New Zealand Dairy Statistics 2020-21

LIC® DairyNZ

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1. Introduction

Introduction

Kia ora and welcome to the 2020/21 edition of New Zealand Dairy Statistics

New Zealand Dairy Statistics is the census of the national dairy herd. Each year it provides the largest and most comprehensive range of statistical analyses on current, historic and emerging trends in the New Zealand dairy sector.

The report includes the latest milk production, herd improvement, animal evaluation and reproduction statistics.

It's been another record year for the New Zealand dairy industry, and we've seen a continuation of the "more milk from less cows" trend as farmers seek higher performing and more efficient dairy cows.

The latest statistics show the dairy industry reached record milk production per herd and per cow in the 2020/21 season, with reduced cow numbers. It is also the first season on record to exceed 1.9 billion kilograms of milksolids.

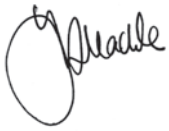
We're seeing a noticeable shift in farmer focus, primarily driven by discussions about farming even more sustainably, and the general acceptance that if we are unable to milk more cows, we need to be milking better ones.

There was an increase in the number of cows artificially inseminated this season as farmers focus on breeding high genetic merit animals to increase their herd's production and environmental efficiency.

The number of cows herd tested was the highest on record (3.735 million cows, 76.2 percent of cows), showing farmers are committed to utilising this valuable information to improve the quality and productivity of their herds.

The dairy sector is developing solutions to provide farmers with tools to breed more productive, efficient, and climate-friendly cows. DairyNZ and LIC have a wide range of research underway to assist farmers to improve profitability and reduce their environmental footprint and emissions. Our farmers are committed to doing their part to help New Zealand meet its climate goals, while delivering world leading animal care.

New Zealand's dairy industry continues to deliver real benefits for all Kiwis, bringing in $20 billion in exports each year and employing over 50,000 people at the latest count. The increasing focus by our farmers on more productive and efficient cows, with a lighter environmental footprint, is good for our industry's reputation and ongoing competitiveness globally.



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This report has been jointly produced by Livestock Improvement Corporation (LIC) and DairyNZ since 2006/7.

LIC is a farmer-owned co-operative and world leader in pasture based dairy genetics and herd management. LIC exists to deliver superior genetics and technological innovation to help its shareholders sustainably farm profitable animals.

DairyNZ is the industry organisation representing New Zealand's dairy farmers, funded by farmers through a levy on milksolids.

Data is sourced from the LIC Herd Improvement Database, New Zealand dairy companies, Animal Evaluation database, TB Free New Zealand, Real Estate Institute of New Zealand, and Statistics New Zealand.

Executive Summary

New Zealand reached record milk production per herd and per cow this year.

New Zealand dairy farmers are embracing a range of tools to enable them to improve their herds' sustainability and productivity outcomes.

This report shows the trend in declining cow numbers over recent years has continued, while the cows we do have are more productive than ever - as farmers continue to focus on cow quality over quantity.

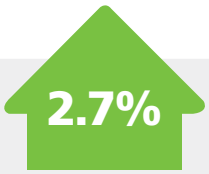
The focus on cow quality is apparent in the increasing uptake of herd improvement services, with herd testing reaching record highs this year. Herd testing provides farmers with valuable information to help manage their herds and is one of a number of tools available to help improve milk quality and production.

Milk Production

New Zealand has reached highest milk volume (litres), milkfat, protein and milksolids production.

In the 2020/21 season, dairy companies processed 21.7 billion litres of milk containing 1.947 billion kilograms of milksolids – a 2.6% (~560 million litres) increase in litres and a 2.7% (~51 million kg) increase in kilograms of milksolids processed compared with the previous season.

Average milk production per cow was 397 kg of milksolids (made up of 222 kg milkfat and 175 kg protein), a 3.1% increase from 385 kg last season and the highest on record. Average milksolids per effective hectare (1,137 kg) was also the highest on record.



21.7 billon litres of milk
containing 1.947 billion kilograms of milksolids, a 2.7% increase in milksolids from 2019/20.

Cow Numbers

Cow numbers decreased slightly.

Cow numbers have continued to decline in recent years. The total cow population in 2020/21 was 4.9 million, a small decrease of 0.36% from the previous season.

4.9 millon cows
(0.36% down from 2019/20)

Dairy Herd Size

New Zealand dairy herds are becoming bigger but the number of herds fell slightly.

There were 11,034 herds this season – 145 fewer than the previous season. This was the sixth year of easing herd numbers. The average herd size was 444, which was four cows higher than the previous season.

11,034 herds
(0.36% down from 2019/20)

444 **average herd size**
(up by 4 from 2019/20)

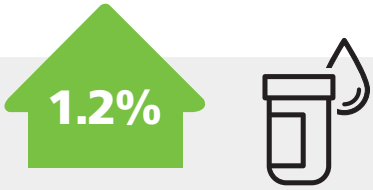
Herd Improvement

a) Herd testing – know your cows

The number of cows being herd tested was the highest on record.

Herd testing enables farmers to collect information about individual cows in their herds – this includes information on milk production, milksolid makeup and mastitis. The information gained from herd testing is useful for effective herd management, monitoring and improving cow wellbeing and on-farm decision making.

A total of 3.735 million cows were herd tested in 2020/21 – the highest on record. That equates to 76.2% of cows in the national herd being herd tested in 2020/21. Both the percentage of total herds and percentage of total cows herd tested increased.



3.73 million cows herd tested
(1.2% up from 2019/20)

b) Artificial breeding (AB) – creating genetic and productive gain through the next generation

The number of cows mated to AB has increased.

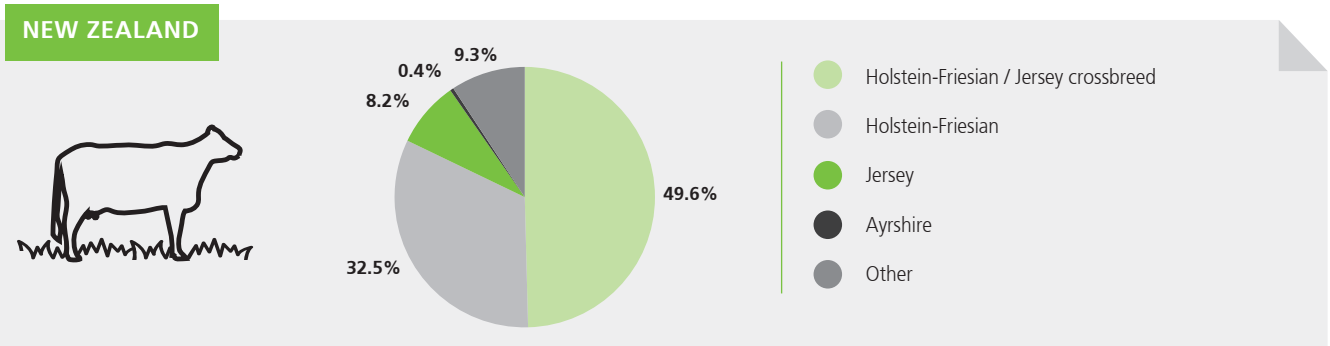
3.497 million cows were mated to AB in 2020/21. The percentage of cows mated to AB was 71.3%, which was higher than the previous season (70.8%), and similar to 2017/18 levels.

3.497 million cows mated to AB
(up 0.5% from 2019/20)

Cow Breed

Almost 50% of cows are Holstein-Friesian/Jersey crossbreed.

Farmers are increasingly shifting to crossbred cows to benefit from the efficiencies of hybrid vigour and get the best traits from the two main dairy breeds. 49.6% of cows are Holstein-Friesian/Jersey crossbreed, a 0.5% increase from the previous season. 32.5% of cows are Holstein-Friesian, 8.2% are Jersey cows, 0.4% are Ayrshire cow and 9.3% of cows are other breeds.



Milk Prices

$7.75 was the average dairy co-operative payout.

The average dairy co-operative payout of $7.75 per kg milksolids in 2020/21 was higher than the previous season ($7.20) and the second-highest average payout in the past 10 seasons.

$7.75 **average dairy co-operative payout per kg milksolids**
(up from $7.20 in 2019/20)

2. National dairy statistics

A. Industry statistics

i) Production

- *Protein at its highest level*
- *Milkfat at its highest level*
- *Milk volume at its highest level*
- *Highest milksolids production*

In 2020/21, dairy companies processed 21.7 billion litres of milk containing 1.95 billion kilograms of milksolids (Table 2.1). Total milksolids increased by 2.7% from the 1.896 billion kilograms processed in the previous season. Since 2013/14 milksolids processed has been in the range of 1.8 to 1.9 billion kilograms, however, the 2020/21 season was the first season on record to exceed 1.9 billion kilograms of milksolids.

Table 2.1: Summary of milk production statistics for the last 35 seasons

Season	Milk processed (million litres)	Milkfat processed (million kgs)	Protein processed (million kgs)	Milksolids processed (million kgs)
1986/87	6,385	301	222	524
1987/88	6,921	333	245	579
1988/89	6,533	311	237	541
1989/90	6,868	330	242	572
1990/91	7,077	343	254	599
1991/92	7,454	365	270	637
1992/93	7,629	373	277	651
1993/94	8,603	423	313	736
1994/95	8,633	422	311	733
1995/96	9,325	452	335	788
1996/97	10,339	506	375	880
1997/98	10,651	513	378	891
1998/99	10,563	503	377	880
1999/00	11,630	560	421	981
2000/01	12,925	626	470	1,096
2001/02	13,607	657	495	1,152
2002/03	13,906	676	515	1,191
2003/04	14,599	716	538	1,254
2004/05	14,103	694	519	1,213
2005/06	14,702	724	543	1,267
2006/07	15,134	750	566	1,316
2007/08	14,745	722	548	1,270
2008/09	16,044	791	602	1,393
2009/10	16,483	817	622	1,438
2010/11	17,339	859	654	1,513
2011/12	19,129	954	731	1,685
2012/13	18,883	939	719	1,658
2013/14	20,657	1,034	791	1,825
2014/15	21,253	1,067	823	1,890
2015/16	20,914	1,050	812	1,862
2016/17	20,702	1,042	809	1,851

(table 2.1 continued)

Season	Milk processed (million litres)	Milkfat processed (million kgs)	Protein processed (million kgs)	Milksolids processed (million kgs)
2017/18	20,724	1,035	804	1,840
2018/19	21,217	1,056	828	1,884
2019/20	21,145	1,059	836	1,896
2020/21	21,705	1,089	858	1,947

Note: *Prior to 1998/99, Table 2.1 consisted of milk production statistics that were processed into export products (i.e. town milk supply was excluded). These statistics on milk, milkfat, protein and milksolids processed were provided by the New Zealand Dairy Board and are no longer available. Consequently, totals from 1998/99 include all milk processed by New Zealand dairy companies, including milk for the domestic market.*

ii) Population

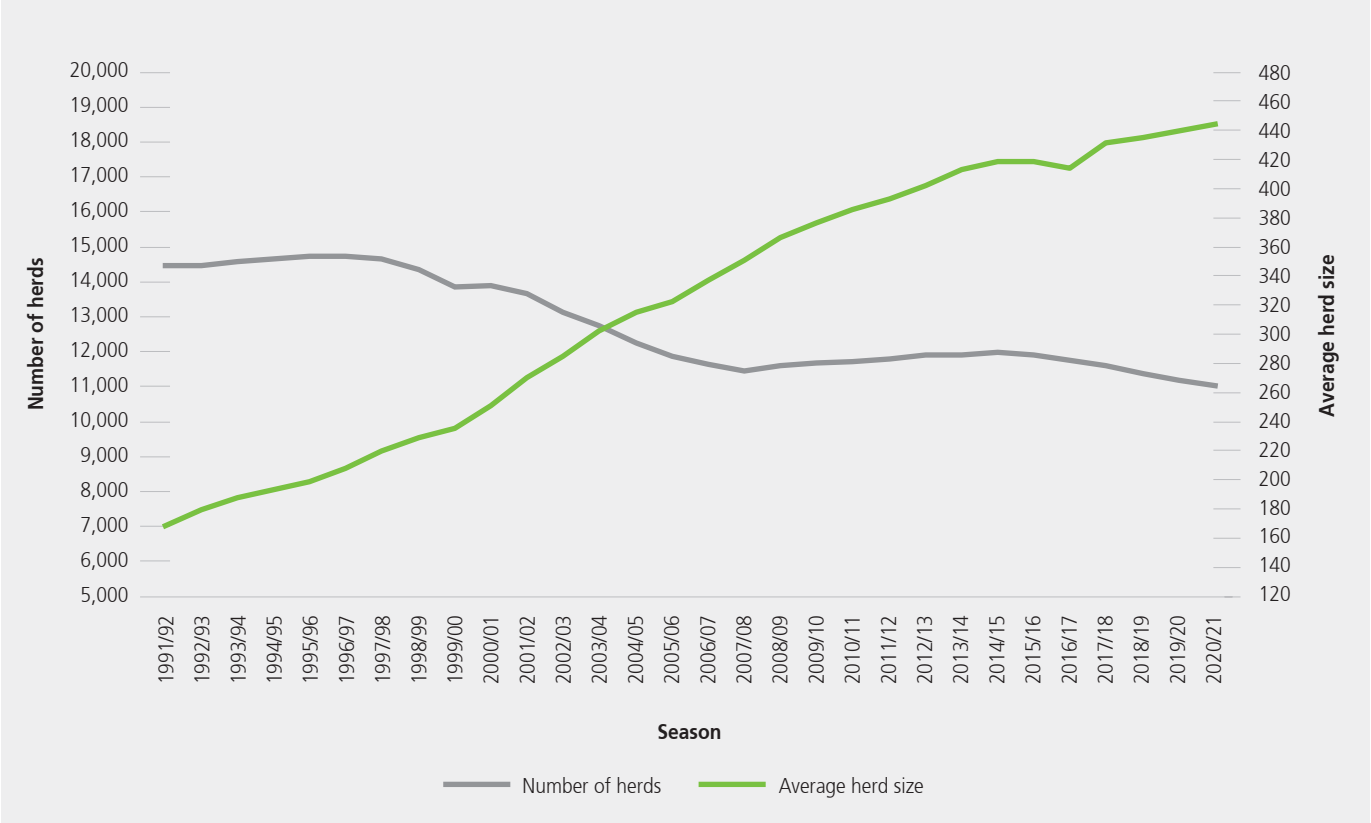
- *Number of herds decreases*
- *Average herd size increases*

Between 1997-98 and 2007-08 total herd numbers declined at an average rate of about 300 herds per season (Graph 2.1), before levelling off. After seven consecutive seasons of small increases, the 2015-16 season again saw herd numbers decline. The rate of decline over the past six years has been about 156 herds per season. The total number of herds in the 2020/21 season decreased by 145 to 11,034.

The average herd size was 444 in 2020/21, which was 4 cows higher than the previous season. The average herd size has almost tripled in the last 30 seasons, and increased by more than 170 cows in the last 20 seasons. The rate of increase has slowed in the last 10 seasons, with the average herd size increasing by less than six cows per year.

Expansion of the dairy herd in the South Island has contributed to the increase in average herd sizes.

Graph 2.1: Trend in the number of herds and average herd size for the last 30 seasons



The total cow population in the 2020/21 season was 4.904 million (Table 2.2), a small decrease of 0.36% from the previous season. Average farm size remained at 155 effective hectares. A stocking rate of 2.86 cows per hectare was a slight increase on the past three seasons. Total effective hectares (milking platform with support block excluded) were 1.713 million – a decrease of about 16,800 ha on the previous season.

Table 2.2: Summary of herd statistics since 1975/76

Season	Herds	Total cows	Total effective hectares[a]	Average herd size	Average effective hectares[b]	Average cows per hectare[b]
1975/76	18,442	2,091,950	-	113	-	-
1980/81	16,089	2,027,096	-	126	-	-
1985/86	15,753	2,321,012	1,008,192	147	64	2.30
1990/91	14,685	2,402,145	1,023,545	164	70	2.35
1991/92	14,452	2,438,641	-	169	-	-
1992/93	14,458	2,603,049	1,069,892	180	74	2.43
1993/94	14,597	2,736,452	1,122,509	188	77	2.44
1994/95	14,649	2,830,977	1,175,940	193	80	2.41
1995/96	14,736	2,935,759	1,208,352	199	82	2.43
1996/97	14,741	3,064,523	1,267,726	208	86	2.42
1997/98	14,673	3,222,591	1,276,551	220	87	2.52
1998/99	14,362	3,289,319	1,306,942	229	91	2.52
1999/00	13,861	3,269,362	1,292,566	236	93	2.53
2000/01	13,892	3,485,883	1,329,173	251	96	2.62
2001/02	13,649	3,692,703	1,404,930	271	103	2.63
2002/03	13,140	3,740,637	1,463,281	285	111	2.56
2003/04	12,751	3,851,302	1,421,147	302	111	2.71
2004/05	12,271	3,867,659	1,411,594	315	115	2.74
2005/06	11,883	3,832,145	1,398,966	322	118	2.74
2006/07	11,630	3,916,812	1,412,925	337	121	2.77
2007/08	11,436	4,012,867	1,436,549	351	126	2.79
2008/09	11,618	4,252,881	1,519,117	366	131	2.80
2009/10	11,691	4,396,675	1,563,495	376	134	2.81
2010/11	11,735	4,528,736	1,638,706	386	140	2.76
2011/12	11,798	4,634,226	1,638,546	393	139	2.83
2012/13	11,891	4,784,250	1,677,395	402	141	2.85
2013/14	11,927	4,922,806	1,716,464	413	144	2.87
2014/15	11,970	5,018,333	1,746,156	419	146	2.87
2015/16	11,918	4,997,811	1,751,704	419	147	2.85
2016/17	11,748	4,861,324	1,728,702	414	147	2.81
2017/18	11,590	4,992,914	1,755,148	431	151	2.84
2018/19	11,372	4,946,305	1,743,673	435	153	2.84
2019/20	11,179	4,921,548	1,730,374	440	155	2.84
2020/21	11,034	4,903,733	1,713,515	444	155	2.86

- Not available

[a] Total effective hectares between 1981/82 and 1999/00 are estimates.

[b] Average effective hectares and average cows per hectare for 1981/82 to 1990/91 are based on factory supply herds only.

***Note:** The number of cows used to calculate the average herd size since 1992/93 includes all cows lactating in that season, whereas in earlier years the number of cows used to produce the average herd size was based only on those cows lactating on 31 December. This change in method has had a small effect on reported cow numbers.*

B. Herd production statistics

- *Milk production per herd at its highest level*
- *Milksolids per effective hectare at its highest level*
- *Milksolids per cow at its highest level*

Herd production has increased most years since 1992/93 (Table 2.3), except for the drought years of 1998/99, 2007/08 and 2012/13. The average milksolids per effective hectare of 1,137 kg in 2020/21 was the highest on record. Milk production per cow increased by 12 kg compared to the previous season with an average of 397 kg milksolids (comprising 222 kg milkfat and 175 kg protein).

Table 2.3: Summary of herd production since 1975/76

Season	Average litres per herd	Average kg milkfat per herd	Average kg protein per herd	Average kg milksolids per herd	Average kg milkfat per effective hectare	Average kg protein per effective hectare	Average kg milksolids per effective hectare	Average litres per cow	Average kg milkfat per cow	Average kg protein per cow	Average kg milksolids per cow
1975/76[a]	-	15,700	-	-	-	-	-	-	137	-	-
1980/81[a]	-	18,864	-	-	-	-	-	-	147	-	-
1985/86[a]	-	23,489	-	-	379	-	-	-	157	-	-
1990/91[a]	-	24,495	-	-	351	-	-	-	148	-	-
1991/92[b]	-	26,567	-	-	-	-	-	-	157	-	-
1992/93	554,040	26,982	20,138	47,120	374	279	653	-	148	111	259
1993/94	618,139	30,220	22,458	52,678	407	301	708	-	160	119	278
1994/95	614,203	29,886	22,117	52,002	386	285	671	-	156	115	271
1995/96	663,248	32,050	23,827	55,877	405	300	705	-	163	120	283
1996/97	728,874	35,436	26,387	61,823	425	316	741	-	173	128	301
1997/98	752,399	36,383	26,984	63,367	430	318	748	-	168	124	292
1998/99	735,544	35,047	26,254	61,301	392	292	684	-	147	109	256
1999/00	839,066	40,365	30,396	70,761	439	329	768	-	165	123	288
2000/01	930,047	45,063	33,850	78,914	472	353	825	-	177	133	310
2001/02	996,904	48,137	36,300	84,436	471	353	824	-	175	132	307
2002/03	1,058,307	51,447	39,174	90,621	471	357	828	-	179	136	315
2003/04	1,144,938	56,150	42,171	98,321	509	380	889	3,737	184	138	322
2004/05	1,149,262	56,520	42,305	98,825	494	368	862	3,574	176	132	308
2005/06	1,237,228	60,955	45,705	106,660	520	387	907	3,763	186	139	325
2006/07	1,301,308	64,495	48,687	113,182	534	400	934	3,791	189	142	330
2007/08	1,289,337	63,158	47,876	111,033	498	375	873	3,567	175	132	307
2008/09	1,381,573	68,116	51,850	119,966	524	396	921	3,710	184	139	323
2009/10	1,409,875	69,859	53,184	123,043	519	392	912	3,642	181	137	318
2010/11	1,477,531	73,184	55,762	128,946	524	399	923	3,829	190	144	334
2011/12	1,621,344	80,875	61,936	142,811	582	446	1,028	4,128	206	158	364
2012/13	1,587,980	78,948	60,462	139,410	560	429	988	3,947	196	150	346
2013/14	1,731,985	86,682	66,330	153,012	602	461	1,063	4,196	210	161	371
2014/15	1,775,501	89,152	68,734	157,886	611	471	1,082	4,235	213	164	377
2015/16	1,754,836	88,132	68,091	156,223	600	463	1,063	4,185	210	162	372
2016/17	1,762,152	88,667	68,892	157,560	603	468	1,071	4,259	214	167	381
2017/18	1,788,051	89,320	69,413	158,733	590	458	1,048	4,151	207	161	368
2018/19	1,865,731	92,868	72,806	165,674	606	475	1,081	4,290	214	167	381
2019/20	1,891,481	94,770	74,824	169,595	612	483	1,096	4,296	215	170	385
2020/21	1,967,106	98,681	77,822	176,503	635	501	1,137	4,426	222	175	397

- Not available

[a] *Figures prior to 1991/92 exclude town milk herds*

[b] *1991/92 figures include some town milk herds*

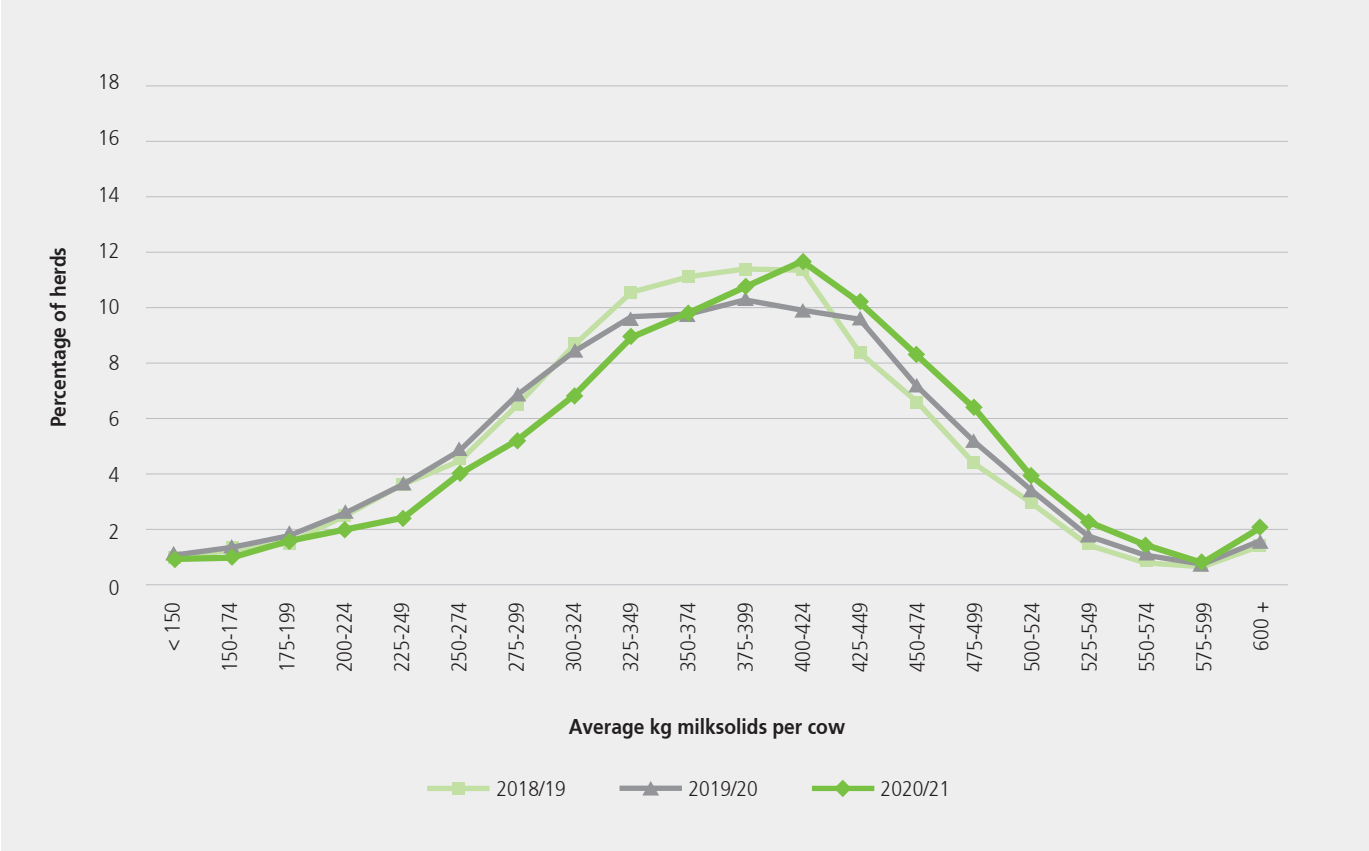
i) Production per cow and per hectare

Average milksolids per cow in 2020/21 was 397 kg, compared with 385 kg last season (Graph 2.2). Average milk production per hectare was 1,137 kg – the highest on record, and 41 kg up on last season. Variations from season to season are masked by the considerable effect of the weather on each season's actual production. For example, widespread drought in 2012/13 caused milk production to decline while in 2013/14, favourable pasture growth conditions, coupled with increased supplementary feed use, enabled high milk production.

Graph 2.2: Milksolids production per cow and per effective hectare since 1992/93

Average production per cow varies considerably from farm to farm. This variation is caused by many factors, including temperature, rainfall, soil fertility, stocking rate, the genetic merit of the herd, level of supplementary feed and farm management practice. Graph 2.3 shows the distribution of milksolids production in 2020/21 compared with the previous two seasons. Fifty-eight percent of herds recorded milksolids production between 300 and 450 kilograms per cow. Twenty-five percent of the herds had an average production of over 450 kilograms milksolids per cow, compared with 21% in the previous season and 18% in 2018/19. In 2020/21, 10.4% of herds recorded over 500 kg milksolids/cow.

Graph 2.3: Distribution of herds by milksolids production per cow for the last three seasons



ii) Herd size distribution

- *55% of herds have less than 400 cows*
- *16.6% of herds have 700 or more cows*

Fifty-five percent (5,534) of herds had less than 400 cows (Table 2.4). In 2020/21, herd size distributions remained proportionately the same as the previous season, where 32% of herds (3,560) had 500 or more cows, 14% (1,549) had 750 or more cows, and 6% (647) had 1,000 cows or more. Averages of milkfat, protein and milksolids per cow, by herd size, are also included in Table 2.4.

