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 2001/02 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

- **Over 1.1 billion kilograms of milksolids processed**

The statistics on milk, milkfat, protein and milksolids processed (Table 2.1) are based on figures provided by dairy companies to the New Zealand Dairy Board. These figures do not include town milk supply.

In 2001/02, three co-operatively owned dairy companies (Fonterra, Tatua and Westland) processed almost 13 billion litres of milk. Over 1.1 billion kilograms of milksolids were processed from seasonal supply units into products predominantly for export.

At 1,107 million kilograms, total milksolids processed into export products for the 2001/02 season represents a 6% increase from the 1,046 million kilograms processed in the previous season.

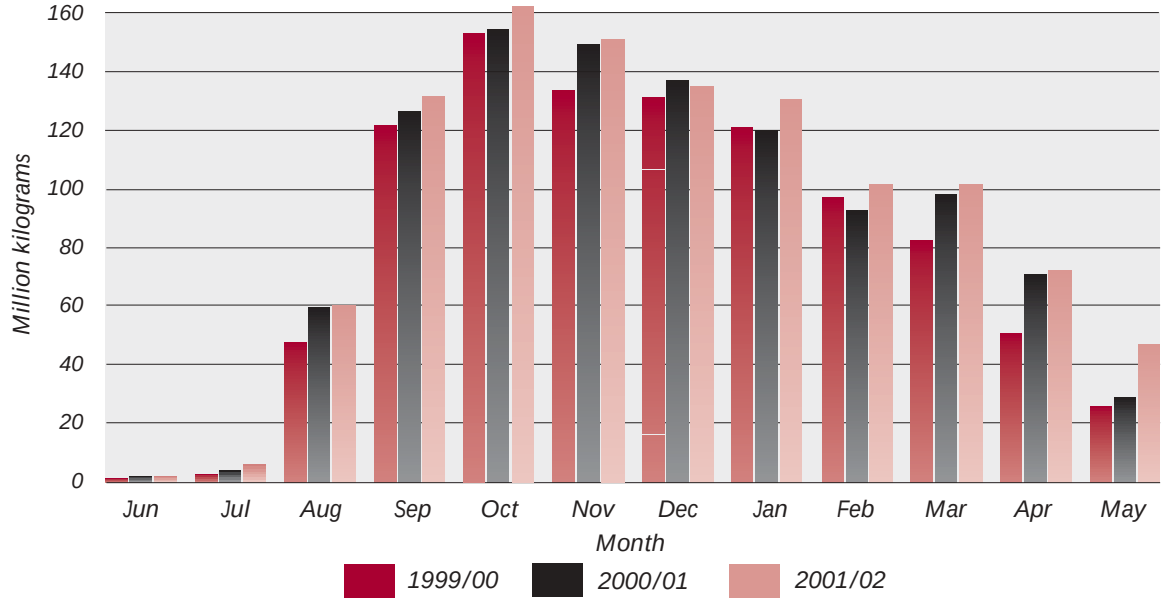
Table 2.1 **Summary of milk production statistics since 1974/75**

Season	*Milk processed (million litres)*	*Milkfat processed (million kgs)*	*Protein processed (million kgs)*	*Milksolids processed (million kgs)*
1974/75	5,222	244	181	425
1975/76	5,403	268	198	466
1976/77	5,775	275	204	479
1977/78	5,238	251	186	437
1978/79	5,655	274	203	477
1979/80	5,997	291	215	506
1980/81	5,868	282	209	491
1981/82	5,979	282	209	491
1982/83	6,096	290	214	505
1983/84	6,733	324	239	564
1984/85	6,965	332	245	578
1985/86	7,326	350	257	609
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	10,168	486	363	850
1999/00	11,480	554	416	970
2000/01	12,322	597	448	1,046
2001/02	12,998	631	476	1,107

Note: Protein figures for 1974/75 to 1981/82 and milksolids figures for 1974/75 to 1990/91 are derived from milkfat figures

Comparing the 2001/02 season milksolids curve to the previous two seasons (Graph 2.1), the 2001/02 season production was higher than in the previous two seasons, particularly in May. Consistent with previous seasons, production peaked in October. Production for every month of the season reached a higher level than the equivalent month in the previous season (with the exception of December), resulting in record production.

