make quick decisions became much easier in 2017 with the release of the HerdData app.

Herd Recording Statistics

The practice of herd recording delivers reliable information for on-farm decision making. Every year, this data is compiled and published to facilitate a broader analysis of herd and production trends.

Tables 1-13 describe production trends by age, breed, mating type and region. As some data in this report dates back to the 1930s, you will find a rich resource describing Australia's changing herd.

Statistics for previous years and further file formats are available at www.datagene.com.au

Table 1 : National and state totals and production averages 2016-2017.

State	Number of herds	Herds and Cows Recorded				Production Averages					
		Included in averages	Excluded from averages	Total cows	Herd size	Milk (litres)	Fat (%)	Fat (kg)	Protein (%)	Protein (kg)	Lactation length (days)
Victoria	1,594	214,961	133,474	348,435	218.6	6,588	4.1	270	3.4	221	322
New South Wales	353	70,635	28,894	99,529	282	7,616	3.9	294	3.2	246	334
Queensland	172	18,388	10,452	28,840	167.7	5,983	3.8	229	3.2	191	328
South Australia	181	32,687	11,085	43,772	241.8	7,416	3.8	282	3.3	242	332
Tasmania	129	31,255	16,851	48,106	372.9	6,230	4.1	255	3.4	215	299
Western Australia	103	23,982	5,426	29,408	285.5	7,825	3.8	294	3.2	249	337
Australia	2,532	391,908	206,182	598,090	236.2	6,861	4.0	274	3.3	227	324
Victorian regions											
Northern	605	80,170	45,534	125,704	207.8	6,737	4	272	3.3	225	327
Eastern	597	83,538	50,456	133,994	224.4	6,294	4.1	261	3.4	212	320
Western	392	51,253	37,484	88,737	226.4	6,834	4.1	282	3.4	231	319

Table 1a : National totals and production averages 1999 to 2017.

Year	Number of herds	Herds and Cows Recorded				Production Averages					
		Included in averages	Excluded from averages	Total cows	Herd size	Milk (litres)	Fat (%)	Fat (kg)	Protein (%)	Protein (kg)	Lactation length (days)
1999/2000	6,976	947,104	81,129	1,028,233	147.4	5,691	4.0	230	3.3	187	302
2000/2001	7,405	940,712	286,248	1,226,960	165.7	5,682	4.0	229	3.3	186	302
2001/2002	6,930	888,497	303,269	1,191,766	172	6,027	4.0	243	3.3	200	307
2002/2003	6,358	842,113	335,786	1,177,899	185.3	5,877	4.0	235	3.3	193	303
2003/2004	5,704	722,074	298,727	1,020,801	179	6,048	4.0	242	3.3	201	310
2004/2005	5,080	725,374	224,352	949,726	187	6,257	4.0	251	3.3	207	314
2005/2006	4,746	701,852	208,536	910,388	191.8	6,402	4.0	255	3.3	212	316
2006/2007	4,462	655,212	222,592	877,804	196.7	6,452	4.0	257	3.3	216	312
2007/2008	3,966	578,263	207,199	785,462	198	6,596	4.0	264	3.3	220	321
2008/2009	3,779	566,029	206,694	772,723	204.5	6,645	4.1	270	3.4	223	318
2009/2010	3,503	522,869	201,400	724,269	206.8	6,680	4.0	270	3.3	223	323
2010/2011	3,359	518,675	186,915	705,590	210.1	6,813	4.0	273	3.3	228	323
2011/2012	3,301	525,908	205,174	731,082	221.5	6,930	4.0	274	3.3	231	324
2012/2013	3,173	511,923	195,896	707,819	223.1	6,881	4.0	272	3.3	229	322
2013/2014	3,023	492,461	180,638	673,099	222.7	6,890	4.0	273	3.3	228	327
2014/2015	2,880	493,582	186,955	680,537	236.3	6,979	4.0	278	3.3	232	324
2015/2016	2,764	472,223	194,462	666,685	241.2	6,983	4.0	279	3.3	233	320
2016/2017	2,532	391,908	206,182	598,090	236.2	6,861	4.0	274	3.3	227	324

National Herd Recording Statistics 2016-2017

Table 2: Number of herds in fat production categories by region 2016-2017.

State	Total herds	Average fat production (kg per cow)									
		< 125	125-149	150-174	175-199	200-224	225-249	250-274	275-299	300-324	> 324
Victoria	1,594	25	35	65	90	130	196	250	234	159	119
New South Wales	353	1	5	8	29	34	41	60	59	42	29
Queensland	172	3	5	11	18	20	31	14	6	5	6
South Australia	181	1	1	6	5	16	20	31	37	24	26
Tasmania	129	1	4	6	7	14	26	16	17	16	4
Western Australia	103	1	1	1	1	2	10	18	15	19	25
Australia	2,532	32	51	97	150	216	324	389	368	265	209
Victorian regions											
Northern	605	10	15	28	29	48	79	92	98	75	43
Eastern	597	9	11	23	41	55	77	103	93	51	25
Western	392	6	9	14	20	27	40	55	43	33	51

Table 3: Number of herds in protein production categories by region 2016-2017.

State	Total herds	Average protein production (kg per cow)									
		< 100	100-124	125-149	150-174	175-199	200-224	225-249	250-274	275-299	> 299
Victoria	1,594	31	44	93	131	231	277	250	138	70	38
New South Wales	353	1	4	17	36	50	60	69	40	22	9
Queensland	172	3	6	15	24	24	26	13	3	3	2
South Australia	181	1	1	7	15	18	32	33	31	13	16
Tasmania	129	1	5	7	15	25	25	12	8	8	5
Western Australia	103	1	1	1	3	3	19	20	21	15	9
Australia	2,532	38	61	140	224	351	439	397	241	131	79
Victorian regions											
Northern	605	11	18	31	47	82	116	94	74	28	16
Eastern	597	11	15	43	56	100	115	89	35	14	10
Western	392	9	11	19	28	49	46	67	29	28	12

Table 4: Production averages by age group 2016-2017.