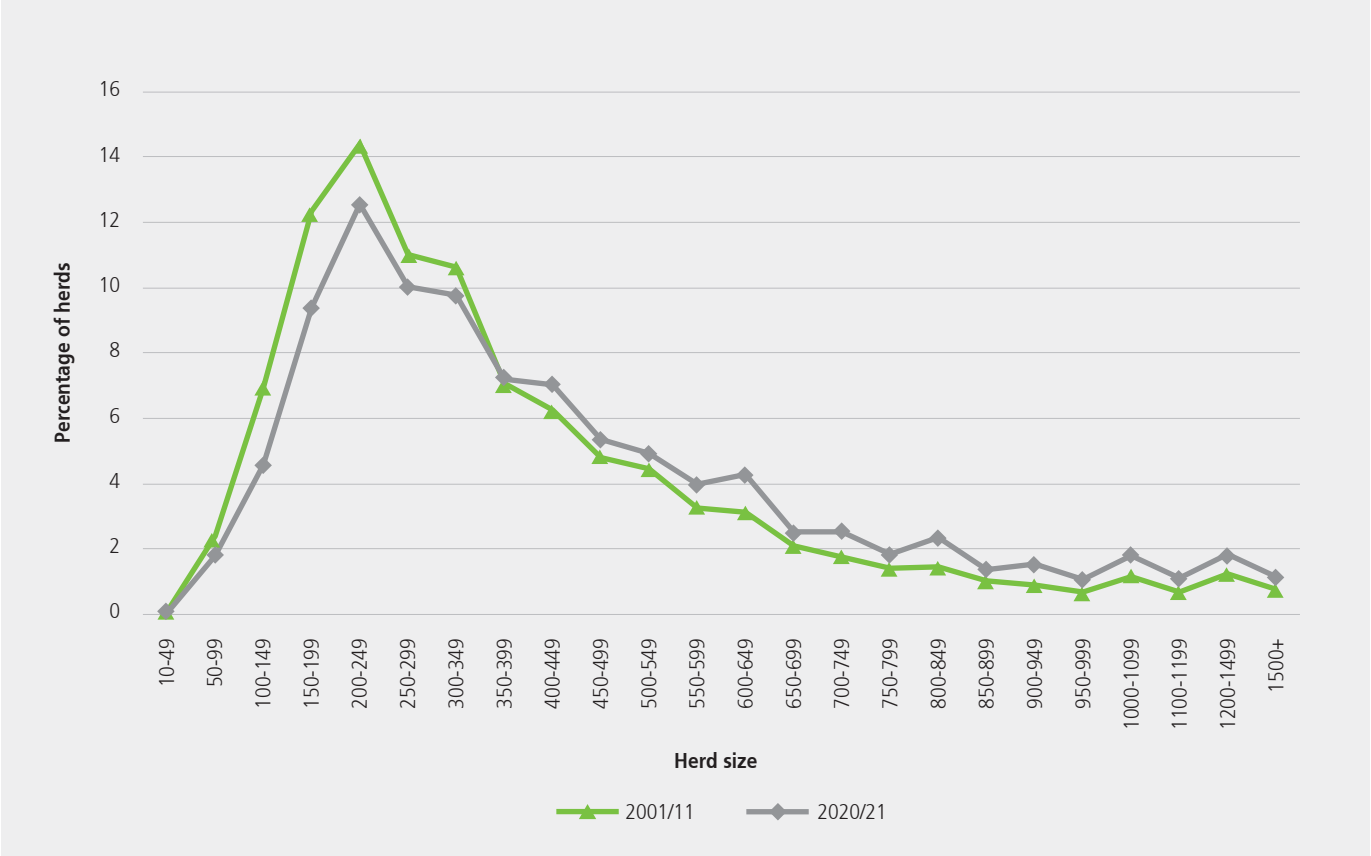
Aside from the 202 herds with fewer than 100 animals, the average milksolids per cow varies between 323 kg (herds with 1,500 cows or more) and 423 kg (herds with 900-949 cows).

Table 2.4: Average production per cow by herd size in 2020/21

Herd size	*Number of herds*	*Percentage of herds*	*Number of cows*	*Percentage of cows*	*Average kg milkfat per cow*	*Average kg protein per cow*	*Average kg milksolids per cow*
10-49	5	0.0	208	0.0	246	187	433
50-99	197	1.8	17,048	0.3	132	104	236
100-149	505	4.6	62,803	1.3	200	155	355
150-199	1,036	9.4	179,978	3.7	211	164	375
200-249	1,383	12.5	305,026	6.2	214	166	380
250-299	1,107	10.0	298,309	6.1	219	170	390
300-349	1,077	9.8	342,973	7.0	217	169	386
350-399	796	7.2	293,659	6.0	224	175	399
400-449	776	7.0	324,245	6.6	227	178	405
450-499	592	5.4	276,938	5.6	222	174	397
500-549	544	4.9	280,941	5.7	227	178	405
550-599	439	4.0	249,105	5.1	227	179	407
600-649	472	4.3	290,736	5.9	233	184	417
650-699	277	2.5	184,413	3.8	230	182	412
700-749	279	2.5	199,117	4.1	233	187	420
750-799	205	1.9	156,934	3.2	232	185	417
800-849	258	2.3	209,940	4.3	231	184	415
850-899	152	1.4	131,580	2.7	226	180	406
900-949	170	1.5	155,428	3.2	236	188	423
950-999	117	1.1	112,777	2.3	226	180	406
1000-1099	199	1.8	204,639	4.2	230	183	414
1100-1199	121	1.1	136,362	2.8	227	182	410
1200-1499	201	1.8	259,415	5.3	220	176	396
1500+	126	1.1	231,158	4.7	179	144	323
Total/Avg	**11,034**		**4,903,732**		**222**	**175**	**397**

The herd size distribution presented in Graph 2.4 shows an increase in herds with 350 cows or more, and a decrease in herds with fewer than 350 cows, compared with ten seasons ago. The most common herd size remains in the range of 200 to 249 cows (comprising 12.53% of herds in 2020/21, compared with 14.4% in 2010/11).

Graph 2.4: Herd size distribution for 2020/21 compared with 2010/11



3. Regional dairy statistics

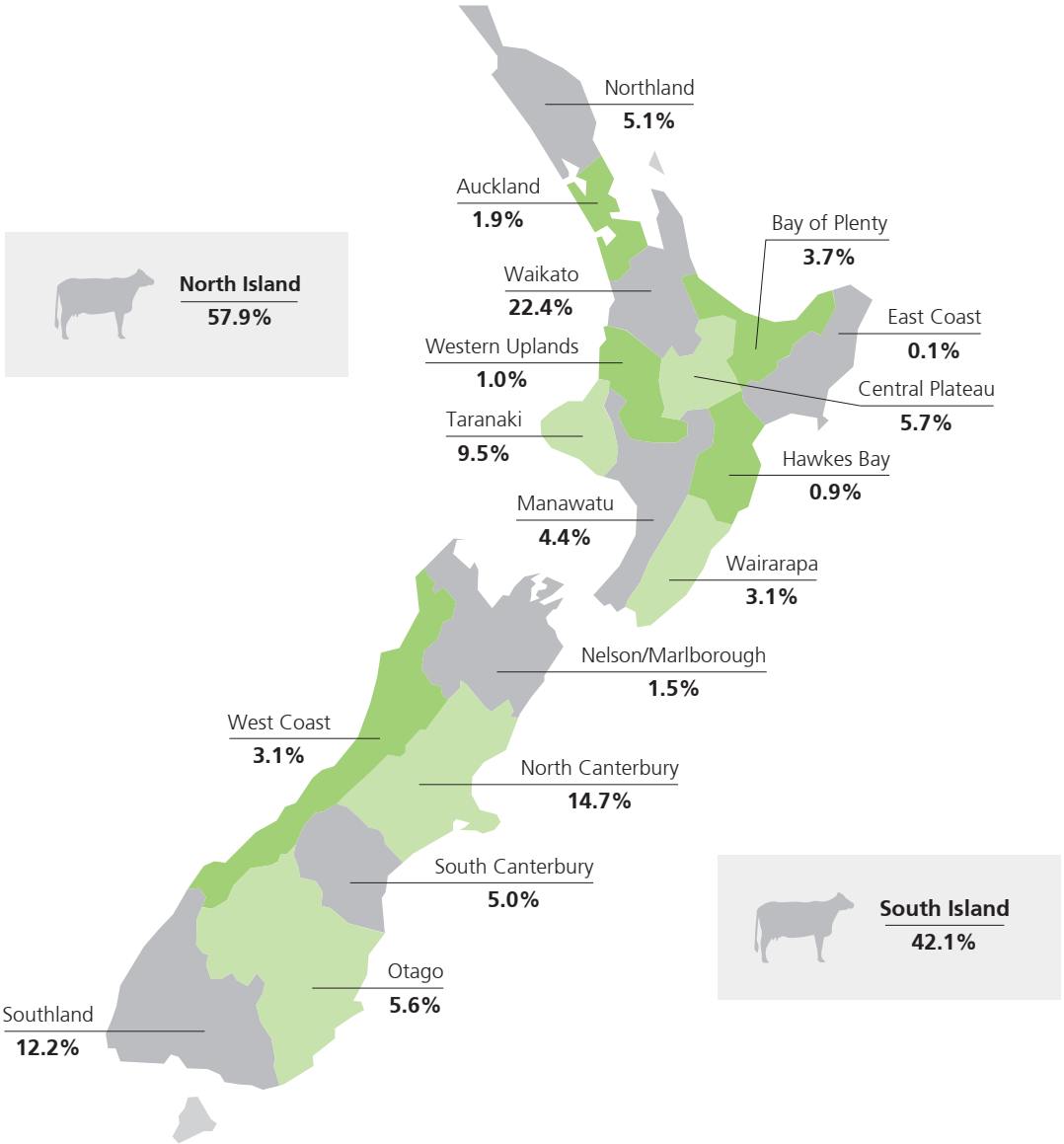
A. Regions

- *71% of dairy herds are located in the North Island*
- *42% of dairy cows are located in the South Island*

The majority of dairy herds (71.1%) are located in the North Island, with the greatest concentration (28.4%) situated in the Waikato region. Taranaki, with 14.1% of dairy herds, is the next largest region followed by Southland with 8.9%.

Although South Island dairy herds account for 28.9% of the national total, they contain 42.1% of all cows milked (Graph 3.1). Twenty-two percent of all dairy cows are located in the Waikato region, followed by North Canterbury (14.7%), Southland (12.2%) and Taranaki (9.5%).

Graph 3.1: Regional distribution of dairy cows in 2020/21



- *Largest average herd size (818) in North Canterbury*

Farms in the South Island are, on average, larger than those in the North Island (both in terms of farm area and cow numbers, see Table 3.1). The average herd size in both islands increased slightly this season. Within the South Island, North Canterbury has the largest average herd size (818 cows). In the North Island, Hawkes Bay has the largest average herd size of 650 cows. The smallest average herd sizes remain in Auckland, Taranaki, and Northland, averaging 289, 300 and 325 cows, respectively. North and South Canterbury have the highest average cows per hectare (3.48 and 3.39 respectively). The regions with the lowest average cows per hectare are the West Coast (2.18) and Northland (2.28).

Table 3.1: Herd analysis by region in 2020/21

Farming region	*Total herds*	*Percentage of herds*	*Total cows*	*Percentage of cows*	*Total effective hectares*	*Percentage of effective hectares*	*Average herd size*	*Average effective hectares*	*Average cows per hectare*
Northland	772	7.0	250,631	5.1	110,043	6.4	325	143	2.28
Auckland	328	3.0	94,805	1.9	38,376	2.2	289	117	2.47
Waikato	3,130	28.4	1,098,722	22.4	373,291	21.8	351	119	2.94
Bay of Plenty	510	4.6	183,427	3.7	64,785	3.8	360	127	2.83
Central Plateau	481	4.4	281,860	5.7	103,664	6.0	586	216	2.72
Western Uplands	87	0.8	48,576	1.0	18,471	1.1	558	212	2.63
East Coast	8	0.1	4,810	0.1	1,855	0.1	601	232	2.59
Hawkes Bay	68	0.6	44,177	0.9	15,587	0.9	650	229	2.83
Taranaki	1,553	14.1	465,896	9.5	167,167	9.8	300	108	2.79
Manawatu	513	4.6	215,574	4.4	80,322	4.7	420	157	2.68
Wairarapa	395	3.6	150,594	3.1	55,496	3.2	381	140	2.71
North Island	**7,845**	**71.1**	**2,839,073**	**57.9**	**1,029,057**	**60.1**	**362**	**131**	**2.76**
Nelson/Marlborough	198	1.8	74,521	1.5	26,227	1.5	376	132	2.84
West Coast	362	3.3	150,624	3.1	69,158	4.0	416	191	2.18
North Canterbury	884	8.0	723,148	14.7	207,637	12.1	818	235	3.48
South Canterbury	314	2.8	246,952	5.0	72,798	4.2	786	232	3.39
Otago	444	4.0	273,241	5.6	91,748	5.4	615	207	2.98
Southland	987	8.9	596,173	12.2	216,889	12.7	604	220	2.75
South Island	**3,189**	**28.9**	**2,064,659**	**42.1**	**684,458**	**39.9**	**647**	**215**	**3.02**
New Zealand	**11,034**		**4,903,733**		**1,713,515**		**444**	**155**	**2.86**

- *Highest average production per herd recorded in North Canterbury*

South Island farms have, on average, higher herd production than herds in the North Island, with North Canterbury recording the highest average herd production at 357,000 kilograms of milksolids (Table 3.2). This reflects a combination of larger herd sizes, a high stocking rate, and high kilograms of milksolids per cow. In the North Island, Hawkes Bay recorded the highest average herd production of 241,169 kilograms of milksolids, reflecting large herd sizes.

In 2020/21, average production per effective hectare and production per cow was higher in the South Island than in the North Island. North Canterbury recorded the highest average milksolids per hectare in the South Island for the 14th season in a row, with 1,520 kg per hectare. Taranaki had the highest average milksolids production per hectare in the North Island (1,162 kg).

North Canterbury also had the highest average milksolids per cow (436 kg). In the North Island, Taranaki had the highest average milksolids per cow (417 kg).

Table 3.2: Herd production analysis by region in 2020/21

Farming region	*Total kg milksolids*	*Percent milk-solids*	*Average litres per herd*	*Average kg milkfat per herd*	*Average kg protein per herd*	*Average kg milk-solids per herd*	*Average kg milkfat per effective hectare*	*Average kg protein per effective hectare*	*Average kg milksolids per effective hectare*	*Average kg milkfat per cow*	*Average kg protein per cow*	*Average kg milksolids per cow*
Northland	80,519,778	4.1	1,183,178	58,670	45,631	104,300	412	320	732	181	141	321
Auckland	34,870,728	1.8	1,219,232	59,503	46,810	106,313	509	400	909	206	162	368
Waikato	420,778,007	21.6	1,508,003	75,635	58,799	134,434	634	493	1,127	215	168	383
Bay of Plenty	66,695,505	3.4	1,478,386	73,481	57,294	130,775	578	451	1,029	204	159	364
Central Plateau	108,223,679	5.6	2,539,964	126,594	98,403	224,997	587	457	1,044	216	168	384
Western Uplands	14,472,707	0.7	1,835,147	93,736	72,617	166,353	441	342	784	168	130	298
East Coast	1,522,841	0.1	2,106,228	106,338	84,017	190,355	459	362	821	177	140	317
Hawkes Bay	16,399,479	0.8	2,732,470	133,828	107,341	241,169	584	468	1,052	206	165	371
Taranaki	194,312,592	10.0	1,364,092	70,467	54,654	125,121	655	508	1,162	235	182	417
Manawatu	86,746,633	4.5	1,921,108	94,289	74,807	169,097	602	478	1,080	224	178	402
Wairarapa	57,770,823	3.0	1,612,841	82,419	63,836	146,255	587	454	1,041	216	167	384
North Island	**1,082,312,771**	**55.6**	**1,543,967**	**77,550**	**60,412**	**137,962**	**591**	**461**	**1,052**	**214**	**167**	**381**
Nelson/ Marlborough	28,864,828	1.5	1,593,126	82,562	63,220	145,782	623	477	1,101	219	168	387
West Coast	50,362,959	2.6	1,497,691	78,640	60,484	139,124	412	317	728	189	145	334
North Canterbury	315,587,803	16.2	3,990,666	197,736	159,264	357,000	842	678	1,520	242	195	436
South Canterbury	107,018,573	5.5	3,783,167	188,969	151,855	340,823	815	655	1,470	240	193	433
Otago	110,824,065	5.7	2,781,426	138,863	111,304	250,167	670	537	1,208	225	180	406
Southland	252,562,720	13.0	2,823,900	141,844	114,045	255,889	645	519	1,164	235	189	424
South Island	**865,220,949**	**44.4**	**3,008,980**	**150,711**	**120,688**	**271,399**	**702**	**562**	**1,264**	**233**	**186**	**419**
New Zealand	**1,947,533,720**	**100.0**	**1,967,284**	**98,690**	**77,829**	**176,519**	**635**	**501**	**1,137**	**222**	**175**	**397**

B. Districts

South Taranaki continues to be the district with the highest number of herds (943) followed by Matamata-Piako (842) (Table 3.3). Southland district has the most cows (443,678), followed by Ashburton (366,710). MacKenzie in South Canterbury has the highest average herd size with 980 cows followed by Ashburton in North Canterbury with 884 cows. The number of owner-operators and sharemilkers is included in Table 3.3. Fifty-six percent of herds are run by owner-operators, while 28.5% of herds are sharemilkers of various types (Table 3.5). The remainder are largely herds with contract milkers.

Table 3.3: Herd analysis by district in 2020/21

Region	District	Total herds	Number of owner-operators	Number of contract milkers	Number of share-milkers	Total cows	Total effective hectares	Average herd size	Average effective hectares	Average cows per hectare
Northland	Far North	222	156	18	48	69,922	30,280	315	136	2.31
	Whangarei	259	145	36	70	86,534	36,151	334	140	2.39
	Kaipara	291	191	37	60	94,175	43,612	324	150	2.16
Auckland	Rodney	123	70	19	34	35,654	15,676	290	127	2.27
	Manukau / Papakura	16	9	-	7	3,710	1,363	232	85	2.72
	Franklin	189	96	22	69	55,440	21,337	293	113	2.60
Waikato	Waikato	609	324	89	192	207,183	74,835	340	123	2.77
	Hamilton City	14	9	1	4	4,262	1,444	304	103	2.95
	Waipa	515	274	95	145	192,288	63,011	373	122	3.05
	Otorohanga	337	178	47	112	131,655	45,125	391	134	2.92
	Thames-Coromandel	83	45	21	17	26,391	9,599	318	116	2.75
	Hauraki	361	179	82	98	108,473	39,762	300	110	2.73
	Matamata-Piako	842	369	147	325	275,123	87,233	327	104	3.15
	South Waikato	369	183	72	114	153,347	52,283	416	142	2.93
Bay of Plenty	Western Bay of Plenty	166	92	39	35	61,300	21,730	369	131	2.82
	Tauranga	11	4	3	4	4,719	1,970	429	179	2.40
	Kawerau / Whakatane	267	153	42	66	95,640	33,136	358	124	2.89
	Opotiki	66	34	8	21	21,769	7,949	330	120	2.74
Central Plateau	Taupo	177	112	34	30	139,985	51,798	791	293	2.70
	Rotorua	304	169	49	85	141,875	51,866	467	171	2.74
Western Uplands	Waitomo	60	40	1	19	35,258	13,169	588	219	2.68
	Ruapehu	27	15	2	10	13,318	5,302	493	196	2.51
East Coast	Gisborne / Wairoa	8	5	2	1	4,810	1,855	601	232	2.59
Hawkes Bay	Napier / Hastings	29	20	5	4	15,651	5,935	540	205	2.64
	Central Hawkes Bay	39	29	3	7	28,526	9,652	731	247	2.96
Taranaki	New Plymouth	389	228	40	120	105,976	40,408	272	104	2.62
	Stratford	221	139	19	63	56,856	21,269	257	96	2.67
	South Taranaki	943	500	128	309	303,064	105,490	321	112	2.87
Manawatu	Wanganui	19	12	2	5	7,922	3,242	417	171	2.44
	Rangitikei	85	57	15	13	42,990	15,241	506	179	2.82
	Manawatu	235	144	28	63	94,331	36,046	401	153	2.62
	Palmerston North City	45	35	3	6	20,683	7,477	460	166	2.77
	Horowhenua	114	80	10	22	44,869	16,348	394	143	2.74
	Kapiti Coast / Upper Hutt	15	10	2	3	4,778	1,968	319	131	2.43
Wairarapa	Tararua	261	158	37	64	88,621	33,726	340	129	2.63
	Masterton	17	8	3	6	8,408	2,732	495	161	3.08
	Carterton	46	33	8	5	18,994	6,720	413	146	2.83
	South Wairarapa	71	36	18	16	34,572	12,318	487	173	2.81
North Island		**7,845**	**4,341**	**1,187**	**2,272**	**2,839,073**	**1,029,057**	**362**	**131**	**2.76**

(table 3.3 continued)

Region	District	Total herds	Number of owner-operators	Number of contract milkers	Number of share-milkers	Total cows	Total effective hectares	Average herd size	Average effective hectares	Average cows per hectare
Nelson/ Marlborough	Marlborough	48	36	2	9	16,028	5,467	334	114	2.93
	Kaikoura	19	8	2	9	8,222	2,415	433	127	3.40
	Tasman / Nelson City	131	101	13	17	50,271	18,345	384	140	2.74
West Coast	Buller	124	90	11	23	50,608	22,109	408	178	2.29
	Grey	88	62	8	18	41,372	18,300	470	208	2.26
	Westland	150	111	9	30	58,644	28,749	391	192	2.04
North Canterbury	Hurunui	94	61	18	15	77,631	22,487	826	239	3.45
	Waimakariri	102	60	13	29	71,298	20,465	699	201	3.48
	Christchurch City	39	24	10	5	31,507	9,349	808	240	3.37
	Banks Peninsula	6	3	-	3	2,132	813	355	136	2.62
	Selwyn	228	152	35	41	173,870	51,535	763	226	3.37
	Ashburton	415	223	66	126	366,710	102,988	884	248	3.56
South Canterbury	Timaru	179	119	15	45	130,291	37,417	728	209	3.48
	MacKenzie	16	7	1	8	15,680	5,698	980	356	2.75
	Waimate	119	60	11	48	100,981	29,683	849	249	3.40
Otago	Waitaki	145	68	23	54	105,189	32,318	725	223	3.25
	Dunedin City	63	37	2	24	28,092	9,349	446	148	3.00
	Clutha	203	105	22	53	113,655	40,138	560	198	2.83
	Central Otago / Lakes	33	22	3	7	26,304	9,943	797	301	2.65
Southland	Gore	165	93	16	50	94,410	36,960	572	224	2.55
	Invercargill	101	54	17	27	58,086	20,863	575	207	2.78
	Southland	721	369	110	232	443,678	159,066	615	221	2.79
South Island		**3,189**	**1,865**	**407**	**873**	**2,064,659**	**684,458**	**647**	**215**	**3.02**
New Zealand		**11,034**	**6,206**	**1,594**	**3,145**	**4,903,733**	**1,713,515**	**444**	**155**	**2.86**

Nationally, MacKenzie district had the highest average production per herd with 408,244 kilograms of milksolids followed by Ashburton with 387,400 kilograms of milksolids (Table 3.4). Hurunui had the highest average milksolids per effective hectare with 1,605 kilograms, while Ashburton had the second highest (1,561 kilograms per hectare). Hurunui also recorded the highest average production per cow (465 kilograms of milksolids). Within the North Island districts, Taupo has the highest milksolids production per herd with an average of 295,473 kilograms of milksolids, followed by Central Hawkes Bay with 287,211 kilograms. Of all the North Island districts, Masterton and South Waikato produced the highest average kilograms of milksolids per hectare (1,347 and 1,230 respectively), while Masterton also produced the highest average kilograms of milksolids per cow (438).

Table 3.4: Herd production analysis by district in 2020/21

Region	*District*	*Average litres per herd*	*Average kg milkfat per herd*	*Average kg protein per herd*	*Average kg milksolids per herd*	*Average kg milkfat per effective hectare*	*Average kg protein per effective hectare*	*Average kg milksolids per effective hectare*	*Average kg milkfat per cow*	*Average kg protein per cow*	*Average kg milksolids per cow*
Northland	Far North	1,167,225	57,763	45,008	102,771	423	330	753	183	143	326
	Whangarei	1,280,099	63,533	49,453	112,986	455	354	809	190	148	338
	Kaipara	1,109,084	55,032	42,703	97,736	367	285	652	170	132	302
Auckland	Rodney / Auckland	1,106,825	54,985	42,741	97,726	431	335	767	190	147	337
	Manukau / Papakura	944,852	45,846	36,108	81,954	538	424	962	198	156	353
	Franklin	1,315,614	63,600	50,364	113,964	563	446	1,009	217	172	389
Waikato	Waikato	1,444,979	72,003	56,060	128,063	586	456	1,042	212	165	376
	Hamilton City	1,318,414	65,897	50,922	116,820	639	494	1,133	216	167	384
	Waipa	1,664,426	83,507	64,832	148,338	683	530	1,212	224	174	397
	Otorohanga	1,603,254	80,959	62,561	143,520	605	467	1,072	207	160	367
	Thames-Coromandel	1,121,724	56,460	44,017	100,476	488	381	869	178	138	316
	Hauraki	1,158,030	57,709	45,124	102,833	524	410	934	192	150	342
	Matamata-Piako	1,413,209	71,334	55,270	126,604	689	533	1,222	218	169	387
	South Waikato	1,959,480	97,811	76,522	174,334	690	540	1,230	235	184	420
Bay of Plenty	Western Bay of Plenty	1,439,605	72,912	56,237	129,149	557	430	987	197	152	350
	Tauranga	1,545,122	80,060	62,292	142,352	447	348	795	187	145	332
	Kawerau / Whakatane	1,546,503	76,161	59,627	135,788	614	480	1,094	213	166	379
	Opotiki	1,289,239	62,976	49,683	112,658	523	413	935	191	151	342
Central Plateau	Taupo	3,323,359	166,322	129,151	295,473	568	441	1,010	210	163	374
	Rotorua	2,083,842	103,464	80,500	183,963	606	472	1,078	222	172	394
Western Uplands	Waitomo	1,831,024	93,634	72,425	166,059	427	330	757	159	123	283
	Ruapehu	1,844,311	93,963	73,044	167,007	478	372	850	190	148	339
East Coast	Gisborne / Wairoa	2,106,228	106,338	84,017	190,355	459	362	821	177	140	317
Hawkes Bay	Napier / Hastings	2,027,776	100,284	78,966	179,250	490	386	876	186	146	332
	Central Hawkes Bay	3,256,473	158,770	128,441	287,211	642	519	1,161	217	176	393
Taranaki	New Plymouth	1,183,461	61,500	47,162	108,661	592	454	1,046	226	173	399
	Stratford	1,183,533	60,575	46,996	107,571	629	488	1,118	235	183	418
	South Taranaki	1,480,921	76,485	59,539	136,023	684	532	1,216	238	185	423
Manawatu	Wanganui	1,645,967	78,142	63,071	141,213	458	370	828	187	151	339
	Rangitikei	2,162,034	107,193	84,948	192,141	598	474	1,072	212	168	380
	Manawatu	1,837,923	90,592	71,748	162,340	591	468	1,058	226	179	404
	Palmerston North City	2,258,724	111,445	87,805	199,250	671	528	1,199	242	191	434
	Horowhenua	1,897,335	92,120	73,291	165,411	642	511	1,153	234	186	420
	Kapiti Coast / Upper Hutt	1,375,433	64,577	52,668	117,245	492	401	894	203	165	368
Wairarapa	Tararua	1,418,008	72,839	56,041	128,880	564	434	997	215	165	380
	Masterton	2,466,782	120,989	95,491	216,480	753	594	1,347	245	193	438
	Carterton	1,754,758	87,590	68,401	155,991	600	468	1,068	212	166	378
	South Wairarapa	2,032,648	105,048	81,958	187,006	605	472	1,078	216	168	384
North Island		**1,543,967**	**77,550**	**60,412**	**137,962**	**591**	**461**	**1,052**	**214**	**167**	**381**

(table 3.4 continued)

Region	*District*	*Average litres per herd*	*Average kg milkfat per herd*	*Average kg protein per herd*	*Average kg milksolids per herd*	*Average kg milkfat per effective hectare*	*Average kg protein per effective hectare*	*Average kg milksolids per effective hectare*	*Average kg milkfat per cow*	*Average kg protein per cow*	*Average kg milksolids per cow*
Nelson/ Marlborough	Marlborough	1,570,198	79,994	61,264	141,257	702	538	1,240	240	183	423
	Kaikoura	2,074,604	105,137	81,737	186,874	827	643	1,470	243	189	432
	Tasman/Nelson City	1,531,694	80,229	61,251	141,480	573	437	1,010	209	160	369
West Coast	Buller	1,461,305	75,948	58,322	134,270	426	327	753	186	143	329
	Grey	1,781,430	92,751	71,804	164,555	446	345	791	197	153	350
	Westland	1,361,309	72,588	55,630	128,218	379	290	669	186	142	328
North Canterbury	Hurunui	4,268,632	214,143	169,927	384,070	895	710	1,605	259	206	465
	Waimakariri	3,498,435	168,655	137,533	306,188	841	685	1,526	241	197	438
	Christchurch City	3,949,184	196,840	158,514	355,354	821	661	1,482	244	196	440
	Banks Peninsula	1,432,885	73,735	56,813	130,548	544	419	963	208	160	367
	Selwyn	3,568,565	176,897	142,581	319,478	783	631	1,413	232	187	419
	Ashburton	4,321,466	214,493	172,907	387,400	864	697	1,561	243	196	438
South Canterbury	Timaru	3,526,441	175,627	141,029	316,656	840	675	1,515	241	194	435
	MacKenzie	4,538,172	225,441	182,803	408,244	633	513	1,146	230	187	417
	Waimate	4,067,823	204,133	163,978	368,111	818	657	1,476	241	193	434
Otago	Waitaki	3,395,325	171,194	137,526	308,719	768	617	1,385	236	190	426
	Dunedin City	2,047,096	101,505	81,437	182,942	684	549	1,233	228	183	410
	Clutha	2,445,552	120,292	96,399	216,691	608	488	1,096	215	172	387
	Central Otago / Lakes	3,576,113	183,721	145,848	329,569	591	469	1,061	224	177	401
Southland	Gore	2,542,148	128,535	102,147	230,682	574	456	1,030	225	179	403
	Invercargill	2,726,894	136,079	109,520	245,599	659	530	1,189	237	190	427
	Southland	2,901,967	145,697	117,402	263,099	660	532	1,193	237	191	428
South Island		**3,008,980**	**150,711**	**120,688**	**271,399**	**702**	**562**	**1,264**	**233**	**186**	**419**
New Zealand		**1,967,284**	**98,690**	**77,829**	**176,519**	**635**	**501**	**1,137**	**222**	**175**	**397**

Note: *Districts with fewer than four herds have been added to a neighbouring district to preserve anonymity*

C. Operating structures

The main operating structures found on New Zealand dairy farms are owner operator, sharemilker and, to a lesser extent, contract milker.