Graph 2.1 **Seasonal trend in total milksolids processed**



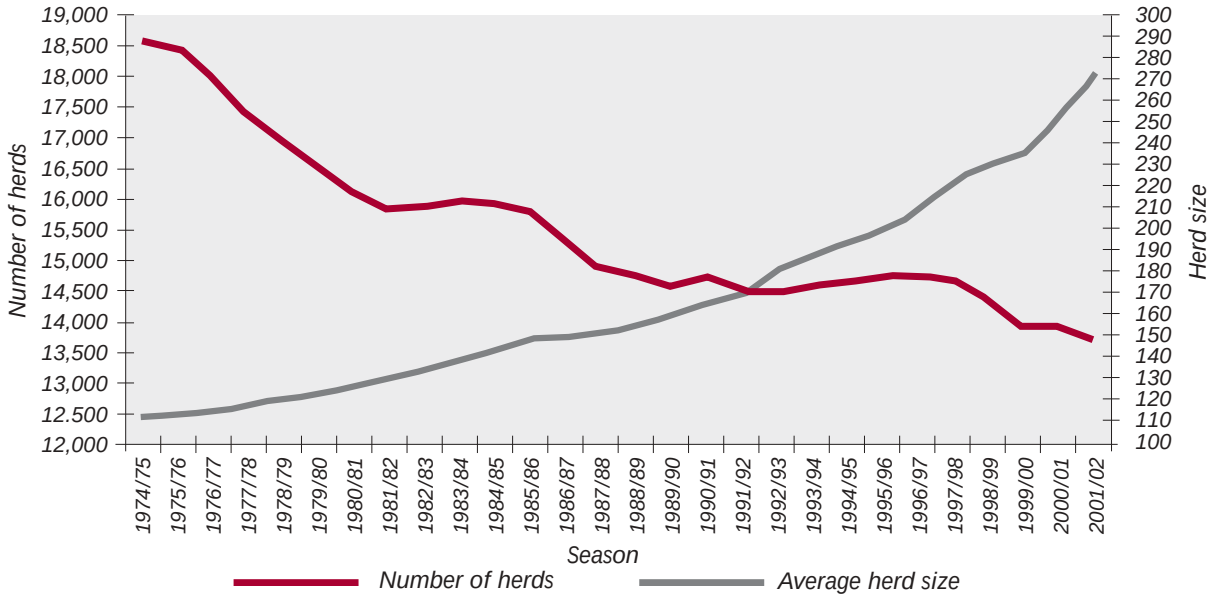
ii) Population

- **Decrease in herd numbers**
- **Continued increase in average herd size**
- **Substantial increase in cow numbers for second consecutive season**

Sharp reductions in herd numbers followed by periods of stability or slight increases are characteristic of the long-term trend (Graph 2.2). The total number of herds in the 2001/02 season dropped by 243, to 13,649, compared with the previous season.

The average herd size increased to 271 in 2001/02, continuing the consistent upward trend since 1974/75. The average herd size has doubled in the last twenty years.

Graph 2.2 **Trend in the number of herds and average herd size since 1974/75**



The total cow population increased in the 2001/02 season to 3.693 million (Table 2.2), a 5.9% increase from 3.486 million cows in 2000/01. A similarly high percentage increase of 6.6% was recorded from the 1999/00 to the 2000/01 season. Average effective hectares increased from 96 in 2000/01, to 103 in 2001/02; consistent with the upward trend since the early 1980s. An average of 2.67 cows per hectare remains equivalent to the previous two seasons. Total effective hectares (runoff excluded) was 1.4 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

– Not available

[a] 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 which lactated 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 similar to 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 2001/02, consistent with increasing average farm size. Average milksolids per effective hectare (824) remained similar to the previous season (825). Production per cow decreased slightly in 2001/02 to an average of 307kg milksolids (comprised of 175kg milkfat and 132kg protein).

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

Season	*Average litres per farm*	*Average 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

– Not available

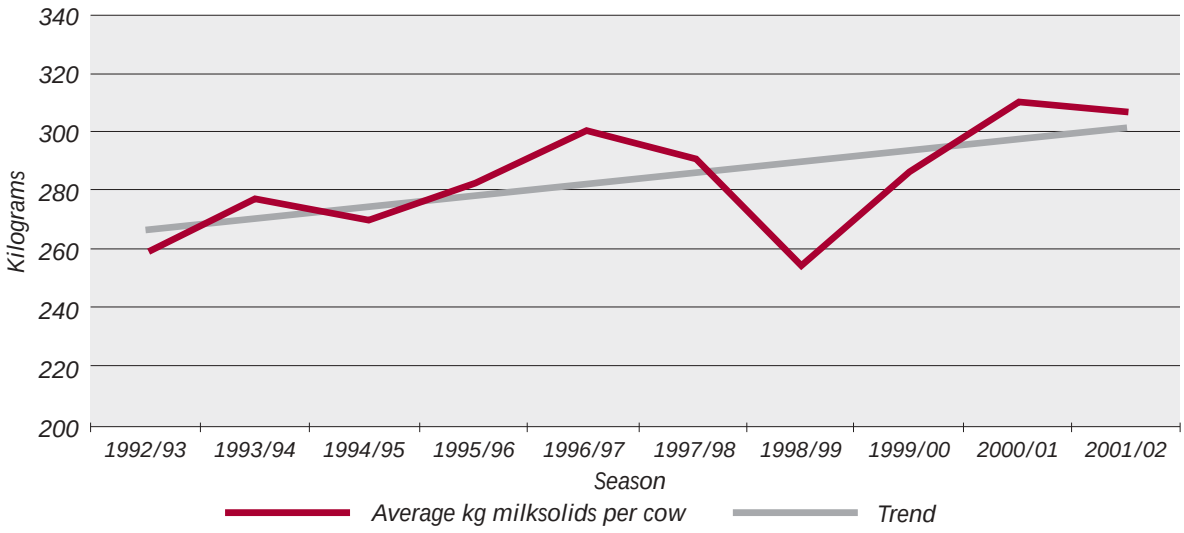
[a] *1991/92 figures include some town milk herds*