Age group	Number of cows	Production averages					Lactation length (days)
		Milk litres	Fat (%)	Fat (kg)	Protein (%)	Protein (kg)	
2 Year Old	74,981	6,100	3.93	240	3.32	202	329
3 Year Old	70,819	6,814	3.96	270	3.34	228	328
Mature Cow	246,108	7,107	4.02	286	3.31	235	322
Total	391,908	6,861	3.99	274	3.32	227	324

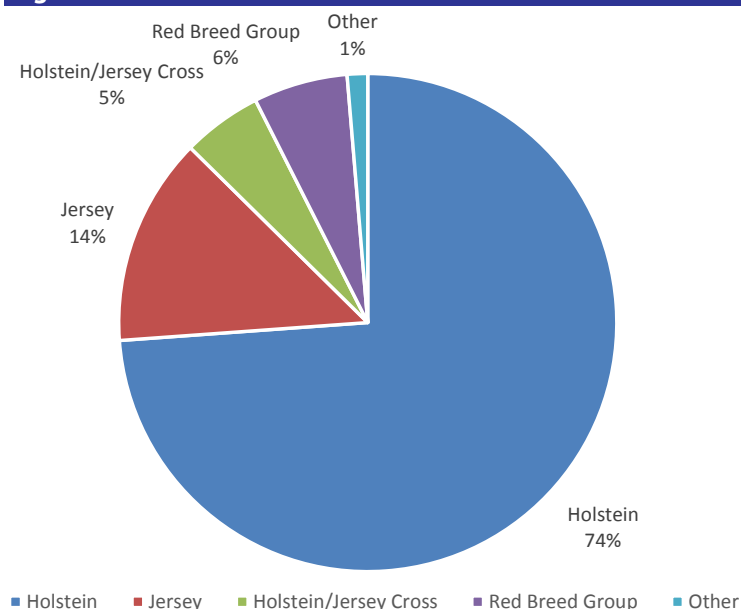
Table 5: Production averages by age group and mating type 2016-2017.

Age group	Number of cows	Average fat (kg)		Average protein (kg)	
		Artificially bred stock	Naturally bred stock	Artificially bred stock	Naturally bred stock
2 Year Old	74,981	245	228	208	191
3 Year Old	70,819	280	250	238	209
Mature Cow	246,108	301	267	248	219
Total	391,908	285	258	237	213

Table 6 : Production averages by percentage of artificially bred cows in herds 2016-2017.

Percentage of artificially bred cows in herd	Number of herds	Production averages		
		Milk litres	Fat (kg)	Protein (kg)
< 10	448	5,914	242	200
10-19	129	6,657	258	218
20-29	124	6,421	253	212
30-39	137	6,289	253	209
40-49	182	6,589	265	218
50-59	233	6,610	267	218
60-69	254	7,489	288	244
70-79	304	7,131	288	237
80-89	306	7,196	289	239
> 89	415	7,257	289	241
Total	2,532	6,861	274	227

Figure 1: Breed distribution of herd recorded cows.



Breed differences

The breeds that show the most genetic gain are those with a larger percentage of cows bred from AI sires rather than naturally-bred (farm) bulls (Table 6). Breeds with higher use of AI can also change trait direction quickly by selecting superior sires based on ABVs.

The breeds that have about half cows AI sired and half natural bull sired have less influence of AI so must wait for the AI influence to trickle down into the herd bull population. Breeds that fall into this category include Illawarra (51.2% AI sired cows), Ayrshire (50.2%) Guernsey (41.9%) and Holstein-Jersey cross (35.8%) (Figure 2).

Figure 2: Breed differences – AI versus naturally sired cows.



Table 7: Production averages by breed 2016-2017.

Breed	Number of cows	Production averages					
		Milk (litres)	Fat (%)	Fat (kg)	Protein (%)	Protein (kg)	Lactation length (days)
Holstein	240,801	7,421	3.84	285	3.24	241	330
Jersey	44,127	5,349	4.79	256	3.66	196	315
Holstein/Jersey Cross	16,871	6,261	4.37	273	3.48	218	314
Guernsey	1,228	5,637	4.33	244	3.38	191	341
Ayrshire	2,299	5,459	4.20	230	3.35	183	319
Dairy Shorthorn	284	5,528	3.85	213	3.32	183	304
Illawarra	4,314	6,677	3.91	261	3.27	218	329
Unknown Breed	65,842	6,223	4.03	251	3.36	209	314
Simmental	234	5,530	3.95	218	3.36	186	318
Aust Red Breed	13,041	6,266	4.20	263	3.44	215	312
Brown Swiss	2,760	6,215	3.97	247	3.39	211	333
Other	107	5,550	4.00	226	3.42	188	305
Total	391,908	6,861	3.99	274	3.32	227	324

Table 8: Production averages by month of calving 2016-2017.

Month of calving	Number of cows	% of total	Production averages					Lactation length (days)
			Milk (litres)	Fat (%)	Fat (kg)	Protein (%)	Protein (kg)	
January	12,623	3.2	7,288	3.86	281	3.26	237	341
February	25,673	6.6	7,323	3.90	285	3.29	241	337
March	48,856	12.5	7,046	3.96	279	3.32	234	332
April	41,180	10.5	7,040	4.00	281	3.33	235	330
May	31,442	8.0	7,039	3.96	279	3.31	233	326
June	24,850	6.3	6,882	3.98	274	3.32	228	321
July	38,086	9.7	6,581	4.06	267	3.35	221	320
August	67,809	17.3	6,489	4.08	265	3.36	218	310
September	51,858	13.2	6,744	4.03	271	3.31	223	319
October	25,871	6.6	6,793	3.97	270	3.25	221	325
November	13,145	3.4	6,928	3.91	271	3.23	224	337
December	10,515	2.7	7,163	3.88	278	3.24	232	342
Total	391,908	100	6,861	3.99	274	3.32	227	324

Update your herd records on the go!



The new DataGene HerdData app is the quick and easy way to enter or access herd records using DataGene HerdData app is the quick in the paddock or dairy.

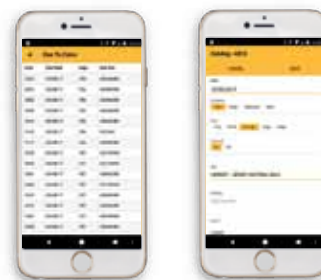
- **Enter** herd records, including calving dates, dry-off dates, pregnancy test results, sales, culls, matings, health events and treatments.
- **View** herd records, including ID, status, sire/dam, herd test results and performance graphs.
- **Synchronise** entered data with your herd management software at the end of each session.

FROM JUST \$99/YEAR



Acknowledgement: DataGene receives the majority of its funding from Dairy Australia.
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Now there's no need to re-enter data when you get back to the office! **For more information, contact the DataGene HerdData helpline on 1800 841 848.**