Owner operators are farmers who own and operate their own farms, or who employ a manager to operate the farm for a fixed wage. Owner-operators receive all the farm income, although they may pay wages. Owner operators comprise the largest group of all operating structures, being 56.2% of all herds.

Contract milkers (14.4% of herds) are contracted to milk a herd at a set price per kilogram of milksolids produced. The rate is set according to the amount of farm work done.

Sharemilking has traditionally been the first step to farm ownership. Sharemilking involves operating a farm on behalf of the farm owner for an agreed share of the farm receipts (as opposed to a set wage). Two types of sharemilking agreement are commonly used: Variable-order sharemilking and 50/50 or herd-owning sharemilking agreements.

Herd-owning sharemilkers (also called 50/50) own the herd and any plant and equipment (other than the milking plant) needed to farm the property. The sharemilker is usually responsible for milk harvesting expenses, labour, stock-related expenses, and general farm work and maintenance. The owner is usually responsible for expenses related to maintaining the property. The percentage quoted in a 50/50 sharemilking agreement usually refers to the proportion of milk income the sharemilker receives. While this percentage is most commonly 50%, it can range from 45% to 55%. Under the 50/50 agreement the sharemilker receives the agreed percentage of milk income plus the majority of income from stock sales, and the farm owner receives the remaining percentage of milk income.

Unlike the 50/50 agreement, where the owner may have little to do with farm management, a variable-order sharemilking agreement often sees the owner retain some involvement in management of the farm. The variable-order sharemilking agreement involves the farm owner retaining ownership of the herd and bearing more of the farm costs, such as animal health and breeding. The amount of farm work required by the sharemilker is determined by the individual agreement, with responsibility ranging from herd management only to carrying out all farm work.

- *56.2% of all herds are operated as owner-operators*
- *58.2% of all sharemilkers are 50/50 sharemilkers*

The number of herds farmed, average herd size, effective area and number of cows per hectare for each of the main operating structures are shown in Table 3.5. Twenty-eight percent (3,145) of New Zealand dairy herds operated under a sharemilking agreement in 2020/21, this was a decrease in numbers by 82 herds from the previous season. Owner-operators number 6,206 and account for 56.2% of all herds, reflecting a movement away from sharemilking, particularly variable order, to contract milking with greater certainty of milk income. Fifty-eight percent (1,831) of all sharemilkers have 50/50 agreements. The majority of the variable-order sharemilkers are between 20-29%. Contract milkers account for 14.4% of herds.

Table 3.5: Herd analysis by operating structure in 2020/21

Operating structure	*Number of herds*	*Percentage of herds*	*Average herd size*	*Average effective hectares*	*Average cows per effective hectare*
Owner-operators	6,206	56.2	436	155	2.80
Contract milkers	1,594	14.4	484	162	2.98
Sharemilkers:					
less than 20%	117	1.1	759	238	3.19
20-29%	534	4.8	477	165	2.88
30-49%	148	1.3	436	149	2.93
50/50	1,831	16.6	408	140	2.90
over 50%	515	4.7	445	154	2.88
All sharemilkers	3,145	28.5	440	151	2.91
Unknown	89	0.8			
All farms	**11,034**	**100**	**444**	**155**	**2.86**

Herd production in each of the main operating structure groups is shown in Table 3.6. The table shows that, on average, sharemilkers on less than 20% agreements have the highest production.

Table 3.6: Herd production analysis by operating structure in 2020/21

Operating structure	*Average litres per herd*	*Average kg milkfat per herd*	*Average kg milksolids per herd*	*Average kg milkfat per effective hectare*	*Average kg milksolids per effective hectare*	*Average kg milkfat per cow*	*Average kg milksolids per cow*
Owner-operators	1,914,158	95,727	171,342	616	1,102	220	393
Contract Milkers	2,175,903	109,563	195,761	674	1,205	226	405
Sharemilkers:							
less than 20%	3,613,529	181,140	326,694	762	1,374	239	430
20-29%	2,134,269	107,322	192,267	650	1,164	225	403
30-49%	1,921,828	97,139	173,656	651	1,164	223	398
50/50	1,786,461	90,346	161,204	643	1,148	222	395
over 50%	2,011,340	100,611	180,248	651	1,167	226	405
All Sharemilkers	1,956,682	98,607	176,339	653	1,168	224	401
All farms	**1,964,497**	**98,569**	**176,334**	**635**	**1,136**	**222**	**397**

Changes to the operating structure in the last ten seasons have seen the percentage of sharemilkers, including 50/50 sharemilkers, decrease. Table 3.7 shows the percentage of herds in each operating structure type, whereas Table 3.8 gives the actual number of herds. Sharemilkers have declined from 34.2% in 2011/12 to 28.5% of herds in 2020/21. For the last four seasons, the percentage of herds with contract milkers are shown separately. Prior to this they were included in the Owner-operator category.

Table 3.7: Trend in the percentage of herds in each operating structure for the last 10 seasons

Operating structure	*2011/12*	*2012/13*	*2013/14*	*2014/15*	*2015/16*	*2016/17*	*2017/18*	*2018/19*	*2019/20*	*2020/21*
Owner-operators	65.8	64.6	65.5	67.3	69.8	72.4	59.9	57.2	56.1	56.2
Contract Milkers							12.4	12.8	14.3	14.4
Sharemilkers:										
less than 20%	2.0	1.9	1.7	1.5	1.3	1.1	1.1	1.2	1.3	1.1
20-29%	9.9	9.6	9.7	8.8	6.9	5.0	5.1	5.2	5.5	4.8
30-49%	1.6	1.4	1.5	1.4	1.5	1.3	1.4	1.4	1.4	1.3
50/50	18.8	18.7	18.5	17.1	16.8	16.4	15.9	16.9	16.6	16.6
over 50%	1.8	3.5	2.9	3.6	3.5	3.5	3.7	4.6	4.0	4.7
All sharemilkers	34.2	35.2	34.2	32.4	30.0	27.3	27.3	29.3	28.9	28.5
Other/Unknown	0.0	0.3	0.3	0.3	0.3	0.3	0.4	0.7	0.8	0.8

Table 3.8: Trend in the number of herds in each operating structure for the last 10 seasons

Operating structure	*2011/12*	*2012/13*	*2013/14*	*2014/15*	*2015/16*	*2016/17*	*2017/18*	*2018/19*	*2019/20*	*2020/21*
Owner-operators	7,764	7,679	7,812	8,059	8,315	8,503	6,940	6,507	6,268	6,206
Contract Milkers							1,440	1,460	1,597	1,594
Sharemilkers:										
less than 20%	234	224	206	179	153	134	122	138	148	117
20-29%	1,173	1,140	1,151	1,050	821	586	595	589	616	534
30-49%	193	170	177	171	174	157	161	159	159	148
50/50	2,218	2,229	2,201	2,050	2,001	1,925	1,848	1,919	1,857	1,831
over 50%	216	417	346	429	421	406	433	526	447	515
All sharemilkers	4,034	4,180	4,081	3,879	3,570	3,208	3,159	3,331	3,227	3,145
Other/Unknown	0	32	34	32	33	37	51	74	87	89
Total	**11,798**	**11,891**	**11,927**	**11,970**	**11,918**	**11,748**	**11,590**	**11,372**	**11,179**	**11,034**

Table 3.9 compares the number (and percentage) of owner-operators with sharemilkers by region in 2020/21. In the South Island there were more variable order sharemilkers than 50/50 sharemilkers, while the opposite was the case in the North Island.

Table 3.9: Operating structure by region in 2020/21

Farming region	*Owner-operators*	*Owner-operators %*	*Contract milkers*	*Contract milkers %*	*All share-milkers*	*All share-milkers %*	*50/50 share-milkers*	*50/50 share-milkers %*	*Variable order share-milkers*	*Variable order share-milkers %*	*Total herds (excl. unknown)*
Northland	492	7.9	91	5.7	178	5.7	116	6.3	62	4.7	761
Auckland	175	2.8	41	2.6	110	3.5	71	3.9	39	3.0	326
Waikato	1,562	25.2	554	34.8	1,006	32.0	719	39.3	287	21.9	3,122
Bay of Plenty	283	4.6	92	5.8	126	4.0	73	4.0	53	4.0	501
Central Plateau	281	4.5	83	5.2	115	3.7	75	4.1	40	3.0	479
Western Uplands	55	0.9	3	0.2	29	0.9	15	0.8	14	1.1	87
East Coast	5	0.1	2	0.1	1	0.0	0	0.0	1	0.1	8
Hawkes Bay	49	0.8	8	0.5	11	0.3	7	0.4	4	0.3	68
Taranaki	867	14.0	187	11.7	492	15.6	268	14.6	224	17.1	1,546
Manawatu	338	5.4	60	3.8	112	3.6	57	3.1	55	4.2	510
Wairarapa	235	3.8	66	4.1	91	2.9	53	2.9	38	2.9	392
North Island	**4,342**	**70.0**	**1,187**	**74.5**	**2,271**	**72.2**	**1,454**	**79.4**	**817**	**62.2**	**7,800**
Nelson/Marlborough	145	2.3	17	1.1	35	1.1	18	1.0	17	1.3	197
West Coast	263	4.2	28	1.8	71	2.3	32	1.7	39	3.0	362
North Canterbury	523	8.4	142	8.9	219	7.0	96	5.2	123	9.4	884
South Canterbury	186	3.0	27	1.7	101	3.2	31	1.7	70	5.3	314
Otago	232	3.7	50	3.1	138	4.4	56	3.1	82	6.2	420
Southland	516	8.3	143	9.0	309	9.8	144	7.9	165	12.6	968
South Island	**1,865**	**30.0**	**407**	**25.5**	**873**	**27.8**	**377**	**20.6**	**496**	**37.8**	**3,145**
New Zealand	**6,207**	**100.0**	**1,594**	**100.0**	**3,144**	**100.0**	**1,831**	**100.0**	**1,313**	**100.0**	**10,945**

Table 3.10 shows the number and percentage of owner-operators, contract milkers and sharemilkers by herd size. Herds in the range of 200-249 animals (which represent 12.6% of herds nationally) also account for the highest percentage of herds in each known operating structure category. Owner-operators of herds with a size of 200-249 were the most common operating structure overall, with 803 herds.

Table 3.10: Operating structure by herd size in 2020/21

Herd size	*Owner-operators*	*Owner-operators %*	*Contract milkers*	*Contract milkers %*	*All share-milkers*	*All share-milkers %*	*50/50 share-milkers*	*50/50 share-milkers %*	*Variable order share-milkers*	*Variable order share-milkers %*	*Number of herds (excl. unknown)*	*Percentage of herds*
10-49	4	0.1	0	0.0	0	0.0	0	0.0	0	0.0	4	0.0
50-99	161	2.6	5	0.3	27	0.9	15	0.8	12	0.9	193	1.8
100-149	397	6.4	16	1.0	92	2.9	52	2.8	40	3.0	505	4.6
150-199	649	10.5	87	5.5	291	9.3	189	10.3	102	7.8	1,027	9.4
200-249	803	12.9	187	11.7	384	12.2	243	13.3	141	10.7	1,374	12.6
250-299	569	9.2	176	11.0	358	11.4	239	13.1	119	9.1	1,103	10.1
300-349	582	9.4	165	10.4	324	10.3	205	11.2	119	9.1	1,071	9.8
350-399	417	6.7	118	7.4	258	8.2	148	8.1	110	8.4	793	7.2
400-449	395	6.4	138	8.7	238	7.6	146	8.0	92	7.0	771	7.0
450-499	295	4.8	108	6.8	184	5.9	102	5.6	82	6.2	587	5.4
500-549	277	4.5	92	5.8	162	5.2	91	5.0	71	5.4	531	4.9
550-599	203	3.3	82	5.1	148	4.7	86	4.7	62	4.7	433	4.0
600-649	234	3.8	94	5.9	138	4.4	73	4.0	65	5.0	466	4.3
650-699	151	2.4	44	2.8	80	2.5	41	2.2	39	3.0	275	2.5
700-749	156	2.5	43	2.7	79	2.5	38	2.1	41	3.1	278	2.5
750-799	118	1.9	32	2.0	53	1.7	27	1.5	26	2.0	203	1.9
800-849	137	2.2	41	2.6	77	2.4	29	1.6	48	3.7	255	2.3
850-899	90	1.4	22	1.4	38	1.2	23	1.3	15	1.1	150	1.4
900-949	105	1.7	25	1.6	38	1.2	16	0.9	22	1.7	168	1.5
950-999	78	1.3	18	1.1	20	0.6	8	0.4	12	0.9	116	1.1
1000-1099	116	1.9	28	1.8	54	1.7	25	1.4	29	2.2	198	1.8
1100-1199	77	1.2	17	1.1	27	0.9	9	0.5	18	1.4	121	1.1
1200-1499	121	1.9	34	2.1	43	1.4	15	0.8	28	2.1	198	1.8
1500+	72	1.2	22	1.4	31	1.0	11	0.6	20	1.5	125	1.1
Total/Avg	**6,207**	**100.0**	**1,594**	**100.0**	**3,144**	**100.0**	**1,831**	**100.0**	**1,313**	**100.0**	**10,945**	**100.0**

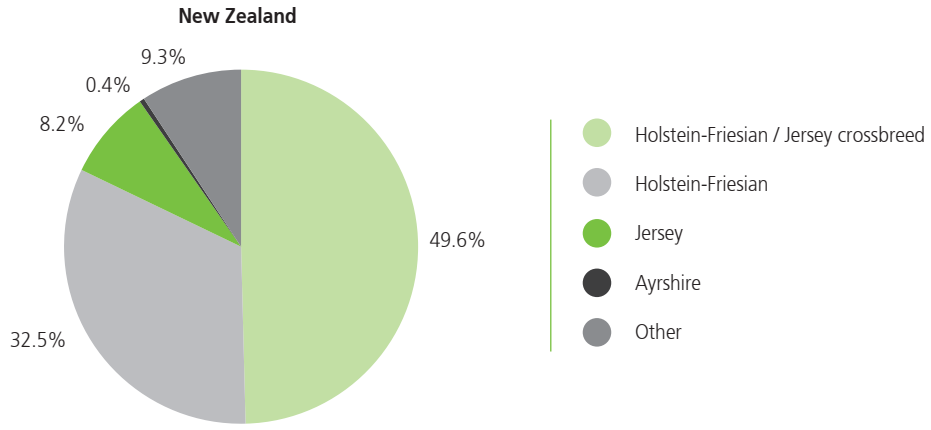
D. Breed breakdown

Three types of dairy cattle dominate the dairy cow inseminations carried out in New Zealand, as recorded on the LIC National Database: Holstein-Friesian, Jersey, and Holstein-Friesian/Jersey crossbreed.

The Jersey breed dominated the national dairy herd until the late 1960s. By 1970, Holstein-Friesian was the dominant dairy breed in New Zealand, because of changes in farm management practices and farmers raising larger numbers of dairy calves for beef. Of the other breeds of cattle used to inseminate dairy cows, the main beef breed currently in use is Polled Hereford. Other beef breeds used to a lesser degree include Angus, Belgian Blue, Simmental and Wagyu. Other breeds of dairy cattle present in smaller numbers in New Zealand include Milking Shorthorn, Guernsey and Brown Swiss. Holstein-Friesian/Jersey Crossbreed now makes up a large proportion of the national dairy herd.

The percentages of the major dairy breed categories for New Zealand and each region are shown in Graphs 3.2 and 3.3. Percentages are given for Holstein-Friesian, Jersey, Holstein-Friesian/Jersey crossbreed and Ayrshire cows with the remaining breeds and crossbreeds grouped into "Other". Holstein-Friesian/Jersey crossbreed is still the prevalent breed category in all regions except the Manawatu/Wairarapa, where Holstein-Friesian remains prevalent. The Manawatu/Wairarapa region continues to have the highest percentage of Holstein-Friesian cows (42.4%) followed by Northland (37.5%). Tasman/West Coast has the highest proportion of Jerseys (15.9%) followed by Taranaki (12.6%). Marlborough/Canterbury has the highest proportion of Holstein-Friesian/Jersey crossbreeds (54.6%), followed by Tasman/West Coast (54.3%).

Graph 3.2: Breed category percentages of cows for New Zealand in 2020/21



Graph 3.3: Breed category percentages of cows by region in 2020/21

4. Herd improvement

A. Use of herd testing

Herd testing enables farmers to collect information about individual cows in their herds. The information gained from herd testing is vital for effective herd management and decision-making. Farmers are able to benchmark animal performance within herd, within region, and nationally.

Farmers currently have the choice of two herd testing service providers (CRV AmBreed and LIC), and are able to choose the frequency of testing. Data used in the following analysis includes figures from both herd test providers.

Herd testing involves the collection of individual milk samples from animals in the herd. A full herd test provides information on milk volumes, milkfat and protein yields, and somatic cell counts.

Herd testing provides an overall picture of the production of the herd, and enables the mastitis status to be monitored. More specifically, herd test information identifies low-producing cows (for culling or drying off), high producers (for breeding), and cows with mastitis (for therapy or culling).

- *76% of cows were herd-tested in 2020/21*

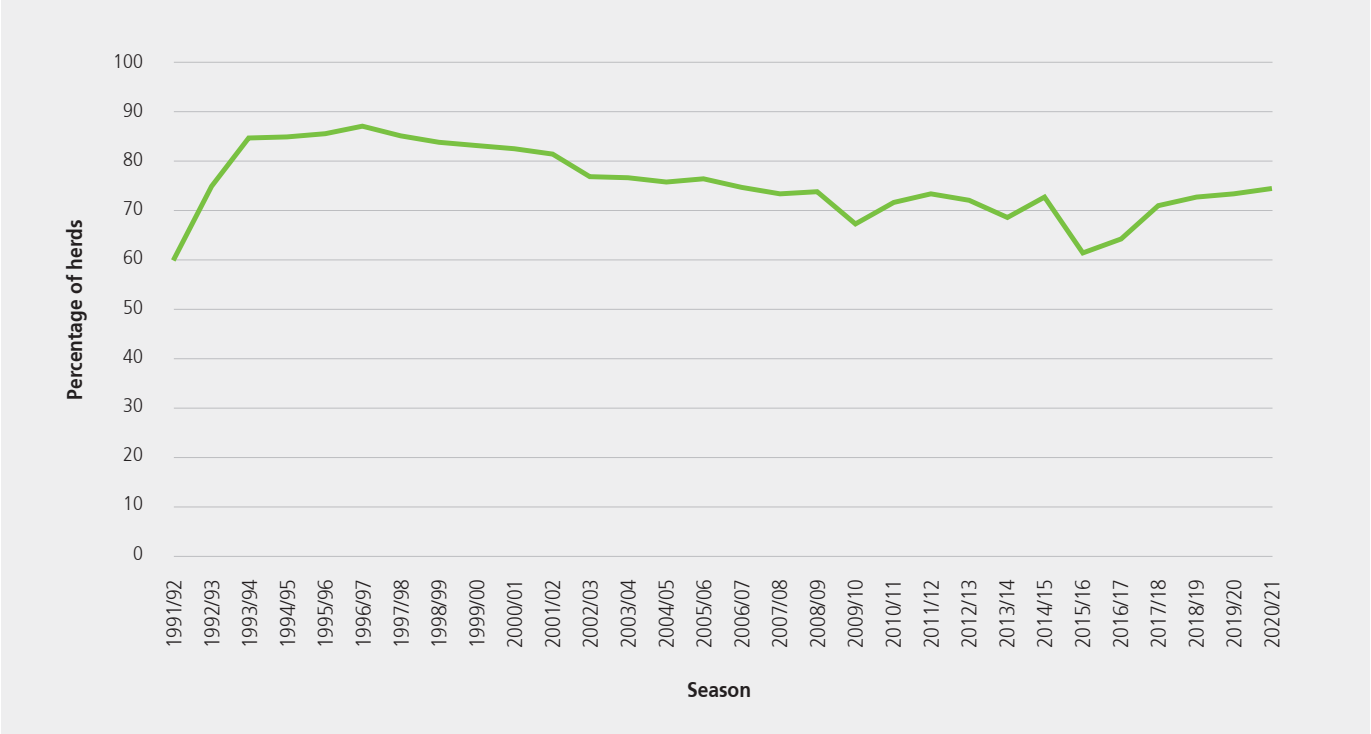
The percentage of total herds and the percentage of total cows using herd testing both increased in 2020/21 (Table 4.1). The percentage of herds testing (74.5%) in 2020/21, was about 13% higher than in 2015/16 and the highest it has been in the past 14 seasons. A total of 3.73 million cows were herd-tested in 2020/21 – the highest on record.

Table 4.1: Trend in the use of herd testing services for the last 20 seasons

Season	Number of herds herd-tested	Total herds	% of total herds herd-tested	Number of cows herd-tested (000)	Total cows (000)	% of total cows herd-tested
2001/02	11,113	13,649	81.4	2,974	3,693	80.5
2002/03	10,113	13,140	77.0	2,855	3,741	76.3
2003/04	9,772	12,751	76.6	2,842	3,851	73.8
2004/05	9,306	12,271	75.8	2,811	3,868	72.7
2005/06	9,082	11,883	76.4	2,846	3,832	74.3
2006/07	8,692	11,630	74.7	2,791	3,917	71.2
2007/08	8,405	11,436	73.5	2,871	4,013	71.5
2008/09	8,589	11,618	73.9	3,040	4,253	71.5
2009/10	7,870	11,691	67.3	2,812	4,397	64.0
2010/11	8,409	11,735	71.7	3,186	4,529	70.4
2011/12	8,673	11,798	73.5	3,362	4,634	72.6
2012/13	8,585	11,891	72.2	3,426	4,784	71.6
2013/14	8,188	11,927	68.7	3,294	4,923	66.9
2014/15	8,724	11,970	72.9	3,654	5,018	72.8
2015/16	7,316	11,908	61.4	3,030	4,998	60.6
2016/17	7,557	11,748	64.3	3,206	4,861	65.9
2017/18	8,242	11,590	71.1	3,615	4,993	72.4
2018/19	8,280	11,372	72.8	3,672	4,946	74.2
2019/20	8,212	11,179	73.5	3,689	4,922	75.0
2020/21	8,218	11,034	74.5	3,735	4,904	76.2

The trend in the percentage of total herds using herd testing shows an increase over the past five seasons, back to the levels between 2010-11 and 2014-15 (Graph 4.1).

Graph 4.1: Trend in the percentage of herds testing for the last 30 seasons



The regional uptake of herd testing services in 2020/21 is shown in Table 4.2, where the number of cows tested refers to all cows tested at least once in the season. All regions recorded between 67 and 79 percent of herds testing (with the exception of East Coast). Wairarapa had the highest percentage of herds using herd testing (79%), closely followed by Taranaki (78.8%). North Canterbury had the highest percentage of cows herd tested (80%), followed by Taranaki (80%).

Table 4.2: Use of herd testing by region in 2020/21

Farming Region	*Herds tested*	*Total herds*	*Percentage of total herds*	*Cows tested*	*Total cows*	*Percentage of total cows*	*Average herd size tested*	*Average herd size*
Northland	521	772	67.5	182,159	250,631	72.7	350	325
Auckland	220	328	67.1	67,430	94,805	71.1	307	289
Waikato	2,325	3,130	74.3	835,373	1,098,722	76.0	359	351
Bay of Plenty	353	510	69.2	128,042	183,427	69.8	363	360
Central Plateau	348	481	72.3	187,162	281,860	66.4	538	586
Western Uplands	61	87	70.1	31,279	48,576	64.4	513	558
East Coast	4	8	50.0	2,008	4,810	41.7	502	601
Hawkes Bay	51	68	75.0	35,221	44,177	79.7	691	650
Taranaki	1,223	1,553	78.8	372,586	465,896	80.0	305	300
Manawatu	358	513	69.8	163,708	215,574	75.9	457	420
Wairarapa	312	395	79.0	120,262	150,594	79.9	385	381
Nelson/Marlborough	145	198	73.2	53,742	74,521	72.1	371	376
West Coast	268	362	74.0	107,557	150,624	71.4	401	416
North Canterbury	692	884	78.3	582,542	723,148	80.6	842	818
South Canterbury	246	314	78.3	192,188	246,952	77.8	781	786
Otago	337	444	75.9	217,812	273,241	79.7	646	615
Southland	754	987	76.4	455,713	596,173	76.4	604	604
New Zealand	**8,218**	**11,034**	**74.5**	**3,734,784**	**4,903,731**	**76.2**	**454**	**444**

Note: *Table includes figures from both herd test providers*

B. Herd test averages

The lactation yield figures in this section are for herd-tested cows. Seasonal and breed averages (parts i and iii) are calculated on lactation yields for herds tested four or more times during the season. Monthly averages (part ii) are calculated on lactation yields for herds tested at least once during the season, and only cows that lactated for 100 days or more were included in the herd test averages. These figures are different to the average milksolids figures given in Chapters 2 and 3 (national and regional dairy statistics, respectively), which were based on all herds supplying a dairy company (regardless of whether herd testing was used) and represented the average production per cow as supplied to the dairy company.

Days-in-milk (herd testing) information is the number of days from the start of lactation to the calculated end of lactation. The start of lactation is four days from calving (with a maximum of 60 days between the estimated start of lactation and the first herd test). The end of lactation is the last herd test date plus 15 days. The inclusion of herds with fewer than four tests reduces the calculated average lactation length: therefore, the number of days-in-milk, calculated using this method, does not necessarily reflect the average lactation length of dairy cows.

