Dairy Statistics 2002-2003

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Livestock Improvement

Contacts

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1. Introduction

As of March 2002, Livestock Improvement Corporation Limited became a user-owned co-operative, with responsibility for farm production activities and, in particular, dairy herd improvement and herd records. Livestock Improvement aims to "lead the world with genetics and knowledge to create wealth for pastoral dairy farmers".

Livestock Improvement's activities can broadly be described as genetics, information and advice. Services provided to farmers include farm management information, herd testing and artificial breeding services, DNA analysis, a farm advisory service, research to improve farm profitability, statistical information related to the New Zealand dairy industry, and herd recording on the Livestock Improvement Database.

Dairy Statistics 2002/03 contains many of the dairy industry statistics that were released until 1983/84 in the *New Zealand Dairy Board Farm Production Report*. In 1984/85, with the formation of the Livestock Improvement Division, the report was renamed the *Livestock Improvement Report*. In 1987/88 it was titled *Annual Report (Livestock Improvement Division)* and, with the establishment of the Livestock Improvement Corporation Limited in 1988, the report is now released under the title *Dairy Statistics*.

Source data used for the publication has altered over time. The statistics presented in *Dairy Statistics* from 1992/93 were obtained from dairy companies and from information stored on the Livestock Improvement Database. Prior to 1991/92, the information for the *Dairy Statistics* publications was obtained primarily from the analysis of the New Zealand Dairy Industry Cow Census (an annual survey of all dairy farmers) last conducted for the 1990/91 season. The 1991/92 edition of *Dairy Statistics* was a transition year for which only minimal data was available.

In the Herd Improvement section of *Dairy Statistics* there is an important difference to the data presented in *Dairy Statistics* before 1995/96. Since the implementation of Animal Evaluation in June 1996, statistics for 1995/96 onward include bull and cow genetic trends.

2. National dairy statistics

A. Industry statistics

i) Production

- **Almost 1.2 billion kilograms of milksolids processed**

Prior to *Dairy Statistics 2002/03*, 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 now no longer available. Consequently, Table 2.1 now includes all milk processed by New Zealand dairy companies, including milk for the domestic market.

In 2002/03, dairy companies processed almost 14 billion litres of milk and close to 1.2 billion kilograms of milksolids (see Table 2.1). At 1,191 million kilograms, total milksolids processed represents a 3.4% increase from the 1,152 million kilograms processed in the previous season.

Table 2.1 **Summary of milk production statistics since 1998/99**

Season	*Milk processed (million litres)*	*Milkfat processed (million kgs)*	*Protein processed (million kgs)*	*Milksolids processed (million kgs)*
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

Note: All figures now include milk for the domestic market.

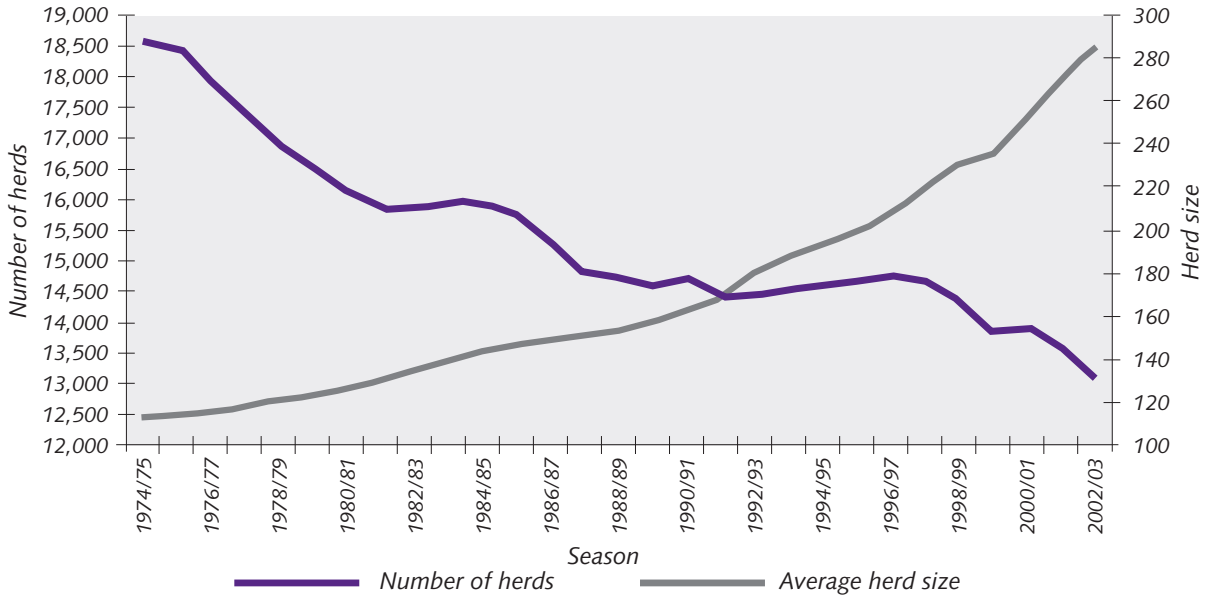
ii) Population

- **Sharp decrease in herd numbers**
- **Continued increase in average herd size**
- **Small increase in cow numbers**

Sharp reductions in herd numbers followed by periods of stability or slight increases are characteristic of the long-term trend (Graph 2.1). The total number of herds in the 2002/03 season dropped by 509, to 13,140, compared with the previous season.

The average herd size increased to 285 in 2002/03, continuing the consistent upward trend since 1974/75. The average herd size has more than doubled in the last twenty years.

Graph 2.1 **Trend in the number of herds and average herd size since 1974/75**



The total cow population increased in the 2002/03 season to 3.741 million (Table 2.2), an increase of only 1.3%, compared with increases of around 6% in previous seasons. Average effective hectares increased from 103 in 2001/02 to 111 in 2002/03; consistent with the upward trend since the early 1980s. An average of 2.61 cows per hectare is slightly lower than in previous seasons. Total effective hectares (runoff excluded) were 1.46 million.

Table 2.2 **Summary of herd statistics since 1974/75**

Season	*Herds*	*Total cows*	*Total effective hectares*	*Average herd size*	*Average effective hectares*[a]	*Average cows per hectare*[a]
1974/75	18,540	2,079,886	–	112	–	–
1975/76	18,442	2,091,950	–	113	–	–
1976/77	17,924	2,074,443	–	116	–	–
1977/78	17,363	2,052,624	–	118	–	–
1978/79	16,907	2,039,902	–	121	–	–
1979/80	16,506	2,045,808	–	124	–	–
1980/81	16,089	2,027,096	–	126	–	–
1981/82	15,821	2,060,898	–	130	63	2.10
1982/83	15,816	2,128,199	–	135	64	2.20
1983/84	15,932	2,209,725	–	139	65	2.20
1984/85	15,881	2,280,273	–	144	64	2.40
1985/86	15,753	2,321,012	–	147	64	2.40
1986/87	15,315	2,281,849	–	149	65	2.40
1987/88	14,818	2,236,290	–	151	65	2.40
1988/89	14,744	2,269,073	–	154	66	2.40
1989/90	14,595	2,313,822	–	159	67	2.40
1990/91	14,685	2,402,145	–	164	70	2.40
1991/92	14,452	2,438,641	–	169	–	–
1992/93	14,458	2,603,049	–	180	74	2.50
1993/94	14,597	2,736,452	–	188	77	2.50
1994/95	14,649	2,830,977	–	193	80	2.48
1995/96	14,736	2,935,759	–	199	82	2.50
1996/97	14,741	3,064,523	–	208	86	2.50
1997/98	14,673	3,222,591	–	220	87	2.60
1998/99	14,362	3,289,319	–	229	91	2.70
1999/00	13,861	3,269,362	–	236	93	2.67
2000/01	13,892	3,485,883	1,329,173	251	96	2.66
2001/02	13,649	3,692,703	1,404,930	271	103	2.67
2002/03	13,140	3,740,637	1,463,281	285	111	2.61

– Not available

[a] Average effective hectares and average cows per hectare for 1981/82 to 1990/91 is 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 on those cows lactating on 31 December. This change in method has had a small effect on reported cow numbers.

B. Farm production statistics

- **Production per hectare and per cow slightly up on last season**

Farm production has typically increased since 1992/93 (Table 2.3). An exception was evident in 1998/99, where production dropped markedly due to unfavourable weather conditions. Average milksolids per farm increased in 2002/03, consistent with increasing average farm size. Average milksolids per effective hectare (828 kg) was slightly up compared with the previous season (824 kg). Production per cow also increased in 2002/03 to an average of 315 kg milksolids (comprising 179 kg milkfat and 136 kg protein).

Table 2.3 **Summary of farm production since 1974/75**

Season	*Average litres per farm*	*Average kg milkfat per farm*	*Average kg protein per farm*	*Average kg milksolids per farm*	*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*
1974/75	–	14,400	–	–	–	–	–	128	–	–
1975/76	–	15,700	–	–	–	–	–	137	–	–
1976/77	–	16,600	–	–	–	–	–	143	–	–
1977/78	–	15,700	–	–	–	–	–	131	–	–
1978/79	–	17,500	–	–	–	–	–	142	–	–
1979/80	–	19,000	–	–	–	–	–	151	–	–
1980/81	–	18,864	–	–	–	–	–	147	–	–
1981/82	–	19,090	–	–	310	–	–	144	–	–
1982/83	–	19,600	–	–	312	–	–	143	–	–
1983/84	–	21,618	–	–	345	–	–	154	–	–
1984/85	–	22,190	–	–	359	–	–	152	–	–
1985/86	–	23,489	–	–	379	–	–	157	–	–
1986/87	–	20,885	–	–	331	–	–	138	–	–
1987/88	–	23,500	–	–	374	–	–	154	–	–
1988/89	–	22,442	–	–	340	–	–	143	–	–
1989/90	–	23,578	–	–	352	–	–	147	–	–
1990/91	–	24,495	–	–	351	–	–	148	–	–
1991/92[a]	–	26,567	–	–	–	–	–	157	–	–
1992/93[b]	554,040	26,982	20,138	47,120	374	279	653	148	111	259
1993/94[b]	618,139	30,220	22,458	52,678	407	301	708	160	119	278
1994/95[b]	614,203	29,886	22,117	52,002	386	285	671	156	115	271
1995/96[b]	663,248	32,050	23,827	55,877	405	300	705	163	120	283
1996/97[b]	728,874	35,436	26,387	61,823	425	316	741	173	128	301
1997/98[b]	752,399	36,383	26,984	63,367	430	318	748	168	124	292
1998/99[b]	735,544	35,047	26,254	61,301	392	292	684	147	109	256
1999/00[b]	839,066	40,365	30,396	70,761	439	329	768	165	123	288
2000/01[b]	930,047	45,063	33,850	78,914	472	353	825	177	133	310
2001/02[b]	996,904	48,137	36,300	84,436	471	353	824	175	132	307
2002/03[b]	1,058,307	51,447	39,174	90,621	471	357	828	179	136	315

– Not available

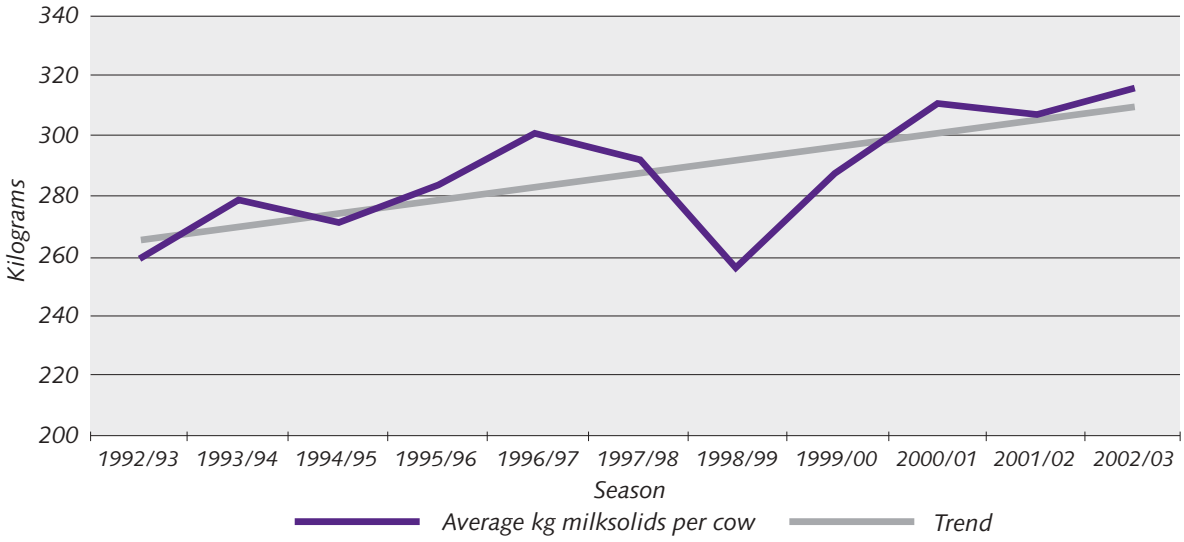
[a] 1991/92 figures include some town milk herds

[b] 1992/93 figures onwards include all town milk herds

i) Production per cow

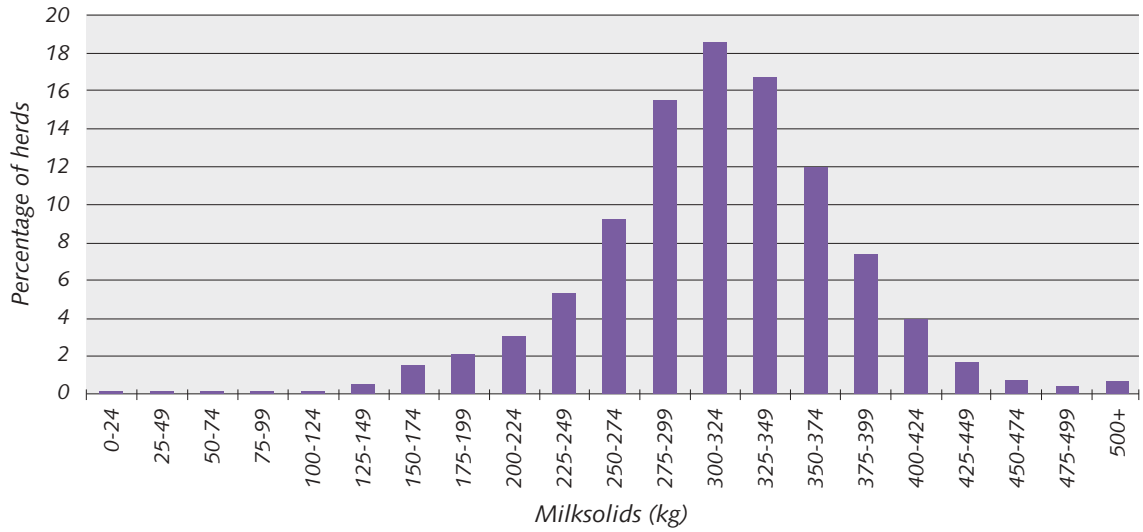
The trend of increased milksolids production per cow over the last several years (Graph 2.2) is due to genetic gain and improvements in farm management. These improvements from season to season are masked by the considerable effect of the weather on each season's actual production. For example, unfavourable weather conditions in 1998/99 caused production per cow to fall to its lowest level since 1992/93.

Graph 2.2 **Trend in milksolids production per cow since 1992/93**



Production per cow varies considerably from farm to farm. The variation is caused by many factors, including geographic location, stocking rate, genetic merit of the herd and farm management practice. About 19% of herds produced between 300 and 324 kg of milksolids and 72% produced between 250 and 374 kg of milksolids (Graph 2.3).

Graph 2.3 **Distribution of herds by milksolids production per cow in 2002/03**



ii) Herd size distribution

- **10% of herds have 500 or more cows**
- **Herds with between 550 and 599 cows have highest production per cow**

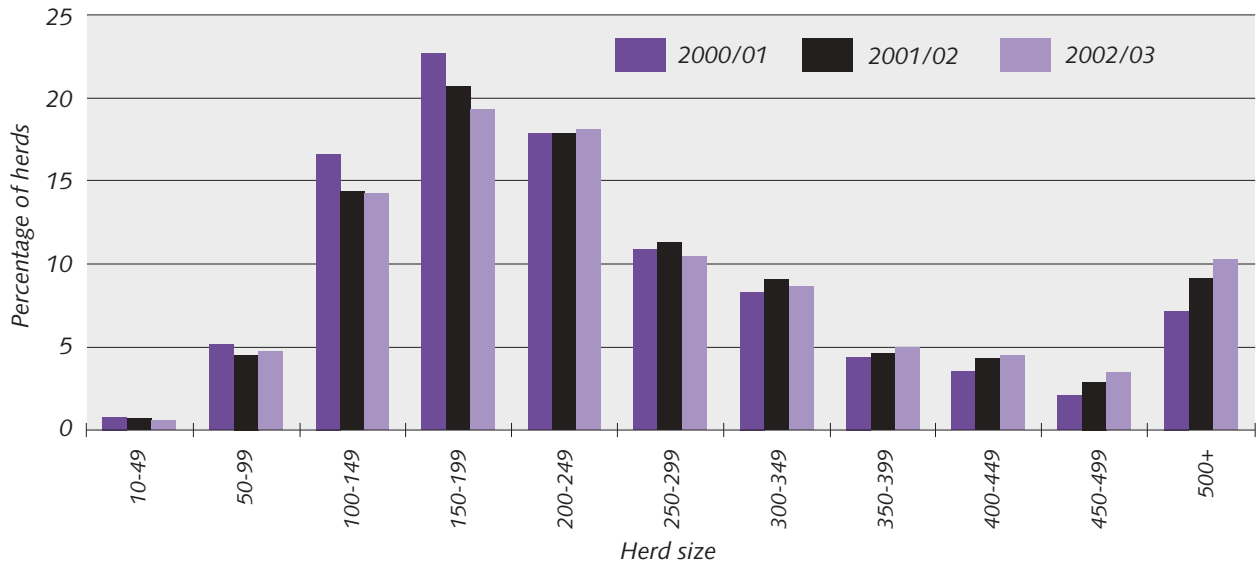
Nineteen percent (2,549) of herds have between 150 and 199 cows (see Table 2.4). Seventy-one percent of all herds have between 100 and 350 cows. In 2002/03, 4,238 herds (32.2%) had 300 or more cows, and 1,360 (10.4%) had 500 or more cows. Average milkfat, protein and milksolids per cow by herd size are also included in Table 2.4. Average milksolids per cow varies between 210 kg (herds with 10-49 cows) and 333 kg (herds with 550-599 cows).