National Herd Recording Statistics 2016-2017

Table 9: Production averages by breed, age group, mating type and registration 2016-2017.								
Breed	Type	Number of cows	Production averages					
			Milk (litres)	Fat (%)	Fat (kg)	Protein (%)	Protein (kg)	Lactation length (days)
Holstein	2-year-old	49,765	6,542	3.78	248	3.26	213	333
	3-year-old	47,175	7,318	3.80	278	3.27	239	334
	Mature cow	143,861	7,759	3.87	301	3.23	251	328
	Total	240,801	7,421	3.84	285	3.24	241	330
	Artificially bred	171,309	7,580	3.84	291	3.25	246	332
	Naturally bred	69,492	7,029	3.86	272	3.23	227	325
	Registered*	44,258	8,127	3.78	308	3.19	259	344
	Grade	196,543	7,262	3.86	280	3.26	236	327
Jersey	2-year-old	9,242	4,773	4.72	225	3.61	172	320
	3-year-old	8,631	5,225	4.81	251	3.68	193	315
	Mature cow	26,254	5,593	4.81	269	3.67	205	314
	Total	44,127	5,349	4.79	256	3.66	196	315
	Artificially bred	27,026	5,441	4.87	265	3.70	201	318
	Naturally bred	17,101	5,204	4.66	242	3.60	187	311
	Registered*	10,913	5,618	4.89	275	3.69	207	328
	Grade	33,214	5,261	4.75	250	3.65	192	311
Holstein/Jersey cross	2-year-old	3,120	5,397	4.29	231	3.44	186	318
	3-year-old	2,860	6,062	4.35	264	3.50	212	314
	Mature cow	10,891	6,560	4.39	288	3.48	229	313
	Total	16,871	6,261	4.37	273	3.48	218	314
	Artificially bred	6,034	6,429	4.43	285	3.51	226	316
	Naturally bred	10,837	6,167	4.33	267	3.46	214	313
	Registered*	0	0	0	0	0	0	0
	Grade	16,871	6,261	4.37	273	3.48	218	314
Guernsey	2-year-old	245	5,619	4.21	237	3.30	186	353
	3-year-old	238	5,380	4.48	241	3.43	185	335
	Mature cow	745	5,726	4.32	247	3.39	194	338
	Total	1,228	5,637	4.33	244	3.38	191	341
	Artificially bred	514	5,843	4.41	258	3.39	198	337
	Naturally bred	714	5,489	4.26	234	3.38	185	343
	Registered*	256	5,075	4.25	216	3.35	170	347
	Grade	972	5,786	4.35	251	3.39	196	339
Ayrshire	2-year-old	475	4,566	4.33	197	3.35	153	320
	3-year-old	520	5,103	4.18	213	3.38	172	325
	Mature cow	1,304	5,927	4.18	248	3.35	198	316
	Total	2,299	5,459	4.20	230	3.35	183	319
	Artificially bred	1,153	5,475	4.21	230	3.35	183	318
	Naturally bred	1,146	5,443	4.20	229	3.36	183	320
	Registered*	582	5,373	4.18	224	3.32	178	328
	Grade	1,717	5,488	4.21	231	3.37	185	316

* A registered cow has been given a herdbook number by a breed association.

National Herd Recording Statistics 2016-2017

Table 9: Production averages by breed, age group, mating type and registration 2016-2017 (continued).								
Breed	Type	Number of cows	Production averages					
			Milk litres	Fat (%)	Fat (kg)	Protein (%)	Protein (kg)	Lactation length days
Illawarra	2-year-old	769	5,872	3.95	232	3.32	195	341
	3-year-old	906	6,257	3.89	244	3.30	207	334
	Mature cow	2,639	7,057	3.90	276	3.24	229	324
	Total	4,314	6,677	3.91	261	3.27	218	329
	Artificially bred	2,208	6,880	3.94	271	3.29	227	327
	Naturally bred	2,106	6,465	3.88	251	3.24	209	331
	Registered*	1,422	7,165	3.79	272	3.21	230	331
	Grade	2,892	6,438	3.97	256	3.29	212	328
Unknown breed	2-year-old	8,208	5,583	3.99	223	3.39	189	319
	3-year-old	7,216	6,304	4.02	254	3.39	214	317
	Mature cow	50,418	6,316	4.04	255	3.35	212	313
	Total	65,842	6,223	4.03	251	3.36	209	314
	Artificially bred	2,869	6,908	3.91	270	3.34	231	315
	Naturally bred	62,973	6,192	4.04	250	3.36	208	314
	Registered*	0	0	0	0	0	0	0
	Grade	65,842	6,223	4.03	251	3.36	209	314
Australian Red Breed	2-year-old	2,527	5,437	4.12	224	3.42	186	321
	3-year-old	2,605	6,119	4.18	256	3.47	212	317
	Mature cow	7,909	6,580	4.23	278	3.44	226	307
	Total	13,041	6,266	4.20	263	3.44	215	312
	Artificially bred	11,690	6,315	4.21	266	3.44	217	311
	Naturally bred	1,351	5,843	4.03	236	3.37	197	312
	Registered*	1,419	6,824	4.03	275	3.37	230	326
	Grade	11,622	6,198	4.22	262	3.45	214	310
Brown Swiss	2-year-old	485	5,283	3.89	205	3.37	178	341
	3-year-old	525	5,912	3.94	233	3.43	203	335
	Mature cow	1,750	6,564	4.00	263	3.39	222	330
	Total	2,760	6,215	3.97	247	3.39	211	333
	Artificially bred	1,902	6,322	4.01	254	3.41	215	336
	Naturally bred	858	5,977	3.88	232	3.36	201	324
	Registered*	970	6,253	3.94	247	3.41	213	348
	Grade	1,790	6,194	3.99	247	3.38	209	324
Other breeds	2-year-old	145	4,842	3.77	183	3.39	164	307
	3-year-old	143	5,289	4.07	215	3.36	178	309
	Mature cow	337	5,933	3.92	233	3.33	197	311
	Total	625	5,533	3.93	217	3.35	185	310
	Artificially bred	183	6,610	3.82	252	3.33	220	302
	Naturally bred	442	5,086	3.99	203	3.36	171	313
	Registered*	14	4,080	3.76	154	3.38	138	275
	Grade	611	5,566	3.92	218	3.35	186	310

* A registered cow has been given a herdbook number by a breed association.

Record sires for better herd insights

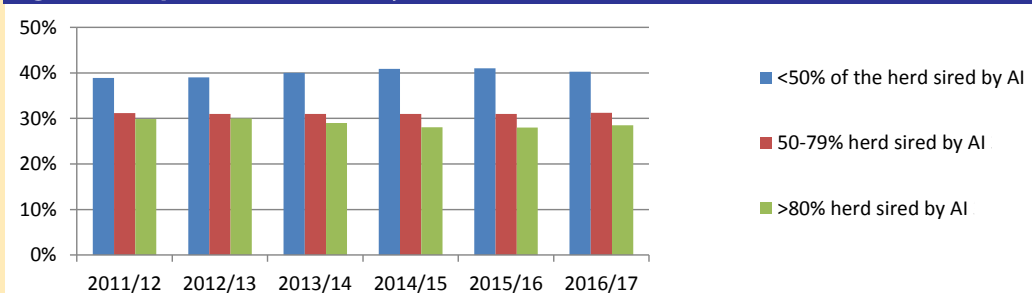
After a hectic calving season finishes, take a minute to check that your calves are recorded with your herd test centre and each has its sire correctly identified. Accurate pedigree records will mean your herd's Genetic Progress Report is more complete and will enable you to better manage inbreeding and breeding programs.

The recording of AI sires has slightly improved in 2016/17 but only 28% of herds have at least 80% of their herd sired by an AI sire. Three reasons for this include:

1. *Sires are a paddock bull.* Keeping replacement heifers sired by paddock bulls will reduce the rate of genetic gain in most herds. To ensure that your replacement heifers improve year after year, make sure you use bulls from the Good Bulls Guide or App.
2. *Sires are an AI bull but this information isn't recorded at the herd test centre.* This can be rectified if information from a calf book or computer file is sent to your herd test centre.
3. *Sires are unknown.* If the sire is unknown, consider doing a genomic test which will provide an assessment of the genetic merit of the animal and its parentage can be discovered.