The days-in-milk (production) figure is the number of days from the estimated start of lactation to the estimated end of lactation (reported since 1997/98). The results are derived from seasonal supplier tanker pick-up information, adjusted for calving spread. The days-in-milk (production) methodology provides a more accurate measure of the average lactation length of dairy cows than the herd-testing methodology.

i) Seasonal averages

- *North Canterbury has the highest milkfat, protein and milksolids production (kg/cow)*
- *West Coast has the highest milkfat, protein and milksolids percentages*

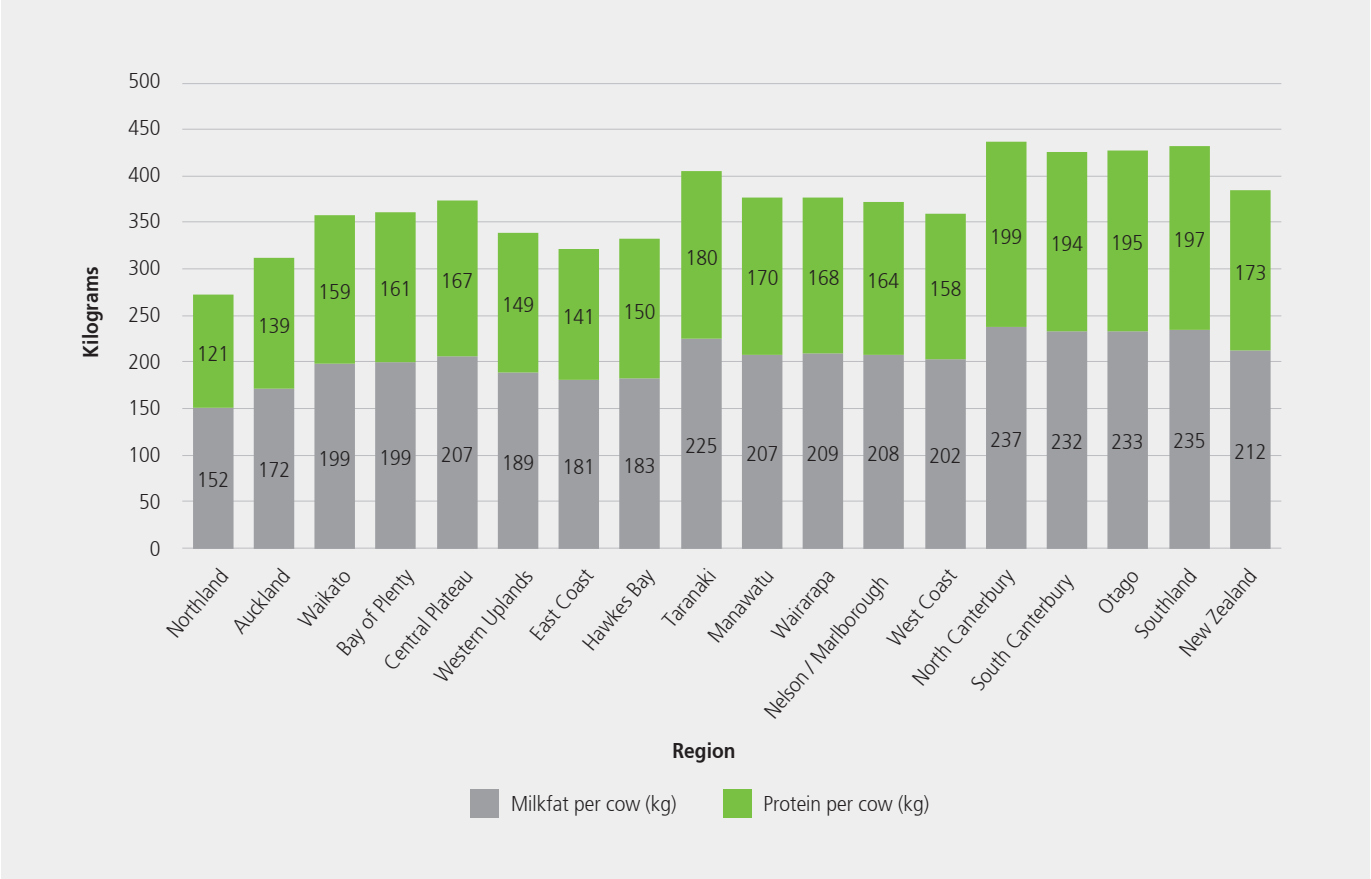
The average per-cow statistics for each region are summarised in Table 4.3. North Canterbury again recorded the highest figures per cow across milk volume (5,139 litres), as well as milkfat (237 kg), protein (199 kg) and milksolids (436 kg), for cows herd tested. West Coast recorded the highest percentage for milkfat (5.13%), protein (4%) and milksolids (9.14%). Herds in North Canterbury recorded the lowest average somatic cells (147,000 cells/ml).

Table 4.3: Season herd test averages per cow by region in 2020/21

Region	Milk (litres)	Milkfat (kg)	Milkfat (%)	Protein (kg)	Protein (%)	Milksolids (kg)	Milksolids (%)	Days in milk (herd testing)	Days in milk (production)	Somatic cell count (000 cells/ millilitre)
Northland	3,193	152	4.75	121	3.78	272	8.52	191	268	215
Auckland	3,733	172	4.61	139	3.73	311	8.34	191	276	185
Waikato	4,163	199	4.77	159	3.82	358	8.59	219	277	164
Bay of Plenty	4,225	199	4.72	161	3.80	360	8.53	224	273	189
Central Plateau	4,359	207	4.74	167	3.82	373	8.56	223	275	185
Western Uplands	3,823	189	4.95	149	3.90	339	8.86	229	270	180
East Coast	3,657	181	4.94	141	3.86	322	8.80	221	283	235
Hawkes Bay	3,935	183	4.64	150	3.82	333	8.47	203	260	198
Taranaki	4,565	225	4.93	180	3.93	404	8.86	224	275	164
Manawatu	4,475	207	4.64	170	3.79	377	8.43	212	282	205
Wairarapa	4,310	209	4.86	168	3.89	377	8.75	223	274	201
Nelson/Marlborough	4,212	208	4.93	164	3.88	371	8.81	227	273	179
West Coast	3,940	202	5.13	158	4.00	360	9.14	221	269	174
North Canterbury	5,139	237	4.62	199	3.87	436	8.49	224	282	147
South Canterbury	4,952	232	4.69	194	3.91	426	8.61	221	283	163
Otago	4,954	233	4.70	195	3.94	428	8.64	232	273	166
Southland	4,979	235	4.72	197	3.95	432	8.67	230	278	163
New Zealand	**4,462**	**212**	**4.75**	**173**	**3.87**	**385**	**8.62**	**220**	**276**	**170**

The 2020/21 milkfat and protein lactation regional averages for herd-tested cows (Graph 4.2) show some variability in figures among regions. North Canterbury recorded the highest milkfat and protein per cow (237 and 199 kg respectively), followed by Southland (235 and 197 kg respectively). At the other end of the scale, Northland recorded the lowest milkfat and protein per cow (152 and 121 kg respectively), followed by Auckland (172 and 139 kg respectively).

Graph 4.2: Average milkfat and protein production per cow by region in 2020/21



- *Herd test averages for milksolids (kg), the highest on record*
- *Somatic cell count average, lowest on record*

Milk production (litres) per cow for 2020/21 increased on the previous six seasons, to be the second highest on record (Table 4.4). Milksolids increased from 376 kilograms in 2019/20 to 385 in 2020/21, to be the highest herd-test average for milksolids (in terms of volume) on record. The percentage of milksolids increased (0.01%) compared with 2019/20, with milkfat percentages also seeing a slight increase while protein remained on par with the previous season.

The average herd somatic cell count decreased to 170,000 cells/millilitre for 2020/21 – the lowest it has ever been on record. Average days in milk (production) at 276 in 2020/21, an increase on the previous season.

Table 4.4: Trend in the national herd test averages for the last 20 seasons

Season	Milk (litres)	Milkfat (kg)	Milkfat (%)	Protein (kg)	Protein (%)	Milksolids (kg)	Milksolids (%)	Days in milk (herd testing)	Days in milk (production)	Somatic cell count (000 cells/ millilitre)
2001/02	3,791	176	4.64	138	3.61	314	8.28	227	268[a]	210
2002/03	3,736	175	4.68	138	3.66	313	8.38	219	-	213
2003/04	3,871	184	4.75	142	3.64	326	8.42	224	265	220
2004/05	3,812	181	4.75	140	3.66	321	8.42	225	265	229
2005/06	3,951	186	4.72	146	3.68	332	8.40	227	266	213
2006/07	4,014	191	4.85	150	3.76	341	8.50	230	267	232
2007/08	3,987	187	4.68	148	3.70	334	8.38	225	252	246
2008/09	4,043	190	4.70	150	3.72	340	8.42	228	266	253
2009/10	4,097	194	4.73	154	3.76	348	8.48	227	260	235
2010/11	4,101	194	4.73	154	3.75	348	8.48	229	274	232
2011/12	4,409	210	4.77	167	3.80	378	8.56	235	275	204
2012/13	4,386	207	4.72	166	3.79	373	8.51	227	258	204
2013/14	4,480	212	4.74	170	3.80	383	8.54	229	266	187
2014/15	4,379	209	4.78	168	3.84	378	8.63	226	273	182
2015/16	4,311	204	4.73	165	3.84	369	8.57	225	276	187
2016/17	4,323	206	4.77	167	3.87	374	8.64	229	276	183
2017/18	4,217	201	4.75	161	3.82	362	8.57	219	274	185
2018/19	4,359	206	4.72	167	3.84	373	8.56	218	271	175
2019/20	4,371	207	4.74	169	3.87	376	8.61	216	268	173
2020/21	4,462	212	4.75	173	3.87	385	8.62	220	276	170

- Not available

[a] *Average excludes Northland, Taranaki and Wellington/Hawkes Bay*

ii) Monthly averages

- *Peak milk in September-October*

The seasonal average figures presented in Table 4.5 are calculated using national monthly herd test averages, and are therefore affected by the number of samples processed. Statistics for May, June, and July are based on far fewer cows than the statistics for the other months, as only a few herds (generally winter milk herds) test in these months. Differences in climate between regions (which in turn can affect the mating period), available feed, and cow condition are reflected in differing months of peak production.

All cows herd tested in each month were included, provided they were tested at least once during the season (Table 4.5). Average peak cow production occurs between August and October, with most regions peaking in September or October.

Table 4.5: Monthly herd test averages by region in 2020/21

Average litres of milk per cow per day

Farming region	*2020 Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*2021 Jan*	*Feb*	*Mar*	*Apr*	*May*	*Season average*
Northland	17.82	17.96	19.93	19.65	19.34	16.77	14.66	12.78	11.19	10.29	10.08	16.06	15.32
Auckland	18.96	20.64	20.44	22.12	21.78	19.68	16.88	14.30	13.98	11.52	11.80	18.69	17.47
Waikato	20.89	20.27	22.26	23.56	23.00	19.58	18.40	16.07	13.43	11.74	11.56	15.42	17.72
Bay of Plenty	19.44	15.12	23.64	23.40	22.73	19.64	19.16	15.97	14.32	11.92	11.27	12.31	17.67
Central Plateau	18.82	19.57	23.76	24.21	25.12	20.86	20.32	17.43	14.03	13.20	12.14	12.97	18.49
Western Uplands	-	9.84	22.84	20.69	21.24	18.61	17.54	14.64	14.02	10.17	9.76	10.29	15.82
East Coast	-	-	-	22.08	-	19.14	-	13.22	-	7.68	7.93	-	14.23
Hawkes Bay	10.81	19.05	22.68	23.86	25.54	19.36	19.36	16.90	15.14	13.84	12.66	15.89	18.62
Taranaki	20.54	21.82	22.16	24.85	24.51	20.97	18.88	18.62	16.69	14.33	12.54	14.99	19.04
Manawatu	21.00	19.53	22.87	24.47	24.79	21.84	20.62	18.45	17.37	14.95	13.69	15.50	19.58
Wairarapa	19.85	19.12	22.31	23.54	23.58	20.80	19.59	17.84	15.86	12.87	11.66	12.21	18.04
Nelson/Marlborough	15.44	14.37	23.89	23.78	24.00	21.27	18.22	18.46	15.04	13.31	11.35	10.96	17.58
West Coast	20.10	14.46	-	21.49	21.58	19.29	17.82	16.35	14.73	13.30	11.06	9.37	16.35
North Canterbury	19.60	20.59	22.89	25.65	26.67	24.25	23.21	21.08	19.69	16.62	14.85	13.72	20.98
South Canterbury	18.42	17.92	23.85	25.07	26.65	23.57	22.37	20.17	18.78	16.20	14.06	12.68	20.28
Otago	12.13	15.37	17.93	25.55	24.70	23.66	21.22	19.24	18.50	15.49	12.53	12.15	19.40
Southland	15.39	17.36	19.72	25.40	24.99	24.36	22.13	20.49	18.73	16.54	14.17	13.03	20.10
New Zealand[1]	**19.55**	**19.50**	**21.84**	**23.91**	**24.43**	**21.26**	**20.13**	**18.00**	**16.38**	**14.13**	**12.83**	**13.89**	**18.82**

Average kg of milkfat per cow per day

Farming region	*2020 Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*2021 Jan*	*Feb*	*Mar*	*Apr*	*May*	*Season average*
Northland	0.81	0.84	0.94	0.92	0.90	0.81	0.71	0.66	0.61	0.59	0.59	0.80	0.77
Auckland	0.87	0.89	0.93	1.01	0.98	0.89	0.80	0.72	0.71	0.63	0.66	0.91	0.85
Waikato	1.00	0.96	1.05	1.10	1.07	0.93	0.88	0.81	0.72	0.67	0.67	0.84	0.89
Bay of Plenty	0.95	0.77	1.08	1.07	1.04	0.92	0.90	0.79	0.75	0.66	0.64	0.73	0.88
Central Plateau	0.87	0.89	1.06	1.11	1.13	0.97	0.94	0.83	0.73	0.73	0.68	0.72	0.91
Western Uplands	-	0.65	1.16	1.01	1.01	0.89	0.83	0.74	0.72	0.58	0.58	0.62	0.82
East Coast	-	-	-	1.03	-	0.91	-	0.71	-	0.46	0.48	-	0.76
Hawkes Bay	0.64	0.92	1.01	1.07	1.13	0.92	0.91	0.82	0.77	0.74	0.71	0.79	0.91
Taranaki	1.05	1.02	1.07	1.17	1.16	1.02	0.95	0.95	0.89	0.81	0.74	0.86	0.98
Manawatu	1.00	0.94	1.03	1.11	1.12	1.00	0.95	0.88	0.86	0.79	0.75	0.84	0.95
Wairarapa	0.94	0.95	1.08	1.10	1.10	1.00	0.95	0.88	0.84	0.71	0.68	0.71	0.92
Nelson/Marlborough	0.84	0.71	1.10	1.13	1.12	1.00	0.90	0.91	0.81	0.75	0.69	0.66	0.92
West Coast	1.12	0.89	-	1.06	1.03	0.93	0.88	0.84	0.81	0.76	0.70	0.61	0.87
North Canterbury	0.99	0.99	1.02	1.14	1.19	1.09	1.05	1.00	0.97	0.88	0.83	0.81	1.03
South Canterbury	0.88	0.87	1.03	1.14	1.18	1.08	1.03	0.96	0.95	0.86	0.81	0.77	1.01
Otago	0.72	0.83	0.83	1.15	1.11	1.08	0.99	0.94	0.91	0.83	0.73	0.74	0.97
Southland	0.86	0.85	0.98	1.16	1.12	1.09	1.03	0.99	0.94	0.88	0.81	0.78	1.00
New Zealand[1]	**0.93**	**0.92**	**1.02**	**1.11**	**1.11**	**0.99**	**0.95**	**0.89**	**0.84**	**0.78**	**0.74**	**0.80**	**0.94**

Average kg of protein per cow per day

Farming region	*2020 Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*2021 Jan*	*Feb*	*Mar*	*Apr*	*May*	*Season average*
Northland	0.66	0.69	0.76	0.75	0.74	0.64	0.57	0.50	0.46	0.46	0.46	0.65	0.61
Auckland	0.71	0.75	0.76	0.84	0.82	0.74	0.66	0.55	0.55	0.49	0.52	0.74	0.68
Waikato	0.82	0.80	0.86	0.91	0.88	0.74	0.71	0.62	0.54	0.51	0.52	0.67	0.71
Bay of Plenty	0.81	0.58	0.91	0.89	0.86	0.74	0.73	0.61	0.57	0.51	0.51	0.57	0.70
Central Plateau	0.73	0.75	0.91	0.92	0.94	0.78	0.77	0.67	0.56	0.56	0.55	0.59	0.73
Western Uplands	-	0.50	0.89	0.81	0.82	0.72	0.66	0.58	0.57	0.44	0.45	0.49	0.64
East Coast	-	-	-	0.84	-	0.73	-	0.55	-	0.34	0.39	-	0.60
Hawkes Bay	0.48	0.76	0.96	0.93	0.98	0.74	0.74	0.65	0.60	0.59	0.57	0.63	0.75
Taranaki	0.82	0.85	0.88	0.96	0.95	0.81	0.74	0.75	0.69	0.62	0.57	0.67	0.78
Manawatu	0.82	0.78	0.90	0.93	0.94	0.82	0.78	0.71	0.69	0.62	0.60	0.68	0.77
Wairarapa	0.77	0.77	0.88	0.91	0.90	0.80	0.75	0.70	0.65	0.55	0.53	0.56	0.73
Nelson/Marlborough	0.68	0.56	0.94	0.92	0.91	0.79	0.70	0.71	0.62	0.58	0.53	0.52	0.72
West Coast	0.91	0.71	-	0.84	0.82	0.74	0.69	0.65	0.62	0.59	0.53	0.47	0.68
North Canterbury	0.78	0.79	0.84	0.98	1.01	0.92	0.90	0.83	0.80	0.72	0.68	0.65	0.85
South Canterbury	0.71	0.73	0.84	0.97	1.01	0.91	0.87	0.80	0.77	0.71	0.65	0.61	0.83
Otago	0.51	0.66	0.68	0.98	0.95	0.91	0.83	0.77	0.76	0.67	0.59	0.58	0.80
Southland	0.70	0.69	0.79	0.97	0.95	0.94	0.86	0.82	0.78	0.72	0.66	0.62	0.83
New Zealand[1]	**0.76**	**0.76**	**0.84**	**0.92**	**0.93**	**0.81**	**0.78**	**0.71**	**0.67**	**0.61**	**0.59**	**0.64**	**0.76**

Average somatic cell count (000 cells per millilitre)

Farming region	*2020 Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*2021 Jan*	*Feb*	*Mar*	*Apr*	*May*	*Season average*
Northland	197	223	190	160	178	173	194	255	239	282	292	272	215
Auckland	171	159	167	161	158	162	175	210	202	224	212	226	185
Waikato	205	188	174	145	153	135	148	171	177	189	198	207	164
Bay of Plenty	294	194	196	164	175	160	173	199	209	218	220	304	189
Central Plateau	295	210	293	165	169	161	167	183	210	189	223	233	185
Western Uplands	-	187	117	149	165	163	156	212	189	189	222	189	180
East Coast	-	-	-	97	-	191	-	241	-	290	327	-	235
Hawkes Bay	320	215	164	184	201	163	185	199	194	191	251	215	198
Taranaki	182	206	179	150	148	150	145	165	166	177	195	212	164
Manawatu	230	234	283	191	191	171	193	205	214	227	225	237	205
Wairarapa	197	218	243	193	179	175	170	203	211	228	232	246	201
Nelson/Marlborough	148	222	208	162	146	162	143	183	178	188	223	253	179
West Coast	249	235	-	164	148	172	136	195	159	194	201	258	174
North Canterbury	225	209	183	150	142	146	136	145	137	149	153	177	147
South Canterbury	178	245	250	170	161	152	150	161	156	163	170	208	163
Otago	384	287	575	192	158	150	144	157	168	151	190	198	166
Southland	203	254	200	172	168	160	141	167	152	167	168	189	163
New Zealand[1]	**208**	**209**	**190**	**158**	**159**	**152**	**152**	**176**	**173**	**183**	**193**	**209**	**170**

[1] *Volume weighted averages*

iii) Breed category averages

- *Holstein-Friesian cows produce highest litres and milksolids (kg) production*

Herd test statistics by breed category (Table 4.6) include cows herd tested four or more times during the season.

On average, Holstein-Friesian cows produced a higher volume of milk than other breeds. This season they also produced the highest protein (kg) and milksolids (kg). Jerseys have the highest milkfat and protein percentages (5.6% and 4.2% respectively).

In 2020/21, the age group that produced more milksolids (kg) ranged between the five-year-olds (Holstein-Friesian and Jersey) to the seven-year-olds (Ayrshire). This is a change from the 2019/20 season where it was the six-year-old cows, across all breeds, who produced more milksolids.

A crossbreed is defined as having at most 13/16 of any one breed. For example, a Holstein-Friesian/Jersey crossbreed may be 13/16 Holstein-Friesian, 2/16 Jersey and 1/16 Ayrshire.

Table 4.6: Herd test averages by breed category and cow age in 2020/21

Holstein-Friesian

Age	*Cows tested*	*Days in milk*	*Milk (litres)*	*Milkfat (kg)*	*Protein (kg)*	*Milksolids (kg)*	*Milkfat (%)*	*Protein (%)*	*Milksolids (%)*
2	189,361	231	3,811	172.4	146.0	318.4	4.58	3.85	8.42
3	168,647	226	4,646	206.9	177.1	384.0	4.50	3.83	8.33
4	141,886	224	5,046	223.6	192.2	415.8	4.48	3.83	8.30
5	126,306	223	5,293	234.1	200.5	434.6	4.47	3.80	8.27
6	97,698	222	5,288	233.5	199.2	432.7	4.46	3.78	8.24
7	65,422	220	5,241	231.1	195.4	426.5	4.45	3.74	8.19
8	47,468	218	5,108	225.3	188.8	414.1	4.45	3.71	8.16
9	28,998	216	4,893	217.4	180.8	398.2	4.48	3.71	8.19
10+	30,904	210	4,465	198.8	162.5	361.3	4.49	3.65	8.14
Total	**896,690**	**224**	**4,764**	**211.8**	**180.2**	**392.0**	**4.50**	**3.80**	**8.30**

Jersey

Age	*Cows tested*	*Days in milk*	*Milk (litres)*	*Milkfat (kg)*	*Protein (kg)*	*Milksolids (kg)*	*Milkfat (%)*	*Protein (%)*	*Milksolids (%)*
2	46,150	232	2,778	154.3	114.9	269.2	5.58	4.15	9.73
3	41,574	228	3,335	187.5	140.7	328.2	5.65	4.23	9.88
4	37,351	227	3,597	201.6	151.6	353.2	5.63	4.23	9.85
5	31,963	225	3,732	209.5	157.0	366.5	5.64	4.22	9.86
6	28,042	224	3,740	207.9	156.5	364.4	5.58	4.19	9.78
7	21,223	221	3,694	206.5	154.3	360.8	5.62	4.19	9.80
8	16,762	219	3,606	199.0	149.7	348.7	5.54	4.16	9.70
9	10,397	216	3,490	191.0	143.6	334.6	5.49	4.13	9.62
10+	12,329	211	3,207	175.0	130.4	305.4	5.48	4.08	9.55
Total	**245,791**	**225**	**3,418**	**190.5**	**142.8**	**333.4**	**5.60**	**4.19**	**9.79**

Holstein-Friesian/Jersey crossbreed

Age	Cows tested	Days in milk	Milk (litres)	Milkfat (kg)	Protein (kg)	Milksolids (kg)	Milkfat (%)	Protein (%)	Milksolids (%)
2	328,875	229	3,461	170.5	137.8	308.3	4.97	3.99	8.97
3	284,747	225	4,212	206.8	168.8	375.5	4.95	4.02	8.97
4	246,179	224	4,605	225.1	184.4	409.5	4.93	4.02	8.95
5	205,432	223	4,775	234.5	190.4	425.0	4.96	4.00	8.96
6	177,011	222	4,762	235.5	190.0	425.5	4.99	4.01	8.99
7	127,473	220	4,768	234.2	188.2	422.4	4.95	3.96	8.92
8	87,396	218	4,623	225.6	181.0	406.6	4.92	3.93	8.85
9	53,784	216	4,470	217.7	173.7	391.4	4.91	3.90	8.81
10+	57,671	211	4,109	201.0	157.4	358.3	4.92	3.84	8.77
Total	**1,568,568**	**223**	**4,325**	**212.3**	**172.0**	**384.3**	**4.95**	**3.99**	**8.94**

Ayrshire

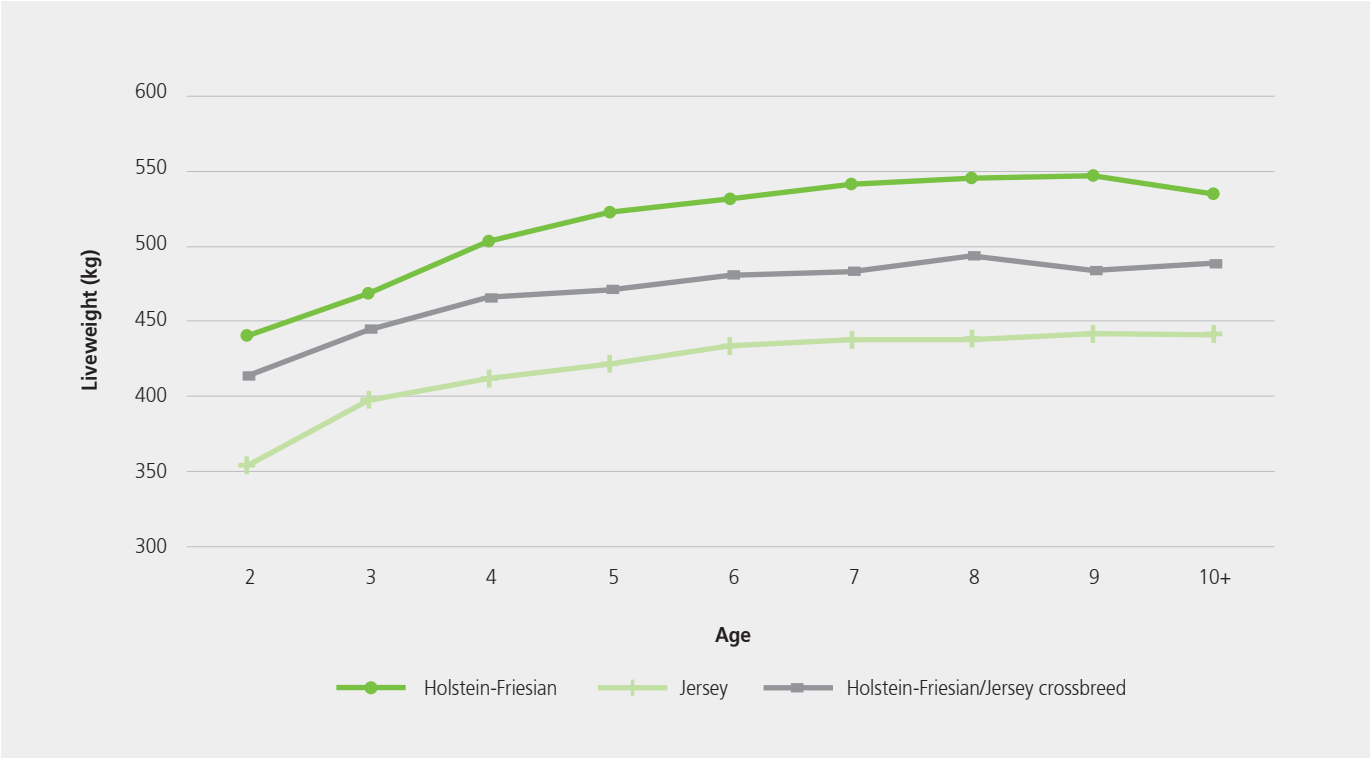
Age	Cows tested	Days in milk	Milk (litres)	Milkfat (kg)	Protein (kg)	Milksolids (kg)	Milkfat (%)	Protein (%)	Milksolids (%)
2	2,179	236	3,407	149.8	121.8	271.6	4.41	3.58	7.99
3	1,998	235	4,205	183.0	150.7	333.7	4.37	3.59	7.96
4	1,746	236	4,657	200.8	167.7	368.4	4.32	3.60	7.92
5	1,554	234	4,840	208.5	174.7	383.3	4.33	3.61	7.94
6	1,481	232	4,855	208.5	173.7	382.2	4.32	3.59	7.91
7	1,112	231	4,872	211.6	174.4	386.0	4.36	3.59	7.94
8	812	232	4,739	203.0	169.5	372.5	4.30	3.58	7.88
9	624	224	4,587	197.5	163.7	361.2	4.32	3.58	7.90
10+	814	217	4,041	175.4	143.0	318.4	4.37	3.54	7.91
Total	**12,320**	**232**	**4,390**	**190.1**	**157.3**	**347.4**	**4.35**	**3.59**	**7.94**

Holstein-Friesians have the highest average liveweight across all ages for the breeds shown in Table 4.7. In contrast, Jerseys have the lowest average liveweight at all ages. Liveweight by age and breed is illustrated in Graph 4.3.

Table 4.7: Liveweight by age and by breed category of cow in 2020/21

	Holstein-Friesian		Jersey		Holstein-Friesian/Jersey crossbreed	
Age	Average liveweight (kg)	Number of cows	Average liveweight (kg)	Number of cows	Average liveweight (kg)	Number of cows
2	440	11,204	353	4,645	413	24,002
3	469	2,244	397	860	444	4,101
4	503	1,942	412	765	466	3,192
5	522	1,704	422	578	471	2,706
6	531	1,365	434	457	480	2,315
7	541	762	438	346	483	1,584
8	545	553	438	241	494	1,236
9	547	351	442	148	484	663
10+	535	347	441	160	489	696
Weighted Avg	**497**		**409**		**458**	

Graph 4.3: Liveweight by age and by breed category of cow in 2020/21



C. Artificial Breeding (AB) statistics

- *3.497 million cows to AB in 2020/21*
- *Percent of cows to AB increased*

All artificial inseminations are recorded on the LIC Herd Improvement Database. Table 4.8 provides a summary of cows mated to AB for the last nine seasons. The percentage of cows to AB (71.3%) in 2020/21 was slightly higher than the previous season (70.8%), with a total of 3.497 million cows mated to AB (Graph 4.4). The number of yearlings to AB decreased (by 4.5%) to 212,639 from 222,263 in the previous season (Table 4.8).