Table 2.4 **Average production per cow by herd size in 2002/03**

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	80	0.6	3,239	0.1	119	91	210
50-99	624	4.7	49,608	1.3	159	120	280
100-149	1,876	14.3	240,322	6.4	173	131	304
150-199	2,549	19.4	445,425	11.9	179	135	315
200-249	2,388	18.2	534,349	14.3	184	139	323
250-299	1,385	10.5	382,790	10.2	184	139	324
300-349	1,145	8.7	370,705	9.9	183	139	322
350-399	669	5.1	250,047	6.7	181	137	318
400-449	600	4.6	252,926	6.8	182	139	321
450-499	464	3.5	220,189	5.9	181	139	320
500-549	269	2.0	141,098	3.8	183	141	324
550-599	257	2.0	147,478	3.9	188	145	333
600-649	157	1.2	97,413	2.6	185	143	327
650-699	156	1.2	105,098	2.8	182	141	323
700-749	77	0.6	55,804	1.5	183	141	324
750-799	81	0.6	62,551	1.7	179	139	318
800-849	57	0.4	46,561	1.2	186	144	330
850-899	68	0.5	58,859	1.6	168	131	299
900-949	34	0.3	31,113	0.8	181	139	319
950-999	49	0.4	47,097	1.3	172	133	305
1000+	155	1.2	197,965	5.3	173	135	307
Total/Avg	**13,140**		**3,740,637**		**179**	**136**	**315**

The herd size distribution presented in Graph 2.4 shows a steady increase in larger herds (350+ cows) and a decrease in herds with fewer than 200 cows over the last three seasons. Despite dwindling numbers of herds with fewer than 200 cows, the most common herds continue to range between 150 and 199 cows, although the number of herds in this range is far less pronounced than two seasons ago.

Graph 2.4 **Herd size distribution for the last three seasons**

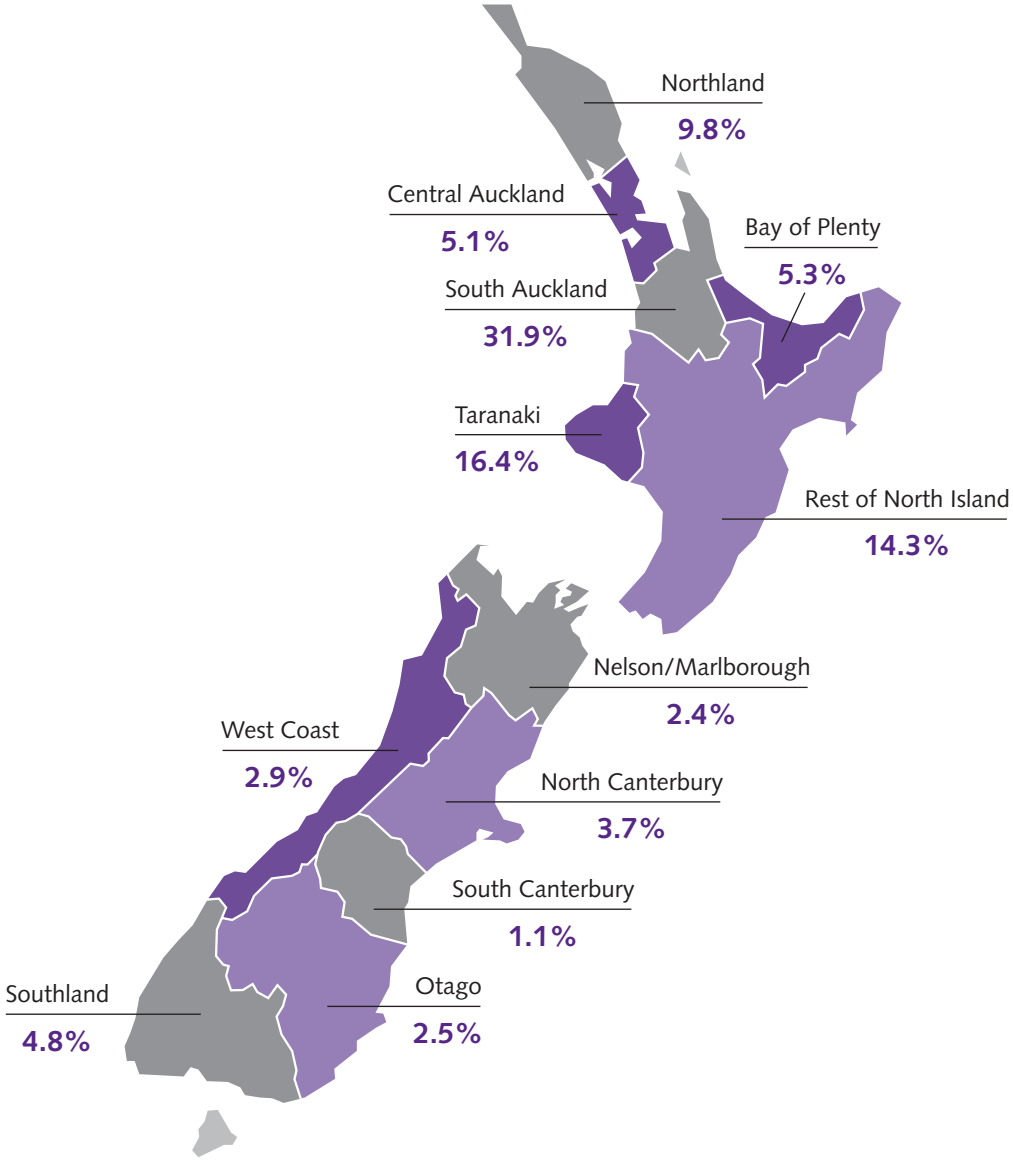


3. Regional dairy statistics

- **One third of all dairy herds are located in the South Auckland region**

The vast majority of dairy herds (83%) are located in the North Island, with the greatest concentration (32%) situated in the South Auckland region. Taranaki, with 16% of dairy herds, is the next most heavily populated region. South Island dairy herds account for 17% of the national total, but have 26% of the cows. The distribution of dairy herds within regions of each island in 2002/03 (Graph 3.1) has remained similar to previous seasons.

Graph 3.1 **Regional distribution of dairy herds in 2002/03**



- **Close to 1,000,000 cows in the South Island**
- **Largest average herd size (591) and average effective hectares (202) in South Canterbury**
- **Average herd size in the South Island reaches 422**

Farms in the South Island are, on average, larger than those in the North Island, in terms of both geographical size and cow numbers. The overall number of herds in New Zealand (13,140) has dropped compared with the previous season, even though the number of herds in the South Island has increased (Table 3.1). Seventy-four percent of the total cows are in the North Island, with 29% in the South Auckland region. The average herd size in both islands continues to increase. Within the South Island, South Canterbury has the largest average herd size with 591 cows, up markedly from the previous season's figure of 539 cows. In the North Island, Hawkes Bay has the largest average herd size with 477 cows. The smallest herds are in Central Auckland, Taranaki and Northland, averaging 205, 225 and 230 cows respectively. South Canterbury has the highest average cows per hectare (2.92), followed by North Canterbury (2.81) and South Auckland (2.80). Herds with the lowest average cows per hectare are found in the West Coast (2.03) and Northland (2.11).

Table 3.1 **Herd analysis by region in 2002/03**

Farming region	*Total herds*	*Total cows*	*Total effective hectares*	*Average herd size*	*Average effective hectares*	*Average cows per hectare*
Northland	1,285	295,691	143,561	230	112	2.11
Central Auckland	667	136,561	59,762	205	90	2.33
South Auckland	4,186	1,070,507	391,771	256	94	2.80
Bay of Plenty	700	185,400	72,039	265	103	2.67
Central Plateau	482	197,046	77,528	409	161	2.61
Western Uplands	81	26,128	10,599	323	131	2.58
East Coast	15	3,431	1,543	229	103	2.56
Hawkes Bay	64	30,502	11,442	477	179	2.62
Taranaki	2,152	484,324	183,240	225	85	2.71
Wellington	654	190,344	77,262	291	118	2.54
Wairarapa	579	161,543	62,204	279	107	2.63
North Island	**10,865**	**2,781,477**	**1,090,949**	**256**	**100**	**2.63**
Nelson/Marlborough	309	83,209	34,080	269	110	2.49
West Coast	375	100,769	51,815	269	138	2.03
North Canterbury	482	255,349	88,559	530	184	2.81
South Canterbury	142	83,944	28,633	591	202	2.92
Otago	335	144,750	55,515	432	166	2.60
Southland	632	291,139	113,730	461	180	2.60
South Island	**2,275**	**959,160**	**372,332**	**422**	**164**	**2.55**
New Zealand	**13,140**	**3,740,637**	**1,463,281**	**285**	**111**	**2.61**

- **Highest average per farm and average per hectare production recorded in South Canterbury**
- **Highest average per cow production recorded in North Canterbury**

South Island farms have, on average, higher per farm production than farms in the North Island, with South Canterbury recording the highest average farm production at 211,269 kilograms of milksolids (Table 3.2). These figures are consistent with the South Canterbury region having the largest average herd size. In the North Island, the Hawkes Bay region recorded the highest average farm production with 157,308 kilograms of milksolids.

In 2002/03, average production per effective hectare and per cow was higher in the South Island than the North Island. South Canterbury recorded the highest average milksolids per hectare in the South Island (1,077 kg), while South Auckland had the highest average milksolid production in the North Island (909 kg).

However, North Canterbury had the highest average milksolids per cow (376 kg). The lowest average milksolids per cow was recorded in Western Uplands (280 kg).

Table 3.2 **Farm production analysis by region in 2002/03**

Farming region	*Average litres per farm*	*Average kg milkfat per farm*	*Average kg protein per farm*	*Average kg milksolids per farm*	*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	790,398	37,871	28,642	66,514	344	260	604	163	123	286
Central Auckland	770,014	36,451	27,880	64,332	412	315	727	176	135	311
South Auckland	958,460	47,099	35,530	82,630	519	390	909	185	139	324
Bay of Plenty	1,013,995	48,076	36,415	84,491	486	367	853	181	137	318
Central Plateau	1,513,675	72,229	54,488	126,717	476	358	834	183	137	320
Western Uplands	1,055,486	51,038	38,577	89,615	411	311	722	159	120	280
East Coast	910,194	38,228	31,675	69,903	455	377	832	182	151	333
Hawkes Bay	1,871,048	88,542	68,766	157,308	479	370	849	182	140	322
Taranaki	743,129	38,363	28,643	67,005	461	344	805	170	127	296
Wellington	1,008,873	47,249	36,557	83,806	414	320	734	163	126	289
Wairarapa	1,000,206	49,190	37,224	86,414	460	346	806	174	131	305
North Island	**923,865**	**45,183**	**34,145**	**79,328**	**466**	**351**	**817**	**176**	**133**	**309**
Nelson/Marlborough	942,575	46,858	35,000	81,858	452	337	789	181	135	316
West Coast	941,835	48,454	35,199	83,653	369	266	635	183	132	316
North Canterbury	2,330,673	110,391	86,295	196,686	591	462	1,053	211	165	376
South Canterbury	2,500,108	118,373	92,895	211,269	603	474	1,077	206	162	368
Otago	1,792,102	83,655	65,955	149,610	509	402	910	195	154	348
Southland	1,811,970	86,084	67,826	153,911	495	390	885	191	150	341
South Island	**1,700,379**	**81,361**	**63,192**	**144,553**	**497**	**385**	**882**	**194**	**150**	**344**
New Zealand	**1,058,307**	**51,447**	**39,174**	**90,621**	**471**	**357**	**828**	**179**	**136**	**315**

South Taranaki continues to be the district with the most herds (1,273) and cows (302,814), followed by Matamata-Piako (Table 3.3). Waimate in South Canterbury has the highest average herd size, with 683 cows and largest average effective hectares (244).

Table 3.3 **Herd analysis by district in 2002/03**

Region	*District*	*Total herds*	*Total cows*	*Total effective hectares*	*Average herd size*	*Average effective hectares*	*Average cows per hectare*
Northland	Far North	366	78,951	39,440	216	108	2.04
	Whangarei	421	104,971	48,891	249	116	2.19
	Kaipara	498	111,769	55,230	224	111	2.09
Central Auckland	Rodney	244	49,615	22,234	203	91	2.25
	Manukau City	26	5,553	2,434	214	94	2.36
	Papakura	11	2,123	812	193	74	2.62
	Franklin	386	79,270	34,282	205	89	2.36
South Auckland	Waikato	816	212,100	82,026	260	101	2.68
	Hamilton City	12	2,796	992	233	83	2.80
	Waipa	686	185,572	65,623	271	96	2.88
	Otorohanga	434	123,834	45,174	285	104	2.78
	Thames-Coromandel	107	23,834	9,882	223	92	2.43
	Hauraki	501	115,715	45,241	231	90	2.58
	Matamata-Piako	1,212	291,130	100,464	240	83	2.95
	South Waikato	418	115,526	42,370	276	101	2.79
Bay of Plenty	Western Bay of Plenty	233	67,188	25,324	288	109	2.73
	Tauranga	10	2,860	1,019	286	102	2.68
	Kawerau/Whakatane	360	91,375	36,700	254	102	2.62
	Opotiki	97	23,977	8,996	247	93	2.68
Central Plateau	Taupo	123	69,892	28,338	568	230	2.55
	Rotorua	359	127,154	49,190	354	137	2.64
Western Uplands	Waitomo	63	20,661	8,300	328	132	2.60
	Ruapehu	18	5,467	2,299	304	128	2.48
East Coast	Gisborne	6	1,729	780	288	130	2.74
	Wairoa	9	1,702	763	189	85	2.43
Hawkes Bay	Napier/Hastings	24	12,953	5,283	540	220	2.37
	Central Hawkes Bay	40	17,549	6,159	439	154	2.77
Taranaki	New Plymouth	549	114,629	45,847	209	84	2.55
	Stratford	330	66,881	26,721	203	81	2.53
	South Taranaki	1,273	302,814	110,672	238	87	2.83
Wellington	Wanganui	26	7,595	3,183	292	122	2.46
	Rangitikei	90	28,971	11,494	322	128	2.63
	Manawatu	305	86,041	34,379	282	113	2.55
	Palmerston North City	40	15,275	6,155	382	154	2.58
	Horowhenua	155	44,100	18,335	285	118	2.53
	Kapiti Coast	29	6,905	3,028	238	104	2.42
	Upper Hutt City	9	1,457	688	162	76	2.17
Wairarapa	Tararua	369	95,681	36,685	259	99	2.63
	Masterton	22	7,881	2,792	358	127	2.83
	Carterton	81	22,515	8,807	278	109	2.63
	South Wairarapa	107	35,466	13,920	331	130	2.61
North Island		**10,865**	**2,781,477**	**1,090,949**	**256**	**100**	**2.63**
Nelson/Marlborough	Marlborough	80	18,293	7,266	229	91	2.51
	Kaikoura	30	9,583	4,086	319	136	2.41
	Tasman/Nelson City	199	55,333	22,728	278	114	2.50
West Coast	Buller	134	35,677	16,707	266	125	2.18
	Grey	78	25,857	13,167	332	169	2.03
	Westland	163	39,235	21,941	241	135	1.89

Regional dairy statistics

Region	District	Total herds	Total cows	Total effective hectares	Average herd size	Average effective hectares	Average cows per hectare
North Canterbury	Hurunui	48	29,434	10,484	613	218	2.82
	Waimakariri	75	27,152	10,173	362	136	2.56
	Christchurch City	10	2,884	980	288	98	2.82
	Banks Peninsula	12	1,587	962	132	80	1.74
	Selwyn	156	79,816	27,799	512	178	2.83
	Ashburton	181	114,476	38,161	632	211	2.97
South Canterbury	Timaru/MacKenzie	96	52,540	17,409	547	181	2.98
	Waimate	46	31,404	11,224	683	244	2.80
Otago	Waitaki/Central Otago	91	50,735	18,802	558	207	2.78
	Dunedin City	86	21,859	9,131	254	106	2.38
	Clutha	158	72,156	27,582	457	175	2.62
Southland	Gore	101	46,937	17,336	465	172	2.72
	Invercargill	47	19,515	7,729	415	164	2.47
	Southland	484	224,687	88,665	464	183	2.58
South Island		**2,275**	**959,160**	**372,332**	**422**	**164**	**2.55**
New Zealand		**13,140**	**3,740,637**	**1,463,281**	**285**	**111**	**2.61**

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

Waimate district has the highest average production per farm with 244,723 kilograms of milksolids (Table 3.4). Timaru/MacKenzie district recorded the highest average kilograms of milksolids per effective hectare (1,105), whereas the highest production per cow was recorded by Christchurch City (388 kg of milksolids). The North Island district with the highest production is Napier/Hastings, with an average of 180,529 kilograms of milksolids per farm.