Recording sires is now easier with the introduction of the HerdData app. Record all the calf details – while still in the paddock.

Figure 3: Proportion of artificially bred cows in herd-recorded herds (2011-2017).



Note: there are likely many more AI bred cows. In this analysis, AI bred means sired by a correctly identified NASIS sire. Herds with poor record keeping often have many unidentified sires.



Good Bulls

Use bulls from the Good Bulls Guide or App to ensure your replacement heifers improve year after year.

National Herd Recording Statistics 2016-2017

Table 10: Distribution of calvings by month and region 2016-2017.

State	Percentage of cows that calved each month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Victoria	1	4	13	12	9	7	11	20	14	6	2	1
New South Wales	6	9	11	9	8	7	9	10	9	7	7	6
Queensland	8	11	11	10	10	8	8	7	7	7	7	7
South Australia	5	10	11	10	8	6	7	13	14	9	5	4
Tasmania	1	4	13	8	3	1	7	33	22	6	1	0
Western Australia	7	13	13	10	8	6	5	9	10	8	6	5
Australia	3	7	12	11	8	6	10	17	13	7	3	3
Victorian regions												
Northern	1	4	16	13	7	3	7	22	16	7	2	2
Eastern	1	3	12	9	6	6	16	24	15	6	2	1
Western	2	7	11	14	16	14	11	9	9	4	1	1

Table 11: Production averages of registered* cows 2016-2017.

Breed	Number of cows	Production averages					
		Milk (litres)	Fat (%)	Fat (kg)	Protein (%)	Protein (kg)	Lactation length (days)
Holstein	44,258	8,127	3.78	308	3.19	259	344
Jersey	10,913	5,618	4.89	275	3.69	207	328
Guernsey	256	5,075	4.25	216	3.35	170	347
Ayrshire	582	5,373	4.18	224	3.32	178	328
Illawarra	1,422	7,165	3.79	272	3.21	230	331
Aust Red Breed	1,419	6,824	4.03	275	3.37	230	326
Brown Swiss	970	6,253	3.94	247	3.41	213	348
Total	59,820	7,545	4.00	298	3.29	246	340

Table 12: Production averages of artificially bred registered* cows 2016-2017.

Breed	Number of cows	Production averages					
		Milk (litres)	Fat (%)	Fat (kg)	Protein (%)	Protein (kg)	Lactation length (days)
Holstein	36,747	8,170	3.78	309	3.19	261	345
Jersey	8,744	5,680	4.91	279	3.69	210	328
Guernsey	122	5,214	4.31	225	3.34	174	338
Ayrshire	366	5,312	4.17	222	3.32	176	328
Illawarra	774	7,311	3.81	278	3.24	237	332
Aust Red Breed	1,380	6,817	4.04	275	3.37	230	327
Brown Swiss	721	6,291	3.94	248	3.42	215	352
Total	48,854	7,616	4.00	300	3.29	249	341

* A registered cow has been given a herdbook number by a breed association.

National Herd Recording Statistics 2016-2017

Table 13: Victorian production averages 1930/1931 – 2016-2017.

Year	Total herds	Total cows	Herd size	Production averages				
				Milk (litres)	Fat (%)	Fat (kg)	Protein (%)	Protein (kg)
1930/1935	2,984	91,328	31	2,295	4.7	107		
1935/1940	2,324	80,883	35	2,210	4.9	108		
1940/1945	1,082	39,368	36	2,154	4.9	105		
1945/1950	2,329	90,015	39	2,301	5.0	114		
1950/1955	3,192	141,387	44	2,284	5.0	114		
1955/1960	3,461	187,306	54	2,485	5.1	126		
1960/1965	4,003	248,791	62	2,643	5.0	132		
1965/1970	5,041	368,300	73	2,793	4.9	137		
1970/1975	4,314	382,925	89	2,942	4.7	139		
1975/1980	2,456	256,744	105	3,159	4.5	143		
1980/1985	3,913	423,120	108	3,471	4.5	155		
1985/1990	4,399	527,240	120	4,047	4.4	180	3.3	134
1990/1991	4,402	568,885	129	4,245	4.4	186	3.4	142
1991/1992	4,061	517,760	128	4,477	4.4	196	3.4	150
1992/1993	4,293	552,445	129	4,708	4.4	205	3.4	158
1993/1994	4,606	604,160	131	4,962	4.3	212	3.3	166
1994/1995	4,591	574,674	125	4,976	4.2	210	3.3	164
1995/1996	4,685	606,198	129	5,142	4.2	215	3.3	169
1996/1997	4,928	619,470	126	4,984	4.2	208	3.3	163
1997/1998	4,328	624,428	144	5,084	4.1	208	3.3	167
1998/1999	4,156	641,106	154	5,350	4.1	220	3.3	177
1999/2000	3,904	622,281	159	5,570	4.1	227	3.3	184
2000/2001	4,267	761,219	178	5,527	4.0	223	3.3	182
2001/2002	4,198	757,029	180	5,969	4.0	240	3.3	198
2002/2003	3,831	738,329	193	5,705	4.0	230	3.3	187
2003/2004	3,414	624,002	183	5,841	4.0	236	3.3	194
2004/2005	3,079	586,566	191	6,083	4.0	245	3.3	202
2005/2006	2,933	572,906	195	6,205	4.0	248	3.3	206
2006/2007	2,775	554,136	200	6,245	4.0	250	3.4	209
2007/2008	2,431	484,030	199	6,423	4.0	259	3.3	215
2008/2009	2,313	478,612	207	6,458	4.1	266	3.4	218
2009/2010	2,127	437,811	206	6,443	4.1	265	3.4	217
2010/2011	2,036	428,660	211	6,588	4.1	268	3.4	222
2011/2012	2,050	453,465	221	6,731	4.0	270	3.4	226
2012/2013	1,977	433,383	219	6,694	4.0	268	3.3	224
2013/2014	1,892	409,743	217	6,709	4.0	270	3.3	225
2014/2015	1,854	419,521	226	6,826	4.1	278	3.4	230
2015/2016	1,756	402,150	229	6,804	4.1	278	3.4	230
2016/2017	1,594	348,435	219	6,588	4.1	270	3.4	221

Genetic trends

Why track genetic gain?

While the impact of genetics is gradual, it is compounding year after year. It's worth making every breeding decision count.