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

i) Production per cow

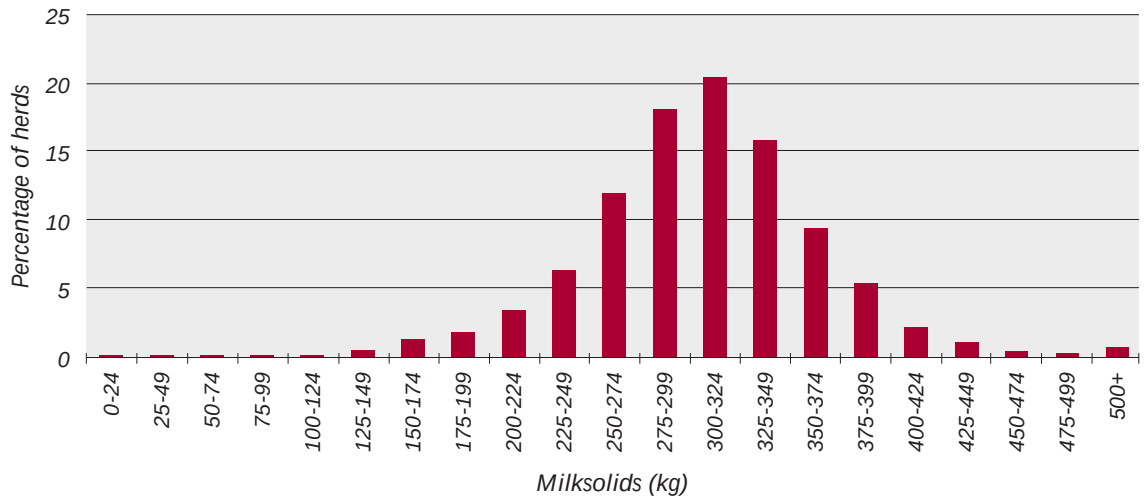
The trend of increased milksolids production per cow over the last several years (Graph 2.3) is due to genetic gain and improvements in farm management. These improvements from season to season are masked by the considerable effect of the weather on each season's actual production. For example, unfavourable weather conditions in 1998/99 caused production per cow to fall to its lowest level since 1992/93.

Graph 2.3 **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 20% of herds produce between 300 and 324kg of milksolids and approximately 75% produce between 250 and 375kg of milksolids (Graph 2.4).

Graph 2.4 **Distribution of herds by milksolids production per cow in 2001/02**



ii) Herd size distribution

- **30% of herds have 300 or more cows**
- **Herds with between 950 and 999 cows have highest production per cow**

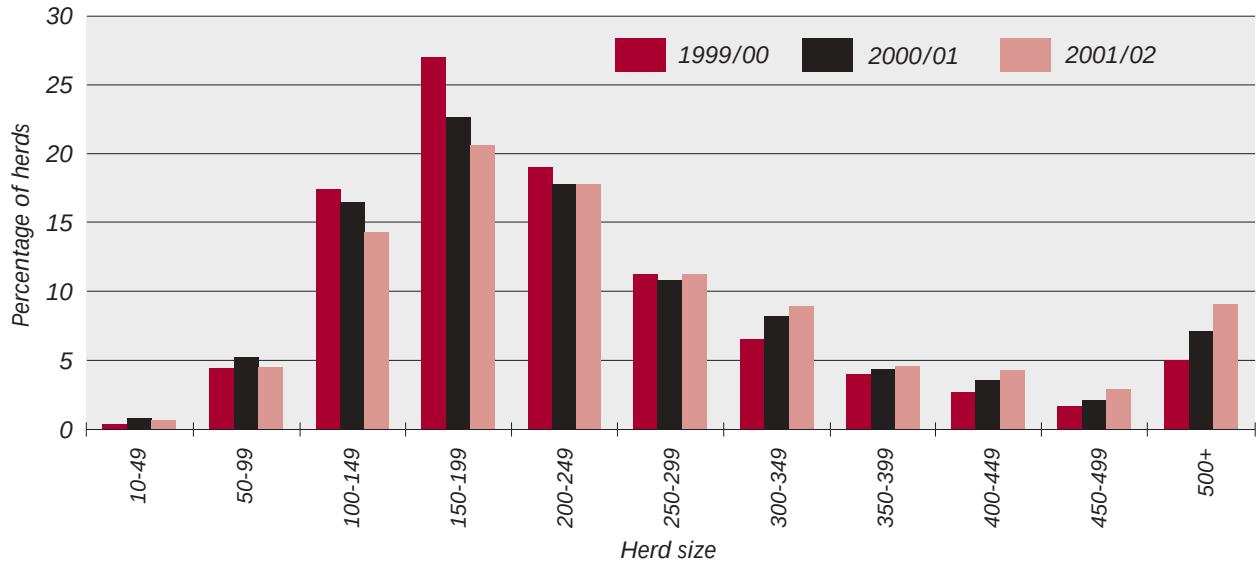
Twenty-one percent (2,823) of herds have between 150 and 199 cows (see Table 2.4). Almost 75% of all herds average between 100 and 350 cows. In 2001/02, 4,154 herds (30.4%) had 300 or more cows, and 1,256 (9.2%) had 500 or more cows. Average milkfat, protein and milksolids per cow by herd size are also included in Table 2.4. Average milksolids per cow varies between 189 kg (herds with 10-49 cows) and 331 kg (herds with 950-999 cows).