Table 3.4 **Farm production analysis by district in 2002/03**

Region	District	Average litres per farm	Average kg milkfat per farm	Average kg protein per farm	Average kg milksolids per farm	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	737,275	34,653	26,428	61,081	320	243	564	158	120	277
	Whangarei	838,692	41,047	30,695	71,741	359	268	628	163	122	285
	Kaipara	788,613	37,552	28,534	66,086	349	265	614	166	126	292
Central Auckland	Rodney	716,365	35,378	26,385	61,763	382	284	666	170	127	297
	Manukau City	892,403	39,413	31,207	70,620	452	357	809	186	147	334
	Papakura	797,436	36,252	28,314	64,567	478	372	850	183	143	327
	Franklin	794,902	36,936	28,589	65,525	427	330	757	180	139	319
South Auckland	Waikato	979,098	47,093	35,929	83,022	492	374	866	183	139	322
	Hamilton City	831,889	41,882	31,089	72,972	502	371	873	180	134	314
	Waipa	1,021,519	50,072	37,864	87,936	534	401	935	184	139	323
	Otorahanga	1,034,624	50,579	38,190	88,769	492	370	862	176	133	309
	Thames-Coromandel	821,722	39,560	29,926	69,486	430	324	754	176	133	308
	Hauraki	869,507	42,630	32,165	74,796	483	364	847	187	141	327
	Matamata-Piako	897,735	45,190	33,729	78,919	560	417	977	189	141	330
	South Waikato	1,056,931	51,593	38,977	90,571	525	395	920	188	142	330
Bay of Plenty	Western Bay of Plenty	1,055,871	51,341	38,561	89,901	488	366	854	178	133	311
	Tauranga	1,054,932	49,456	37,870	87,325	446	340	786	161	123	284
	Kawerau/Whakatane	1,004,650	46,764	35,669	82,434	488	371	859	185	141	325
	Opotiki	943,868	44,958	33,877	78,835	480	359	839	177	133	310
Central Plateau	Taupo	1,966,548	93,908	71,270	165,178	433	327	759	170	128	298
	Rotorua	1,358,512	64,801	48,738	113,539	491	369	860	187	140	328
Western Uplands	Waitomo	1,053,725	51,572	38,786	90,358	416	312	728	159	119	278
	Ruapehu	1,061,650	49,170	37,845	87,015	397	306	703	161	125	286
East Coast	Gisborne	1,036,627	43,538	36,075	79,613	460	381	842	153	127	281
	Wairoa	825,906	34,688	28,742	63,430	452	374	826	201	166	367

Table 3.4 continued

Region	District	Average litres per farm	Average kg milkfat per farm	Average kg protein per farm	Average kg milksolids per farm	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
Hawkes Bay	Napier/Hastings	2,156,107	101,825	78,703	180,529	425	329	754	176	136	311
	Central Hawkes Bay	1,700,013	80,572	62,804	143,376	511	395	906	185	143	328
Taranaki	New Plymouth	695,203	35,488	26,442	61,930	430	320	750	169	126	294
	Stratford	659,260	33,294	25,169	58,463	417	315	733	164	124	289
	South Taranaki	785,539	40,916	30,492	71,409	486	362	848	171	128	299
Wellington	Wanganui	1,072,613	48,395	37,839	86,234	404	313	717	162	126	288
	Rangitikei	1,112,778	53,648	41,040	94,688	432	330	762	164	125	289
	Manawatu	963,361	45,348	35,036	80,384	410	317	727	161	124	285
	Palmerston North City	1,292,625	60,958	46,883	107,841	430	329	760	173	133	305
	Horowhenua	998,592	46,094	35,930	82,024	417	324	740	165	128	293
	Kapiti Coast	902,637	39,929	31,507	71,437	400	316	716	165	130	295
	Upper Hutt City	586,273	26,933	20,729	47,662	347	268	615	165	127	291
Wairarapa	Tararua	911,932	45,527	34,119	79,646	458	342	800	173	130	303
	Masterton	1,448,473	68,092	52,627	120,719	535	412	946	188	145	334
	Carterton	991,593	47,393	36,263	83,655	446	340	786	170	130	300
	South Wairarapa	1,218,981	59,297	45,493	104,790	463	353	816	176	134	310
North Island		**923,865**	**45,183**	**34,145**	**79,328**	**466**	**351**	**817**	**176**	**133**	**309**
Nelson/Marlborough	Marlborough	830,348	40,598	30,611	71,209	453	340	794	179	135	314
	Kaikoura	1,114,053	54,224	40,789	95,013	429	325	754	179	135	315
	Tasman/Nelson City	961,840	48,265	35,892	84,156	454	338	793	182	135	317
West Coast	Buller	921,113	46,833	34,132	80,964	392	284	676	180	131	311
	Grey	1,190,366	59,759	44,223	103,983	366	269	635	182	133	315
	Westland	839,941	44,377	31,758	76,135	351	251	602	187	133	320
North Canterbury	Hurunui	2,670,875	126,973	98,523	225,495	586	454	1,040	208	161	369
	Waimakariri	1,673,449	76,772	60,669	137,441	541	428	969	212	168	380
	Christchurch City	1,374,685	62,189	48,972	111,161	603	477	1,080	217	172	388
	Banks Peninsula	512,026	23,329	17,975	41,304	304	234	538	176	136	312
	Selwyn	2,311,584	108,040	84,925	192,965	604	476	1,080	215	169	384
	Ashburton	2,702,626	130,385	101,444	231,828	619	481	1,100	209	163	372
South Canterbury	Timaru/MacKenzie	2,317,970	109,260	85,978	195,239	618	487	1,105	207	163	370
	Waimate	2,880,223	137,392	107,331	244,723	572	447	1,019	203	159	363
Otago	Waitaki/Central Otago	2,375,815	111,202	87,489	198,691	567	446	1,012	202	159	360
	Dunedin City	1,157,364	52,704	41,649	94,353	487	386	873	205	162	367
	Clutha	1,801,403	84,635	66,783	151,418	487	385	872	185	147	332
Southland	Gore	1,821,577	85,789	67,385	153,174	504	396	900	185	146	331
	Invercargill	1,740,950	81,346	64,948	146,295	483	385	869	193	154	346
	Southland	1,816,861	86,606	68,198	154,804	494	389	883	192	151	343
South Island		**1,700,379**	**81,361**	**63,192**	**144,553**	**497**	**385**	**882**	**194**	**150**	**344**
New Zealand		**1,058,307**	**51,447**	**39,174**	**90,621**	**471**	**357**	**828**	**179**	**136**	**315**

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

4. Herd improvement

A. Use of herd testing

Farmers had the choice of two herd testing service providers in 2002/03. Users of the Livestock Improvement service were able to choose between Self Sample Service (where the farmer does the sampling using equipment supplied by Livestock Improvement), and Self Sample Assist (where the farmer does the sampling using equipment supplied by Livestock Improvement and Livestock Improvement provides an assist officer).

All herd test systems are based on measured yields obtained over a 24-hour period, with samples collected from consecutive evening and morning milkings.

Farmers were able to choose the frequency of testing. If farmers tested four or more times a season, they received information on individual cows' milk, milkfat and protein yields, milkfat and protein percentages, and somatic cell count information. Also included was the Production Worth, which takes account of each lactation of the cow as well as the date of calving, age, stage of lactation and Breeding Worth.

Farmers who opted for two or three tests during the season received Production Worth for individual cows but did not receive estimated lactation yields for milk, milkfat, or protein. Production Worth information is sufficient for farmers to cull for low production.

- **77% of herds undertake herd testing in 2002/03**

The regional uptake of herd testing services in 2002/03 is shown in Table 4.1, where the number of cows tested refers to all cows tested at least once in the season. Taranaki and Bay of Plenty/East Coast regions had the highest percentage of herds using herd testing with 82.6% and 80.8% respectively. Taranaki at 84.1% reported the highest percentage of cows herd tested.

Table 4.1 **Use of herd testing by region in 2002/03**

Livestock Improvement Region	*Herds tested*	*Total herds*	*% of total herds*	*Cows tested*	*Total cows*	*% of total cows*
Northland	1,088	1,529	71.2	259,016	345,306	75.0
Auckland	3,915	5,172	75.7	1,035,578	1,380,627	75.0
Bay of Plenty/East Coast	578	715	80.8	153,260	188,831	81.2
Taranaki	1,778	2,152	82.6	407,455	484,324	84.1
Wellington/Hawkes Bay	991	1,297	76.4	293,309	382,389	76.7
South Island	1,763	2,275	77.5	705,961	959,160	73.6
New Zealand	**10,113**	**13,140**	**77.0**	**2,854,579**	**3,740,637**	**76.3**

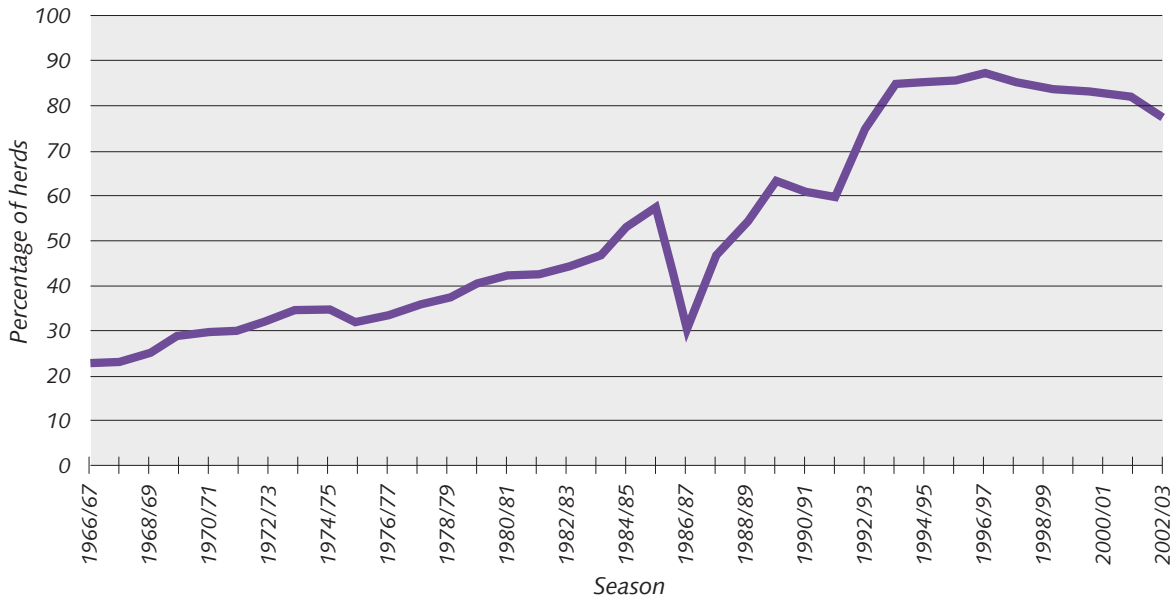
The percentage of total herds using herd testing decreased to 77.0% in 2002/03 (Table 4.2). This figure is down 10.2% from the highest percentage of herd testing set in 1996/97. Although there are a record number of cows (3.74 million), fewer were tested (2.86 million) compared with last season (2.97 million). The percentage of total cows tested (76.3%) was the lowest in ten years.

Table 4.2 **Trend in the use of herd testing services since 1955/56**

Season	*Number of herds*	*% of total herds*	*Number of cows (000)*	*% of total cows*
1955/56	7,469	21.0	476	23.8
1960/61	7,006	22.5	494	25.6
1965/66	6,206	23.5	521	25.0
1966/67	5,730	22.7	501	23.5
1967/68	5,724	23.1	538	24.1
1968/69	6,089	24.7	601	26.1
1969/70	6,768	28.4	700	30.2
1970/71	6,574	29.3	716	32.0
1971/72	6,274	29.6	690	31.4
1972/73	6,771	32.6	772	35.3
1973/74	6,640	34.7	780	36.4
1974/75	6,436	34.7	779	37.5
1975/76	5,858	31.8	706	33.7
1976/77	5,945	33.2	725	34.9
1977/78	6,159	35.5	771	37.6
1978/79	6,250	37.0	801	39.3
1979/80	6,662	40.4	871	42.6
1980/81	6,789	42.2	909	44.8
1981/82	6,702	42.4	922	44.7
1982/83	7,018	44.4	995	46.8
1983/84	7,430	46.6	1,092	49.4
1984/85	8,445	53.2	1,294	56.7
1985/86	9,026	57.3	1,484	63.9
1986/87	4,555	29.7	753	33.0
1987/88	6,930	46.8	1,175	52.5
1988/89	7,932	53.8	1,341	59.1
1989/90	9,213	63.1	1,604	69.3
1990/91	8,918	60.7	1,566	65.2
1991/92	8,661	59.9	1,611	66.1
1992/93	10,843	75.0	2,039	78.3
1993/94	12,372	84.8	2,377	86.9
1994/95	12,446	85.0	2,474	87.4
1995/96	12,620	85.6	2,592	88.3
1996/97	12,851	87.2	2,746	89.6
1997/98	12,510	85.3	2,826	87.7
1998/99	12,059	84.0	2,819	85.7
1999/00	11,521	83.1	2,806	85.8
2000/01	11,472	82.6	2,942	84.4
2001/02	11,113	81.4	2,974	80.5
2002/03	10,113	77.0	2,855	76.3

The trend in the percentage of total herds using herd testing continues to decrease from the peak reached in the 1996/97 season (Graph 4.1).

Graph 4.1 **Trend in the percentage of herds testing since 1966/67**



B. Herd test averages

The lactation yield figures in this section are for cows herd tested. Season 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 one hundred days or more were included in herd test averages. In comparison, the average milksolids figures given in Chapters 2 and 3 (national and regional dairy statistics respectively) are based on all herds supplying a dairy company, regardless of whether herd testing was used, and represent the average production per cow as supplied to the dairy company. Therefore, production figures reported using each of these methods will differ.

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 average lactation length. Therefore, the number of days in milk 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 days in milk (herd testing).

i) Season averages

- **South Island has highest herd test production (kg)**
- **Taranaki has the highest milkfat, protein and milksolids percentages**

Average per cow statistics for each Livestock Improvement region is summarised in Table 4.3. The additional information for the days in milk (production) more accurately reflects the lactation length by using milk supply information from seasonal suppliers compared with days in milk (herd testing). Days in milk (production) figures were unavailable for the 2002/03 season.

The South Island recorded the highest per cow per day milk volume (4,289 litres), milkfat (197 kg) and protein (159 kg) of cows herd tested. Taranaki recorded the highest percentages for milkfat (4.98%), protein (3.80%) and milksolids (8.91%).

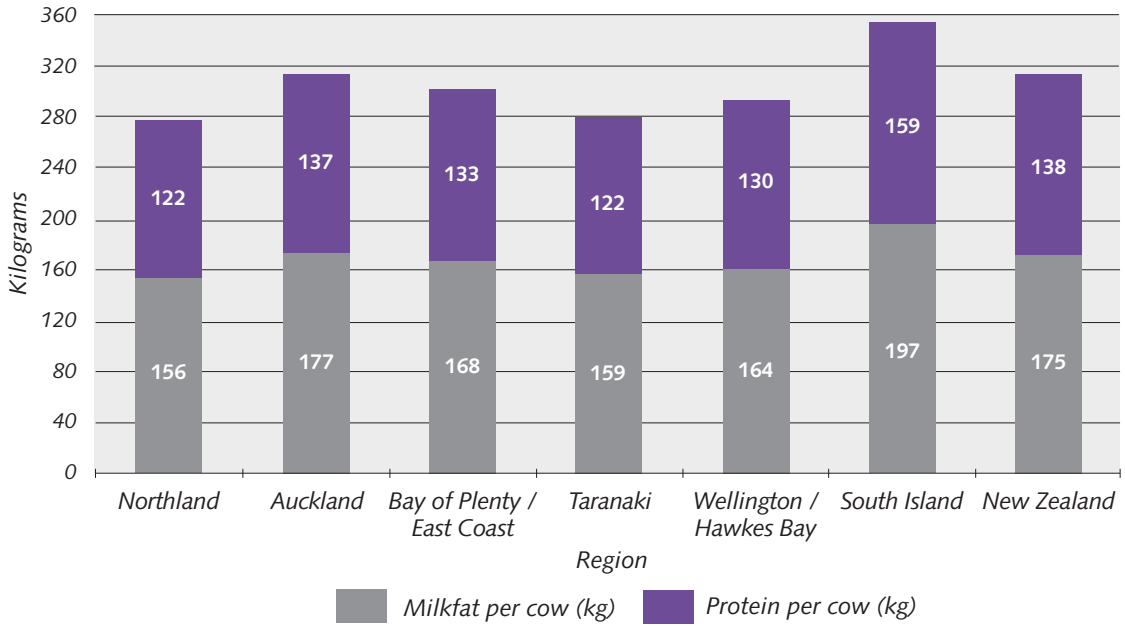
Table 4.3 **Season herd test averages per cow by region in 2002/03**

Livestock Improvement 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	3,391	156	4.61	122	3.59	278	8.20	222	–	216
Auckland	3,740	177	4.72	137	3.65	314	8.40	225	–	201
Bay of Plenty / East Coast	3,716	168	4.45	133	3.49	301	8.10	212	–	222
Taranaki	3,154	159	4.98	122	3.80	281	8.91	205	–	225
Wellington / Hawkes Bay	3,568	164	4.55	130	3.57	294	8.24	208	–	243
South Island	4,289	197	4.58	159	3.67	356	8.30	225	–	227
New Zealand	**3,736**	**175**	**4.68**	**138**	**3.66**	**313**	**8.38**	**219**	**–**	**213**

– Not available

The 2002/03 milkfat and protein lactation regional averages of herd tested cows (Graph 4.2) shows some variability in values between all regions, with milkfat production ranging from 156 (Northland) to 197 kg per cow (South Island) and protein production from 122 (Northland and Taranaki) to 159 kg per cow (South Island).