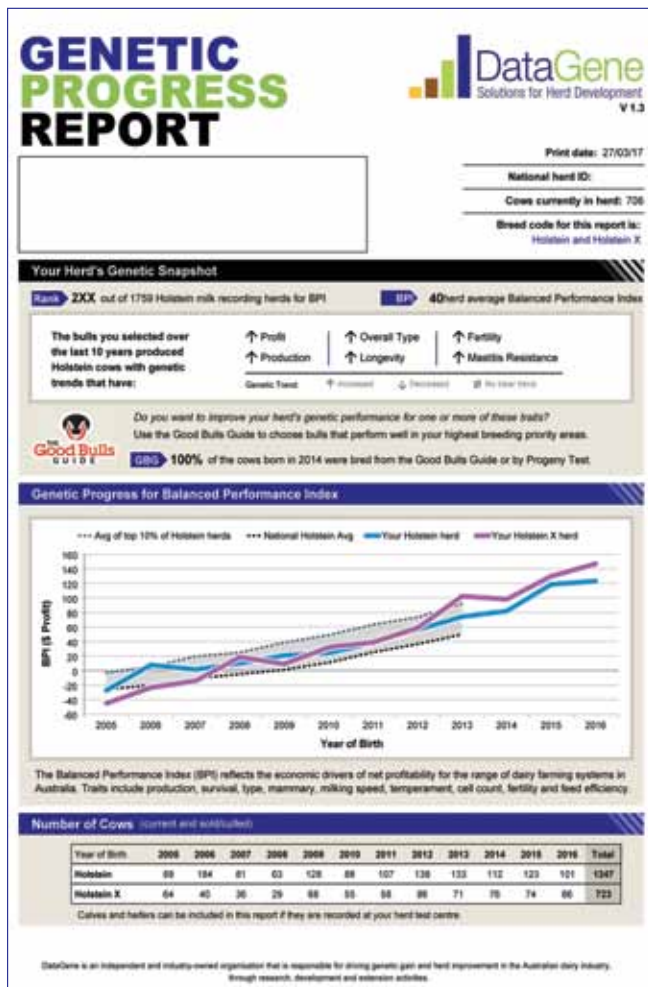
Over the past decade, about one third of productivity improvements achieved by Australian dairy farmers can be credited to better genetics. Since 1983, Australian dairy farmers have had access to independent information to make breeding choices in the form of Australian Breeding Values (ABVs), and more recently through multi-trait indices such as the Balanced Performance Index (BPI), Health Weighted Index (HWI) and Type Weighted Index (TWI). These reflect Australian dairy farmers' breeding preferences and are the best estimate of the genetic merit of animals for performance in Australian production systems. They are a proven effective tool to improve the performance of Australian dairy herds.

Tracking genetic gain

The Balanced Performance Index (BPI) identifies bulls and cows that combine traits that are important to profit – production, longevity, fertility, mastitis resistance, type, workability and feed efficiency. National trends show that Australia's cows are making genetic progress, year after year.

At a herd level, genetic gain can be measured and monitored using the Genetic Progress Report. This tool enables farmers to track progress for BPI and several traits of interest.

Use the Genetic Progress Report to monitor genetic gain in an individual herd.



National rate of genetic gain

At a national level, genetic gain can also be measured and monitored using the genetic trends illustrated in Figures 4 to 6. Each breed is analysed separately.

This year, for the first time, we report national genetic gain using the BPI of the cow's sire, rather than the cow herself. There are two key benefits of this approach:

- Information is available on young animals so the reporting time lag is reduced.
- Information is available on more animals so it is a better representation of the national herd.

Figure 4 shows that Holstein sires of calves born in 2017 had an average BPI of almost \$200, about four times the genetic merit of the sires of cows born in 2010.

Figure 7 shows the rates of genetic gain of Australian Holsteins in different five-year time periods. The average rate of genetic gain since 2005 was \$15.80/year (green line in the graph), but the current rate is more than \$20, which is almost double that of in 2005-2009 (\$10).

A number of initiatives are likely to have contributed to the acceleration in genetic gain. Encouraging farmers to use a Good Bulls straw to breed every replacement is a collective effort. Bull companies, AI service providers, farmers, researchers and industry all have an important role. Important industry initiatives included the introduction of the Good Bulls Strategy in 2010, genomics in 2011 and dairy's three new indices in 2015.

Figure 4: Genetic trend of sires of Holstein cows for Balanced Performance Index.

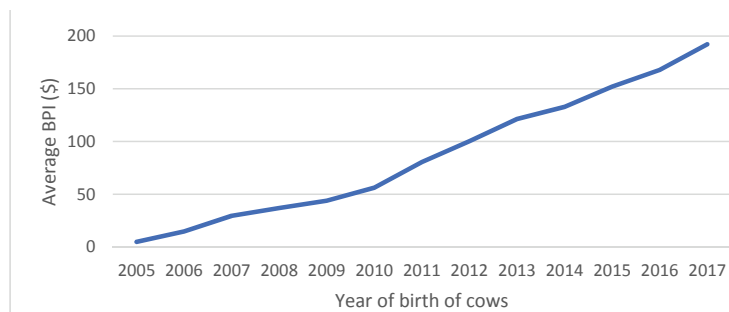


Figure 5: Genetic trend of sires of Jersey cows for Balanced Performance Index.

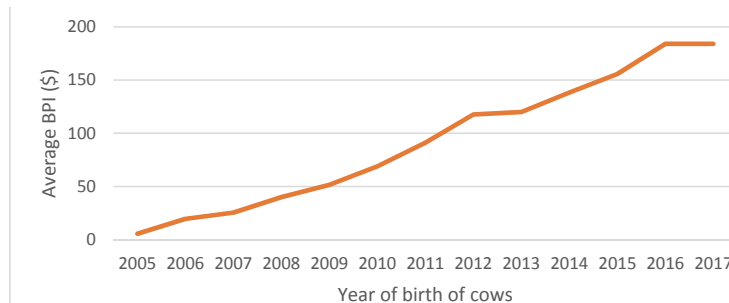


Figure 6: Genetic trend of sires of Aussie Red cows for Balanced Performance Index.

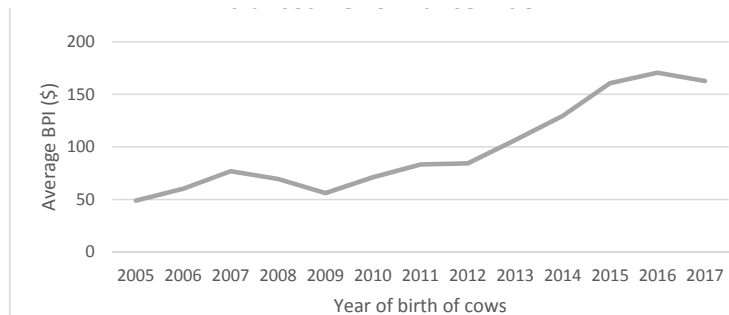
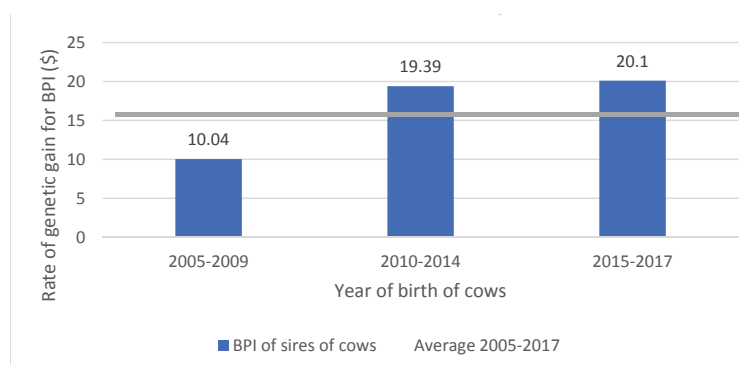


Figure 7: Rates of genetic gain for BPI in Australian Holsteins in different time periods.