Table 2.4 **Average production per cow by herd size in 2001/02**

Herd size	*Number of herds*	*Percentage of herds*	*Average kg milkfat per cow*	*Average kg protein per cow*	*Average kg milksolids per cow*
10-49	93	0.7	107	82	189
50-99	625	4.6	159	120	279
100-149	1,964	14.4	170	127	298
150-199	2,823	20.7	175	130	305
200-249	2,442	17.9	178	133	312
250-299	1,548	11.3	177	132	309
300-349	1,247	9.1	180	135	315
350-399	642	4.7	179	134	313
400-449	598	4.4	179	135	314
450-499	411	3.0	181	138	319
500-549	318	2.3	185	141	327
550-599	188	1.4	181	138	319
600-649	176	1.3	183	140	322
650-699	128	0.9	180	138	317
700-749	103	0.8	183	141	324
750-799	52	0.4	177	135	312
800-849	64	0.5	180	138	318
850-899	35	0.3	181	140	321
900-949	38	0.3	179	138	317
950-999	36	0.3	187	144	331
1000+	118	0.9	179	138	316
Total	**13,649**	**100**			

The herd size distribution presented in Graph 2.5 shows a steady increase in large herds (300+ cows) and a decrease in herds with fewer than 250 cows over the last three seasons. Despite dwindling herds of fewer than 250 cows, the most common herds continue to range between 150 and 199 cows, although this is far less pronounced than two seasons ago.