Graph 4.2 **Average milkfat and protein production per cow in 2002/03**



- **Increase in production per cow percentages for 2002/03**

The last twenty years has seen a general trend of increasing production in both milk volume and milkfat. However, in individual years this trend can be masked by other factors, in particular, weather conditions. The 1998/99 season shows a decrease in production per cow, the lowest in more than 10 years (Table 4.4).

The sharp decrease in the average somatic cell count per millilitre of milk from 1993/94 onwards compared with the seasons prior to 1993/94, as shown in Table 4.4, is due to a number of factors, including industry pressure for improved milk quality, farm management practice, and climatic conditions.

Table 4.4 **Trend in the national herd test averages since 1970/71**

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)*
1970/71	2,809	134	4.77	–	–	–	–	–	–	–
1971/72	3,089	146	4.73	–	–	–	–	–	–	–
1972/73	2,941	139	4.73	–	–	–	–	–	–	–
1973/74	2,797	135	4.83	–	–	–	–	–	–	–
1974/75	2,913	138	4.74	–	–	–	–	–	–	–
1975/76	3,112	149	4.79	–	–	–	–	–	–	–
1976/77	3,240	154	4.75	–	–	–	–	–	–	–
1977/78	3,027	142	4.69	–	–	–	–	–	–	–
1978/79	3,266	155	4.75	–	–	–	–	–	–	–
1979/80	3,380	162	4.79	–	–	–	–	–	–	–
1980/81	3,331	160	4.80	–	–	–	–	–	–	–
1981/82	3,326	159	4.78	–	–	–	–	–	–	–
1982/83	3,377	160	4.74	–	–	–	–	–	–	–
1983/84	3,451	165	4.78	–	–	–	–	–	–	–
1984/85	3,416	162	4.74	–	–	–	–	–	–	–
1985/86	3,424	161	4.78	–	–	–	–	247	–	–
1986/87	3,046	143	4.79	–	–	–	–	230	–	–
1987/88	3,300	156	4.81	–	–	–	–	235	–	–
1988/89	3,197	149	4.67	115	3.60	264	8.26	237	–	265
1989/90	3,221	152	4.72	117	3.66	269	8.35	235	–	358
1990/91	3,190	152	4.81	116	3.65	268	8.40	222	–	298
1991/92	3,361	162	4.83	124	3.70	286	8.51	226	–	282
1992/93	3,298	157	4.77	121	3.65	278	8.43	221	–	280
1993/94	3,560	171	4.84	131	3.69	302	8.48	223	–	216
1994/95	3,253	154	4.77	118	3.64	272	8.36	208	–	206
1995/96	3,501	164	4.72	126	3.60	290	8.28	224	–	206
1996/97	3,641	173	4.78	133	3.66	306	8.40	223	–	197
1997/98	3,373	158	4.67	119	3.52	277	8.21	209	266	195
1998/99	3,189	147	4.51	113	3.44	260	8.15	208	266	200
1999/00	3,601	169	4.69	130	3.58	299	8.30	221	263	193
2000/01	3,706	173	4.68	134	3.59	307	8.28	224	268	196
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

- Not available

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

ii) Monthly averages

- **Highest average production per cow per day occurred in October**

The seasonal average figures presented in Table 4.5 are calculated using national monthly herd test averages, and are therefore affected by milk volume. Statistics for May, June and July are based on far fewer cows than the statistics for 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 illustrated by differing months of peak production.

Before September 1998, monthly herd test averages included all herds scheduled for four or more tests during the season. After this time all cows herd tested in each month were included, provided they were tested once or more during the season (Table 4.5).

Table 4.5 **Monthly herd test averages by region in 2002/03**

Average litres of milk per cow per day

Livestock Improvement Region	*2002 Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*2003 Jan*	*Feb*	*Mar*	*Apr*	*May*	*Season average*
Northland	14.74	13.16	16.27	18.33	17.86	17.09	14.59	13.33	12.12	10.45	10.24	12.39	14.62
Auckland	16.37	15.77	18.24	20.22	20.26	18.60	17.39	15.44	13.24	11.06	10.65	11.91	16.02
BOP / East Coast	16.25	14.27	20.98	21.95	21.70	19.91	17.84	14.94	13.00	11.59	11.23	12.24	16.91
Taranaki	19.92	15.93	17.84	18.80	18.54	17.58	16.35	14.23	11.81	8.79	8.58	10.61	14.81
Wgtn / Hawkes Bay	14.02	15.91	17.99	20.28	20.56	19.76	18.25	15.49	13.39	10.73	10.81	12.86	16.43
South Island	17.26	16.91	18.33	23.34	23.37	21.88	20.38	17.95	16.85	14.99	12.07	11.84	18.23
New Zealand	**15.70**	**15.47**	**17.96**	**20.28**	**20.85**	**19.05**	**18.17**	**15.34**	**14.06**	**11.38**	**11.02**	**11.94**	**16.36**

Average kg of milkfat per cow per day

Livestock Improvement Region	*2002 Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*2003 Jan*	*Feb*	*Mar*	*Apr*	*May*	*Season average*
Northland	0.64	0.60	0.71	0.79	0.79	0.78	0.66	0.65	0.59	0.55	0.54	0.61	0.68
Auckland	0.70	0.68	0.83	0.90	0.91	0.87	0.80	0.75	0.66	0.59	0.57	0.62	0.76
BOP / East Coast	0.69	0.63	0.89	0.94	0.94	0.89	0.79	0.69	0.63	0.59	0.58	0.58	0.77
Taranaki	0.90	0.76	0.84	0.88	0.88	0.88	0.81	0.74	0.64	0.51	0.52	0.60	0.75
Wgtn / Hawkes Bay	0.62	0.72	0.79	0.89	0.91	0.90	0.82	0.73	0.66	0.56	0.57	0.64	0.76
South Island	0.76	0.74	0.78	1.01	1.01	0.98	0.92	0.83	0.81	0.74	0.64	0.63	0.85
New Zealand	**0.68**	**0.68**	**0.80**	**0.90**	**0.93**	**0.89**	**0.83**	**0.74**	**0.70**	**0.60**	**0.59**	**0.62**	**0.77**

Average kg of protein per cow per day

Livestock Improvement Region	*2002 Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*2003 Jan*	*Feb*	*Mar*	*Apr*	*May*	*Season average*
Northland	0.51	0.46	0.57	0.65	0.65	0.62	0.52	0.48	0.44	0.40	0.41	0.47	0.53
Auckland	0.55	0.54	0.66	0.72	0.74	0.69	0.63	0.57	0.48	0.43	0.43	0.48	0.59
BOP / East Coast	0.55	0.50	0.75	0.77	0.77	0.72	0.63	0.52	0.46	0.44	0.44	0.46	0.61
Taranaki	0.66	0.57	0.66	0.69	0.70	0.69	0.63	0.55	0.46	0.36	0.37	0.45	0.57
Wgtn / Hawkes Bay	0.49	0.55	0.64	0.72	0.74	0.73	0.66	0.56	0.49	0.42	0.43	0.50	0.60
South Island	0.60	0.56	0.61	0.83	0.85	0.80	0.74	0.65	0.64	0.58	0.50	0.48	0.68
New Zealand	**0.54**	**0.53**	**0.64**	**0.73**	**0.76**	**0.71**	**0.66**	**0.56**	**0.52**	**0.45**	**0.45**	**0.48**	**0.61**

Average somatic cell count (000 cells per millilitre)

Livestock Improvement Region	*2002 Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*2003 Jan*	*Feb*	*Mar*	*Apr*	*May*	*Season average*
Northland	224	221	193	191	184	183	201	222	229	257	269	283	216
Auckland	232	228	173	174	166	164	173	193	209	243	260	284	201
BOP / East Coast	229	261	226	189	200	181	191	210	238	258	259	297	222
Taranaki	330	262	209	180	190	172	182	189	213	266	276	282	225
Wgtn / Hawkes Bay	265	239	247	228	223	220	224	228	247	286	303	267	243
South Island	222	247	253	212	212	208	212	227	214	243	248	263	227
New Zealand	**235**	**236**	**198**	**187**	**189**	**180**	**192**	**204**	**218**	**254**	**263**	**274**	**213**

iii) Breed averages

- **Holstein-Friesian/Jersey Crossbreed cows show higher milkfat production**

Holstein-Friesian, Jersey, Ayrshire and Holstein-Friesian/Jersey Crossbreed herd test statistics were analysed for the 2002/03 season. The breed averages listed in Table 4.6 are for cows herd tested four or more times during the season.

On average, Holstein-Friesian/Jersey Crossbreed cows produced more milkfat than the other breeds listed, while Holstein-Friesian cows produced more protein and a higher volume of milk. Jerseys have the highest milkfat and protein percentages. In the Holstein-Friesian breed, six-year-old cows produced more milk, milkfat and protein than any other age group. Six-year-olds dominated production for Jerseys and Holstein-Friesian/Jersey Crossbreeds, while seven-year-olds had the highest production for Ayrshires.

A crossbred 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 breed averages by age of cow in 2002/03**

Holstein-Friesian

Age	*Number*	*Days in milk*	*Milk (litres)*	*Milkfat (kg)*	*Protein (kg)*	*Milkfat (%)*	*Protein (%)*
2	205,334	220	3,381	147.0	119.0	4.38	3.53
3	165,631	216	3,881	166.2	138.0	4.32	3.56
4	152,877	215	4,225	181.3	149.8	4.33	3.56
5	139,296	216	4,348	190.3	155.2	4.41	3.58
6	125,912	216	4,455	193.6	157.1	4.38	3.54
7	107,617	216	4,348	192.4	154.5	4.46	3.56
8	82,576	214	4,228	185.1	148.8	4.41	3.53
9	55,284	210	4,133	178.8	144.4	4.36	3.51
10+	76,351	206	3,805	165.8	133.7	4.39	3.53
Total	**1,110,878**	**216**	**4,038**	**175.4**	**142.9**	**4.38**	**3.55**

Jersey

Age	*Number*	*Days in milk*	*Milk (litres)*	*Milkfat (kg)*	*Protein (kg)*	*Milkfat (%)*	*Protein (%)*
2	72,541	222	2,494	140.2	99.3	5.65	3.99
3	60,572	218	2,762	158.4	113.6	5.76	4.12
4	54,895	219	2,904	169.6	121.4	5.87	4.19
5	50,070	219	3,026	175.5	126.5	5.83	4.19
6	39,603	218	3,050	174.5	127.0	5.75	4.18
7	31,590	217	3,026	174.1	125.7	5.78	4.17
8	24,455	214	2,997	169.6	123.4	5.68	4.13
9	17,695	212	2,902	164.5	118.6	5.69	4.10
10+	22,988	207	2,738	154.8	111.6	5.68	4.09
Total	**374,409**	**218**	**2,839**	**162.6**	**116.9**	**5.75**	**4.12**

Holstein-Friesian/Jersey crossbreed (1st-2nd cross)

Age	*Number*	*Days in milk*	*Milk (litres)*	*Milkfat (kg)*	*Protein (kg)*	*Milkfat (%)*	*Protein (%)*
2	136,716	223	3,110	154.1	116.6	5.00	3.76
3	107,125	219	3,511	174.6	134.5	5.02	3.85
4	91,689	219	3,736	187.8	144.1	5.08	3.88
5	84,618	220	3,875	195.3	150.0	5.08	3.89
6	55,261	218	3,983	196.3	151.3	4.98	3.82
7	43,833	217	3,938	195.1	149.7	5.00	3.82
8	35,677	216	3,863	188.6	145.3	4.92	3.78
9	23,640	213	3,785	182.5	140.8	4.87	3.74
10+	34,309	207	3,507	169.1	130.6	4.86	3.74
Total	**612,868**	**219**	**3,610**	**179.1**	**137.3**	**5.01**	**3.82**

Ayrshire

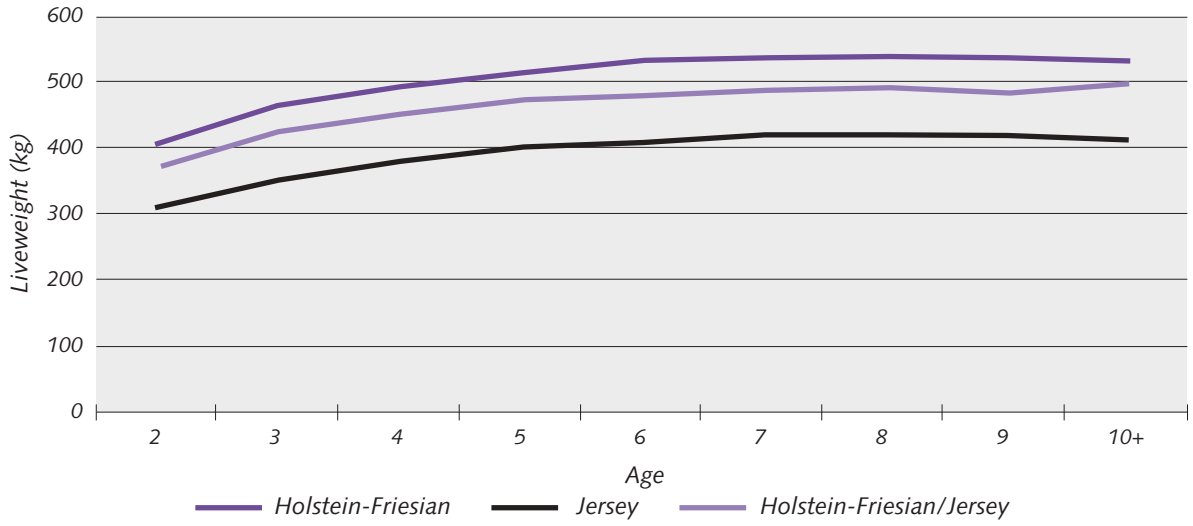
Age	Number	Days in milk	Milk (litres)	Milkfat (kg)	Protein (kg)	Milkfat (%)	Protein (%)
2	4,561	228	2,994	132.7	107.4	4.45	3.59
3	3,953	222	3,370	148.0	122.0	4.41	3.63
4	3,608	220	3,668	159.6	133.1	4.38	3.63
5	3,264	220	3,816	165.9	138.0	4.37	3.62
6	2,860	221	3,900	168.4	140.6	4.34	3.61
7	2,394	220	3,939	169.2	141.5	4.31	3.59
8	1,841	217	3,838	163.0	137.1	4.27	3.58
9	1,393	217	3,704	157.8	131.9	4.28	3.57
10+	2,006	209	3,459	147.4	122.7	4.28	3.55
Total	**25,880**	**220**	**3,571**	**154.9**	**128.5**	**4.36**	**3.60**

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 for all ages. Too few liveweights were recorded for Ayrshires to warrant continued inclusion in Table 4.7. Liveweight by age and breed is illustrated in Graph 4.3.

Table 4.7 **Liveweight by age and breed of cow in 2002/03**

	Holstein-Friesian		Jersey		Holstein-Friesian/Jersey	
Age	Average liveweight (kg)	Number of cows	Average liveweight (kg)	Number of cows	Average liveweight (kg)	Number of cows
2	406	13,740	310	4,478	371	9,019
3	466	1,361	352	265	428	1,108
4	493	1,013	380	271	452	808
5	515	872	402	203	472	748
6	534	810	409	155	478	508
7	537	617	420	133	485	441
8	539	394	419	107	489	303
9	536	275	419	68	482	215
10+	530	356	412	69	494	227

Graph 4.3 **Liveweight by age and breed of cow in 2002/03**



C. Artificial Breeding statistics

- **4% decrease in the number of cows to AB for 2002/03**

All artificial inseminations are recorded on the Livestock Improvement Database. Table 4.8 provides a summary of cows mated to artificial breeding (AB) for the last nine seasons. This is the first season since 1993/94 where the percentage of cows to AB has dropped below the 80% mark (Graph 4.4). Similarly, the number of yearlings to AB in the 2002/03 season has decreased (Table 4.8).