Feeding and breeding

The reasons for wanting to increase the rate of genetic gain are evident in on-farm performance. However, there's been a widely-held belief that high genetic merit cows performed differently under different feeding systems. The 2016 Feeding the Genes study investigated interactions between sire genetics and feeding systems on milk solids production and the cow's chance of lasting in the herd.

The results show that in all feeding systems, the daughters of higher BPI sires produce more milk solids than daughters of lower BPI sires. However, the scale of response to using high BPI sires varies between feeding systems. Table 14 shows the benefits are greater in herds using more intensive feeding systems (hybrid and total mixed ration).

Table 14: Impact of sire BPI on milk solids yield.		
Extra production (kg milk solids/cow/305d lactation) for every 50 unit increase in sire BPI.		
Feeding system	Holstein	Jersey
Low bail	5.0	4.3
Moderate-high bail	6.1	5.9
Partial Mixed Ration (PMR)	4.8	6.0
Hybrid	8.0	n/a
Total Mixed Ration (TMR)	11.6	n/a
Source: John Morton		

In pasture-based feeding systems, the daughters of high BPI sires are *more* likely than other cows to last in the herd. In total mixed ration herds, there is no marked effect of a cow's sire's BPI on her longevity in the herd; daughters of high BPI sires are *just* as likely as their herdmates to last in the herd.

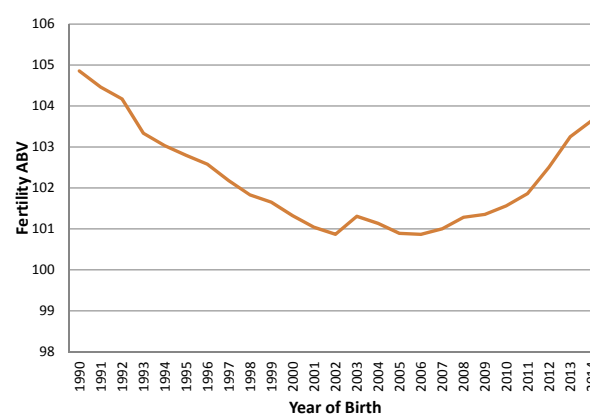
One easy way to ensure there are more high BPI animals in a herd is to select bulls from the *Good Bulls Guide* or App to breed replacements.

Fertility genetics improve

The genetic trend for fertility in Holstein and Jersey cows is improving. After two decades of decline, it is positive to see that the average Daughter Fertility ABV of cows born in 2014 is similar to cows born in 1993.

One of the reasons for the improvement is that bull companies have actively sought bulls with high Daughter Fertility ABVs, resulting in an increase in the number available in the *Good Bulls Guide*.

Figure 8: Genetic trend for Daughter Fertility in Holstein cows (2010–2017).



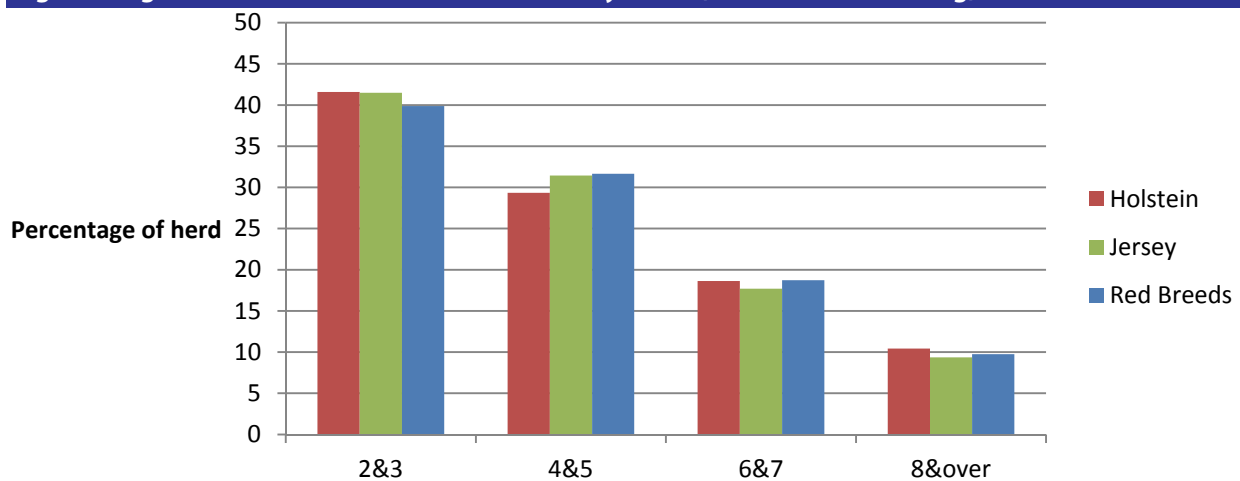
Survival

Cow survival is an important contributor to farm profit. Cows that milk through to maturity maximise their production potential (Table 5), reduce replacement costs and create the opportunity to increase genetic gain by heavier culling on production.

Australian dairy farmers have a proud history of producing cattle bred for survival/longevity. Figure 9 shows that almost a third of cows in Australian herds are at least six years old. The results are similar across breeds.

Survival/longevity affects the average herd age. This is important to farm profitability because a cow needs to last beyond her first lactation to produce enough milk to recover her rearing costs and start generating a profit. In Australia, the average herd age is close to 56 months for Holsteins and similar in other breeds.

Figure 9: Age distribution of herd recorded cows by breed (at most recent calving).



Cows with long survival maximise their production potential, reduce replacement costs and create the opportunity to increase genetic gain by heavier culling on production.

Trends in genotyping

Increasing numbers of dairy females and bulls are being genotyped by both farmers and bull companies (Table 15).

Bull companies have expanded their genomic testing programs to identify bulls for the Australian market based on Australian indices and breeding values.

The result is a wider choice of bulls for Australian dairy farmers. For example, the April 2017 *Good Bulls Guide* included 28 young genomic bulls with a BPI of greater than 300, up from zero a year earlier (April 2016 *Good Bulls Guide*).

The number of commercial heifers/cows tested increased 38% in 2016/17 as more farmers use genomics as a breeding management tool. Genomics is being used to confirm/correct pedigree, to identify the most profitable heifers to keep and to guide breeding and culling decisions.

Table 15: Number of animals genotyped.