Table 4.8: Trend in Artificial Breeding use for the last nine seasons by region: Cows and yearlings to AB

Cows to AB

Region	*2012/13*	*2013/14*	*2014/15*	*2015/16*	*2016/17*	*2017/18*	*2018/19*	*2019/20*	*2020/21*
Northland	192,066	190,785	188,887	178,521	175,397	174,589	172,301	159,517	155,621
Auckland	76,013	74,961	75,070	68,754	69,918	66,330	64,468	67,098	64,560
Waikato	867,180	843,758	835,426	792,672	782,259	783,030	789,866	776,605	777,326
Bay of Plenty	137,806	139,262	141,394	134,733	127,063	126,445	125,356	121,144	118,735
Central Plateau	160,005	157,294	164,093	168,407	177,653	181,982	181,769	161,763	165,708
Western Uplands	28,427	28,256	28,163	25,143	25,764	26,257	28,382	29,269	28,868
East Coast	2,240	2,025	2,450	2,703	2,283	2,588	975	1,090	1,247
Hawkes Bay	36,878	38,851	40,145	34,375	32,076	35,780	36,077	33,989	32,057
Taranaki	396,646	395,722	396,760	371,247	358,147	356,631	356,435	351,326	348,037
Manawatu	160,485	155,417	159,631	155,641	150,140	148,158	147,948	145,062	144,447
Wairarapa	133,086	135,131	130,870	120,007	114,472	115,694	115,332	111,856	111,269
Nelson/Marlborough	68,423	65,670	65,629	63,613	61,112	61,409	61,606	59,179	56,942
West Coast	98,182	103,085	107,056	105,142	98,711	97,689	95,486	87,570	89,174
North Canterbury	502,449	524,567	539,260	549,647	566,958	579,275	588,114	570,058	581,641
South Canterbury	171,235	183,195	184,241	187,341	187,901	189,284	197,560	191,936	186,646
Otago	180,320	178,088	192,118	189,911	189,665	196,805	191,550	185,983	196,841
Southland	367,641	379,911	404,233	405,102	414,283	427,837	431,942	432,600	432,763
New Zealand	**3,579,082**	**3,595,978**	**3,655,426**	**3,552,959**	**3,533,802**	**3,569,783**	**3,585,167**	**3,486,045**	**3,497,267**

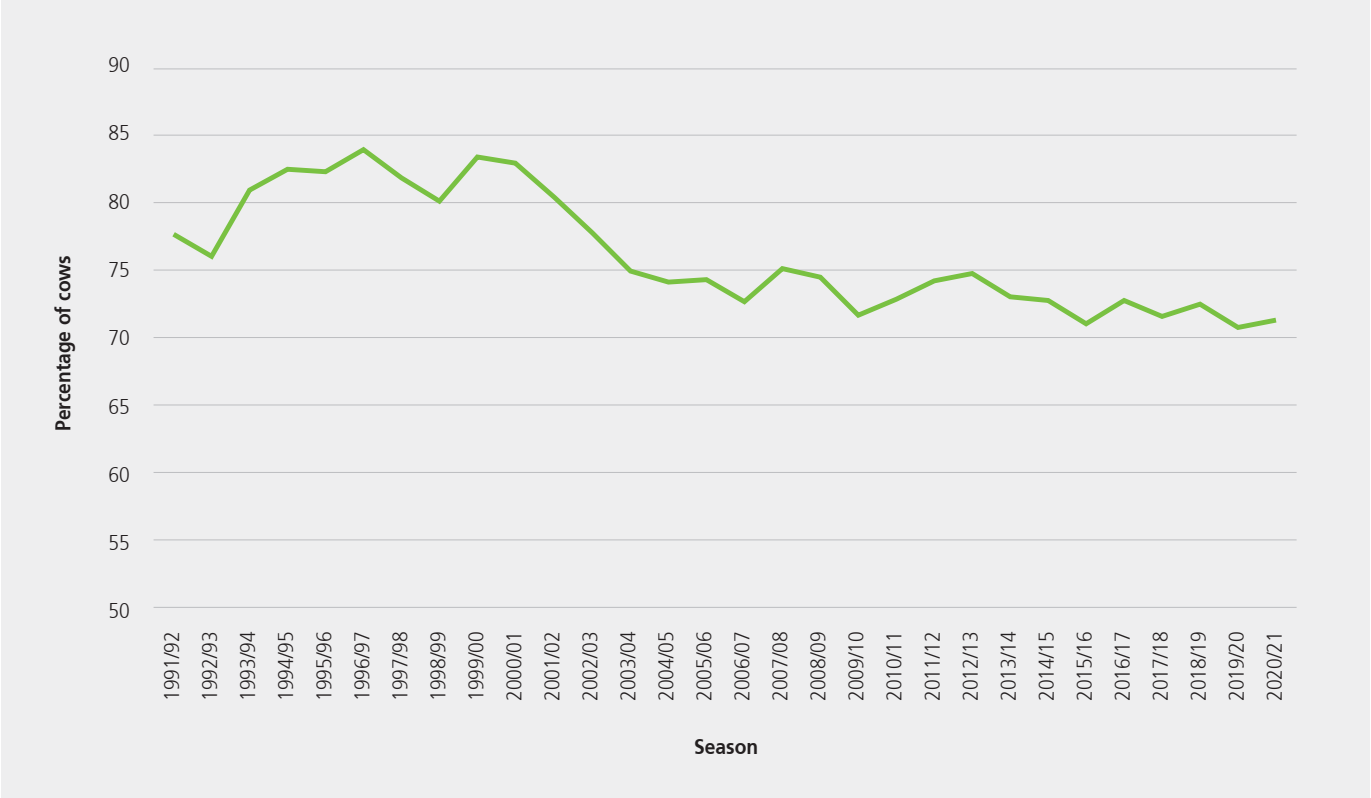
Percentage of Cows to AB

Region	*2012/13*	*2013/14*	*2014/15*	*2015/16*	*2016/17*	*2017/18*	*2018/19*	*2019/20*	*2020/21*
Northland	67.2	67.0	66.2	63.7	65.2	64.2	65.2	61.8	62.1
Auckland	67.9	67.6	65.8	61.8	67.0	62.9	64.9	70.0	68.1
Waikato	75.5	72.4	71.2	68.8	70.0	68.9	70.7	70.3	70.7
Bay of Plenty	71.4	70.5	70.4	67.8	66.4	64.5	66.0	65.3	64.7
Central Plateau	64.8	62.4	62.6	62.9	65.5	64.8	65.3	57.7	58.8
Western Uplands	67.5	63.2	60.9	53.8	58.4	54.6	58.9	62.3	59.4
East Coast	45.7	43.6	52.2	45.9	38.2	44.0	16.6	18.1	25.9
Hawkes Bay	77.2	80.2	82.1	70.5	70.2	73.9	75.6	74.7	72.6
Taranaki	80.9	80.2	79.9	76.2	75.7	74.7	76.4	75.1	74.7
Manawatu	74.7	70.7	72.6	70.4	70.5	67.2	68.4	67.7	67.0
Wairarapa	78.9	79.8	77.4	72.2	71.2	71.3	73.6	73.4	73.9
Nelson/Marlborough	79.4	74.1	74.8	74.0	71.8	73.8	74.9	74.0	76.4
West Coast	66.5	68.6	68.8	66.5	63.4	63.4	62.4	58.4	59.2
North Canterbury	82.7	79.7	79.9	79.7	84.3	82.6	83.1	79.3	80.4
South Canterbury	78.4	78.4	76.1	78.0	80.8	75.4	78.7	76.1	75.6
Otago	76.1	70.8	72.8	72.4	73.9	73.5	71.0	68.5	72.0
Southland	69.1	69.0	70.5	70.4	73.6	73.4	73.0	73.1	72.6
New Zealand	**74.8**	**73.0**	**72.8**	**71.1**	**72.7**	**71.5**	**72.5**	**70.8**	**71.3**

Yearlings to AB

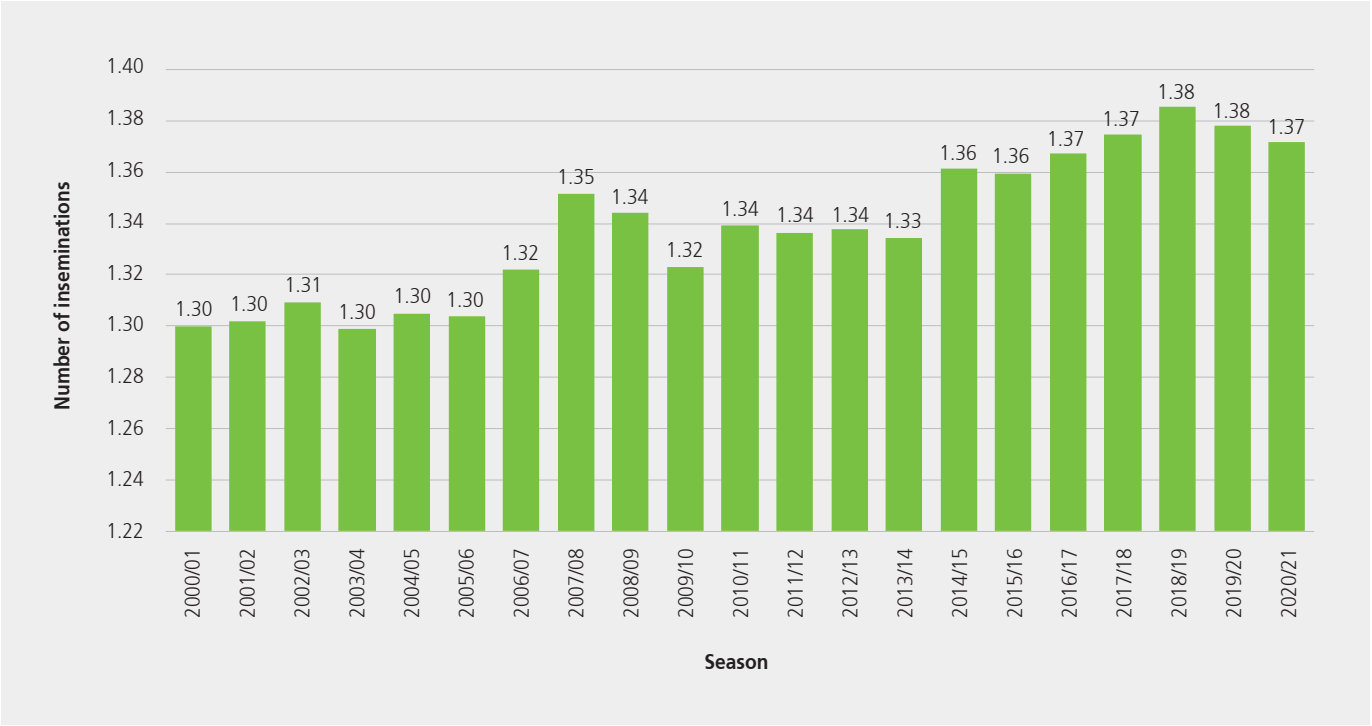
Region	*2012/13*	*2013/14*	*2014/15*	*2015/16*	*2016/17*	*2017/18*	*2018/19*	*2019/20*	*2020/21*
Northland	10,377	11,876	11,160	8,912	9,665	9,858	10,430	8,564	8,218
Auckland	2,994	3,622	3,754	2,593	2,706	2,943	2,760	2,587	3,667
Waikato	26,144	28,667	25,827	18,358	18,685	19,506	19,803	19,178	18,597
Bay of Plenty	8,373	9,375	9,411	8,032	7,205	7,750	7,440	8,348	7,557
Central Plateau	4,533	5,343	6,798	3,833	4,439	4,685	6,333	6,833	5,573
Western Uplands	2,066	2,344	1,697	2,106	1,779	1,786	2,150	2,237	2,064
East Coast	0	60	69	60	126	152	0	0	0
Hawkes Bay	3,725	2,955	2,532	1,441	1,609	2,794	2,523	2,127	2,463
Taranaki	7,651	7,920	6,652	4,292	3,800	3,848	4,639	4,819	4,625
Manawatu	7,119	8,575	8,850	5,482	6,352	6,013	6,788	5,942	6,390
Wairarapa	4,721	5,792	5,172	4,630	4,649	4,497	4,837	4,447	4,635
Nelson/Marlborough	4,874	5,012	4,082	3,210	3,597	4,246	4,513	4,393	3,355
West Coast	3,760	5,201	4,269	3,573	4,569	4,889	4,966	5,759	6,334
North Canterbury	43,063	48,312	47,250	36,328	42,882	56,143	64,421	63,526	59,616
South Canterbury	23,201	25,707	25,731	17,724	19,428	21,429	22,876	21,396	21,088
Otago	16,974	20,490	20,306	16,918	17,326	21,754	24,434	24,782	22,688
Southland	29,161	35,522	37,415	26,372	28,353	35,101	41,584	37,325	34,709
New Zealand	**198,736**	**226,773**	**220,975**	**163,864**	**177,170**	**207,394**	**230,497**	**222,263**	**212,639**

Graph 4.4: Trend in the percentage of cows to Artificial Breeding for the last 30 seasons



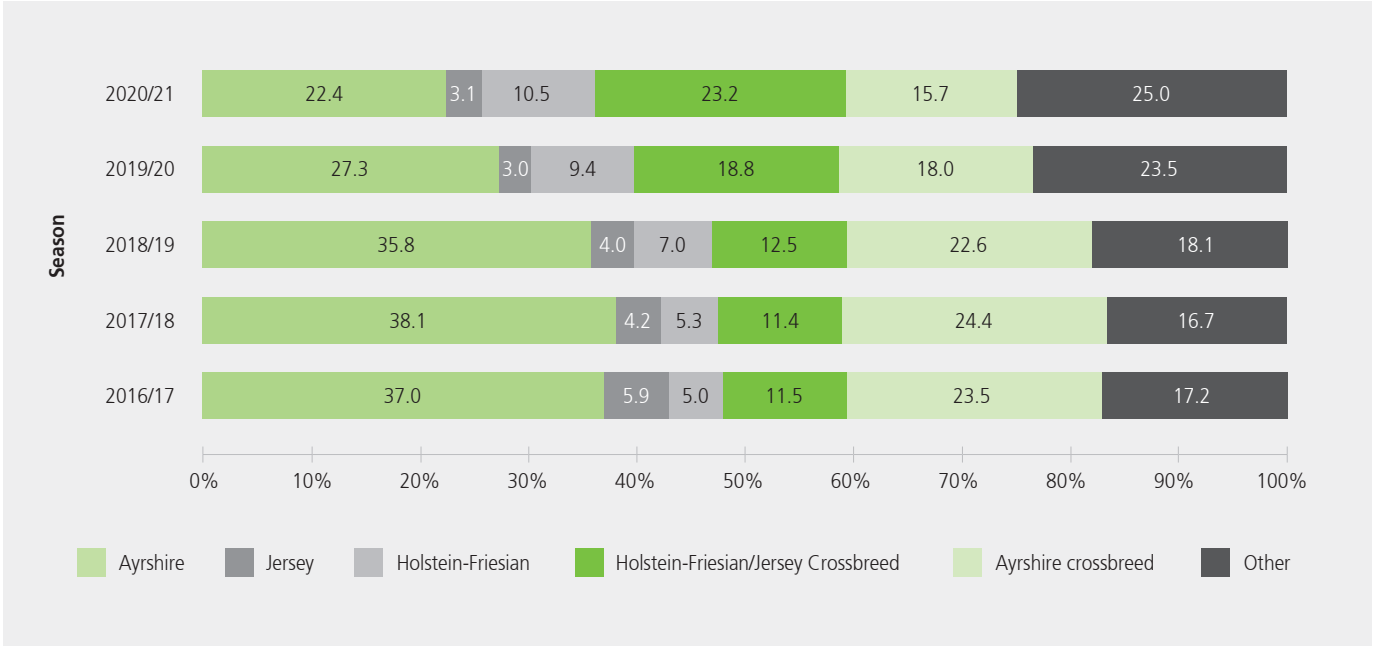
In 2020/21 the average number of inseminations per cow (recorded on the LIC Herd Improvement Database) was 1.37 (Graph 4.5).

Graph 4.5: Average number of inseminations per cow for the last 20 seasons

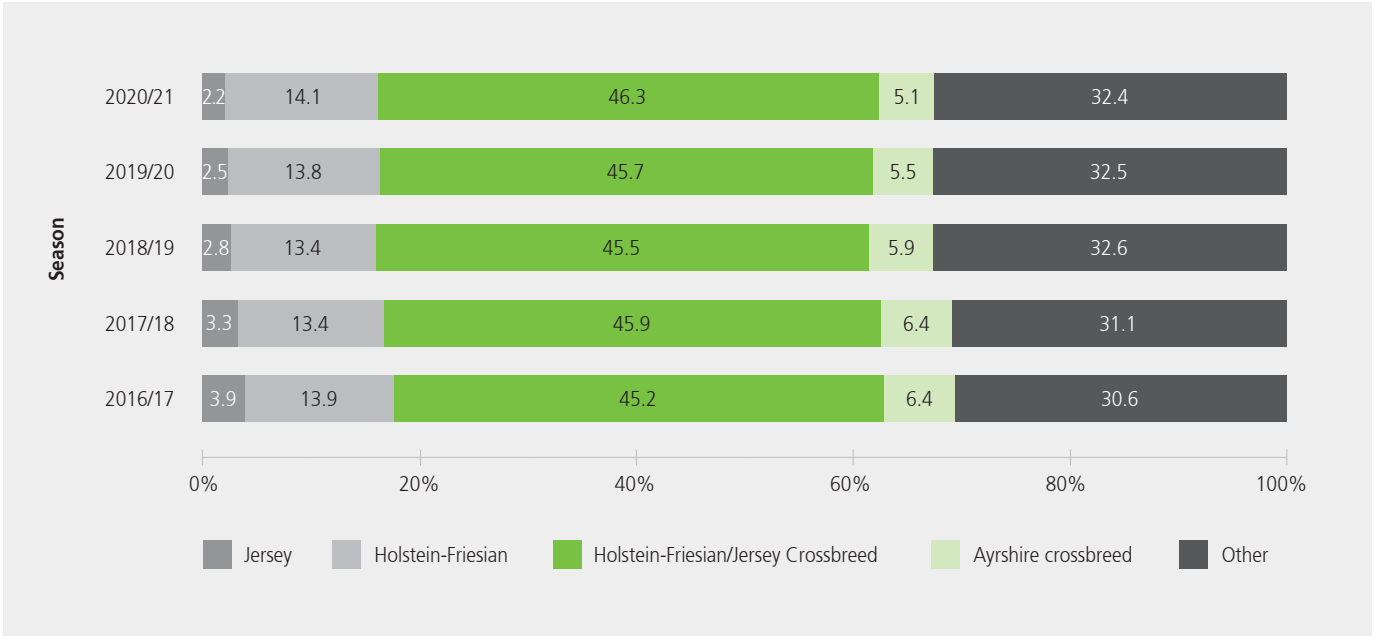


The use of Ayrshire, Holstein-Friesian and Jersey semen over different cow breeds for the past five seasons is shown in the graphs below. The use of Ayrshire semen over Ayrshire cows is no longer the dominant trend in Ayrshire semen use, with more being used over Holstein-Friesian/Jersey crosses (23%) and 'other' breeds (25%) (Graph 4.6). Holstein-Friesian/Jersey Crossbreed semen is used predominantly over Holstein-Friesian/Jersey crosses (Graph 4.7). The use of Jersey semen remains predominately over Jersey cows, as illustrated in Graph 4.8. The use of Holstein-Friesian semen remains similar to previous seasons (Graph 4.9), with usage spread fairly evenly across Holstein-Friesian, Holstein-Friesian/Jersey Crossbreeds and breeds other than Jersey.

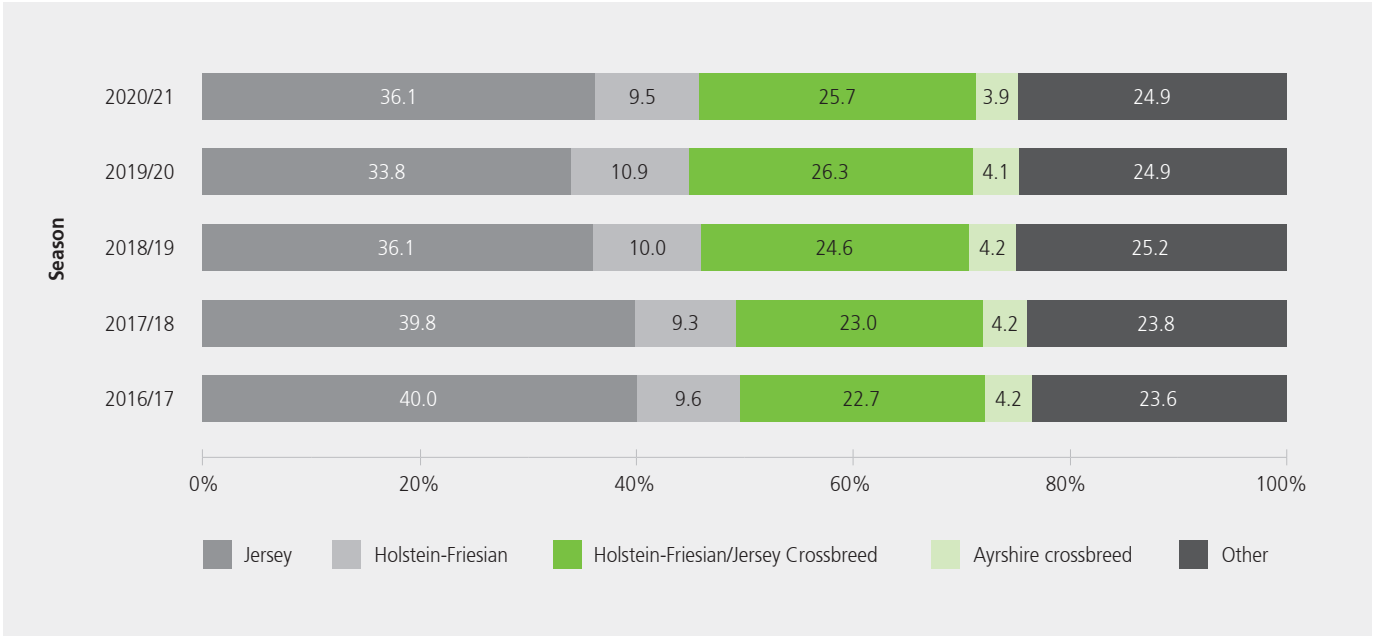
Graph 4.6: Ayrshire semen usage (%) over breed category for the last five seasons



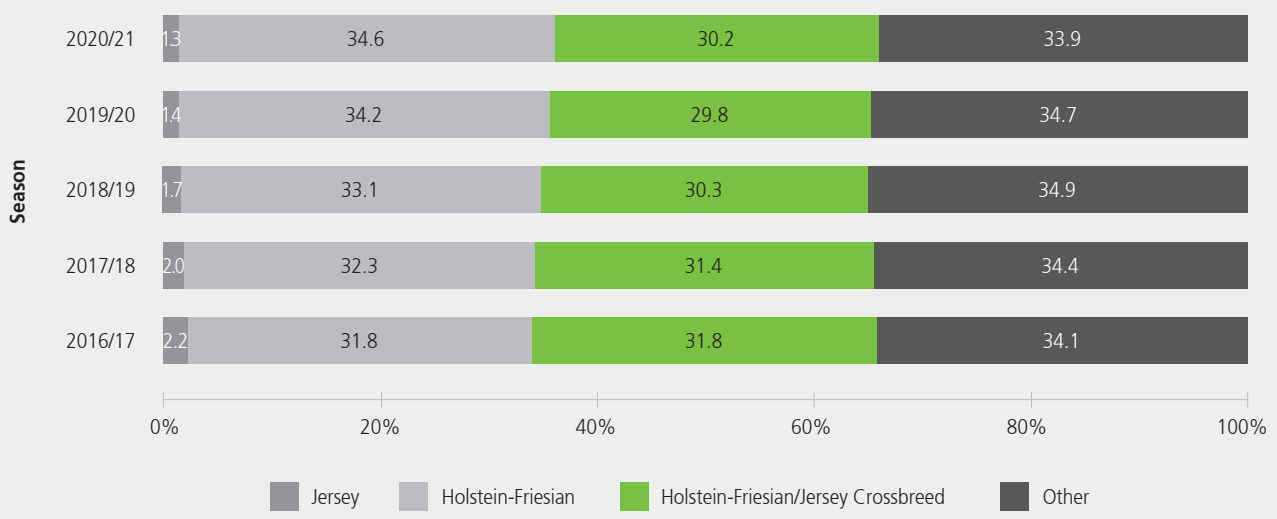
Graph 4.7: Holstein-Friesian / Jersey Crossbreed semen usage (%) over breed category for the last five seasons



Graph 4.8: Jersey semen usage (%) over breed category for the last five seasons

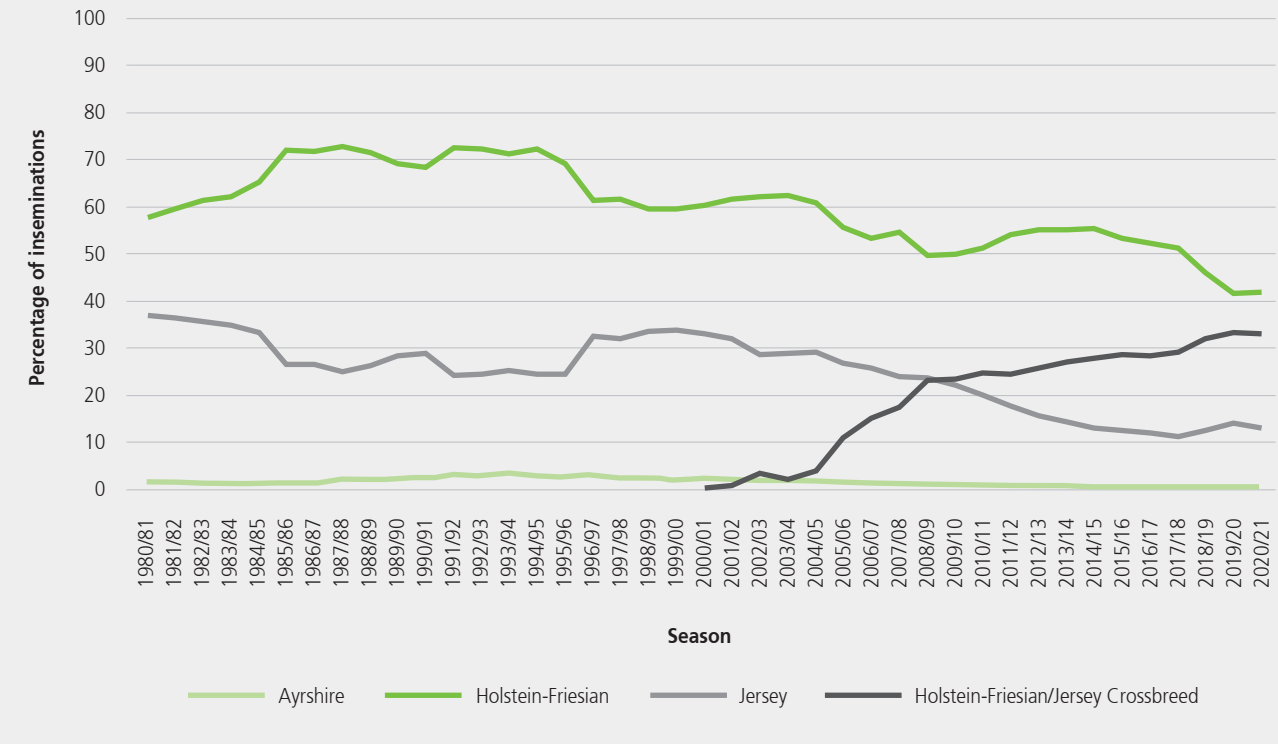


Graph 4.9: Holstein-Friesian semen usage (%) over breed category for the last five seasons



The percentage of inseminations for each breed category (Holstein-Friesian, Jersey, Holstein-Friesian/Jersey Crossbreed, and Ayrshire), as recorded on the LIC Herd Improvement Database, is shown in Graph 4.10. The percentage of inseminations for Holstein-Friesian/Jersey Crossbreed and Holstein-Friesians plateaued compared with the previous season movement, while the percentage of inseminations for Jerseys dropped.

Graph 4.10: Trend in the percentage of inseminations of each breed category for the last 40 seasons



D. Herd Reproduction

Reproductive performance is a key determinant of farm productivity. The 6-week in-calf rate is the best overall measure of herd reproductive performance and is used to compare performance between herds and to monitor national performance.