Table 4.8 **Trend in Artificial Breeding use for the last 9 seasons by region: cows and yearlings to AB**

Cows to AB

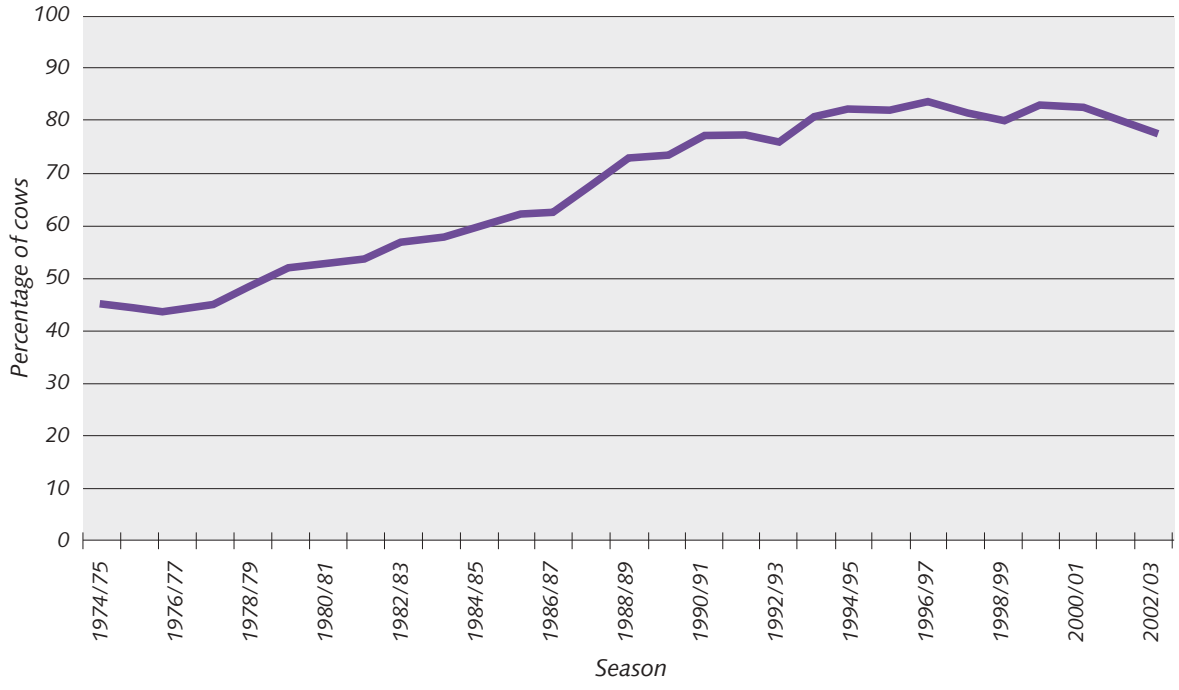
Livestock Improvement Region	*1994/95*	*1995/96*	*1996/97*	*1997/98*	*1998/99*	*1999/00*	*2000/01*	*2001/02[r]*	*2002/03*
Northland	253,662	257,557	262,429	258,057	244,115	246,617	257,752	261,197	228,988
Auckland	992,301	1,007,497	1,065,624	1,069,038	1,066,442	1,057,618	1,096,379	1,089,655	1,030,788
BOP / East Coast	151,469	152,836	155,267	156,602	153,294	152,751	157,162	154,762	147,047
Taranaki	398,201	398,571	399,435	404,930	395,636	405,605	427,683	423,723	400,322
Wgtn / Hawkes Bay	220,471	230,582	254,002	266,514	266,171	276,517	294,387	302,349	291,188
South Island	319,949	371,210	437,078	483,968	510,514	587,957	660,075	756,874	769,954
New Zealand	**2,336,053**	**2,418,253**	**2,573,835**	**2,639,109**	**2,636,172**	**2,727,065**	**2,893,438**	**2,988,560**	**2,868,287**

[r] *revised*

Yearlings to AB

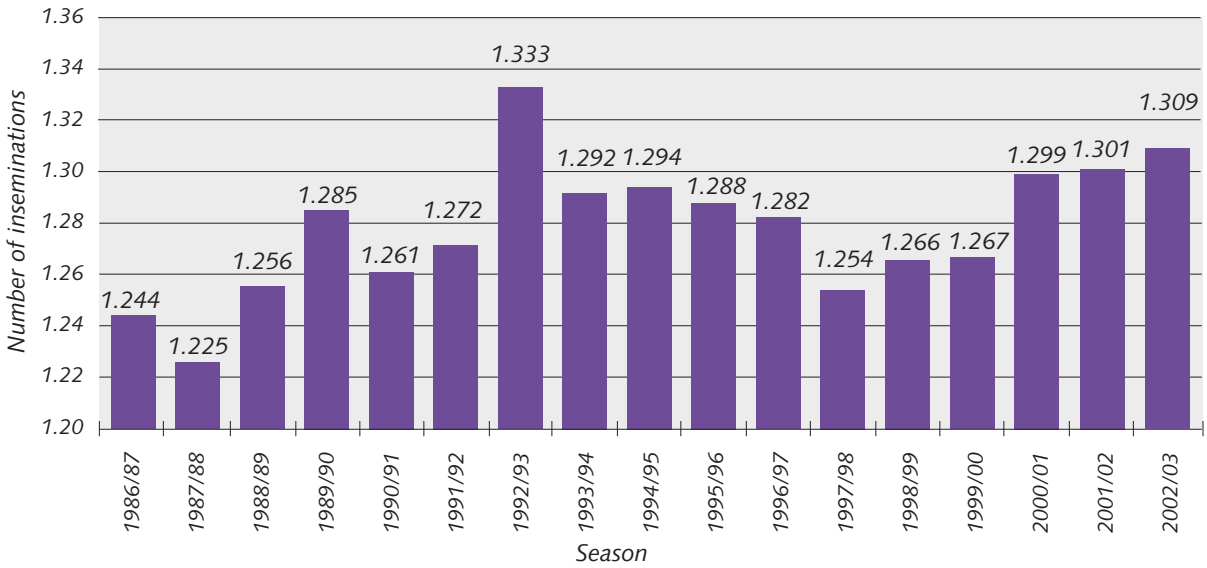
Livestock Improvement Region	*1994/95*	*1995/96*	*1996/97*	*1997/98*	*1998/99*	*1999/00*	*2000/01*	*2001/02*	*2002/03*
Northland	21,159	22,034	20,613	15,966	11,188	9,825	10,437	10,942	7,982
Auckland	54,867	53,038	48,291	31,102	25,968	21,804	24,543	24,988	20,143
BOP / East Coast	16,773	17,501	15,753	10,317	7,854	7,250	8,492	8,929	6,763
Taranaki	19,099	17,864	11,909	8,428	5,748	5,700	7,698	7,528	8,220
Wgtn / Hawkes Bay	13,473	15,321	14,375	9,887	6,223	6,313	7,823	7,517	5,948
South Island	44,715	48,194	54,152	35,159	34,906	41,469	56,743	55,680	47,162
New Zealand	**170,086**	**173,952**	**165,093**	**110,859**	**91,887**	**92,361**	**115,736**	**115,584**	**96,218**

Graph 4.4 **Trend in the percentage of cows to Artificial Breeding since 1974/75**



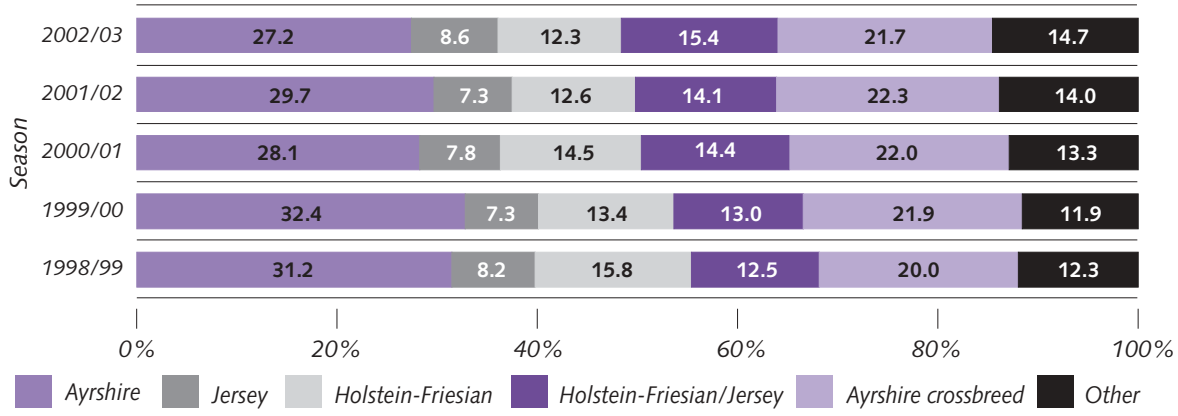
In 2002/03 the average number of inseminations per cow (1.31) as recorded on the Livestock Improvement Database, was similar to previous seasons (Graph 4.5). Figures for 2000/01 and 2001/02 have been revised downwards.

Graph 4.5 **Average number of inseminations per cow since 1986/87**

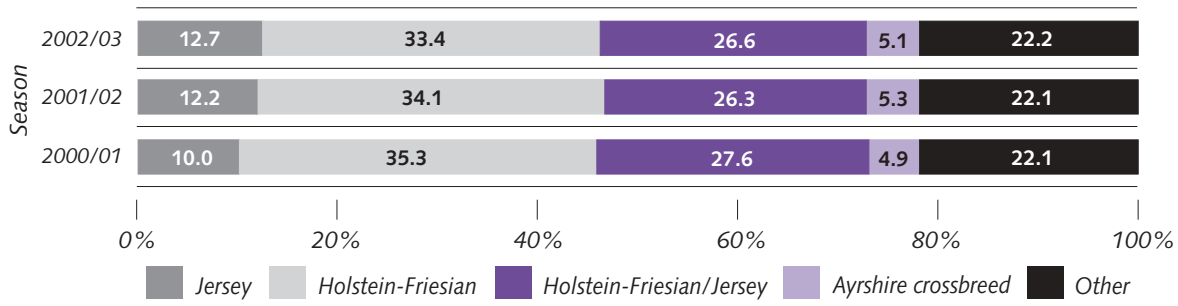


The use of Ayrshire, Holstein-Friesian, Jersey and semen over different cow breeds for the past five seasons is shown in the graphs below. The use of crossbred semen is becoming more prevalent and is now included along with the other breeds (Graph 4.7). Ayrshire semen use over Ayrshire cows is 27.2% (Graph 4.6). Crossbred semen is used predominantly over Friesian cows followed by Friesian/Jersey crosses (Graph 4.7). The use of Jersey semen over other breeds remains similar to previous seasons (Graph 4.8), with slightly more use over Friesian/Jersey cows and less use over Friesians. The percentage of Holstein-Friesian semen over Holstein-Friesian cows continues to decrease (Graph 4.9).

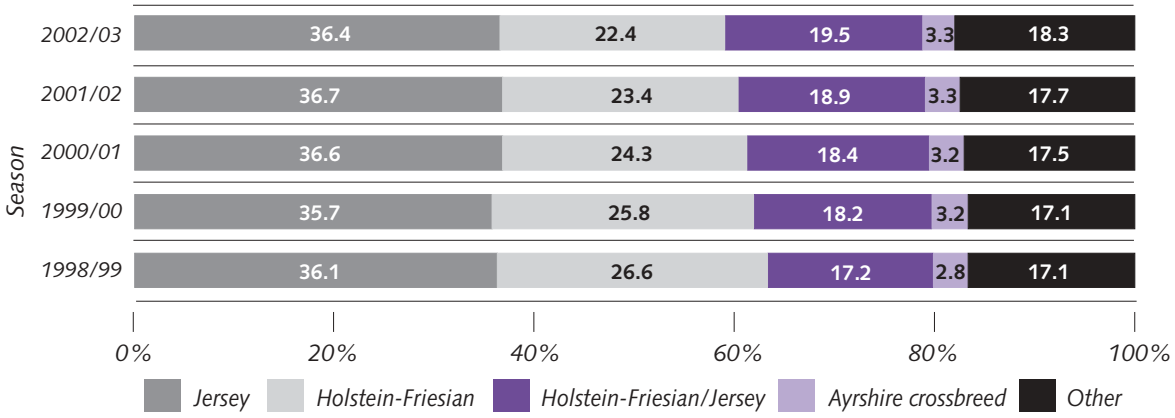
Graph 4.6 **Ayrshire semen usage (%) by cow breed for the last five seasons**



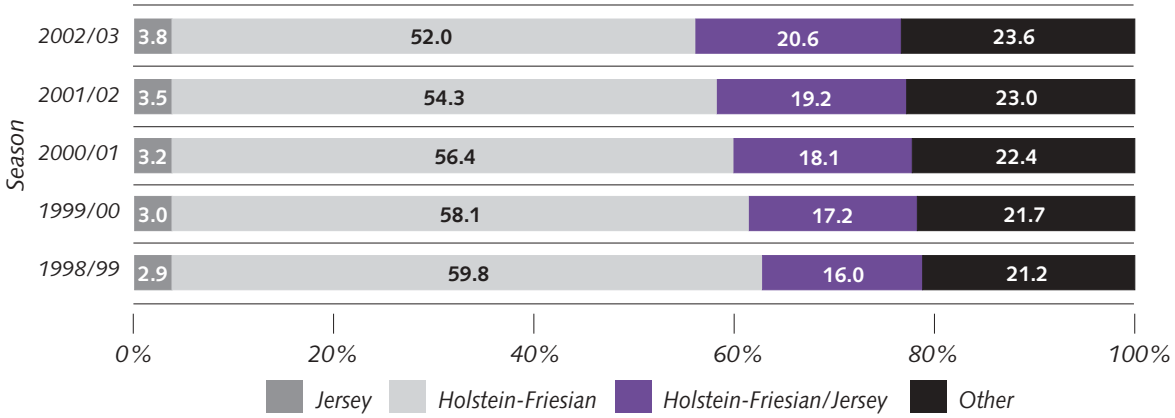
Graph 4.7 **Crossbreed semen usage (%) by cow breed since 2000/01**



Graph 4.8 **Jersey semen usage (%) by cow breed for the last five seasons**

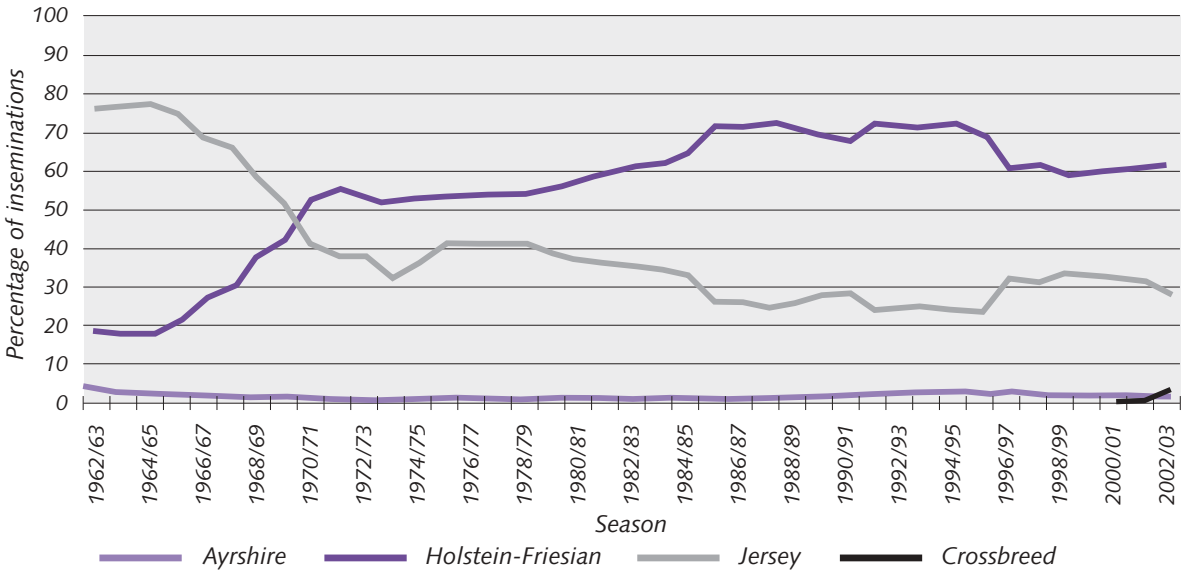


Graph 4.9 **Holstein-Friesian semen usage (%) by cow breed for the last five seasons**



The percentage of inseminations for each major breed (Holstein-Friesian, Jersey and Ayrshire) as recorded on the Livestock Improvement Database is shown in Graph 4.10. The percentage of inseminations for the three breeds is similar to that of the previous season. The percentage of inseminations for Crossbreed (shown for the last two seasons) reached 3.5% for the 2002/03 season and is expected to continue to increase.

Graph 4.10 **Trend in the percentage of inseminations of each major breed for the last 40 seasons**



D. Animal Evaluation

The genetic merit of New Zealand dairy cows and sires is estimated using statistical methods that 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 allow farmers to select the most profitable animals for the future.

Two types of evaluation are calculated for New Zealand dairy animals:

1. **Trait evaluations** are a measure of an animal's genetic merit (*Breeding Values*), lifetime productive ability (*Production Values*) and current season productive ability (*Lactation Values*) for individual traits, including milkfat, protein, volume, liveweight, fertility and longevity.
2. **Economic evaluations** combine an animal's individual trait evaluations to measure its ability to convert feed into profit, through breeding replacements (*Breeding Worth*), lifetime production (*Production Worth*) and current season production (*Lactation 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 one unit of 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 4.5 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**	**$EV**	**+**
		Protein BV	**x**	**$EV**	**+**
		Milk BV	**x**	**$EV**	**+**
		Liveweight BV	**x**	**$EV**	**+**
		Fertility BV	**x**	**$EV**	**+**
		Longevity BV	**x**	**$EV**	

where BV = Breeding Value for each trait, and

$EV = economic value for each trait for breeding replacements

Animal Evaluation ranks animals in terms of their expected profit per unit of feed eaten, ie it identifies those animals in a herd that are the most efficient converters of feed into profit. Breeding Worth (BW) and Production Worth (PW) are based on future price predictions for milk components, while Lactation Worth (LW) is based on predicted end of season prices. The economic values for 2003 are presented below (Table 4.9).

Table 4.9 **Economic values used from 17 May 2003**

	Milkfat ($/kg)	*Protein ($/kg)*	*Milk ($/kg)*	*Liveweight ($/kg)*	*Fertility (%)*	*Longevity ($/day)*
Breeding Worth	1.021	6.865	–0.078	–0.915	1.659	0.033
Production Worth	1.250	6.038	–0.072	–0.892	–	–
Lactation Worth	1.263	5.712	–0.071	–0.735	–	–

Note: The economic values are reviewed annually and therefore may change from year to year.

The information for all Animal Evaluation statistics was sourced from cows and sires recorded on the Livestock Improvement Database as at 17 May 2003.

Table 4.10 shows the Breeding Values (BV) and BW by breed, of all bulls born in 1998, first proven in the 2002/03 season with a BW Reliability of 75% or greater.