	Females	Bulls	Total	Cumulative total
Pre 12/13	14486	6500	20,986	20,986
2012/13	0	555	555	21,541
2013/14	445	2260	2705	24,246
2014/15	17,364	1097	18,461	42,707
2015/16	27,537	1561	29,098	71,805
2016/17	15,578	3202	18,780	90,585

The cumulative total number of genotyped animals continues to grow (Table 15) at a steady rate with commercial testing supported by Ginco, the national reference population. To date Ginco has contributed more than 35,000 genotypes, which has improved the reliabilities of Australian Breeding Values (Tables 16 and 17) and provided the key data set for the development of the heat tolerance breeding value and next generation genomic health traits. Of particular note are the improvements in reliability for daughter fertility.

Table 16: Improvements in reliability of bull ABVs.

	Young bull		Young bull with genotype		1st crop bull		1st crop bull with genotype	
	Aug 2015	Dec 2017	Aug 2015	Dec 2017	Aug 2015	Dec 2017	Aug 2015	Dec 2017
Protein	22	37	66	77	86	93	86	93
Overall Type	21	24	48	55	75	72	76	73
Survival	20	29	46	53	58	67	66	70
Daughter Fertility	22	30	45	53	71	71	75	75

Table 17: Improvements in reliability of heifer ABVs

	Young heifer		Young heifer with genotype		7-lactation cow		7-lactation cow with genotype	
	Aug 2015	Dec 2017	Aug 2015	Dec 2017	Aug 2015	Dec 2017	Aug 2015	Dec 2017
Protein	25	31	66	76	55	77	75	84
Overall Type	18	20	46	53	30	29	51	55
Survival	21	22	46	50	33	34	51	54
Daughter Fertility	20	23	44	50	37	38	53	56

Genetic trends

Holstein. Top 5% of herds based on herd average BPI, December 2017.

BPI Rank	National herd ID	Owner	Location	Cows on file	Current cows	Genomic cows	BPI	HWI	TWI	ASI	Prot	Prot %	Milk	Fat	Fat %	HWI Rank	TWI Rank
1	C00155U	Hogg AL & JM	Biggara, VIC	1028	228	332	147	107	130	115	16	0.16	300	18	0.07	3	3
2	N00544Q	Parrish, TJ & LR	Barrengarry, NSW	1338	128	414	144	116	134	81	11	0.10	211	13	0.06	1	1
2	4I0025F	Hoey DM & L	Katunga, VIC	106	58	92	144	104	130	108	14	0.17	182	17	0.13	4	3
4	W00248F	Kitchen Farms	Boyanup, WA	2293	464	390	138	108	126	87	14	0.07	392	15	-0.03	2	5
5	500047P	Manna Farm Holsteins	Yankalilla, SA	1033	196	226	134	103	132	84	14	0.09	337	13	-0.02	5	2
6	850441U	Dickson BJ & JL	Terang, VIC	3621	1034	1307	132	102	124	87	14	0.11	310	11	-0.04	6	6
7	240108T	Henry TW & TC	Tinamba, VIC	2827	614	820	130	99	111	90	13	0.11	275	14	0.03	7	10
8	C01125S	Sprunt RG	Kaarimba, VIC	622	204	341	128	99	122	84	17	0.06	493	11	-0.15	7	7
9	4A3216P	Lister Craig A	Calivil, VIC	1425	324	600	120	94	109	78	13	0.08	333	12	-0.03	10	13
9	540597R	Anderson WR & BL	Kongwak, VIC	1531	322	256	120	92	111	81	10	0.15	83	11	0.10	13	10
9	C00276F	Countryroad Holsteins	Edi Upper, VIC	2489	657	208	120	90	113	89	16	0.10	393	9	-0.11	15	8
12	540624E	Perrett RJ & HE	Kongwak, VIC	966	401	48	118	94	112	70	11	0.06	293	12	-0.00	10	9
12	T62SIAI	Ireland J & C	Lockington, VIC	794	504	614	118	93	103	71	10	0.09	213	12	0.04	12	15
14	T62SIAI	Guye Ashley	Barwon Downs, VIC	506	88	0	117	99	110	57	12	-0.01	476	11	-0.13	7	12
15	770030J	Johnston R & L	Bundalaguah, VIC	2378	229	70	114	88	105	77	13	0.06	367	12	-0.05	16	14
16	C00210E	Holloway ID & AM	Gundowring, VIC	2852	621	0	111	87	99	71	10	0.10	171	10	0.04	17	16
17	981306Q	Coster B & M	Ripplebrook, VIC	2684	878	522	105	80	89	72	11	0.12	175	8	0.01	21	24
17	540184S	Lia TO & PM Pty Ltd	Nilma North, VIC	770	147	0	105	71	93	101	14	0.15	218	16	0.09	39	19
19	C00784P	Morgan R & R Pty. Ltd.	Girgarre, VIC	2645	714	100	104	92	87	36	7	0.03	207	4	-0.06	13	29
20	2K0054J	McRae SA & NM	Nambrok, VIC	1028	525	701	103	78	78	71	11	0.11	187	9	0.01	26	44
21	841985D	Eccles AT & WJ	Purnim, VIC	2225	532	794	102	80	91	65	10	0.05	263	14	0.04	21	21
21	T13AHMV	Lillico JM & V	Smithton, TAS	3861	1024	1411	102	79	93	68	11	0.07	283	10	-0.02	24	19
23	840377M	Coates JD & OR	Allestree, VIC	1275	225	0	101	83	88	54	9	0.06	211	9	-0.00	19	26
23	840329N	Mcrae AG L & EM	Heywood, VIC	1437	298	2	101	81	83	57	4	0.13	-83	10	0.19	20	36
23	240111W	Holt Family Trust	Bundalaguah, VIC	1139	68	0	101	74	89	74	7	0.15	-47	12	0.21	31	24
26	C00274W	Nankervis D & E	Wooragee, VIC	231	40	0	100	85	87	46	8	0.07	148	4	-0.04	18	29
26	850604I	Wyss Trading P/L	Boorcan, VIC	1305	41	0	100	76	78	64	2	0.23	-386	7	0.34	29	44
28	540300E	Moscript ME CJ & JM	Leongatha South, VIC	1010	215	0	99	80	94	57	11	0.04	356	8	-0.11	21	18
28	650274B	Eastern Creek Road Pty	Melbourne, VIC	1570	367	0	99	78	88	63	11	0.07	266	9	-0.04	26	26
28	2J0053D	McCaughan AF & DJ	Pound Creek, VIC	459	161	0	99	73	87	78	10	0.11	158	13	0.09	32	29
31	540605F	White KL & DM & RL	Leongatha South, VIC	1612	422	503	97	72	91	75	13	0.07	354	12	-0.05	33	21
31	850550V	Pekin JG & KM	Terang, VIC	1529	405	0	97	72	86	72	11	0.09	219	12	0.04	33	33
31	2Q0052V	Mortlock RM & JE	Foster, VIC	208	173	122	97	71	79	74	13	0.1	276	7	-0.06	39	42
34	4A1321C	Wild RA & DF	Mitta Mitta, VIC	1058	132	0	96	66	87	86	11	0.16	96	11	0.1	61	29
34	C00998L	Briggs RG & EH	Nanneella, VIC	419	48	0	96	66	84	85	9	0.15	52	14	0.18	61	35
36	840391T	Uebergang IS & JA	Gorae West, VIC	316	42	0	95	70	85	75	12	0.11	211	8	-0.01	47	34
37	540364W	Jelbart Dairy Pty Ltd	Leongatha South, VIC	5857	1023	707	93	67	79	77	11	0.13	153	8	0.02	54	42
38	240291K	McKay Dairy	Denison, VIC	1209	180	0	91	77	76	42	4	0.08	-13	7	0.1	28	53
38	B21449A	McMillan R & R	Nanneella, VIC	454	218	80	91	70	80	62	10	0.07	242	8	-0.03	47	40
40	N00416Q	Green, RJ LM & AE	Tamworth, NSW	953	272	284	90	72	88	53	9	0.04	263	8	-0.05	33	26

Genetic trends

Jersey. Top 5% of herds based on herd average BPI, December 2017.