Graph 2.5 **Herd size distribution for the last three seasons**

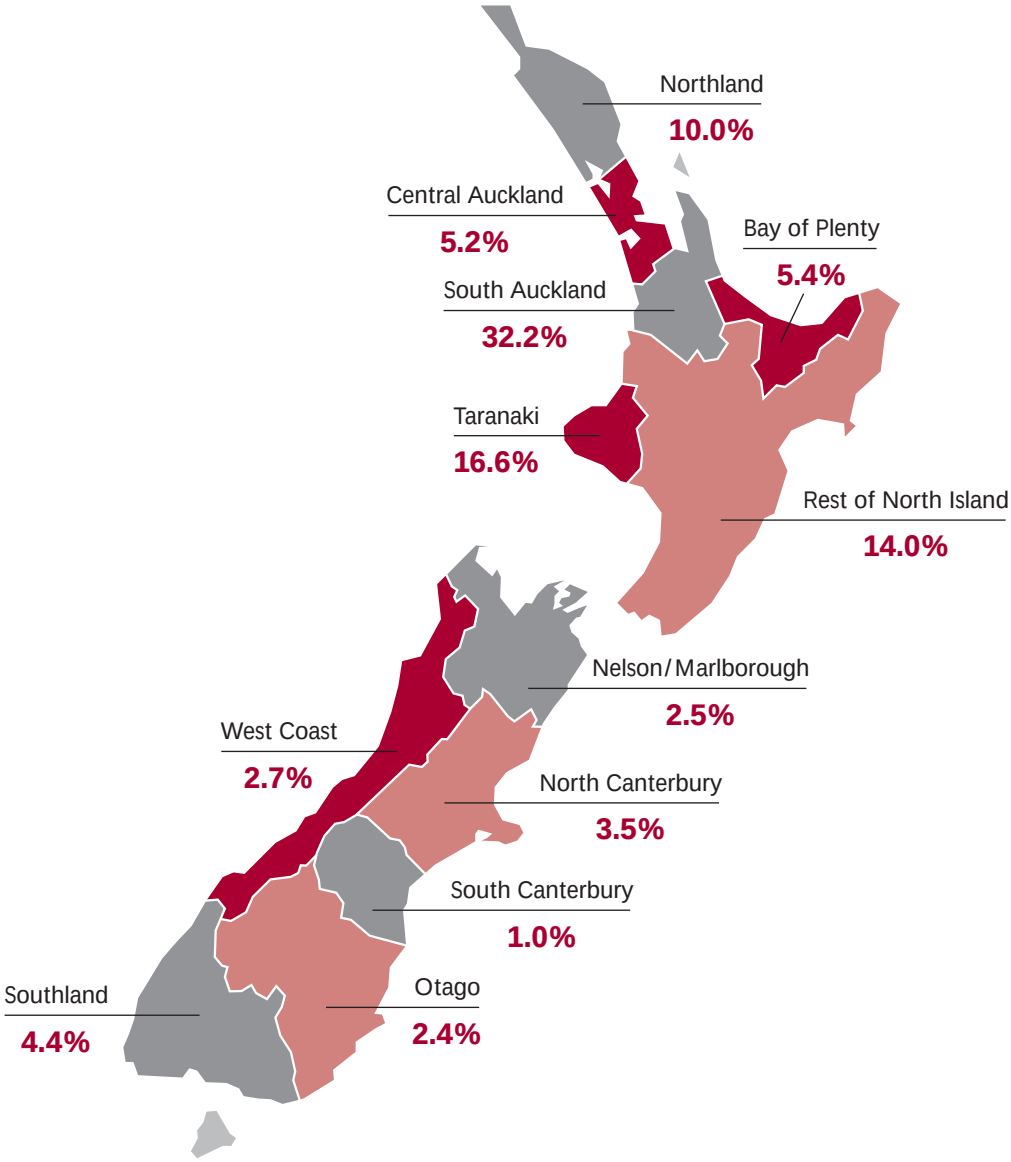


3. Regional dairy statistics

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

The vast majority of dairy farms (83%) are located in the North Island, with the greatest concentration (32%) situated in the South Auckland region. Taranaki, with 17% of dairy farms, is the next most heavily populated region. South Island dairy farms account for 17% of the national total. The distribution of dairy farms within regions of each island in 2001/02 (Graph 3.1) has remained similar to previous seasons.

Graph 3.1 **Regional distribution of dairy farms in 2001/02**



- **0.5 million cows in Taranaki**
- **Largest average herd size (539) and average effective hectares (192) in South Canterbury**
- **Average herd size in the South Island reaches 394**

Farms in the South Island are, on average, larger than those in the North Island, in terms of both physical size and cow numbers. The overall number of herds in New Zealand (13,649) has dropped compared with the previous season, even though the number of herds in the South Island has increased (Table 3.1). Seventy-six 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 539 cows, up markedly from the previous season's figure of 483 cows. In the North Island, Hawkes Bay has the largest average herd size with 468 cows. The smallest herds are in Central Auckland, Northland and Taranaki, averaging 199, 220 and 221 cows respectively. South Auckland has the highest average cows per hectare (2.85), followed by Taranaki and South Canterbury (2.82 each). The lowest average cows per hectare are found in the West Coast (2.13) and Northland (2.15).

Table 3.1 **Herd analysis by region in 2001/02**

Farming region	*Total herds*	*Total cows*	*Total effective hectares*	*Average herd size*	*Average effective hectares*	*Average cows per hectare*
Northland	1,364	300,043	141,266	220	104	2.15
Central Auckland	711	141,274	61,393	199	86	2.34
South Auckland	4,399	1,073,564	384,065	244	87	2.85
Bay of Plenty	731	187,615	69,181	257	95	2.74
Central Plateau	489	193,597	75,380	396	154	2.65
Western Uplands	82	24,555	9,682	299	118	2.60
East Coast	15	4,053	1,530	270	102	2.80
Hawkes Bay	66	30,896	11,048	468	167	2.69
Taranaki	2,272	501,004	180,417	221	79	2.82
Wellington	664	187,441	70,560	282	106	2.67
Wairarapa	600	160,611	60,445	268	101	2.69
North Island	**11,393**	**2,804,653**	**1,064,967**	**246**	**93**	**2.69**
Nelson/Marlborough	344	83,450	32,642	243	95	2.57
West Coast	365	98,274	47,623	269	130	2.13
North Canterbury	475	234,431	80,550	494	170	2.81
South Canterbury	139	74,945	26,637	539	192	2.82
Otago	331	136,818	51,853	413	157	2.65
Southland	602	260,132	100,658	432	167	2.59
South Island	**2,256**	**888,050**	**339,963**	**394**	**151**	**2.58**
New Zealand	**13,649**	**3,692,703**	**1,404,930**	**271**	**103**	**2.67**

- **Highest per farm production recorded in South Canterbury**

South Island farms have, on average, higher per farm production, with South Canterbury recording the highest average farm production at 186,323kg 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 147,282kg of milksolids.