Table 4.10 **Average Breeding Values and Breeding Worth of 1998 born bulls (reliability of 75% or greater)**

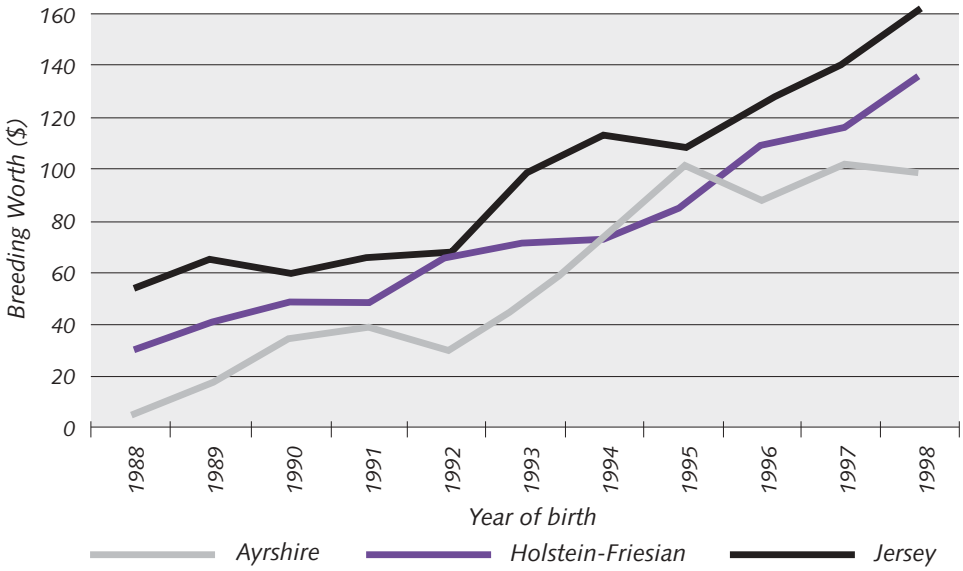
Breed	*Milkfat BV*	*Protein BV*	*Milk Volume BV*	*Liveweight BV*	*Fertility BV*	*Total Longevity BV[a]*	*BW*	*Number of Bulls*
Ayrshire	25.4	23.9	602	35.9	–6.7	–46	97.6	11
Holstein Friesian	31.7	40.5	1210	76.4	–3.1	–157	135.6	202
Jersey	25.8	15.3	78	–37.3	1.2	–25	160.5	130

[a] *Total Longevity is the same trait as the trait reported as Longevity in Dairy Statistics 2000-2001. It is not the same trait as the longevity measure used in calculating BW.*

(Evaluation date: 17 May 2003)

The genetic trend of proven dairy bulls is shown in Graph 4.11. Bulls born in 1998 are first proven in the 2002/03 season.

Graph 4.11 **Genetic trend of proven dairy bulls by year of birth (reliability of 75% or greater)**



(Evaluation date: 17 May 2003)

Young bulls are initially selected for use in Artificial Breeding based on the genetic merit of their sire and dam. 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 4.11 shows the number of sires, by birth year and breed, for which the Reliability of the BW was at least 75%. 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 4.11 **Number of Sires by birth year and breed (reliability of BW 75% or greater, includes overseas bulls)**

Year of Birth	Number of Sires	Holstein-Friesian	Jersey	Ayrshire	Other Breeds
1988	325	197	97	22	9
1989	379	224	117	20	18
1990	365	219	106	29	11
1991	406	261	104	28	13
1992	410	256	118	28	8
1993	391	235	117	33	6
1994	406	242	127	33	4
1995	434	258	132	37	7
1996	385	215	139	26	5
1997	372	228	120	19	5
1998	344	202	130	11	1

(Evaluation date: 17 May 2003)

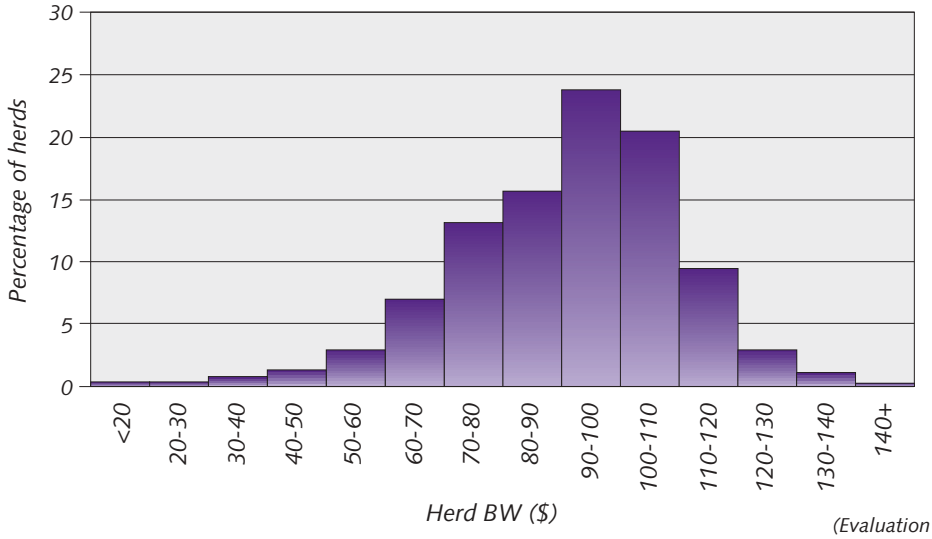
The Breeding Worth for **herds** presented below (Table 4.12 and Graph 4.12) are based on all cows recorded on the Livestock Improvement Database with a test number, in herds with at least 80 cows, and signed up for herd testing for the 2002/03 season. For example, Table 4.12 shows that 50% of New Zealand herds had a BW of 94 or above and 25% of New Zealand herds had a BW of 105 or above.

Table 4.12 **Herd Breeding Worth in 2002/03**

	Median	*Top 5%*	*Top 10%*	*Top 25%*	*Bottom 25%*	*Bottom 10%*	*Bottom 5%*
Herd BW	**94**	**> 120**	**> 114**	**> 105**	**< 81**	**< 67**	**< 58**

(Evaluation date: 17 May 2003)

Graph 4.12 **Distribution of herd Breeding Worth in 2002/03**



(Evaluation date: 17 May 2003)

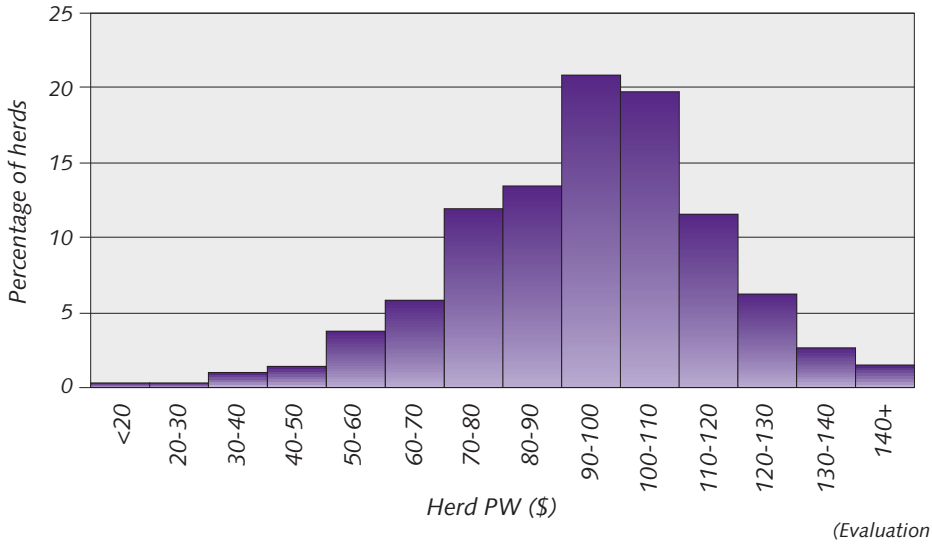
The Production Worth (PW) for **herds** (Table 4.13 and Graph 4.13) are based on all cows recorded on the Livestock Improvement Database with a test number, in herds with at least 80 cows, and signed up for herd testing for the 2002/03 season. For example, Table 4.13 shows that 50% of New Zealand herds had a PW of 97 or above and 25% of New Zealand herds had a PW of 111 or above.

Table 4.13 **Herd Production Worth in 2002/03**

	Median	*Top 5%*	*Top 10%*	*Top 25%*	*Bottom 25%*	*Bottom 10%*	*Bottom 5%*
Herd BW	**97**	**> 129**	**> 122**	**> 111**	**< 82**	**< 67**	**< 58**

(Evaluation date: 17 May 2003)

Graph 4.13 **Distribution of herd Production Worth in 2002/03**



(Evaluation date: 17 May 2003)

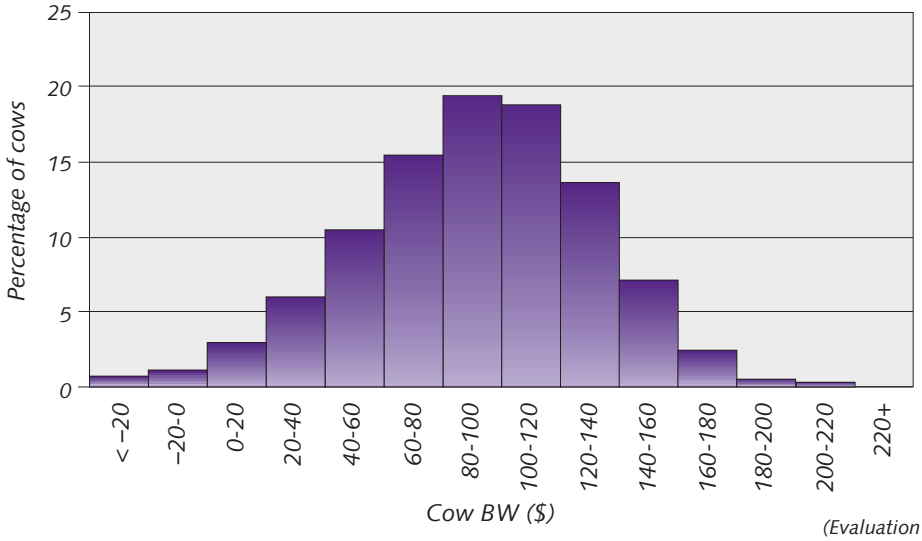
The Breeding Worth (BW) for **cows** presented below (Table 4.14 and Graph 4.14) are based on all cows recorded on the Livestock Improvement Database with a test number, in herds with at least 80 cows, and signed up for herd testing for the 2002/03 season. Table 4.14 shows that 50% of New Zealand cows had a BW of 95 or above and that 25% of New Zealand cows had a BW of 120 or above.

Table 4.14 **Cow Breeding Worth in 2002/03**

	Median	*Top 5%*	*Top 10%*	*Top 25%*	*Bottom 25%*	*Bottom 10%*	*Bottom 5%*
Cow BW	**95**	**> 155**	**> 142**	**> 120**	**< 66**	**< 38**	**< 21**

(Evaluation date: 17 May 2003)

Graph 4.14 **Distribution of cow Breeding Worth in 2002/03**



(Evaluation date: 17 May 2003)

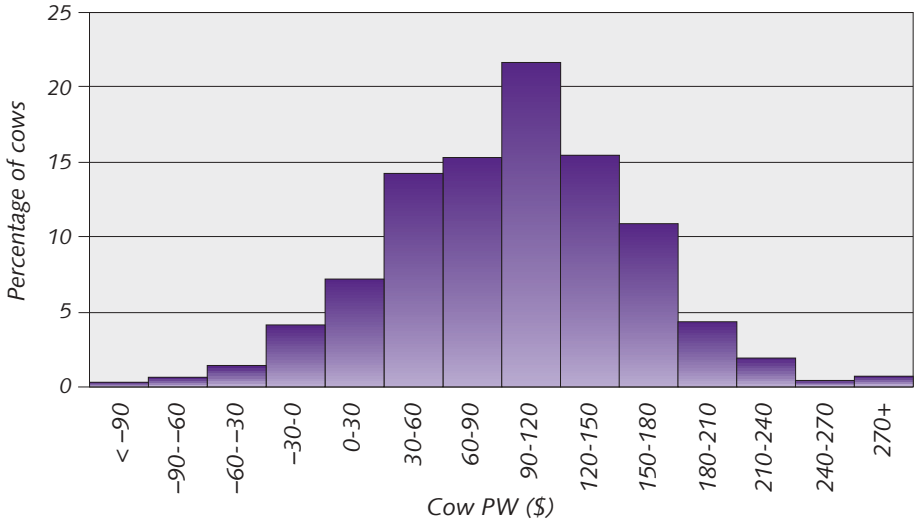
The Production Worth (PW) for **cows** (Table 4.15 and Graph 4.15) are based on all cows recorded on the Livestock Improvement Database with a test number, in herds with at least 80 cows, and signed up for herd testing for the 2002/03 season. Table 4.15 shows that 50% of New Zealand cows had a PW of 97 or above and that 25% of New Zealand cows had a PW of 136 or above.

Table 4.15 **Cow Production Worth in 2002/03**

	Median	*Top 5%*	*Top 10%*	*Top 25%*	*Bottom 25%*	*Bottom 10%*	*Bottom 5%*
Cow BW	**97**	**> 193**	**> 171**	**> 136**	**< 56**	**< 17**	**< –7**

(Evaluation date: 17 May 2003)

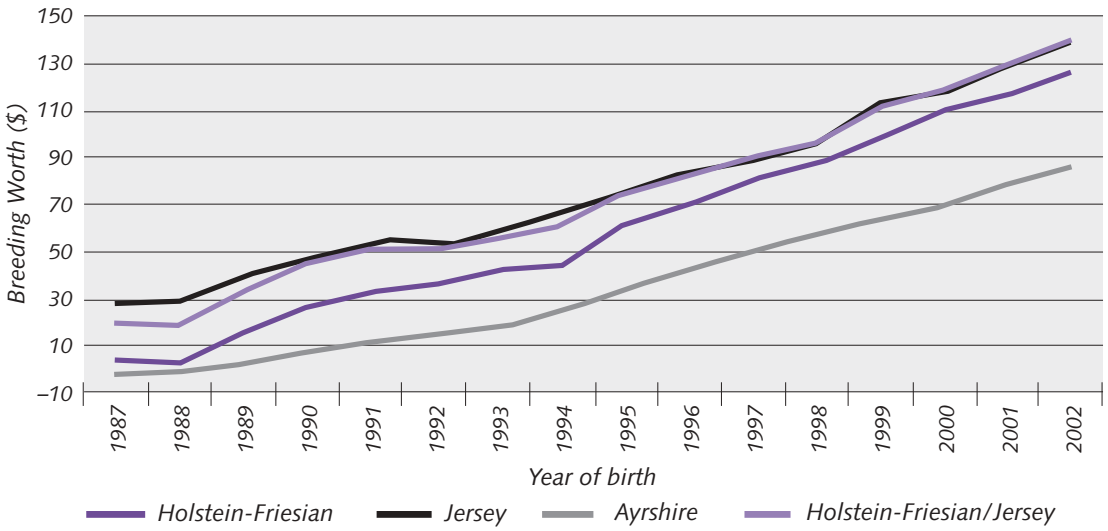
Graph 4.15 **Distribution of cow Production Worth in 2002/03**



(Evaluation date: 17 May 2003)

The genetic trend for cows is based on all cows (alive or dead) recorded on the Livestock Improvement Database in the 2002/03 season. Also included are the estimated BW and PW for replacement stock (2001 and 2002 born animals). All evaluations can be compared across breeds. The genetic trend for BW by breed is presented in Graph 4.16. The Breeding Worth for all breeds has increased over time.

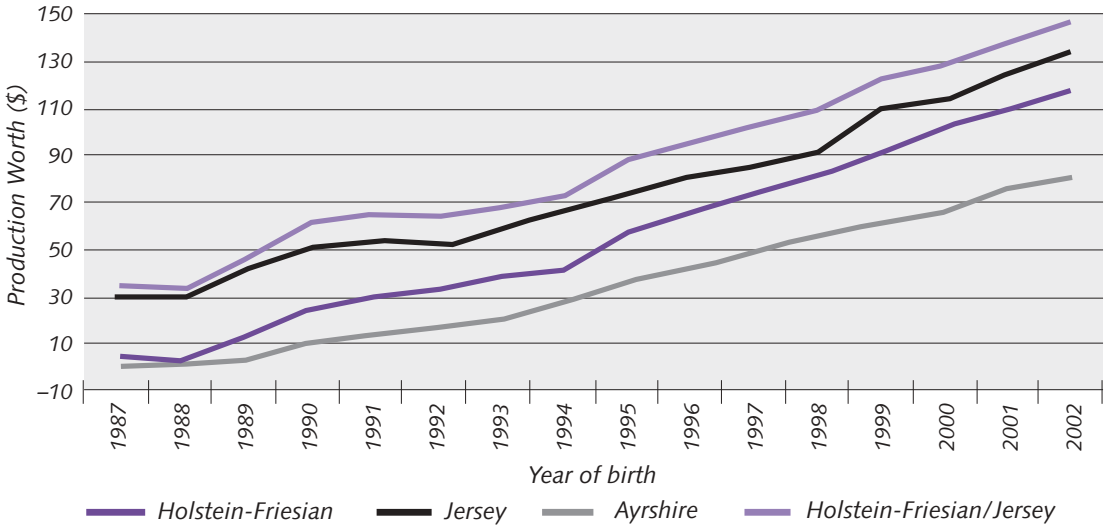
Graph 4.16 **Genetic trend in Breeding Worth for all cows in 2002/03**



(Evaluation date: 17 May 2003)

The trend for PW by breed is presented in Graph 4.17. Holstein-Friesian/Jersey Crossbreeds have maintained a higher PW over other breeds, caused by the effect of heterosis (hybrid vigour) in the crossbreds.

Graph 4.17 **Trend in Production Worth for all cows in 2002/03**



(Evaluation date: 17 May 2003)

Table 4.16 shows the average BV and BW by breed, for all 2000 born cows. The Holstein-Friesian/Jersey Crossbreed has the highest BW at 118.2. The Holstein-Friesian cows have the highest milkfat, protein, and milk volume BV. All evaluations are comparable across breeds.