The not-in-calf rate at end of mating is important at a herd level, but is not suitable for comparison between herds due to differences in length of mating period.

Actual 6-week in-calf rate (Detailed Fertility Focus Reports) is calculated for herds with sufficient early aged pregnancy test records (at least 80% of cows in the herd, and at least 80% of all pregnancy test results are less than or equal to 122 days pregnant, or non-pregnant).

The 6-week in-calf rate for herds without sufficient early aged pregnancy test records is estimated from calving and mating data (Intermediate Fertility Focus Reports).

The statistics in this section are for LIC MINDA® recording herds only.

Since the launch of the DairyNZ InCalf programme in 2008/09, there has been a trend towards more early aged pregnancy testing and thus an increase of actual results available from Detailed Fertility Focus Reports. The number of herds with detailed reports has increased from 354 in 2008/09 to 4,492 in 2020/21 (Table 4.9).

The mean actual 6-week in-calf rate at 67.7% is slightly lower than the previous season. The mean estimated 6-week in-calf rates are 2-4% lower than the mean actual 6-week in-calf rate, but a similar trend is evident.

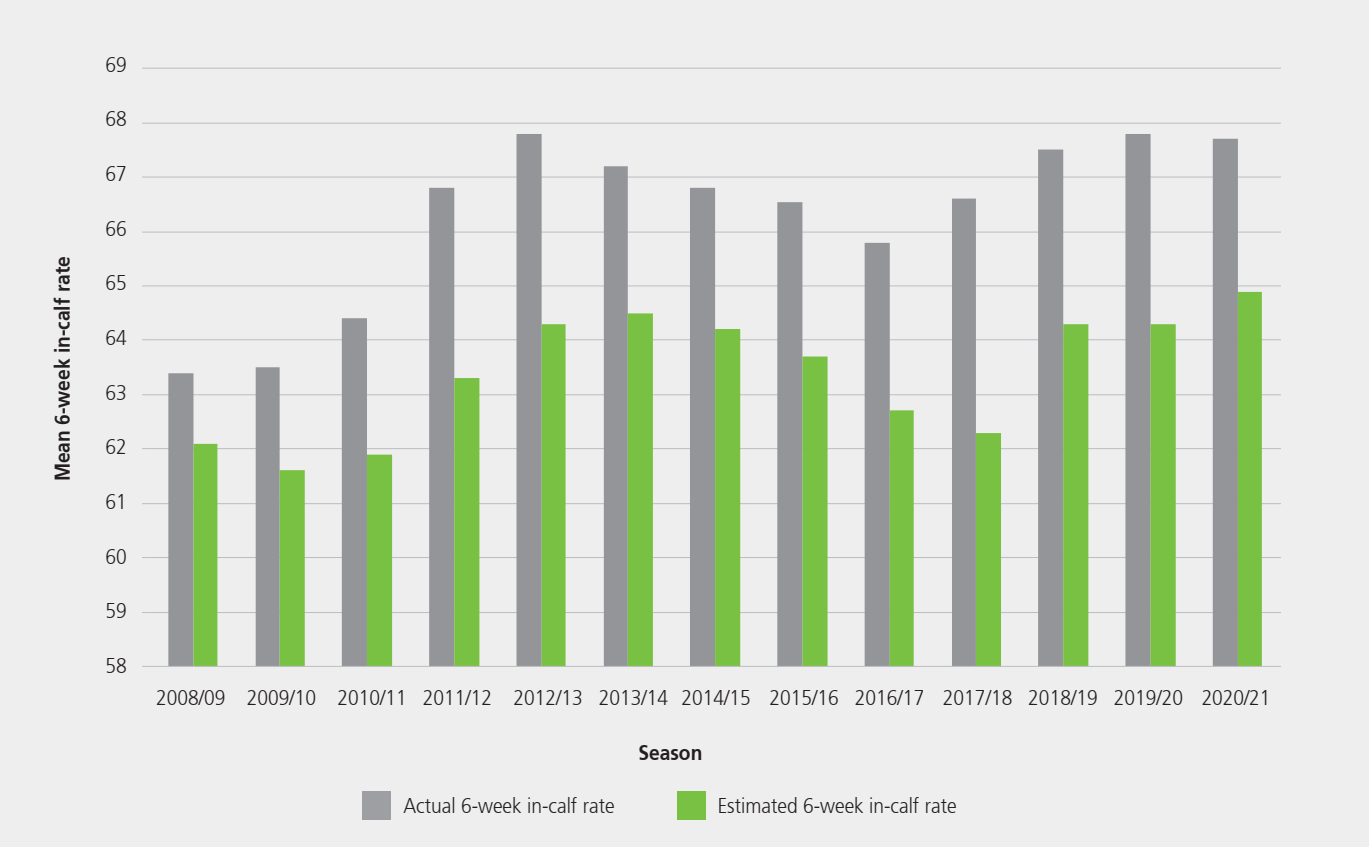
The mean 3-week submission rate is higher in 2020/21 compared with the previous season, while the mean conception rate dropped (by 1.5%) compared with the previous season. Conception rates are not available for Intermediate Fertility Focus Reports.

Table 4.9: Mean herd reproductive performance since 2008/09

	Actual				Estimated		
Mating season	**Number of herds**	**Mean 6-week in-calf rate (%)**	**Mean 3-week submission rate (%)**	**Mean conception rate (%)**	**Number of herds**	**Mean 6-week in-calf rate (%)**	**Mean 3-week submission rate (%)**
2008/09	354	63.4	78.5	50.1	4,872	62.1	72.7
2009/10	712	63.5	77.5	51.0	4,749	61.6	72.2
2010/11	982	64.4	78.7	50.7	4,090	61.9	72.6
2011/12	1,341	66.8	80.7	52.2	4,051	63.3	76.0
2012/13	1,862	67.8	81.6	52.9	4,034	64.3	76.6
2013/14	2,363	67.2	80.8	52.5	3,874	64.5	76.5
2014/15	2,895	66.8	81.1	52.6	3,918	64.2	76.2
2015/16	3,646	66.5	80.0	52.4	4,778	63.7	75.0
2016/17	3,952	65.8	78.1	53.4	4,566	62.7	72.0
2017/18	3,963	66.6	79.1	54.0	4,035	62.3	73.2
2018/19	4,207	67.5	80.7	54.1	3,883	64.3	76.0
2019/20	4,430	67.8	80.2	54.2	3,624	64.3	75.7
2020/21	4,492	67.7	81.3	52.7	3,527	64.9	76.4

Note: *Results for 2008/09 and 2009/10 are based on version 1.0 of the Fertility Focus Report software. Results for 2010/11 until 2015/16 are from version 2.15 and results for 2016/17 onwards are from version 3.01. These updated versions had improvements made to calculations and reflect more correctly what the national performance is.*

Graph 4.11: Mean actual and estimated 6-week in-calf rate since 2008/09



Note: *Results for 2008/09 and 2009/10 are based on version 1.0 of the Fertility Focus Report software. Results for 2010/11 until 2015/16 are from version 2.15 and results for 2016/17 onwards are from version 3.01. These updated versions had improvements made to calculations and reflect more correctly what the national performance is.*

Mean actual 6-week in-calf rate by region ranged between 65.7% (Manawatu/ Wairarapa) and 69% (Northland/ Auckland and Taranaki) in 2020/21 (Table 4.10). Northland/ Auckland, West Coast/ Nelson/ Marlborough and Canterbury were the only regions which recorded a slight increase over the previous season.

Table 4.10: Mean 6-week in-calf rate by farming region for the last three seasons.

	Actual						Estimated					
	2018/19		2019/20		2020/21		2018/19		2019/20		2020/21	
Farming region	**Number of herds**	**Mean 6-week in-calf rate (%)**	**Number of herds**	**Mean 6-week in-calf rate (%)**	**Number of herds**	**Mean 6-week in-calf rate (%)**	**Number of herds**	**Mean 6-week in-calf rate (%)**	**Number of herds**	**Mean 6-week in-calf rate (%)**	**Number of herds**	**Mean 6-week in-calf rate (%)**
Northland / Auckland	207	68.2	237	68.5	228	68.7	390	62.5	369	62.7	364	63.3
Waikato / Western Uplands	1,128	69.0	1,188	69.2	1,171	68.4	1,191	64.6	1,127	65.0	1,102	65.4
BoP / Central Plateau / East Coast	373	66.6	400	67.4	402	66.9	354	63.8	331	63.8	322	64.4
Hawkes Bay / Manawatu / Wairarapa	345	65.9	361	66.0	338	65.7	309	62.8	284	62.5	297	64.4
Taranaki	371	70.0	396	69.1	414	68.8	877	65.6	824	65.8	808	66.1
West Coast / Nelson / Marlborough	143	68.3	157	66.7	170	68.6	284	64.9	266	63.7	259	64.2
North & South Canterbury	815	66.0	825	66.8	849	67.4	178	63.7	166	62.9	151	64.1
Otago / Southland	824	66.8	866	67.5	920	67.1	286	63.9	257	62.4	224	63.9

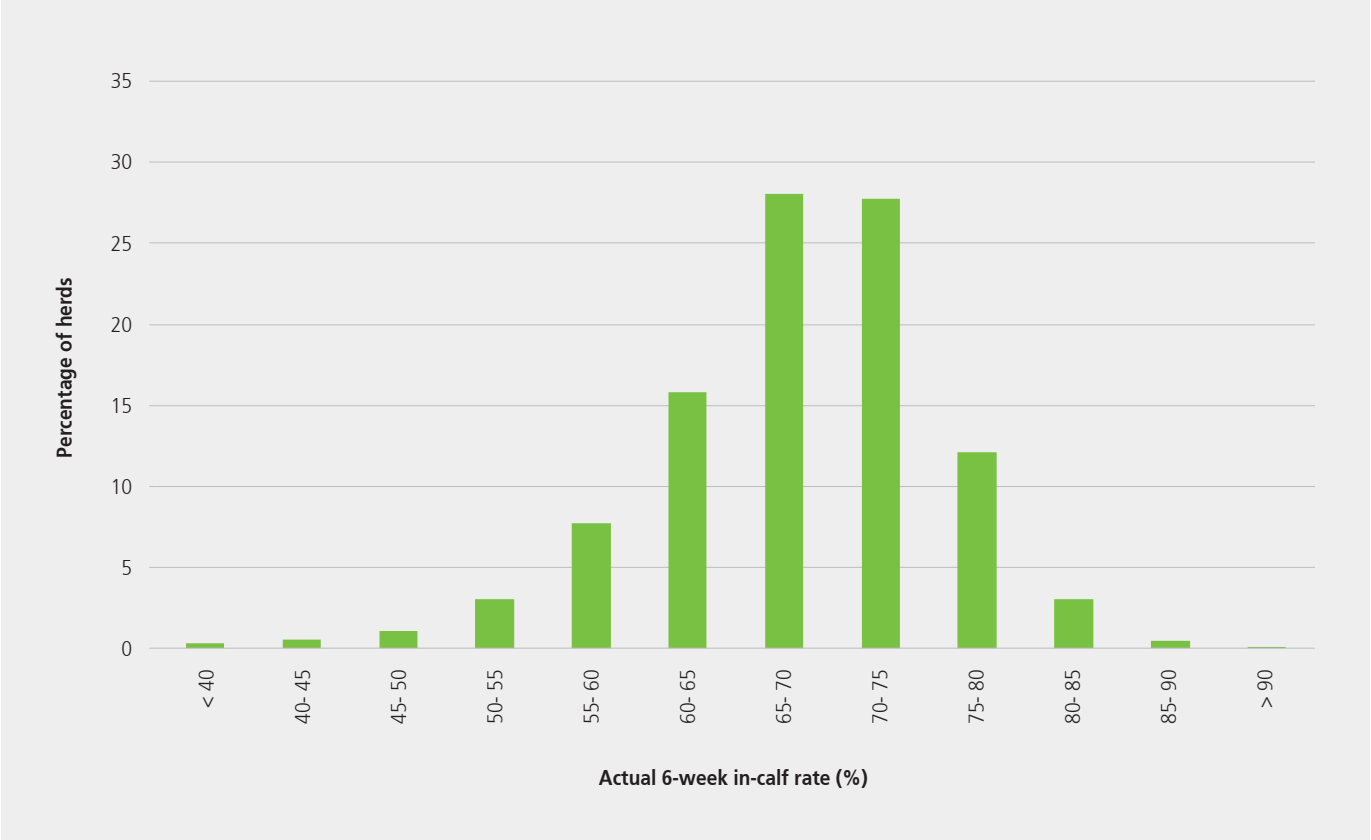
Note: *Results reported in this table are from an improved version of the Fertility Focus Report software and will differ from earlier publications.*

In 2020/21, 50% of herds had an actual 6-week in-calf rate of 68% or higher and 10% had an in-calf rate of 76% or higher (Table 4.11). Ten percent of herds had 6-week-in-calf rate of 58% or lower.

Table 4.11: Actual 6-week in-calf rate in 2020/21

	Number of herds	*Median*	*Top 10%*	*Top 25%*	*Bottom 25%*	*Bottom 10%*
6-week in-calf rate	4,492	68	> 76	> 73	< 64	< 58

Graph 4.12: Distribution of actual 6-week in-calf rate in 2020/21

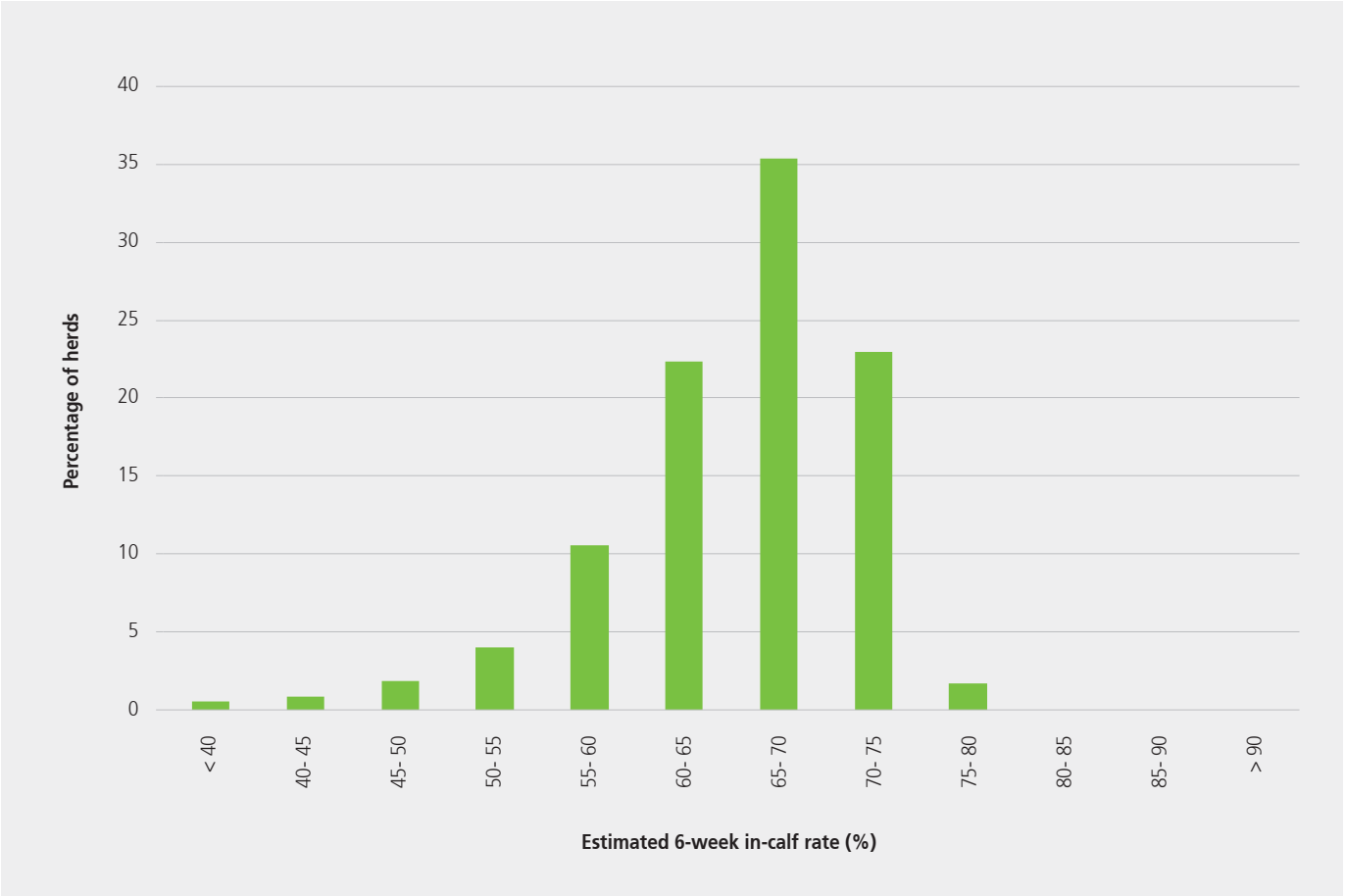


The distribution of estimated 6-week in-calf rates is tighter than the actual results reflecting that estimates tend towards the mean. This is because estimates for low performing herds tend to be overestimated, while estimates for high performing herds tend to be underestimated. In 2020/21, 50% of herds had an estimated 6-week in-calf rate of 66% or higher and 10% of herds had an estimated 6-week in-calf rate of 72% or higher (Table 4.12). Ten percent of herds had an in-calf rate of 57% or lower.

Table 4.12: Estimated 6-week in-calf rate in 2020/21

	Number of herds	*Median*	*Top 10%*	*Top 25%*	*Bottom 25%*	*Bottom 10%*
6-week in-calf rate	3,527	66	> 72	> 69	< 61	< 57

Graph 4.13: Distribution of estimated 6-week in-calf rate in 2020/21



E. Calving

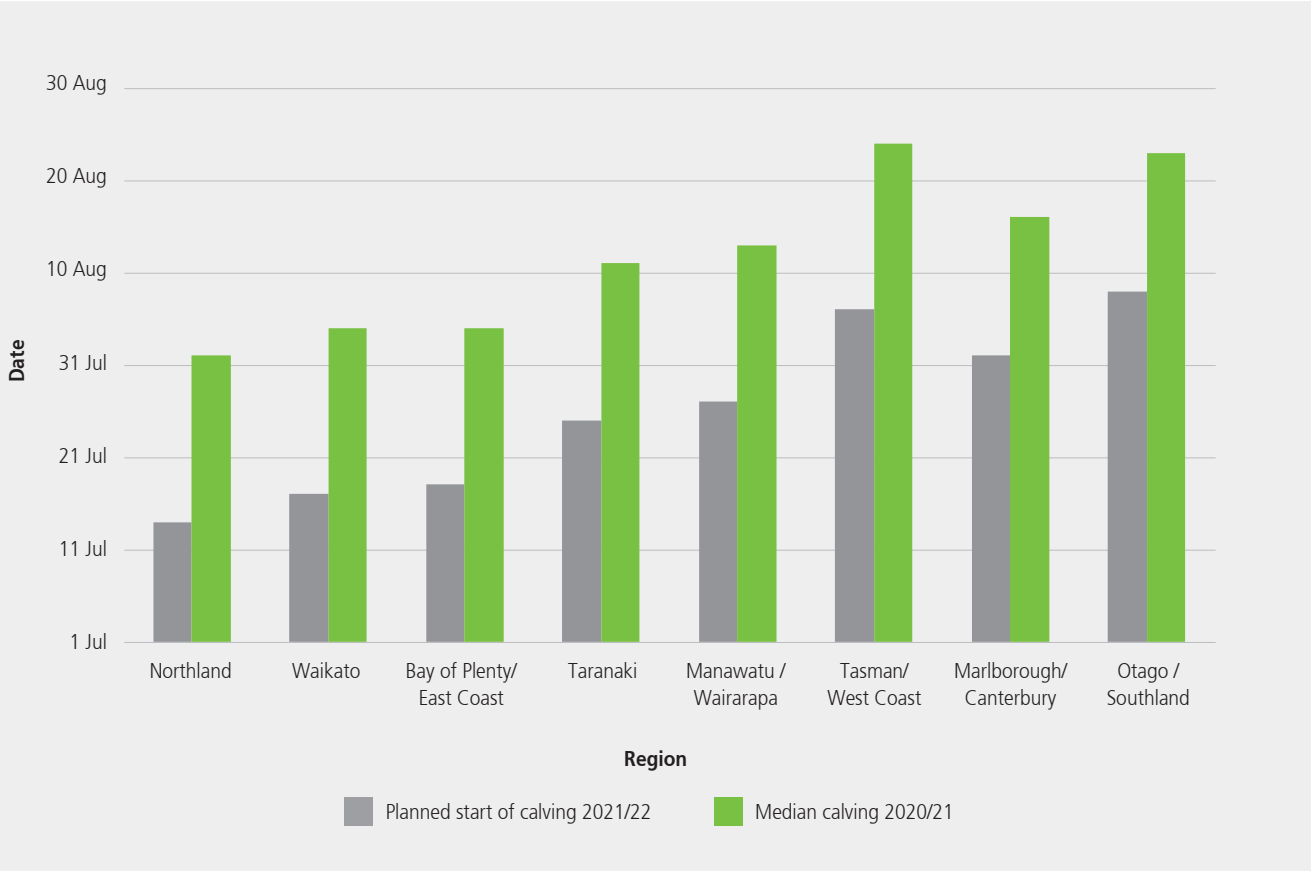
i) Planned start of calving and median calving dates

The trend in calving dates within and between regions is best shown by the "planned start of calving" date. The planned start of calving date is 282 days from the date that mating is started in the herd. The farmer has control over, and the ability to change, the start of mating.

Mating and calving information is recorded on the LIC Herd Improvement Database for approximately 85% of all herds.

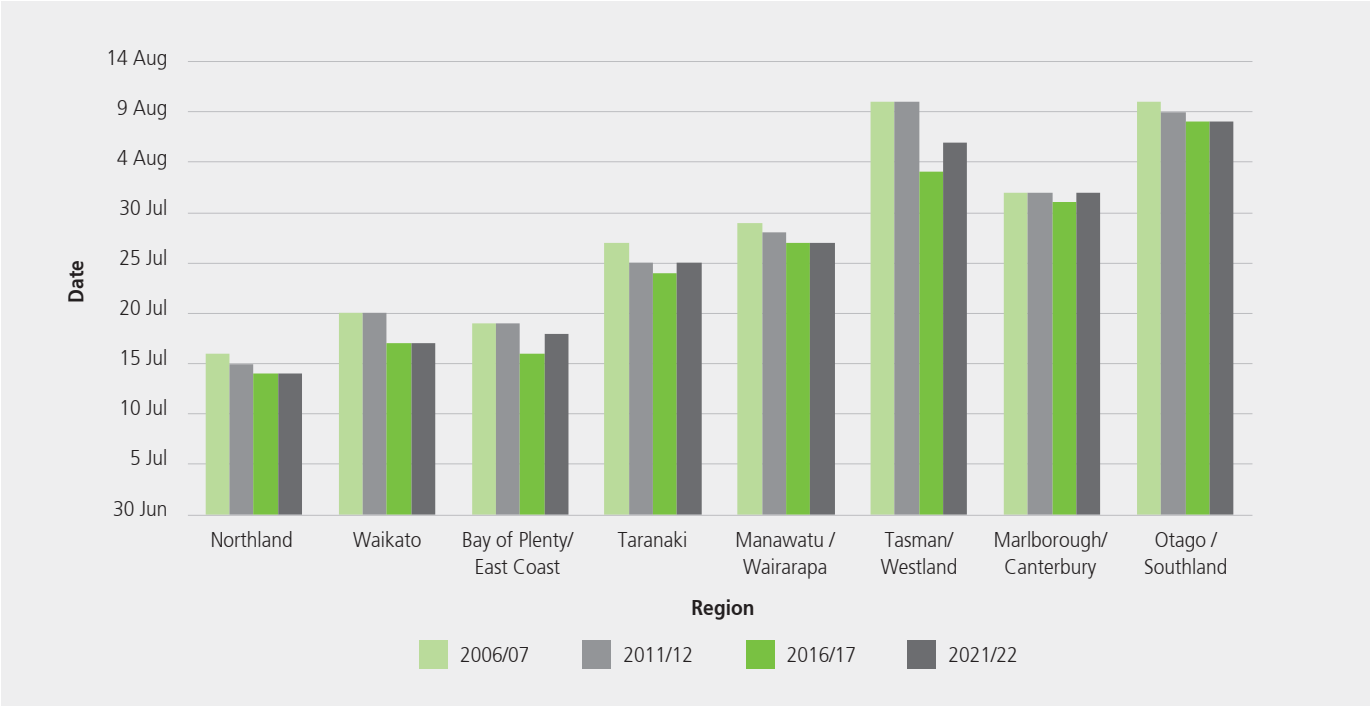
The median calving date (the date that occupies the middle position after the dates are arranged in ascending order) is used as an indicator of actual calving spread. The forecast planned start of calving and actual median calving dates for cows (excluding first calvers) for the 2020/21 season are shown in Graph 4.14.

Graph 4.14: Planned start of calving and median calving dates for cows (excluding first calvers) by region



The planned start of calving for five-yearly intervals since 2006/07 is shown in Graph 4.15. The trend has generally been for an earlier planned start of calving, particularly compared with ten and fifteen years ago. However, for the 2021/22 season the pattern is split 50/50 between regions for either maintaining a similar planned start of calving date or using a later planned start of calving date compared with five years ago. Bay of Plenty/ East Coast, Taranaki, Tasman/ Westland and Marlborough/ Canterbury have a later planned start of calving date compared to five years ago.

Graph 4.15: Trend in planned start of calving dates for cows (excluding first calvers) by region



ii) Calving interval

The calving interval for a herd tested cow is the number of days between her calving date in the current season and her calving date in the preceding season. No interval is calculated for first-calving heifers. The average calving interval is based on all recorded calving dates for herd tested cows calving during the period from 1 June to 30 November. All records where pregnancy was terminated were excluded.

Table 4.13: Mean calving interval by breed since 2000/01

	All breeds		*Holstein-Friesian*		*Jersey*		*Friesian/Jersey Cross*		*Ayrshire*	
Season	*Average number of days*	*Number of records*	*Average number of days*	*Number of records*	*Average number of days*	*Number of records*	*Average number of days*	*Number of records*	*Average number of days*	*Number of records*
2000/01	368.2	2,075,300	368.4	1,120,489	368.4	355,463	367.7	491,090	369.3	25,941
2001/02	368.3	2,093,134	368.7	1,091,334	367.8	363,278	367.7	526,610	369.7	25,572
2002/03	368.4	2,109,651	368.6	1,068,842	368.3	365,913	368.0	562,974	369.4	24,175
2003/04	369.0	2,181,103	369.4	1,067,677	368.2	375,598	368.6	620,523	368.9	23,642
2004/05	369.5	2,210,747	370.1	1,040,243	368.8	383,759	369.0	666,562	370.6	23,169
2005/06	367.8	2,241,175	368.2	1,013,546	367.7	390,971	367.4	706,441	368.2	23,129
2006/07	368.9	2,260,512	369.3	1,002,099	369.0	387,357	368.2	739,493	370.4	22,785
2007/08	369.9	2,349,042	370.4	985,422	369.7	366,954	369.5	853,422	371.0	21,239
2008/09	370.1	2,359,392	371.0	953,577	368.9	359,509	369.5	891,949	371.9	19,948
2009/10	368.7	2,477,122	369.1	972,118	368.3	361,329	368.5	980,435	369.3	16,745
2010/11	368.6	2,628,672	369.2	1,000,637	368.2	364,664	368.2	1,088,976	370.5	19,719
2011/12	368.3	2,807,333	368.5	1,030,006	368.0	370,877	368.2	1,213,169	369.1	20,164
2012/13	368.8	2,927,817	368.7	1,323,053	368.4	370,796	368.7	1,323,053	369.5	20,643
2013/14	368.4	3,054,915	368.8	1,051,940	368.2	366,500	368.2	1,427,255	369.8	20,337
2014/15	368.4	3,087,517	368.9	1,037,413	367.8	350,376	368.1	1,478,464	368.9	18,949
2015/16	369.5	3,063,466	370.0	1,002,362	368.5	327,521	369.4	1,515,761	370.0	17,358
2016/17	370.9	3,102,833	371.6	1,010,574	370.3	310,334	370.7	1,553,638	370.8	16,162
2017/18	368.6	3,088,021	369.3	1,011,453	367.8	293,988	368.4	1,557,077	369.9	15,086
2018/19	368.9	3,092,199	369.4	935,436	368.5	274,187	368.9	1,653,697	369.5	14,178
2019/20	369.0	3,085,761	369.3	753,923	368.3	247,196	369.0	1,866,661	369.2	13,276

F. Animal Evaluation

Animal Evaluation

The genetic merit of New Zealand dairy cows and sires is estimated using statistical methods which allow simultaneous evaluation of cows and sires of all breeds, using all recorded relationships. The structure of the national herd reveals large numbers of crossbred cows, and large numbers of herds with mixed breeds. For this reason, the national evaluation system is designed to compare animals irrespective of breed, both nationally and within herd, to assist farmers to select the most profitable animals for the future.