In 2001/02, average production per effective hectare and per cow was higher in the South Island than the North Island. North Canterbury recorded the highest average milksolids per hectare in the South Island (1,006 kg), while Taranaki had the highest average milksolid production in the North Island (889 kg).

However, Southland had the highest average milksolids per cow (358kg) followed closely by North Canterbury (357kg). The lowest average milksolids per cow was recorded in Northland (268kg).

Table 3.2 **Farm production analysis by region in 2001/02**

Farming region	*Average litres per farm*	*Average milkfat per farm*	*Average protein per farm*	*Average milksolids per farm*	*Average milkfat per effective hectare*	*Average protein per effective hectare*	*Average milksolids per effective hectare*	*Average milkfat per cow*	*Average protein per cow*	*Average milksolids per cow*
Northland	718,717	34,123	25,532	59,654	329	246	575	153	115	268
Central Auckland	694,857	32,600	24,670	57,270	380	288	668	162	123	285
South Auckland	864,747	41,849	31,261	73,110	489	364	853	171	127	298
Bay of Plenty	945,528	44,344	33,384	77,728	473	356	829	172	129	301
Central Plateau	1,439,736	68,397	51,344	119,741	466	348	814	176	132	308
Western Uplands	993,540	47,553	35,618	83,171	416	311	727	160	119	279
East Coast	1,023,110	43,431	34,918	78,348	483	390	873	176	142	318
Hawkes Bay	1,754,399	83,085	64,198	147,282	478	367	845	179	138	317
Taranaki	776,545	40,179	29,674	69,853	512	377	889	181	134	315
Wellington	1,116,245	52,553	40,394	92,947	498	382	881	186	143	329
Wairarapa	1,020,210	50,149	37,733	87,883	503	377	880	187	141	328
North Island	**878,069**	**42,656**	**31,946**	**74,602**	**466**	**348**	**814**	**172**	**129**	**301**
Nelson/Marlborough	851,628	41,773	30,763	72,536	444	326	770	171	126	297
West Coast	924,026	47,195	33,727	80,922	374	266	639	177	126	303
North Canterbury	2,109,371	98,760	76,644	175,404	566	440	1,006	201	156	357
South Canterbury	2,236,424	105,056	81,266	186,323	557	432	989	200	155	355
Otago	1,741,800	80,763	62,979	143,742	520	406	926	196	153	349
Southland	1,799,542	85,042	66,535	151,578	516	403	920	201	157	358
South Island	**1,597,032**	**75,815**	**58,287**	**134,101**	**496**	**379**	**875**	**192**	**146**	**338**
New Zealand	**996,904**	**48,137**	**36,300**	**84,436**	**471**	**353**	**824**	**175**	**132**	**307**

South Taranaki continues to be the district with the most herds (1,330) and cows (309,243), followed by Matamata-Piako (Table 3.3). Waimate in South Canterbury has the highest average herd size, with 671 cows and largest average effective hectares (240).

Table 3.3 **Herd analysis by district in 2001/02**

Region	District	Total herds	Total cows	Average herd size	Average effective hectares	Average cows per hectare
Northland	Far North	389	77,195	198	97	2.08
	Whangarei	449	108,407	241	110	2.21
	Kaipara	526	114,441	218	103	2.15
Central Auckland	Rodney	264	53,072	201	92	2.19
	Manukau City	27	5,872	217	82	2.64
	Papakura	12	2,259	188	72	2.58
	Franklin	408	80,071	196	83	2.40
South Auckland	Waikato	866	210,670	243	92	2.72
	Hamilton City	14	3,070	219	82	2.70
	Waipa	727	186,826	257	89	2.92
	Otorohanga	451	126,320	280	99	2.85
	Thames-Coromandel	109	24,327	223	90	2.52
	Hauraki	523	115,364	221	85	2.64
	Matamata-Piako	1,280	291,404	228	77	3.00
	South Waikato	429	115,583	269	95	2.89
Bay of Plenty	Western Bay of Plenty	252	68,945	274	98	2.80
	Tauranga	10	2,619	262	95	2.65
	Kawerau/Whakatane	366	91,155	249	94	2.70
	Opotiki	103	24,896	242	90	2.70
Central Plateau	Taupo	122	66,747	547	228	2.54
	Rotorua	367	126,850	346	130	2.68
Western Uplands	Waitomo	66	19,989	303	118	2.64
	Ruapehu	16	4,566	285	120	2.42
East Coast	Gisborne	6	1,776	296	114	2.84
	Wairoa	9	2,277	253	94	2.77
Hawkes Bay	Napier/Hastings	24	12,228	510	190	2.47
	Central Hawkes Bay	42	18,668	444	154	2.82
Taranaki	New Plymouth	585	122,064	209	80	2.64
	Stratford	357	69,697	195	75	2.63
	South Taranaki	1,330	309,243	233	80	2.94
Wellington	Wanganui	29	8,857	305	125	2.56
	Rangitikei	90	28,878	321	119	2.75
	Manawatu	305	84,080	276	103	2.68
	Palmerston North City	42	14,460	344	119	2.90
	Horowhenua	160	43,317	271	103	2.65
	Kapiti Coast	29	6,514	225	91	2.54
	Upper Hutt City	9	1,335	148	71	2.14
Wairarapa	Tararua	388	96,067	248	94	2.67
	Masterton	23	7,738	336	125	2.79
	Carterton	84	22,186	264	100	2.68
	South Wairarapa	105	34,620	330	121	2.77
North Island		**11,393**	**2,804,653**	**246**	**93**	**2.69**
Nelson/Marlborough	Marlborough	85	18,401	216	87	2.46
	Kaikoura	31	9,469	305	115	2.73
	Nelson City	6	1,000	167	77	2.24
	Tasman	222	54,580	246	96	2.60
West Coast	Buller	129	33,766	262	114	2.32
	Grey	73	24,354	334	158	2.13
	Westland	163	40,154	246	131	1.97