Table 4.16 **Average Breeding Worth and Breeding Value of all cows by breed born in 2000**

Breed	*BW $*	*Milkfat BV (kg)*	*Protein BV (kg)*	*Milk Volume BV (l)*	*Liveweight BV (kg)*	*Fertility BV (%)*	*Longevity BV (days)[a]*	*Cow Numbers*
Holstein-Friesian	110.0	29.5	30.6	928	60.4	–0.1	112	417,172
Jersey	117.5	19.3	8.2	–16	–42.0	1.4	99	127,853
Ayrshire	69.2	11.1	16.1	485	12.4	–3.1	56	9,681
Holstein-Friesian /Jersey	118.2	26.0	20.1	476	9.8	0.7	120	248,722
Guernsey	–16.2	–1.3	3.3	95	23.6	0.3	–256	152
Milking Shorthorn	8.9	–1.3	7.2	204	21.6	–1.5	–40	899
Brown Swiss	–9.5	–1.5	10.6	303	48.7	–5.0	–215	98
Other	84.3	18.0	18.0	485	18.3	–0.8	46	28,385
Weighted Average	**112.1**	**26.2**	**23.4**	**627**	**27.5**	**0.3**	**109**	**832,962**

[a] *Total Longevity is the same trait as the trait reported as Longevity in Dairy Statistics 2000-2001. It is not the same trait as the longevity measure used in calculating BW.*

Evaluation date: 17 May 2003

Survivability is measured by the percentage of cows that have a lactation recorded for consecutive years. The 2002/03 season 2-3 years figure is the percentage of cows that were milking as two-year-olds in the 2001/02 season and are now milking as three-year-olds in the 2002/03 season. Table 4.17 shows that for the 2002/03 season the highest percentage of survival is in animals ageing from 4-5 years (86.6%), followed by animals ageing from 3-4 years (85.9%).

Table 4.17 **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

5. General statistics

A. Prices received by dairy farmers

i) Milksolids

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 its 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 become 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 still based on the "A+B-C" system, which incorporates payments for milkfat (A) and protein (B) with penalties for milk volume (C). The payment system for suppliers to town supply dairy companies varies between companies. Some town supply 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.

General statistics – Prices received by dairy farmers – Milksolids

- **Average dairy company payout was $3.66**

The average dairy company total payout (per kilogram of milksolids) received by dairy farmers from seasonal supply dairy companies is shown in Table 5.1. The average payout is given in both nominal and inflation adjusted dollars using the Consumer's Price Index.

Table 5.1 **Trend in prices received for milksolids since 1973/74**

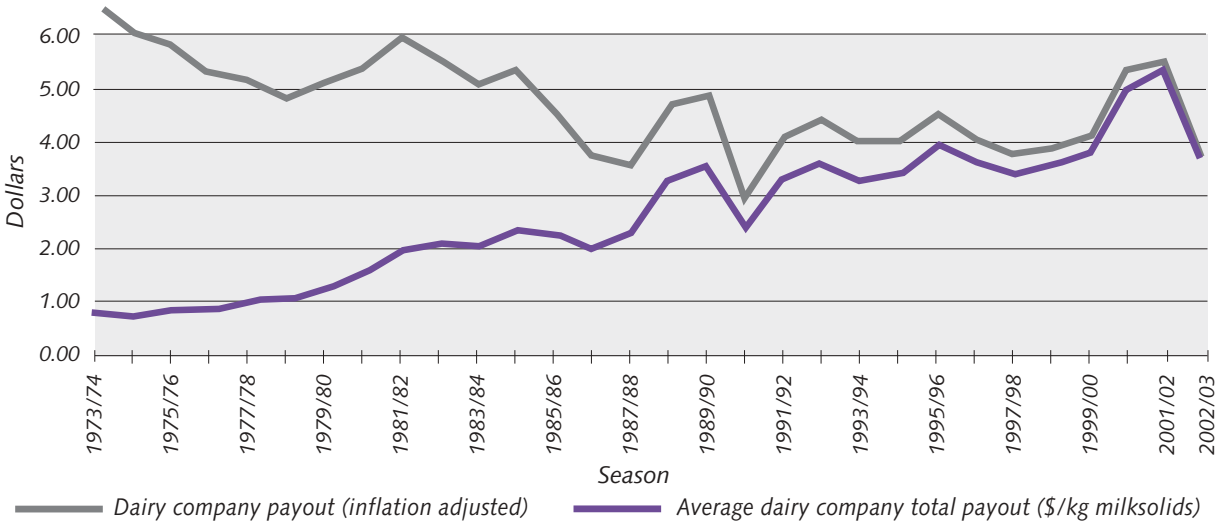
Season	*Average Dairy Company total payout ($/kg milksolids)*	*Dairy Company payout (inflation adjusted)[a]*
1973/74	0.76	6.73
1974/75	0.75	6.03
1975/76	0.83	5.81
1976/77	0.87	5.22
1977/78	0.98	5.14
1978/79	1.03	4.80
1979/80	1.22	5.07
1980/81	1.52	5.33
1981/82	1.95	5.95
1982/83	2.11	5.50
1983/84	2.09	5.04
1984/85	2.33	5.37
1985/86	2.29	4.52
1986/87	2.03	3.64
1987/88	2.34	3.52
1988/89	3.28	4.63
1989/90	3.59	4.86
1990/91	2.42	3.04
1991/92	3.34	4.09
1992/93	3.66	4.43
1993/94	3.32	3.97
1994/95	3.40	4.02
1995/96	3.99	4.51
1996/97	3.63	4.02
1997/98	3.42	3.75
1998/99	3.58	3.86
1999/00	3.78	4.09
2000/01	5.01	5.31
2001/02	5.35	5.50
2002/03	3.66	3.66

[a] *Weighted to give real dollar values using the Consumers Price Index for the end of the June quarter. Sourced from Statistics New Zealand*

Note: Average Dairy Company total actual payout for 1974/75 to 1988/89 has been derived from $/kg milkfat

- **Payout drops back to pre-2000/01 levels**

Graph 5.1 **Trend in milksolids payout to dairy farmers since 1973/74**



ii) Dairy farm land sale values

- **Average sale price of farms reaches 1.2 million dollars**

The average sale price of dairy farms ($1.21 million) continues to increase compared with previous seasons (Table 5.2). The average dairy farm price per kilogram of milksolids holds steady against last years high.

Table 5.2 **Trend in dairy land sale values for the last 20 years**

Year	Number of farms	Average sale price ($)	Inflation adjusted average sale price[a]	Average hectares	Average price per hectare ($)	Inflation adjusted average price per hectare[a]	Price per kg milkfat[b]	Price per kg milksolids[c]
1983	527	257,373	629,389	46	5,587	13,663	20.4	11.7
1984	618	301,076	703,365	49	6,189	14,459	21.9	12.6
1985	505	298,746	598,582	49	6,044	12,110	21.0	12.1
1986	274	251,165	455,833	47	5,298	9,615	18.4	10.6
1987	504	270,180	412,025	52	5,212	7,948	16.8	9.7
1988	576	278,650	399,423	56	5,013	7,186	16.0	9.2
1989	1,013	325,847	447,225	59	5,561	7,632	17.8	10.2
1990	868	373,553	476,378	58	6,467	8,247	21.8	12.5
1991	538	362,819	450,142	58	6,283	7,795	21.7	12.5
1992	897	446,979	548,974	62	7,183	8,822	23.1	13.3
1993	834	543,984	659,994	61	8,903	10,802	31.0	17.8
1994	784	704,245	845,094	61	11,640	13,968	37.5	21.6
1995	672	775,110	889,311	58	13,400	15,374	41.9	24.1
1996	784	785,510	883,699	60	13,187	14,835	41.6	23.9
1997	520	674,809	750,699	54	12,388	13,781	38.5	22.1
1998	496	704,309	770,250	64	11,076	12,113	32.0	18.4
1999	600	769,606	845,027	72	10,759	11,813	33.1	19.0
2000	576	856,374	921,861	80	10,740	11,561	35.3	20.3
2001	941	1,032,618	1,076,747	74	13,959	14,556	41.2	23.7
2002	704	1,049,939	1,065,465	72	14,658	14,875	45.6	26.2
2003[d]	340	1,206,841	1,206,841	78	15,463	15,463	46.8	26.9

Source: Quotable Value New Zealand Rural Property Sales Statistics (Table D3)

[a] *Adjusted using the Consumers Price Index for the end of the June quarter*

[b] *Price per kg milkfat has been derived from price per kg milksolids (1996 to current year)*

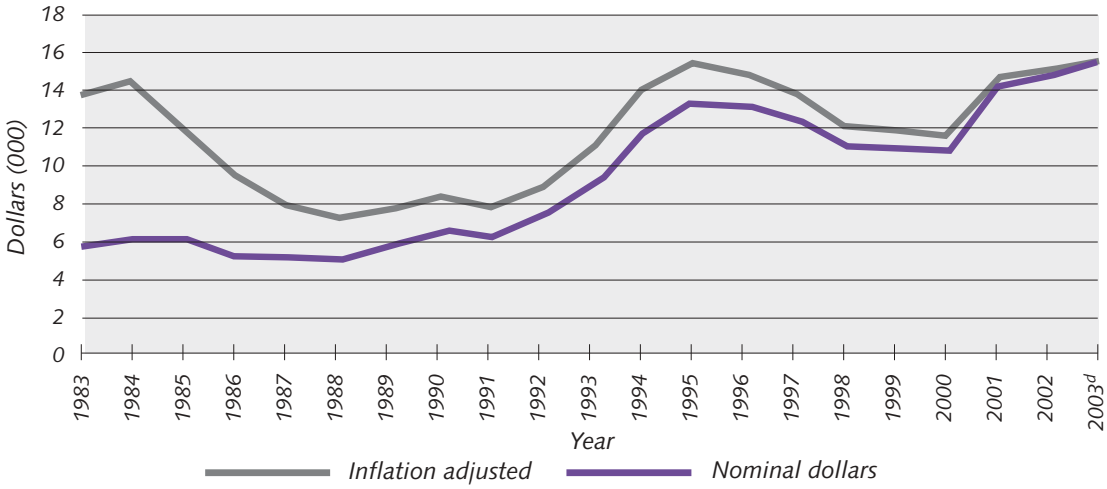
[c] *Price per kg milksolids has been derived from price per kg milkfat (1978 to 1995)*

[d] *Half year only – sales to June 2003*

- **Increase in nominal price per hectare**

Prior to 1992 the average price per hectare fluctuated considerably, in both real and nominal terms, as shown in Graph 5.2. The average price per hectare rose steeply from 1992 to 1995. Between 1995 and 2000, the average price per hectare decreased. However, this trend reversed decisively in 2001 and the price per hectare is currently $15,463. These figures are based on the calendar year, not the dairy industry season.

Graph 5.2 **Trend in dairy land values (price per hectare) for the last 20 years**



[d] *Half year only – sales to June 2003*

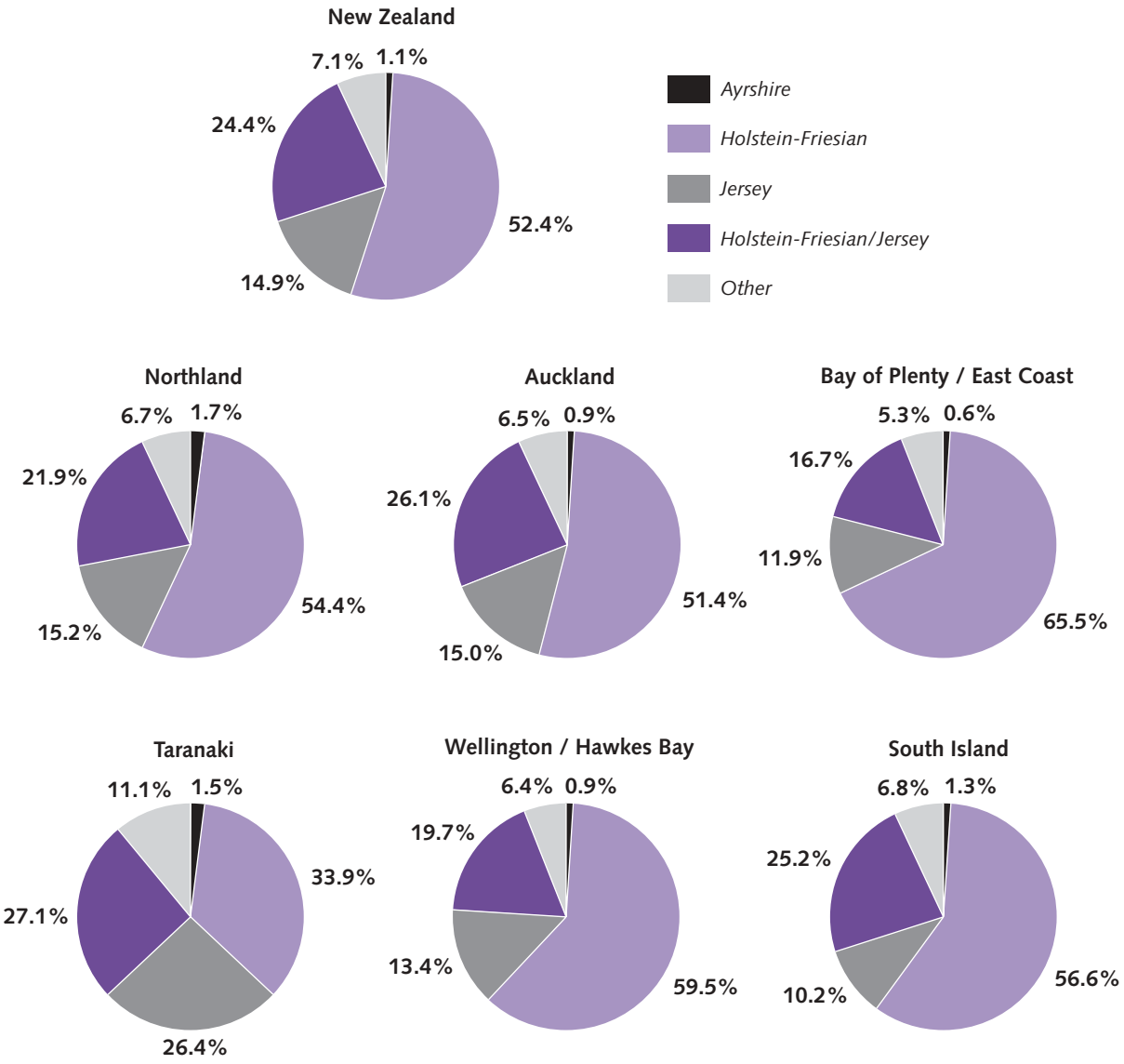
B. Breed breakdown

Three dairy breeds (Holstein-Friesian, Jersey, and to a lesser extent, Ayrshire) dominate the dairy cow inseminations carried out in New Zealand, as recorded on the Livestock Improvement Database.

The Jersey breed dominated the national dairy herd until the late 1960s. By 1970, Holstein-Friesian was the dominant dairy breed in New Zealand, as a result 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, and Simmental. Other breeds of dairy cattle present in smaller numbers in New Zealand include Milking Shorthorn, Guernsey and Brown Swiss. Crossbreed is emerging as a breed in its own right in the insemination of dairy cows.

The percentages of the major dairy breeds for New Zealand and each region are shown in Graph 5.3. Percentages are given for Holstein-Friesian, Jersey, Holstein-Friesian/Jersey Crossbreed and Ayrshire cows with the remaining breeds grouped into "Other". Holstein-Friesian is the prevalent breed in every region, although this is less pronounced in Taranaki. Bay of Plenty/East Coast region continues to have the highest percentage of Holstein-Friesian cows (65.5%), whereas Taranaki has the highest proportion of Jerseys (26.4%) and Holstein-Friesian/Jersey Crossbreeds (27.1%).

Graph 5.3 **Breed percentages of cows in each region in 2002/03**



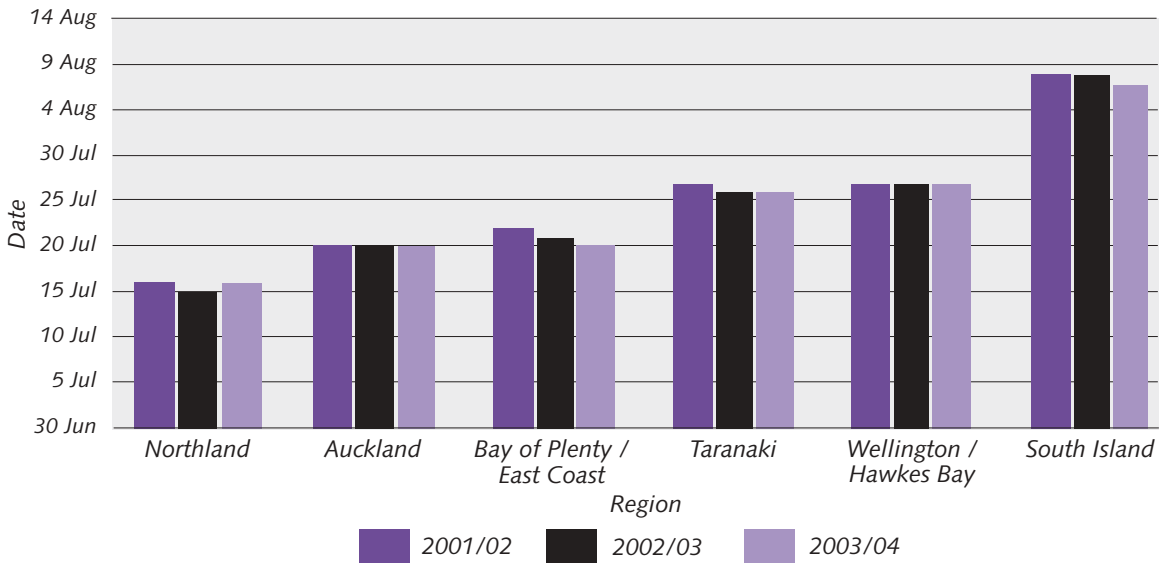
C. Planned start of calving and median calving dates

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 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 Livestock Improvement Database for approximately 85% of all herds. Only herds that have matings or calvings recorded for at least 50% of their recorded animals are included in this analysis.