There are two types of evaluations calculated for New Zealand dairy animals:

1. **Trait evaluations** are estimates of an animal's genetic merit (Breeding Values) for individual traits including milkfat, protein, volume, liveweight, somatic cell, fertility, body condition score and residual survival. There are also estimates of an animal's lifetime productive ability (Production Values) for milkfat, protein, volume, somatic cell and liveweight.

2. **Economic evaluations** combine an animal's individual trait evaluations to estimate its comparative ability to convert feed into profit, through breeding replacements (Breeding Worth) and lifetime production (Production Worth).

For each economic index, Economic Values are calculated for the relevant traits. For Breeding Worth, the Economic Values represent the net income per unit of feed from breeding replacements with a one-unit genetic improvement in the trait. For Production Worth, the Economic Values represent the net income per unit of feed from milking cows with a one unit improved productive ability in the trait. In each case the base unit of feed is 5 tonnes of dry matter in average quality pasture.

The profit-related traits are combined into a single economic index. For example,

Breeding Worth =	**Milkfat BV**	**x**	**$EV (Milkfat)**	**+**
	Protein BV	**x**	**$EV (Protein)**	**+**
	Milk BV	**x**	**$EV (Milk)**	**+**
	Liveweight BV	**x**	**$EV (Liveweight)**	**+**
	Somatic Cell BV	**x**	**$EV (Somatic cell)**	**+**
	Fertility BV	**x**	**$EV (Fertility)**	**+**
	Body Cond. Score BV	**x**	**$EV (Body Cond. Score)**	**+**
	Residual Survival BV	**x**	**$EV (Residual Survival)**	

where: BV = Breeding Value for each trait
$EV = economic value for each trait for breeding replacements

Production Worth is calculated using Production Values for the 3 production traits, somatic cell and liveweight, multiplied by the respective economic values.

Animal Evaluation ranks animals in terms of their expected profit per unit of feed consumed.

The economic values for 2021 are presented below (Table 4.14). The economic values are reviewed annually and therefore may change from year to year. More recently, the movement in EVs has been highly influenced by the fluctuation in milk price and the increasing value for milkfat compared to protein (i.e. increasing Value Component Ratio, or VCR).

Table 4.14: Economic values used from 22 February 2020

	Milkfat ($/kg)	*Protein ($/kg)*	*Milk ($/kg)*	*Liveweight ($/kg)*	*Somatic Cell ($/score)*	*Fertility ($/%)*	*Body Cond. Score ($/score)*	*Residual Survival ($/day)*
Breeding Worth	4.25	4.26	-0.09	-1.38	-37.11	5.92	101.96	0.11
Production Worth	4.97	3.80	-0.10	-1.51	-38.27	-	-	-

The information for all Animal Evaluation statistics was sourced from cows and sires recorded on the LIC Database as at 22nd May 2021 using the NZAEL2.0 model. The evaluations were conducted with reference to a genetic base of cows born in 2005.

For more information on economic values, follow these links - **www.lic.co.nz/about/animal-evaluation and www.dairynz.co.nz/animal/animal-evaluation/interpreting-the-info/economic-values.**

i) Sire Evaluations

Table 4.15 shows the Breeding Values (BV) and Breeding Worth (BW) by breed, of all bulls born in 2016, first proven in the 2020/21 season with a BW Reliability of 70% or greater. Reliability of BW is reported on a scale from 0% to 99%. 0% is the case where there are no performance records for any related animal used in the bull's evaluation. 99% is the case where the bull has a very large number of performance-recorded daughters.

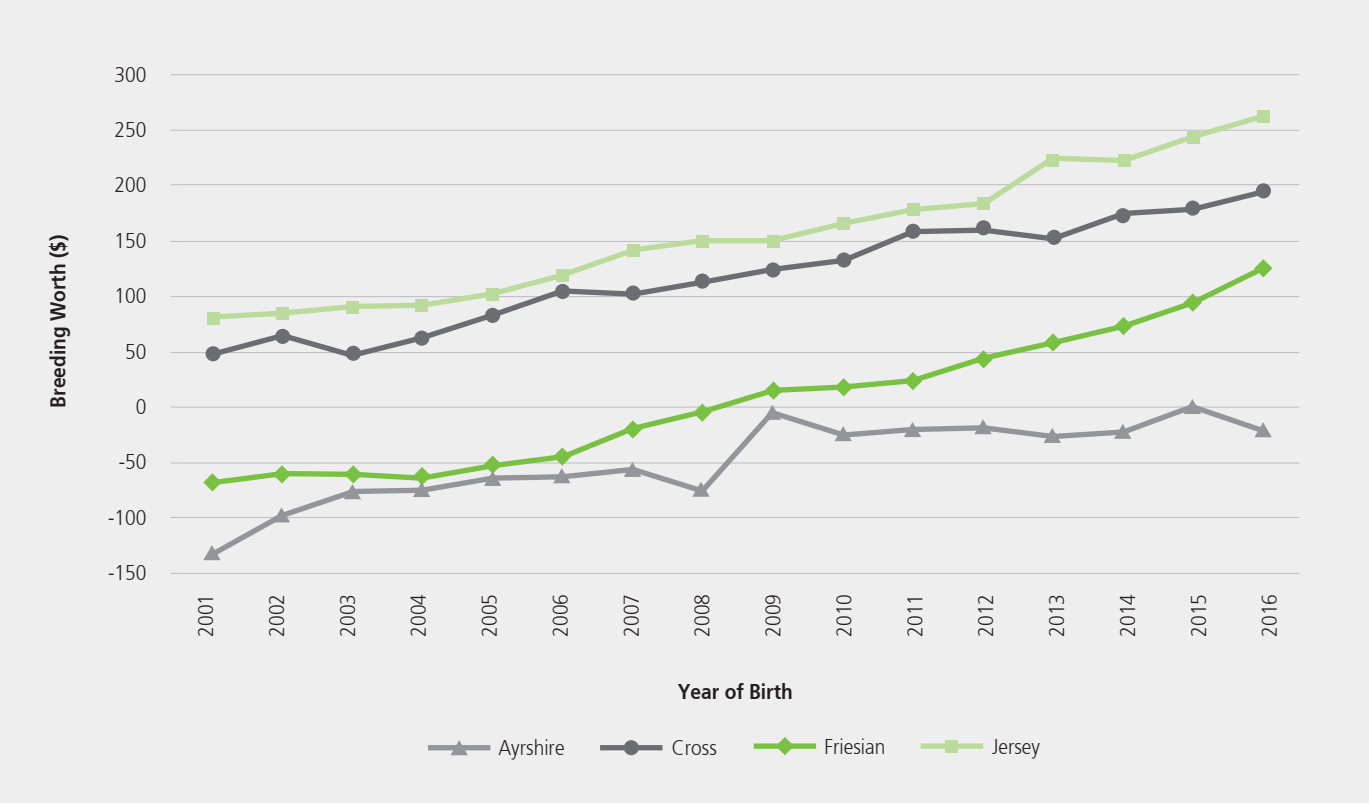
Table 4.15: Average Breeding Values and Breeding Worth of 2016 born bulls (BW reliability of 70% or greater)

Breed category	Milk Fat BV	Protein BV	Milk Volume BV	Liveweight BV	Somatic Cell BV	Fertility BV	Body Condition Score BV	Residual Survival BV	Breeding Worth	Number of Bulls
Ayrshire	8.4	12.6	458.8	19.4	-0.2	-7.6	-0.2	138.8	-21.6	4
Friesian	24.6	35.4	831.6	39.5	0.2	-0.3	0.0	77.0	125.6	137
Jersey	23.0	8.2	-271.7	-54.0	-0.1	2.1	0.1	-1.5	263.1	76
Cross	25.7	26.7	407.4	4.1	0.1	0.7	0.1	75.3	195.3	97

(Evaluation date: 22 May 2021)

The genetic trend of all proven dairy bulls is shown in Graph 4.16. Note, there are only 4 2016-born Ayrshire bulls that have reached a BW reliability of 70% or greater.

Graph 4.16: Genetic trend of proven dairy bulls by year of birth (BW reliability of 70% or greater)



(Evaluation date: 22 May 2021)

Young bulls are initially selected for use in Artificial Breeding based on the genetic merit of their sire and dam and/or genomic indices. These young sires are then progeny tested to estimate their Breeding Worth more accurately via the performance of their daughters. Each year some progeny tested bulls are returned to service for use as proven sires.

Table 4.16 shows the number of sires, by birth year and breed category, for which the Reliability of the BW was at least 70%. The information in this table is updated every year for all age groups to include older bulls that have now been proven in New Zealand.

Table 4.16 Number of Sires by birth year and breed category (reliability of BW 70% or greater, includes overseas bulls)

Year of Birth	Number of Sires	Friesian	Jersey	Ayrshire	Cross	Other Breeds
2000	556	300	138	43	68	7
2001	552	267	165	38	74	8
2002	549	277	165	29	73	5
2003	543	270	156	41	69	7
2004	559	273	158	33	92	3
2005	539	246	163	31	94	5
2006	541	262	161	34	82	2
2007	354	171	103	27	49	4
2008	372	168	111	21	69	3
2009	378	165	121	26	63	3
2010	354	180	91	20	61	2
2011	416	200	117	26	71	2
2012	427	192	109	22	101	3
2013	449	205	104	24	112	4
2014	440	206	91	21	121	1
2015	385	180	90	13	101	1
2016	314	137	76	4	97	
Grand Total	**7728**	**3699**	**2119**	**453**	**1397**	**60**

(Evaluation date: 22 May 2021)

ii) Cow Evaluations

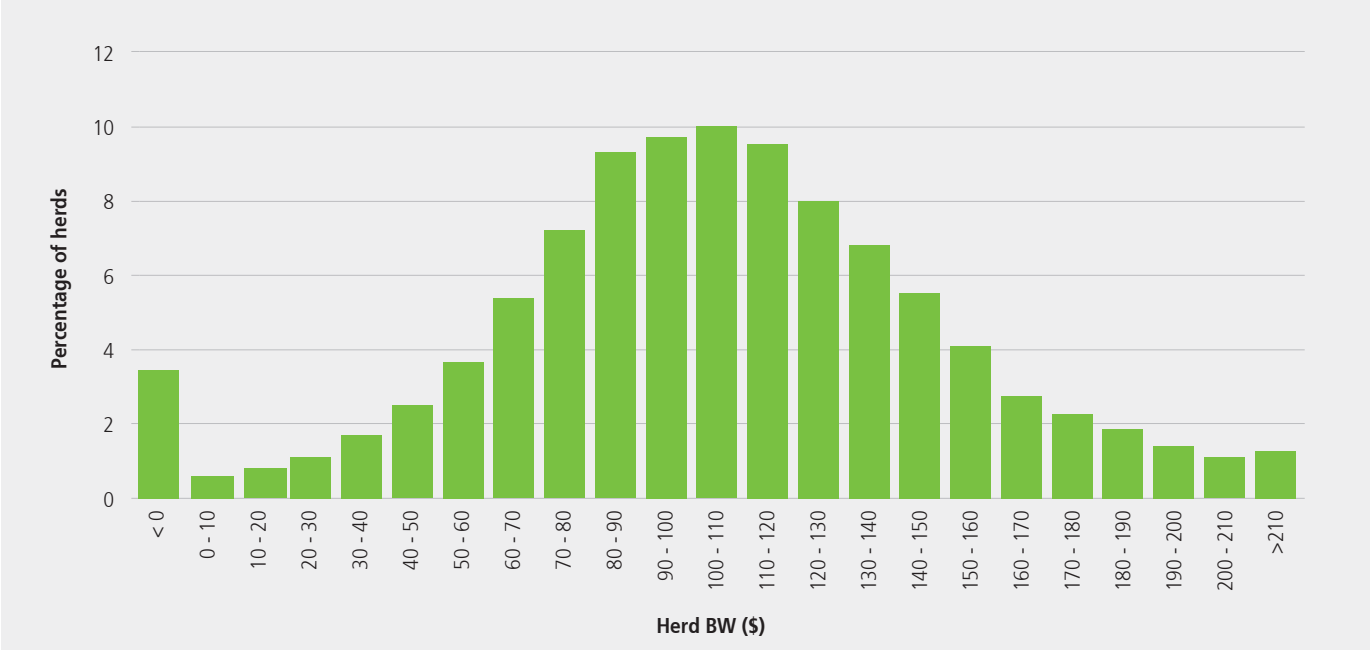
The Breeding Worth for herds presented below (Table 4.17 and Graph 4.17) is based on cows of the users of herd testing services, in herds with at least 80 cows, in the 2020/21 season. Table 4.17 shows that 50% of these herds had a BW of 102.1 or above and 25% of these herds had a BW of 131.0 or above.

Table 4.17: Herd Breeding Worth in 2020/21

	Median	Top 5%	Top 10%	Top 25%	Bottom 25%	Bottom 10%	Bottom 5%
Herd BW	102.1	>181.3	>160.4	>131.0	<75.7	<45.2	<22.6

(Evaluation date: 22 May 2021)

Graph 4.17: Distribution of Herd Breeding Worth in 2020/21



(Evaluation date: 22 May 2021)

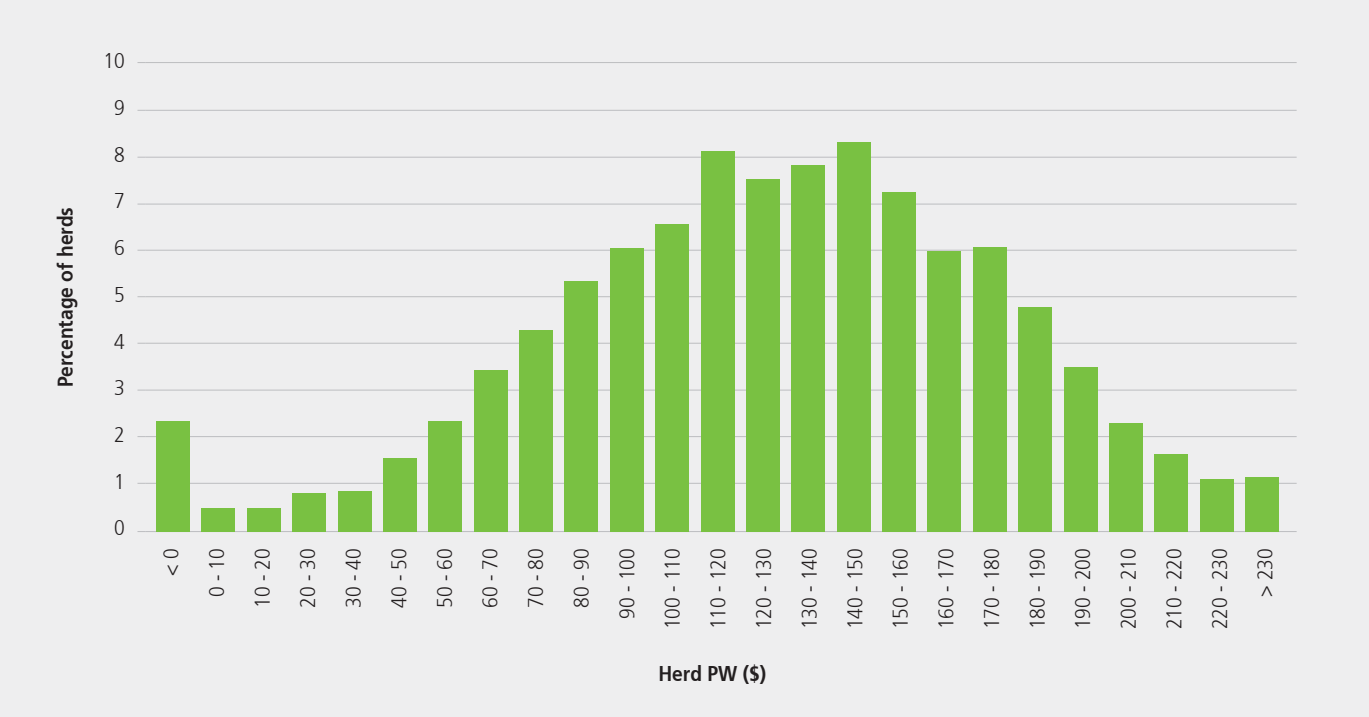
The Production Worth (PW) for herds presented below (Table 4.18 and Graph 4.18) is based on cows of the users of herd testing services, in herds with at least 80 cows, in the 2020/21 season. Table 4.18 shows that 50% of these herds had a PW of 126.7 or above and 25% of these herds had a PW of 160.1 or above.

Table 4.18: Herd Production Worth in 2020/21

	Median	Top 5%	Top 10%	Top 25%	Bottom 25%	Bottom 10%	Bottom 5%
Herd PW	126.7	>203.4	>188.1	>160.1	<92.6	<61.3	<40.4

(Evaluation date: 22 May 2021)

Graph 4.18: Distribution of Herd Production Worth in 2020/21



(Evaluation date: 22 May 2021)

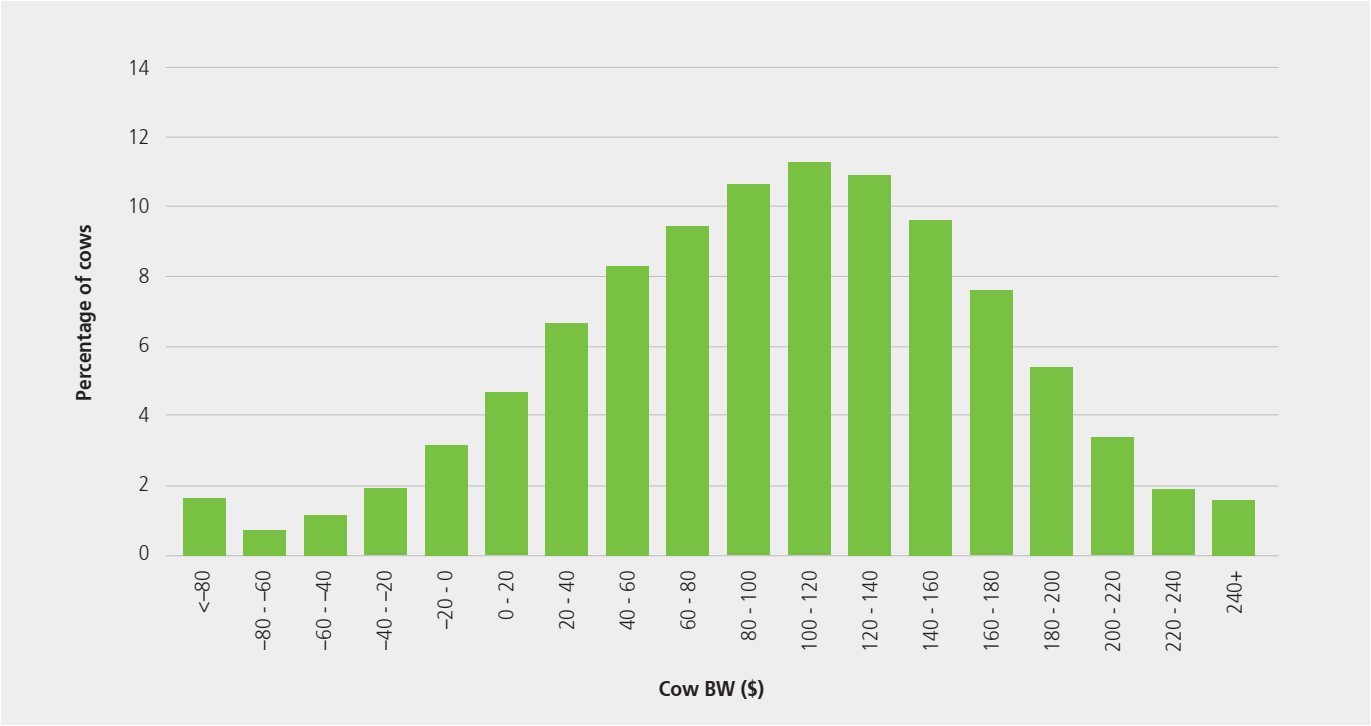
The distribution of herd Production Worth is closely aligned with the breed makeup of the herd, with the increasing value of milkfat compared to protein favouring the Jersey Breed. The average breed mix of the herds within the PW range $110-$120 equates to approximate F12J4; a breed mix that is preferred by many crossbred herd owners.

The Breeding Worth (BW) for cows presented below (Table 4.19 and Graph 4.19) is based on all cows of the users of herd testing services, in herds with at least 80 cows, and signed up for herd testing in the 2020/21 season. Table 4.19 shows that 50% of these cows had a BW of 103 or above and that 25% of these cows had a BW of 148.9 or above.

Table 4.19: Cow Breeding Worth in 2020/21

	Median	Top 5%	Top 10%	Top 25%	Bottom 25%	Bottom 10%	Bottom 5%
Cow BW	103.0	> 209.6	> 187.4	> 148.9	< 55.1	< 11.4	< -15.2

Graph 4.19: Distribution of Cow Breeding Worth in 2020/21



(Evaluation date: 22 May 2021)

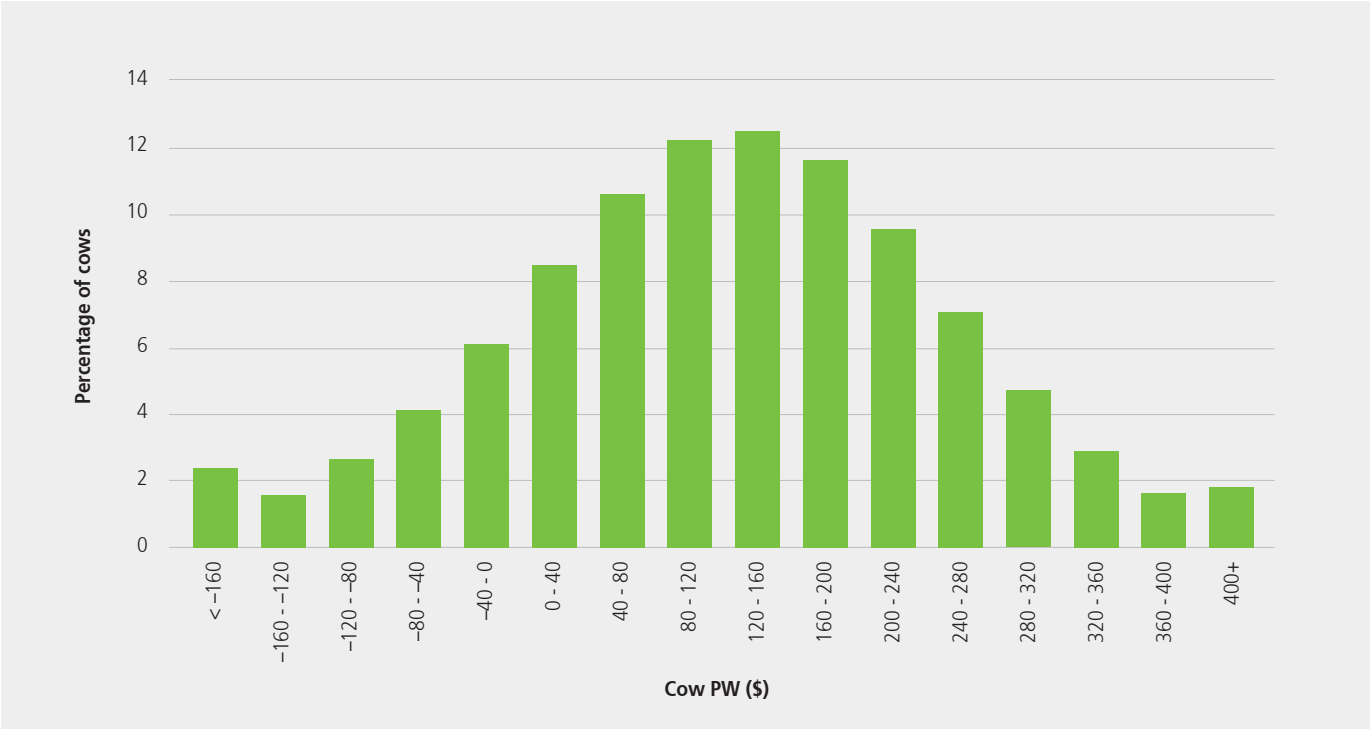
The Production Worth (PW) for cows presented below (Table 4.20 and Graph 4.20) is based on cows of the users of herd testing services, in herds with at least 80 cows, in the 2020/21 season. Table 4.20 shows that 50% of these cows had a PW of 126 or above and that 25% of these cows had a PW of 210.5 or above.

Table 4.20: Cow Production Worth in 2020/21

	Median	*Top 5%*	*Top 10%*	*Top 25%*	*Bottom 25%*	*Bottom 10%*	*Bottom 5%*
Cow PW	126.0	> 336.4	> 287.9	> 210.5	< 42.9	< -38.0	< -87.7

(Evaluation date: 22 May 2021)

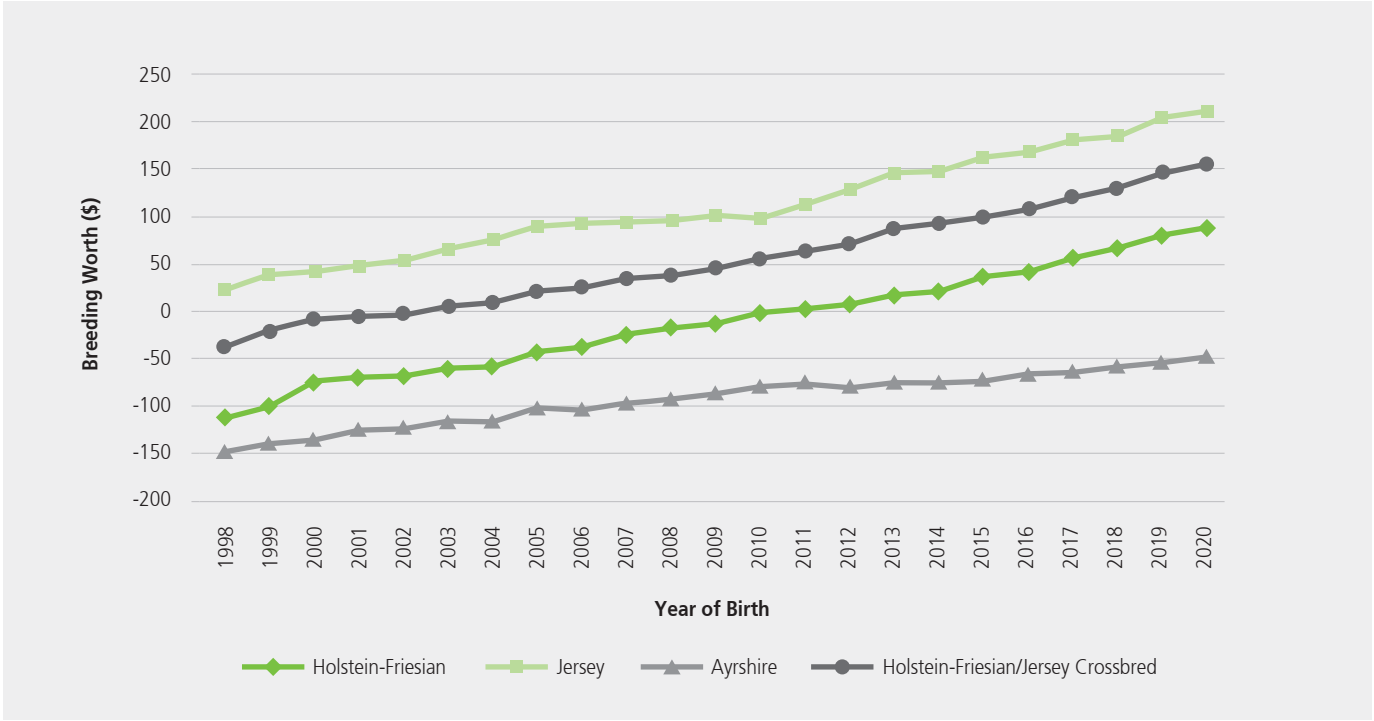
Graph 4.20: Distribution of Cow Production Worth in 2020/21



(Evaluation date: 22 May 2021)

The genetic trend for cows is based on all cows (alive or dead) recorded on the LIC Database as of 22 May 2021. Also included are the estimated BW and PW for replacement stock (2019 and 2020 born animals). All evaluations can be compared across breeds. The genetic trend for BW by breed is presented in Graph 4.21. The Breeding Worth for all breed categories has increased over time.