Region	District	Total herds	Total cows	Average herd size	Average effective hectares	Average cows per hectare
North Canterbury	Hurunui	49	28,310	578	204	2.85
	Waimakariri	74	22,279	301	120	2.49
	Christchurch City	10	2,712	271	93	2.67
	Banks Peninsula	13	1,728	133	76	1.79
	Selwyn	163	75,922	466	157	2.82
	Ashburton	166	103,480	623	206	3.03
South Canterbury	Timaru/MacKenzie	92	43,401	472	167	2.82
	Waimate	47	31,544	671	240	2.82
Otago	Waitaki/Central Otago	89	46,897	527	196	2.72
	Dunedin City	89	22,699	255	104	2.44
	Clutha	153	67,222	439	164	2.72
Southland	Gore	91	42,610	468	176	2.67
	Invercargill	49	20,375	416	161	2.51
	Southland	462	197,147	427	166	2.58
South Island		**2,256**	**888,050**	**394**	**151**	**2.58**
New Zealand		**13,649**	**3,692,703**	**271**	**103**	**2.67**

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

Waimate district has the highest average production per farm with 224,885 kilograms of milksolids (Table 3.4). Ashburton district recorded the highest average kilograms of milksolids per effective hectare (1,061), whereas the highest production per cow was recorded in Waimakariri (371 kg of milksolids). The North Island district with the highest production is Taupo, with an average of 164,388 kilograms of milksolids per farm.

Table 3.4 **Farm production analysis by district in 2001/02**

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	660,362	30,856	23,242	54,098	310	233	542	150	112	262
	Whangarei	775,175	37,558	27,795	65,353	344	254	598	156	115	272
	Kaipara	713,680	33,607	25,293	58,899	331	249	580	154	116	269
Central Auckland	Rodney	659,001	32,248	23,837	56,085	348	256	604	159	117	276
	Manukau City	810,078	35,858	27,793	63,651	440	341	780	168	130	297
	Papakura	669,404	29,688	23,058	52,746	382	296	678	144	112	256
	Franklin	711,182	32,698	25,050	57,748	398	304	702	164	126	290
South Auckland	Waikato	878,099	41,665	31,433	73,098	465	350	815	170	128	298
	Hamilton City	735,744	37,349	27,286	64,635	465	339	804	173	127	300
	Waipa	947,265	45,675	34,354	80,029	517	387	904	176	132	308
	Otorahanga	984,952	47,493	35,581	83,075	490	366	857	172	128	300
	Thames-Coromandel	770,901	36,813	27,620	64,433	415	311	726	165	124	288
	Hauraki	770,768	37,130	27,680	64,811	446	332	777	169	126	295
	Matamata-Piako	773,398	38,248	28,196	66,444	505	371	876	168	124	291
	South Waikato	986,770	47,724	35,698	83,422	511	381	892	176	132	308
Bay of Plenty	Western Bay of Plenty	958,953	45,862	34,269	80,131	469	350	819	167	125	291
	Tauranga	897,413	41,726	31,559	73,285	411	309	720	152	114	267
	Kawerau/Whakatane	962,738	44,431	33,693	78,124	486	368	853	178	135	313
	Opotiki	856,201	40,572	30,300	70,873	447	332	779	164	122	285
Central Plateau	Taupo	1,959,642	93,834	70,554	164,388	435	326	761	172	128	300
	Rotorua	1,266,906	59,940	44,959	104,899	476	356	832	178	133	310
Western Uplands	Waitomo	983,016	47,474	35,333	82,808	418	310	729	157	116	273
	Ruapehu	1,036,952	47,880	36,790	84,670	407	313	720	171	132	303