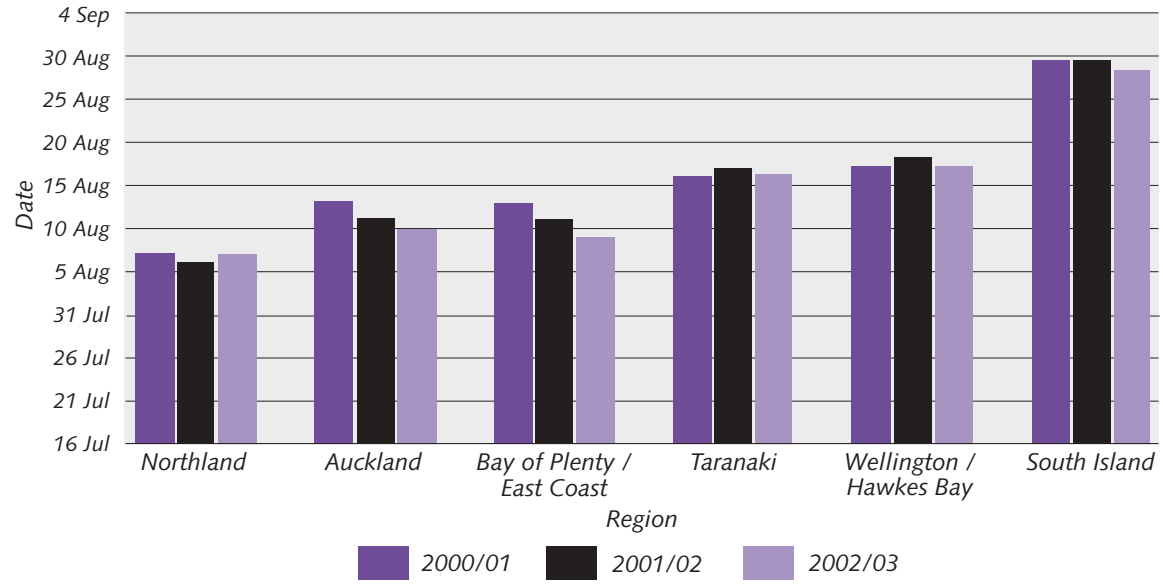
The forecast planned start of calving dates for mature cows for the 2003/04 season compared to the dates previously forecast for 2001/02 and 2002/03 seasons are shown in Graph 5.4.

Graph 5.4 **Planned start of calving dates for mixed age cows by region**



Calving spread can be controlled to some degree by farm management (for example, cow condition score at calving, level of nutrition in the four to six weeks prior to mating, and the use of CIDR devices and other reproductive technology). The actual start of calving can be meaningless, since the first calving in a herd can be premature, occurring well before the rest of the herd calves. Hence the median calving date is used as an indicator of calving spread. Graph 5.5 compares median calving dates for mature cows for the three most recent seasons.

Graph 5.5 **Median calving dates for mixed age cows by region**



D. 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 either 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 then have to pay wages. Owner-operators comprise the largest group of all operating structures.

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 agreement, and 50% agreements.

Under the 50% agreement (also called 50/50) the sharemilker owns 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, all 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% 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% 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% agreement, where the owner may have little to do with farm management, a variable order sharemilking agreement often sees the owner heavily involved in management. The variable order sharemilking agreement involves the farm owner retaining ownership of the herd and bearing more of the farm costs, such as hay-making and animal health. 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.

Contract milkers 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. In 2002/03, all farms with contract milkers could not be identified, consequently, any farms with contract milkers are included with owner-operators.

General statistics – Operating structures

- **37% of all milkers are sharemilkers**
- **64% of all sharemilkers are 50/50 sharemilkers, 24% have 20-29% agreements**

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 5.3. In 2002/03, 4,854 (37%) New Zealand dairy farms operated under a sharemilking agreement. Sixty-four percent (3,114) of all sharemilkers have 50/50 agreements. On average, owner-operators tend to farm smaller herds on smaller properties, while variable order sharemilkers tend to farm larger herds on larger properties.

Table 5.3 **Herd analysis by operating structure in 2002/03**

Operating structure	*Number of herds*	*Percentage of herds*	*Average herd size*	*Average effective hectares*	*Average cows per effective hectare*
Owner-operators	8,215	62.5	265	106	2.55
Sharemilkers:					
Less than 20%	96	0.7	453	163	2.83
20-29%	1,150	8.8	321	121	2.74
30-39%	219	1.7	240	98	2.52
40-44%	38	0.3	263	102	2.62
50/50 (45-54%)	3,114	23.7	317	120	2.72
over 54%	237	1.8	314	121	2.70
All sharemilkers	4,854	36.9	316	120	2.71
Unknown	71	0.5	340	122	2.90
All farms	**13,140**		**285**	**111**	**2.61**

Note: Contract milkers included with owner-operators

Farm production in each of the main operating structure groups is shown in Table 5.4. The table shows that on average, sharemilkers on less than 20% agreements have the highest production per farm, followed by 20-29% and 50/50 sharemilkers.

Table 5.4 **Farm production analysis by operating structure in 2002/03**

Operating structure	*Average litres per farm*	*Average kg milkfat per farm*	*Average kg milksolids per farm*	*Average kg milkfat per effective hectare*	*Average kg milksolids per effective hectare*	*Average kg milkfat per cow*	*Average kg milksolids per cow*
Owner-operators	991,567	47,956	84,538	458.2	806	178.5	314
Sharemilkers:							
Less than 20%	1,836,960	89,402	157,655	555.8	979	195.1	344
20 – 29%	1,175,974	57,548	101,155	497.4	872	181.0	318
30 – 39%	839,553	41,970	73,414	442.5	773	174.9	306
40 – 44%	950,671	48,024	83,914	476.6	834	181.3	317
50/50 (45-54%)	1,170,073	57,315	100,868	492.3	864	180.4	317
over 54%	1,150,614	55,702	98,418	488.3	859	180.9	318
All Sharemilkers	1,167,081	57,161	100,568	492.2	864	180.6	317
Unknown	1,344,048	64,698	114,404	557.3	983	191.6	338
All farms	**1,058,307**	**51,447**	**90,621**	**471.3**	**828**	**179.3**	**315**

Note: Contract milkers included with owner-operators

Changes to the operating structure in the last ten years are minimal. Table 5.5 shows the percentage of herds in each operating structure type, whereas Table 5.6 gives the actual number of herds.

Table 5.5 **Trend in the percentage of herds in each operating structure for the last 10 seasons**

Operating structure	*1993/94*	*1994/95*	*1995/96*	*1996/97*	*1997/98*	*1998/99*	*1999/00*	*2000/01*	*2001/02*	*2002/03*
Owner-operators	57.2	65.7	65.0	63.6	63.1	62.7	62.7	61.8	62.1	62.5
Contract	0.7	0.6	0.8	1.3	1.2	1.1	0.9	0.8	–	–
Sharemilkers:										
29%	0.8	1.1	0.9	0.8	0.8	0.8	0.7	*	*	*
39%	0.7	0.9	0.9	0.7	0.6	0.5	0.5	*	*	*
50%	18.6	24.9	24.5	23.4	24.0	23.7	23.7	24.3	23.7	23.7
Other	4.0	6.8	7.8	9.3	10.2	11.2	11.5	13.1	14.1	13.2
All Sharemilkers	24.1	33.7	34.2	34.3	35.7	36.2	36.4	37.3	37.8	36.9
Unknown	18.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.1	0.5

– Included with owner-operators

** Included in "Other"*

From 1989/90 owner-operators includes leased farms

Table 5.6 **Trend in the number of herds in each operating structure for the last 10 seasons**

Operating structure	*1993/94*	*1994/95*	*1995/96*	*1996/97*	*1997/98*	*1998/99*	*1999/00*	*2000/01*	*2001/02*	*2002/03*
Owner-operators	8,344	9,627	9,581	9,368	9,263	9,005	8,694	8,592	8,476	8,215
Contract	97	84	121	195	172	154	126	113	–	–
Sharemilkers:										
29%	118	158	133	120	124	114	98	*	*	*
39%	108	138	138	108	95	76	66	*	*	*
50%	2,714	3,642	3,614	3,455	3,522	3,403	3,280	3,372	3,240	3,114
Other	583	994	1,149	1,367	1,497	1,610	1,597	1,815	1,924	1,740
All Sharemilkers	3,523	4,932	5,034	5,050	5,238	5,203	5,041	5,187	5,164	4,854
Unknown	2,633	6	0	128	0	0	0	0	9	71
Total	**14,597**	**14,649**	**14,736**	**14,741**	**14,673**	**14,362**	**13,861**	**13,892**	**13,649**	**13,140**

– Included with owner-operators

** Included in "Other"*

From 1989/90 owner-operators includes leased farms

6. Disease control

A. Enzootic Bovine Leucosis (EBL) eradication scheme

- **Excellent progress toward eradication of EBL**
- **32 herds have an EBL positive status**
- **10,722 herds have an EBL Free status**

Livestock Improvement manages and operates the EBL eradication scheme and Dairy InSight funds the scheme on behalf of the dairy industry. Testing for EBL is undertaken using samples from bulk milk and individual animal milk samples. Blood testing is used to monitor infected herds.

Since its inception in 1997, the EBL eradication programme has dramatically reduced the number of EBL infected herds within New Zealand. Testing of all dairy herds continued during the 2002/2003 dairy season, with the number of recorded infected (positive) herds further reducing from a peak of 928 (6.3%) in 1998 to 32 (0.2%) in June 2003 (Graph 6.1). The majority of the remaining infected herds are large with 25 of the 32 herds having at least 300 milking cows. There were 10,722 herds with an EBL Free status and 141 Suspect status herds. Herds become suspect if they purchase stock from infected or other suspect herds.

The New Zealand Dairy Industry is close to achieving eradication of EBL. Following eradication, some annual testing will continue to demonstrate to international customers that New Zealand dairy animals remain free of this disease.

Graph 6.1 **The number of EBL positive herds is declining rapidly**

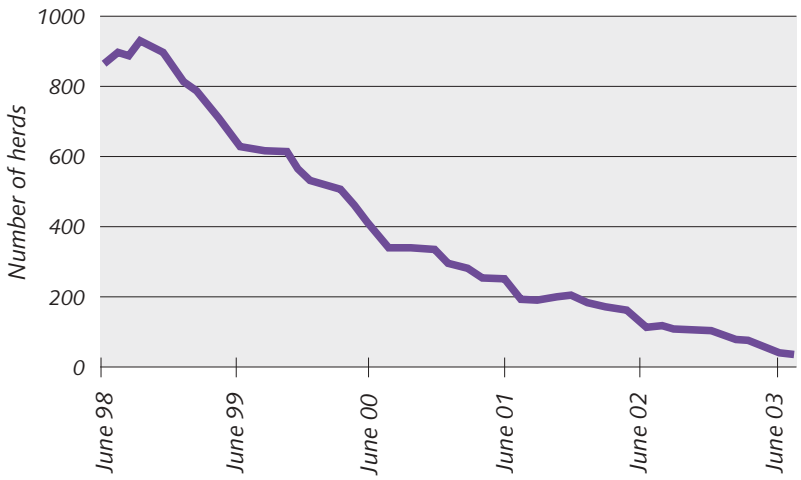


Table 6.1 **EBL status for dairy herds (June 2003)**

Herd EBL Status	*Number of herds*	*%*
EBL Free	10,722	81.6
Negative	1,855	14.1
Untested/New locations	390	3.0
Suspect	141	1.1
Blood Positive	29	0.2
Milk Test Positive	3	0.0
Total	**13,140**	**100.0**

Note: EBL Free herds have been tested for at least three years with a negative result. Negative herds have been screened at least once with negative test results using milk samples. Untested/New locations include herds yet to be assigned a status following herd movement between locations. Suspect herds contain animals that have been purchased or leased from positive or other suspect herds. Milk test positive herds have not completed the required blood testing to confirm status.

B. Tuberculosis (Tb) control

- **Number of infected dairy herds decreases compared with the previous season**

Tuberculosis (Tb) is a chronic infectious disease characterised by the formation of tubercles in the tissues of the body. Various tissues and organs including the lungs, lymphatic system, kidneys, liver, intestines and brain may become infected. The disease is caused by the organism *Mycobacterium spp.* of which there are three strains: *M. bovis* (cattle), *M. tuberculosis* (human) and *M. avian* (bird). Cattle can be susceptible to strains other than *M. bovis* and react to initial testing in the same way but the disease is not as serious with this infection.

Control of Tb (*M. bovis*) over the agricultural industry is managed by the Animal Health Board 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 that are considered a source of infection (e.g., possums, and ferrets).

In 2002/03 the number of infected dairy herds (79) and number of dairy cattle with Tb (247) continues to decrease compared with the previous season (96 and 328 respectively).

Table 6.2 **Tuberculosis (Tb) testing and results in 2002/03**

Region	*Vector Status*	*Number of infected dairy herds June 2003*	*Number of dairy cattle primary tested*	*Number of Tuberculous[a] dairy cattle*
Northland	Free	0	110,389	0
Auckland	Free	0	46,939	2
	Risk	0	6,612	1
Waikato	Free	10	1,246,874	29
	Risk	2	180,352	4
Bay of Plenty	Free	1	77,771	1
	Risk	0	16,293	2
Gisborne	Free	0	909	0
Hawkes Bay	Free	0	15,474	0
	Risk	1	20,217	2
Taranaki	Free	0	182,736	0
Manawatu / Wanganui	Free	1	117,547	2
	Risk	1	78,639	1
Wellington	Risk	7	119,078	38
Nelson / Marlborough	Free	0	85,854	0
	Risk	4	16,163	11
West Coast	Free	0	4,858	1
	Risk	36	171,357	116
Canterbury	Free	4	205,297	2
	Risk	1	101,109	3
Otago	Free	1	93,471	5
	Risk	5	133,465	21
Southland	Free	1	166,053	2
	Risk	4	122,724	4
North Island	Free	12	1,798,639	34
	Risk	11	421,191	48
North Island	**Total**	**23**	**2,219,830**	**82**
South Island	Free	6	555,533	10
	Risk	50	544,818	155
South Island	**Total**	**56**	**1,100,351**	**165**
New Zealand	Free	18	2,354,172	44
	Risk	61	966,009	203
New Zealand	**Total**	**79**	**3,320,181**	**247**

Sourced from Animal Health Board - Annual Report for the year ending 30 June 2002

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

Appendix 1 Farming regions and districts

The following map shows the six Livestock Improvement Corporation Limited regions and the farming regions used in all analyses presented in this report. The list of districts and cities within each region is also given.

1 Northland
Far North
Whangarei
Kaipara

2 Central Auckland
Rodney
North Shore
Waitakere
Auckland
Manukau
Papakura
Franklin

3 South Auckland
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 Wellington
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

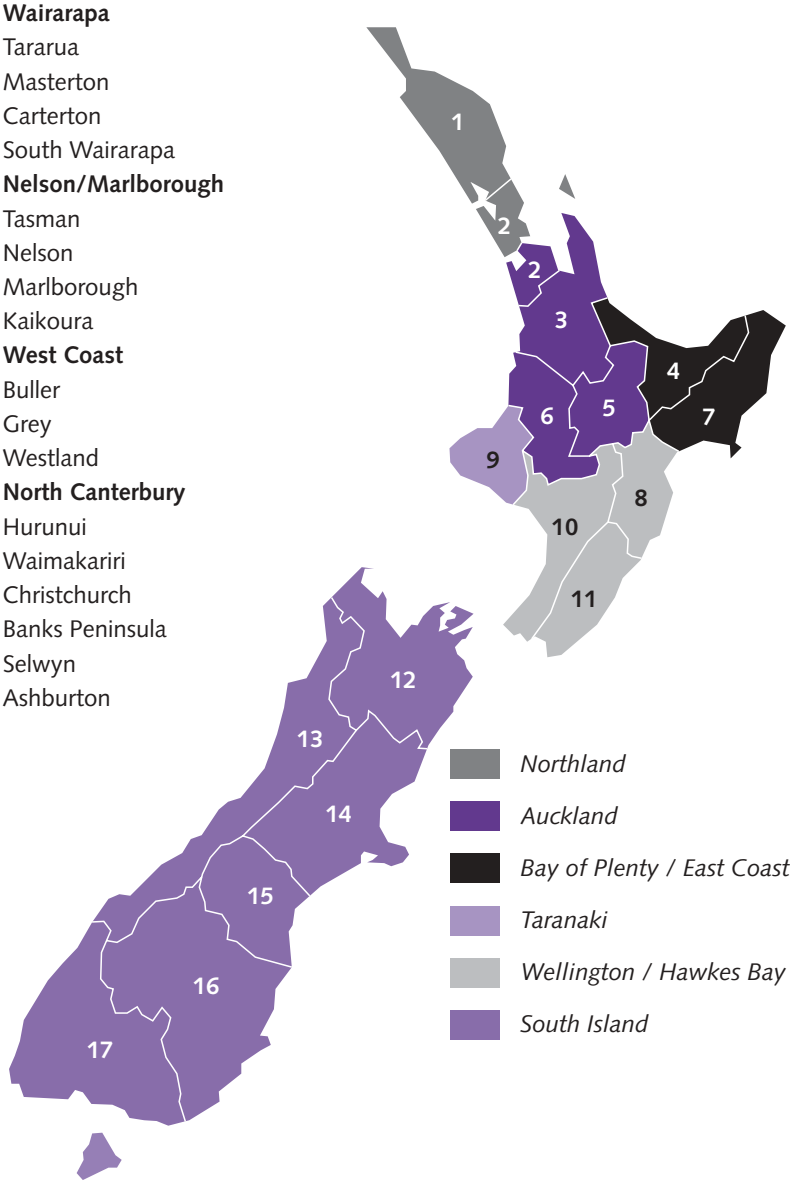
13 West Coast
Buller
Grey
Westland

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



Dairy **InSight**