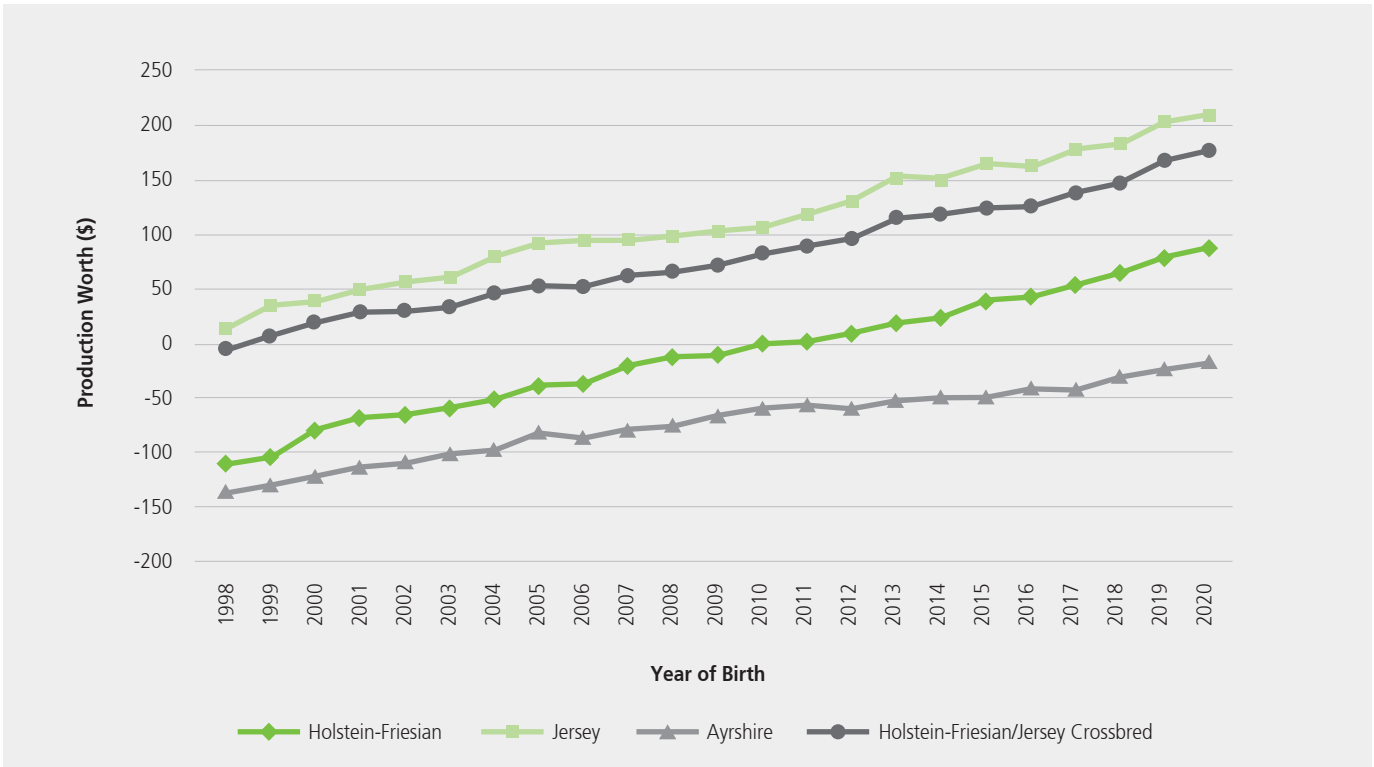
Graph 4.21: Trend in Breeding Worth for all cows



(Evaluation date: 22 May 2021)

The trend for PW by breed is presented in Graph 4.22. The value of milkfat has resulted in a favourable outcome for Jersey animals. The value on milkfat continues to provide a greater advantage than heterosis (hybrid vigour), an attribute only expressed in crossbred animals.

Graph 4.22: Trend in Production Worth for all cows



(Evaluation date: 22 May 2021)

Table 4.21 shows the average BVs and BW by breed category, of all current 2018 born cows. The Jersey cows had the highest average BW at 185.4. Holstein Friesian cows had the highest milkfat, protein, and milk volume BVs. All evaluations are comparable across breeds.

Table 4.21: Average Breeding Worth and Breeding Values of all current cows born in 2018 by breed category

Breed	*BW $*	*Milkfat BV (kg)*	*Protein BV (kg)*	*Milk Volume BV (l)*	*Liveweight BV (kg)*	*Somatic Cell BV (score)*	*Fertility BV (%)*	*Body Cond. Score (score)*	*Residual Survival BV (days)*	*Cow Numbers*
Holstein-Friesian	68.1	16.4	23.8	626	36.5	0.03	-0.1	0.02	42	233,717
Jersey	185.4	11.8	1.5	-371	-49.7	-0.1	2	0.09	-3	65,796
Ayrshire	-52.4	-1.7	3	225	9.9	-0.2	-5.9	-0.14	149	3,860
HF/J Crossbred	131.5	16.1	16.9	253	2.6	-0.01	0.9	0.06	53	565,761
Guernsey	-182	-20.7	-16	-407	25.2	0.02	-2.2	-0.03	-138	63
Milking Shorthorn	-155	-21.4	-10.5	-230	23.8	-0.14	-1.3	0.03	-21	117
Brown Swiss	-127	-15.2	-2.7	-100	47	-0.36	-5.6	0.02	147	85
Other	96.2	11.8	13.8	208	6.4	-0.05	0	0.04	51	64,499
Weighted Average	**116.2**	**15.5**	**17.3**	**299.0**	**7.7**	**-0.01**	**0.6**	**0.05**	**46.5**	**933,898**

(Evaluation date: 22 May 2021)

Survivability is measured by the percentage of cows that have a lactation recorded for consecutive years. In the 2020/21 season, survivability was higher than the previous year for only the two youngest age groups (2-3 and 3-4 year-olds). The value in the "2-3 years" column is the percentage of cows that were milking as two-year-olds in the 2019/20 season and are now milking as three-year-olds in the 2020/21 season. Table 4.22 shows that for the 2020/21 season the highest percentage of survival is in animals aged 2-3 years (88.6%), followed by animals aged 3-4 years (85.9%) and 4-5 years (84.3%).

Table 4.22: Survivability percentages since 1996/97

	Percentage (%) of age group surviving to next lactation						
Season	*2-3 years*	*3-4 years*	*4-5 years*	*5-6 years*	*6-7 years*	*7-8 years*	*8-9 years*
1996/97	84.9	85.1	84.8	81.6	78.2	74.2	69.0
1997/98	85.9	86.7	85.6	81.9	77.7	73.9	68.3
1998/99	84.5	86.1	85.8	83.0	80.0	75.5	70.5
1999/00	84.1	86.2	85.8	82.8	80.7	76.3	70.8
2000/01	85.3	86.7	86.5	83.2	80.1	76.5	71.7
2001/02	85.6	88.4	86.8	84.3	80.8	77.1	73.5
2002/03	85.7	85.9	86.6	83.8	80.8	76.0	71.2
2003/04	85.2	86.9	86.0	83.0	78.7	74.8	69.4
2004/05	85.7	87.3	86.7	82.7	79.7	74.6	69.6
2005/06	85.0	87.5	87.6	84.2	79.7	76.7	70.6
2006/07	84.8	87.8	88.2	84.7	79.5	74.9	71.2
2007/08	84.0	87.6	87.2	84.1	80.0	74.9	69.5
2008/09	86.8	87.7	87.5	83.4	80.2	76.1	70.7
2009/10	87.0	87.2	86.3	82.2	77.6	72.9	67.3
2010/11	86.2	87.2	86.0	81.1	76.8	71.2	65.7
2011/12	87.3	87.7	86.8	81.5	76.8	72.2	65.6
2012/13	87.6	89.2	87.9	82.7	77.9	71.6	66.1
2013/14	87.6	87.4	86.3	82.0	77.2	71.5	64.3
2014/15	86.9	85.7	84.7	80.8	75.7	70.5	64.1
2015/16	87.0	87.1	84.2	79.5	74.9	69.1	62.9
2016/17	84.1	84.5	83.4	78.9	74.2	69.1	63.2
2017/18	85.2	85.0	84.1	79.8	73.9	69.6	63.5
2018/19	86.3	85.5	85.0	80.5	75.1	68.8	64.2
2019/20	87.5	85.0	85.0	80.4	75.5	70.5	64.1
2020/21	88.6	85.9	84.3	79.8	74.4	69.8	63.9

5. Prices received

A. Milk prices

Up until the end of the 2000/01 season, dairy farmers received payment from the New Zealand Dairy Board through a system of advance and final payouts via dairy companies. Seasonal supply dairy companies passed on the Dairy Board advance payout to their suppliers, in addition to a margin based on dairy company efficiency, product mix and investment policies; together known as the total payout.

The introduction of the *Dairy Industry Restructuring Act 2001* opened the way for New Zealand's largest dairy companies, Kiwi Co-operative Dairy Company (Kiwi) and New Zealand Dairy Group (NZDG) to merge with the Dairy Board to form Fonterra. Further, the Act allowed the smaller dairy companies, such as Tatua and Westland, to remain separate co-operatives. Consequently, the historic payment system became redundant. Tatua and Westland have now established commercial arrangements for sale of dairy products.

Payments to seasonal supply farmers are based on the "A+B±C" system, which incorporates payments for milkfat (A) and protein (B) with adjustments for milk volume (C). The payment system for winter milk supply varies between companies. Some winter milk payment systems are based on the milk volume only, whereas other payment systems are similar to seasonal supply payment systems, which incorporate components of milkfat, protein, and volume.

- *$7.75 average dairy co-operative payout*

The weighted average dairy co-operative total payout (per kilogram of milksolids) received by dairy farmers from seasonal supply milk is shown in Table 5.1 (weightings are based on the number of herds supplying each dairy co-operative). The average payout is given in both nominal and inflation-adjusted dollars using the Consumers Price Index (CPI) provided by Statistics New Zealand. The average dairy co-operative payout of $7. 75 per kg milksolids in 2020/21 was higher than the previous season ($7.20) and the second-highest average payout in the past 10 seasons. It is $1.30 above the decade average payout for milksolids which sits at $6.45.

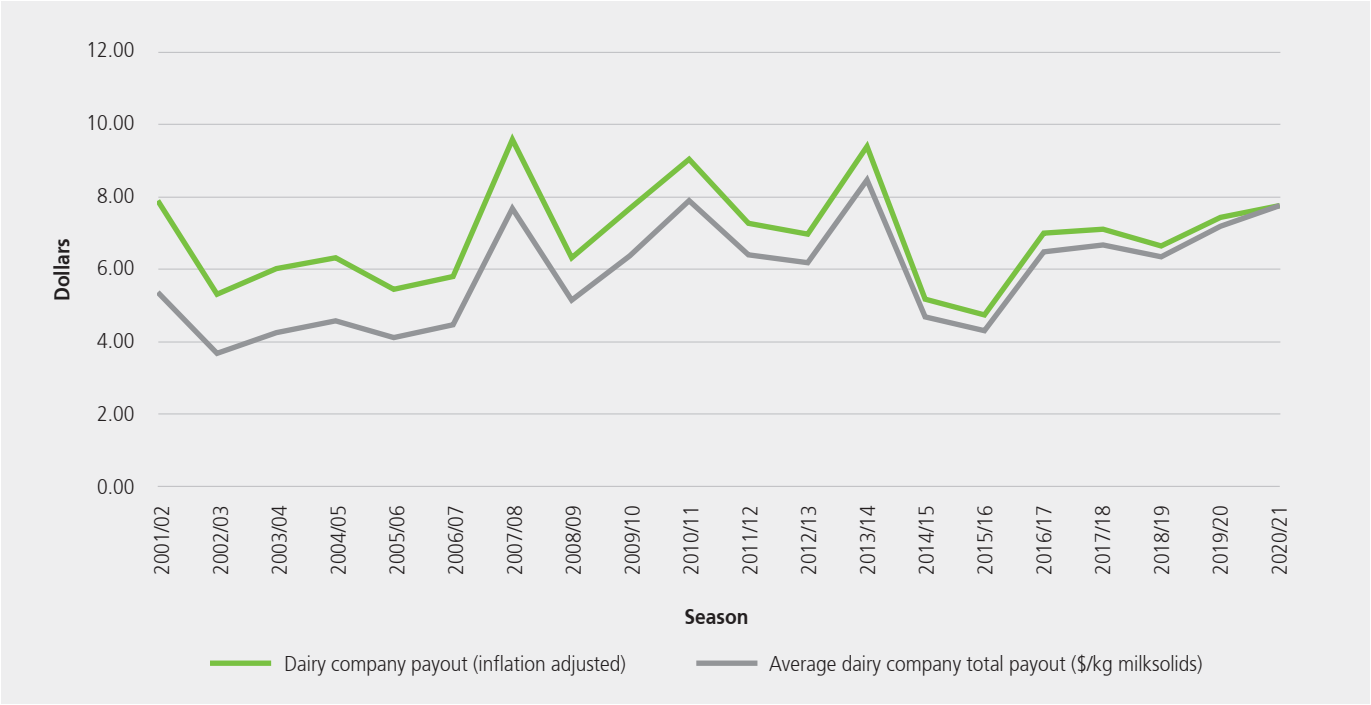
Table 5.1: Trend in prices received for milksolids for the last 20 seasons

Season	Average Dairy Co-operative total payout ($/kg milksolids)	Dairy Co-operative payout (inflation-adjusted)[a]
2000/01	5.01	7.59
2001/02	5.35	7.89
2002/03	3.66	5.32
2003/04	4.25	6.03
2004/05	4.58	6.32
2005/06	4.10	5.44
2006/07	4.46	5.80
2007/08	7.67	9.60
2008/09	5.14	6.31
2009/10	6.37	7.69
2010/11	7.89	9.04
2011/12	6.40	7.27
2012/13	6.18	6.97
2013/14	8.47	9.40
2014/15	4.69	5.18
2015/16	4.30	4.73
2016/17	6.47	7.00
2017/18	6.68	7.12
2018/19	6.35	6.66
2019/20	7.20	7.44
2020/21	7.75	7.75

[a] *Weighted to give real dollar values using the Consumers Price Index for the end of the June quarter. Sourced from Statistics New Zealand; excludes dairy co-operative retentions and deduction for DairyNZ Levy.*

Note: *from 2009/10 average dairy co-operative payout is from Fonterra, Tatua, and Westland. This includes Fonterra dividend payments.*

Graph 5.1: Trend in milksolids payout to dairy farmers for the last 20 seasons



B. Dairy farm land prices

- *Dairy farm land price per hectare at a 10-year low*
- *Dairy farm sale numbers increase*

Prior to 2011/12 Table 5.2 was computed using data from Quotable Value (QV) on a calendar year basis. Dairy farm land sales are now based on data provided by the Real Estate Institute of New Zealand (REINZ) on a seasonal basis. Up until the 2019/20 season, raw data provided by REINZ was weighted by the number of farms in each region. From the 2019/20 season onwards, data is no longer weighted due to changes in the way data is provided by REINZ. The new method produces values that are consistent with changes observed and past season figures. The farms sold are considered to be economic units.

The weighted average sale price of dairy farms increased to $4.81 million in 2020/21 from the previous season ($4.45 million) (Table 5.2). Farms sold were 20 hectares larger on average than sales in 2019/20. The weighted average sale price per hectare of $31,393 decreased 6.0% on the previous season and was at a ten-year low.

Table 5.2: Trend in dairy land sale values for the past ten seasons

Season	Number of dairy farms sold	Weighted * average sale price ($)	Inflation adjusted average sale price ($)	Weighted * average land area (ha)	Weighted * average sale price/ha ($)	Inflation adjusted average sale price/ha ($)	Weighted * average sale price/KgMS ($)	CPI
2011/12	157	4,514,365	5,125,439	139	32,376	36,758	41	953
2012/13	197	4,375,251	4,936,415	130	33,557	37,861	36	959
2013/14	312	5,174,010	5,741,824	142	36,369	40,360	42	975
2014/15	244	5,228,018	5,778,055	132	39,577	43,741	44	979
2015/16	192	5,381,697	5,923,698	169	36,557	40,239	39	983
2016/17	217	4,808,676	5,202,987	151	37,835	40,937	40	1,000
2017/18	226	4,935,487	5,261,278	130	38,015	40,524	40	1,015
2018/19	148	5,125,837	5,374,182	144	36,846	38,631	38	1,032
2019/20	113	4,451,927	4,600,750	133	33,410	34,527	37	1,047
2020/21	198	4,810,641	4,810,641	153	31,393	31,393	35	1,082

Source: Real Estate Institute of New Zealand (REINZ), Statistics New Zealand, DairyNZ

Note: *Number of dairy farms sold is for a season (01-Jun to 31-May) and excludes support blocks and non-economic units.*

**** pre-2019/20 figures have been weighted by the number of dairy farms in each region. From 2019/20 onwards, figures have not been weighted.***

6. Disease Control

A. Tuberculosis (Tb) control

Control of Mycobacterium bovis (Tb) over the agricultural industry is managed by TBfree New Zealand, whose primary objective is to manage Tb to reduce the number of infected herds and to prevent Tb vector free areas becoming vector risk areas. The status of a vector area is determined by the prevalence of wild animals (e.g. possums and ferrets) that are considered a source of infection.

The number of infected dairy herds in 2020/21 was 17 (Table 6.1). The number of Tuberculous dairy cattle increased to 29 from the 20 in 2019/20. This exceeds totals from the past three seasons; however, it is still well below 2016/17 numbers (112).

The West Coast had the greatest number of infected herds (11) in 2020/21, as well as the greatest number of Tuberculous dairy cattle (18).

Table 6.1: Tuberculosis (Tb) testing and results in 2020/21

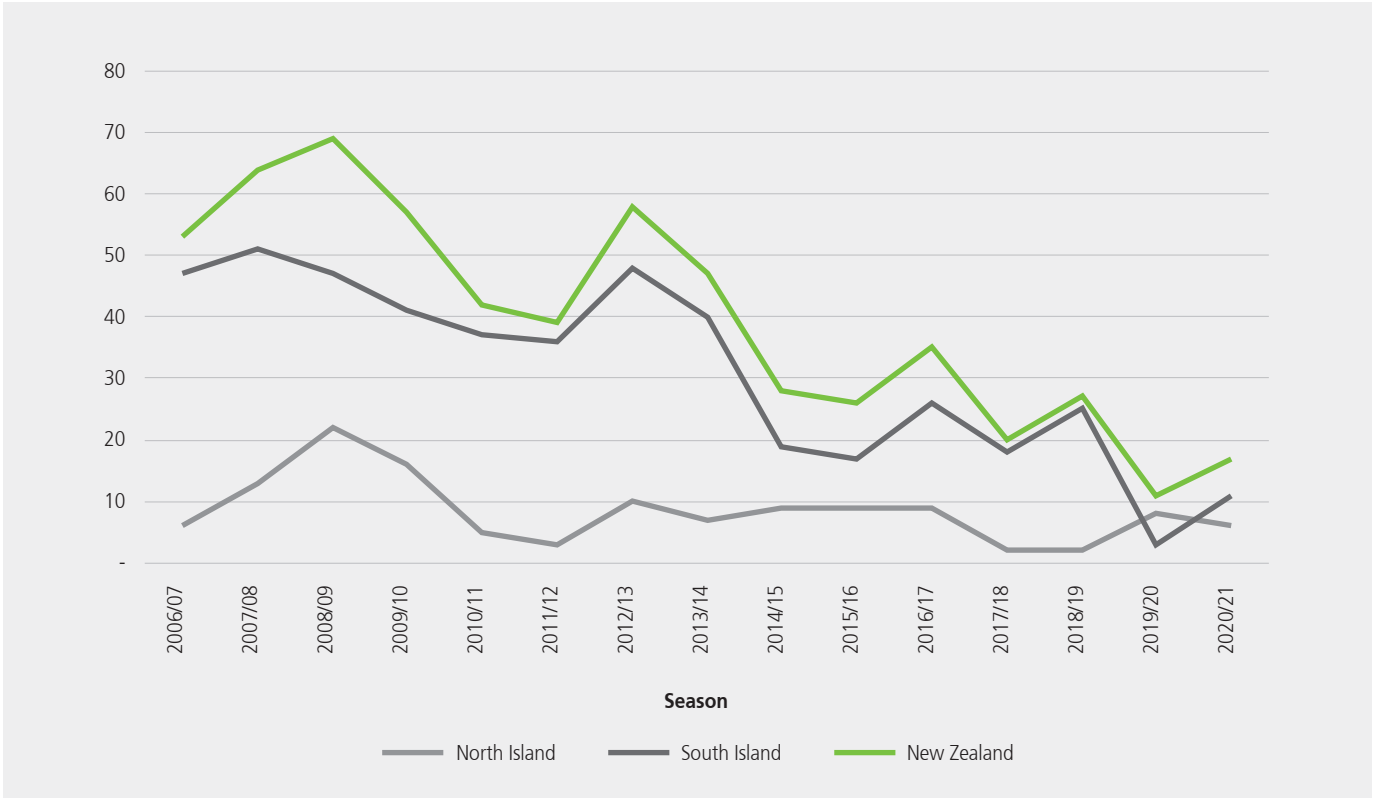
Region	*Vector Status*	*Number of infected Dairy herds at 30 June 2020*	*Number of Dairy Cattle Primary Tested in 2020/21*	*Number of tuberculous[a] dairy cattle*
Northland	Free	0	73,503	0
Auckland	Free	0	15,456	0
Waikato	Free	3	440,169	3
	Risk	0	10,581	0
Bay of Plenty	Free	1	66,699	3
	Risk	0	7,299	0
Gisborne	Free	0	86	0
Hawke's Bay	Free	1	16,907	2
	Risk	1	30,363	3
Taranaki	Free	0	112,543	0
Manawatu/Wanganui	Free	0	88,897	0
	Risk	0	4,233	0
Wellington	Free	0	8,607	0
	Risk	0	49,723	0
North Island	Free	5	822,867	8
	Risk	1	102,199	3
North Island	**Total**	**6**	**925,066**	**11**
Marlborough	Free	0	5,341	0
	Risk	0	6	0
Tasman/Nelson	Free	0	9,962	0
	Risk	0	11,141	0
West Coast	Free	0	2,031	0
	Risk	11	220,222	18
Canterbury	Free	0	244,573	0
	Risk	0	104,574	0
Otago	Free	0	83,332	0
	Risk	0	141,679	0
Southland	Free	0	158,103	0
	Risk	0	38,170	0
South Island	Free	0	503,342	0
	Risk	11	515,792	18
South Island	**Total**	**11**	**1,019,134**	**18**
New Zealand	Free	5	1,326,209	8
	Risk	12	617,991	21
New Zealand	**Total**	**17**	**1,944,200**	**29**

Sourced from TBfree New Zealand

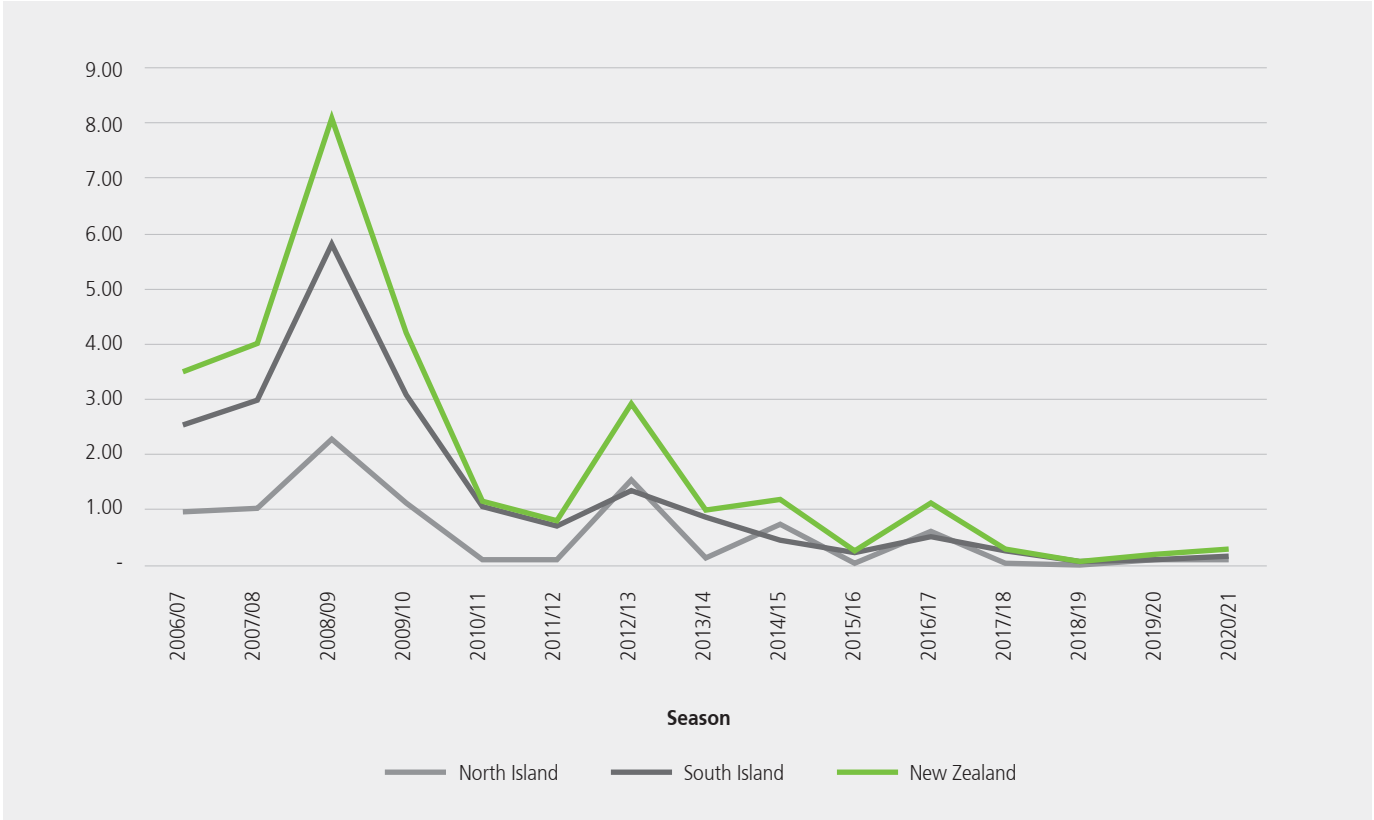
[a] *Tuberculous animals include lesioned reactor cattle and lesioned cull cattle*

The trend in the number of infected herds, by island and for the country as a whole, is presented in Graph 6.1. Nationally, the past 15 seasons has seen a 67.9% decrease in the number of infected herds. The overall number of infected animals has also decreased (91.7%) over the same period (Graph 6.2).

Graph 6.1: Trend in the number of infected herds since 2006/07



Graph 6.2: Trend in the number of tuberculous dairy cattle since 2006/07



Appendix 1: Farming regions and districts

The following map shows the farming regions used in all analyses presented in this report. The list of districts, which follow local authority boundaries (except in Auckland, Christchurch and Banks Peninsula), within each region is also given.

1 Northland
- Far North
- Whangarei
- Kaipara

2 Auckland
- Rodney
- North Shore
- Waitakere
- Auckland
- Manukau
- Papakura
- Franklin

3 Waikato
- Thames/Coromandel
- Hauraki
- Waikato
- Matamata/Piako
- Hamilton
- Waipa
- Otorohanga
- South Waikato

4 Bay of Plenty
- Western Bay of Plenty
- Tauranga
- Whakatane
- Kawerau
- Opotiki

5 Central Plateau
- Rotorua
- Taupo

6 Western Uplands
- Waitomo
- Ruapehu

7 East Coast
- Gisborne
- Wairoa

8 Hawkes Bay
- Hastings
- Napier
- Central Hawkes Bay

9 Taranaki
- New Plymouth
- Stratford
- South Taranaki

10 Manawatu
- Wanganui
- Rangitikei
- Manawatu
- Palmerston North
- Horowhenua
- Kapiti
- Porirua
- Upper Hutt
- Lower Hutt
- Wellington

11 Wairarapa
- Tararua
- Masterton
- Carterton
- South Wairarapa

12 Nelson/Marlborough
- Tasman
- Nelson
- Marlborough
- Kaikoura

13 West Coast
- Buller
- Grey
- Westland

14 North Canterbury
- Hurunui
- Waimakariri
- Christchurch
- Banks Peninsula
- Selwyn
- Ashburton

15 South Canterbury
- Timaru
- Mackenzie
- Waimate

16 Otago
- Waitaki
- Central Otago
- Queenstown/Lakes
- Dunedin
- Clutha

17 Southland
- Southland
- Gore
- Invercargill