BPI Rank	National herd ID	Owner	Location	Cows on file	Current cows	Genomic cows	BPI	HWI	TWI	ASI	Prot	Prot %	Milk	Fat	Fat %	HWI Rank	TWI Rank
1	240699A	Hoey DM & L	Katunga, VIC	1112	204	341	119	83	121	89	8	0.23	-64	14	0.33	1	1
2	850588C	Glennen C & CO	Noorat, VIC	2954	493	544	118	81	105	92	8	0.26	-125	15	0.41	2	3
3	C00935T	McManus BT & CA	Bamawm, VIC	854	186	0	106	80	105	67	6	0.15	-39	13	0.29	3	3
4	C00859H	Bacon RLG & SL	Tennyson, VIC	2020	367	197	96	78	109	49	6	0.05	108	10	0.07	4	2
5	740064P	Codling & Baker	Larpent, VIC	736	118	0	93	70	84	64	5	0.21	-135	8	0.3	7	9
6	260037W	Balnageith Jersey Stud	Warragul, VIC	1375	338	0	92	73	85	54	4	0.13	-43	10	0.24	5	8
7	C00927B	Van Den Bosch, JH & CA	Lockington, VIC	402	59	0	90	71	82	50	1	0.18	-201	12	0.42	6	11
8	340284T	Gelbeado Park Jerseys	Won Wron, VIC	1995	456	201	88	67	83	57	6	0.12	11	10	0.17	8	10
9	C01682H	Bacon C & N	Lockington, VIC	745	254	0	88	67	82	59	6	0.15	-22	9	0.19	8	11
10	981473R	Saunders TA & Day AG	Shady Creek, VIC	1614	632	495	84	67	91	42	5	0.09	16	6	0.1	8	6
11	D80828D	Manintveld F & M	Warragul South, VIC	1238	202	43	83	65	75	47	1	0.2	-255	10	0.44	11	16
12	240684H	Broad L & L	Lockington, VIC	1433	321	147	82	64	87	47	7	0.06	116	6	0	13	7
13	842144T	Gleeson Stephen G	Purnim, VIC	941	163	0	81	65	76	43	2	0.14	-139	9	0.32	11	15
13	C00637Q	Akers R & H & G Farm 1	Tallygaroopna, VIC	1939	664	77	81	64	78	49	5	0.08	45	9	0.13	13	13
15	4H0077N	Buchanan Family Trust 2	Cobram, VIC	450	126	0	80	62	73	50	4	0.13	-56	8	0.21	15	18
16	S00122B	Koweo Jerseys	Hope Forest, SA	1500	321	0	78	62	71	45	6	0.07	88	5	0.01	15	19

Australian Red Breed. Top 5% of herds based on herd average BPI, December 2017.

BPI Rank	National herd ID	Owner	Location	Cows on file	Current cows	Genomic cows	BPI	HWI	TWI	ASI	Prot	Prot %	Milk	Fat	Fat %	HWI Rank	TWI Rank
1	N00555U	Graham, RW & BC	Numbaa, NSW	1801	624	0	114	91	110	69	10	0.05	281	14	0.03	1	1
2	979082I	Green Family Trust	Mount Schank, SA	958	343	0	100	78	94	64	11	0.06	298	10	-0.04	2	2
3	2L0091H	Vagg GI&SE & Cocksedge	Leongatha South, VIC	96	58	0	96	70	90	75	12	0.14	184	4	-0.05	4	3
4	650244V	Raleigh Jan	Timboon, VIC	897	270	0	91	74	82	47	6	0.1	27	5	0.06	3	5
5	851139M	Taylor TA	Brucknell, VIC	271	59	0	84	70	84	41	7	0.04	176	6	-0.03	4	4

Brown Swiss herds. Top 5% of herds based on herd average BPI, December 2017.

BPI Rank	National herd ID	Owner	Location	Cows on file	Current cows	Genomic cows	BPI	HWI	TWI	ASI	Prot	Prot %	Milk	Fat	Fat %	HWI Rank	TWI Rank
1	C00871I	Restdown Pastoral	Rochester, VIC	2021	562	0	11	6	8	13	0	0.10	-94	2	0.15	1	1
2	W00252L	Trigwell IL J	Dardanup, WA	174	34	0	0	-5	-1	15	3	0.04	50	0	-0.05	5	2
3	N01423J	Cooltah P'ship	Narromine, VIC	658	48	0	-3	-2	-2	-3	0	0.07	-71	-5	-0.03	2	3
3	B21285J	Balfour, PE & SM	Kanoona, NSW	602	232	0	-3	-4	-4	5	1	0.06	-31	-2	-0.01	3	4
5	C01047A	Govett WF & J	Dingee, VIC	702	149	0	-7	-4	-8	-8	0	-0.01	7	-4	-0.10	3	6

Guernsey. Top 5% of herds based on herd average BPI, December 2017.

BPI Rank	National herd ID	Owner	Location	Cows on file	Current cows	Genomic cows	BPI	HWI	TWI	ASI	Prot	Prot %	Milk	Fat	Fat %	HWI Rank	TWI Rank
1	S00376B	Cleggett LF & JM	Glencoe, SA	1774	463	0	53	46	50	21	2	0.04	12	5	0.10	1	1
2	W00137V	Colin Gilbert	North Dandalup, WA	122	67	0	25	30	26	-13	-2	-0.06	29	0	-0.03	2	2
3	N01749P	Gray, MD & PM	Rolands Plains, NSW	114	51	0	2	14	0	-36	-7	-0.03	-204	-4	0.14	3	3
4	N00021N	Clark Partnership	Lismore, NSW	1049	117	0	-6	2	-5	-28	-3	-0.02	-87	-7	-0.08	4	4
5	460005P	Gallus MR I	Strathmerton, VIC	683	126	0	-23	-11	-30	-40	-10	0.08	-451	-9	0.28	5	6

About DataGene

DataGene is an independent, industry-owned organisation that delivers world-class herd improvement products and services to Australian dairy farmers and their service providers. Our members include leading herd improvement service providers, genetics suppliers, breed associations and peak dairy industry organisations.