Regional dairy statistics

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
East Coast	Gisborne	1,175,345	49,364	39,962	89,326	490	397	887	179	145	324
	Wairoa	921,621	39,475	31,555	71,030	478	385	863	174	140	314
Hawkes Bay	Napier/Hastings	1,931,350	91,129	70,360	161,490	440	339	779	177	136	313
	Central Hawkes Bay	1,653,285	78,488	60,676	139,164	500	383	883	180	138	319
Taranaki	New Plymouth	725,228	37,043	27,259	64,302	469	344	813	177	131	308
	Stratford	680,622	34,268	25,718	59,986	461	346	807	175	132	307
	South Taranaki	824,864	43,144	31,799	74,943	544	401	945	185	136	321
Wellington	Wanganui	1,194,903	55,048	42,539	97,587	464	356	821	181	139	320
	Rangitikei	1,262,483	61,422	46,566	107,989	527	399	926	191	145	336
	Manawatu	1,090,934	51,619	39,659	91,278	499	383	883	186	143	329
	Palmerston North City	1,363,070	64,142	49,212	113,354	548	418	966	190	145	335
	Horowhenua	1,069,309	49,389	38,221	87,610	485	374	859	183	142	325
	Kapiti Coast	912,788	40,840	31,991	72,831	470	369	838	192	151	343
	Upper Hutt City	596,328	27,378	21,189	48,567	385	299	684	184	142	326
Wairarapa	Tararua	943,969	47,064	35,178	82,242	505	377	882	189	141	331
	Masterton	1,415,238	67,057	51,370	118,427	552	421	973	198	151	349
	Carterton	1,026,461	49,260	37,286	86,546	496	375	871	188	142	330
	South Wairarapa	1,210,405	58,558	44,545	103,103	490	370	860	177	134	311
North Island		**878,069**	**42,656**	**31,946**	**74,602**	**466**	**348**	**814**	**172**	**129**	**301**
Nelson/Marlborough	Marlborough	745,800	35,756	26,631	62,387	414	307	721	166	124	289
	Kaikoura	1,205,260	57,914	43,408	101,322	512	386	898	189	143	332
	Nelson City	713,706	31,727	24,428	56,155	439	338	777	195	150	344
	Tasman	846,495	42,094	30,750	72,844	446	325	771	169	124	293
West Coast	Buller	927,636	46,716	33,515	80,230	414	294	708	178	127	305
	Grey	1,155,572	57,360	41,855	99,216	368	266	633	176	127	303
	Westland	817,469	43,022	30,254	73,276	345	243	588	178	125	303
North Canterbury	Hurunui	2,471,884	116,574	89,649	206,222	575	442	1,016	201	154	355
	Waimakariri	1,381,481	62,017	48,799	110,816	520	407	926	208	163	371
	Christchurch City	1,176,533	53,356	41,662	95,018	536	419	955	204	160	364
	Banks Peninsula	482,560	21,933	16,804	38,737	296	227	523	163	125	288
	Selwyn	2,034,686	94,241	73,565	167,806	575	450	1,024	205	161	366
	Ashburton	2,583,778	123,069	95,035	218,104	599	462	1,061	196	152	348
South Canterbury	Timaru/MacKenzie	2,014,458	93,774	72,848	166,622	566	441	1,008	203	158	361
	Waimate	2,670,911	127,140	97,745	224,885	538	414	951	193	149	342
Otago	Waitaki/Central Otago	2,216,532	102,619	79,836	182,455	533	415	948	194	151	345
	Dunedin City	1,167,061	52,798	41,289	94,087	498	390	888	205	160	365
	Clutha	1,799,973	84,317	65,790	150,107	525	410	935	192	150	342
Southland	Gore	1,906,394	89,297	69,679	158,976	518	405	923	197	153	350
	Invercargill	1,799,125	83,849	66,208	150,057	509	399	908	205	161	366
	Southland	1,778,539	84,331	65,951	150,282	517	404	920	201	157	359
South Island		**1,597,032**	**75,815**	**58,287**	**134,101**	**496**	**379**	**875**	**192**	**146**	**338**
New Zealand		**996,904**	**48,137**	**36,300**	**84,436**	**471**	**353**	**824**	**175**	**132**	**307.23**

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

4. Herd improvement

A. Use of herd testing

Farmers had the choice of two herd testing options in 2001/02. They 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.

- **81% of herds undertake herd testing in 2001/02**

The regional uptake of herd testing services in 2001/02 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 87.0% and 85.6% respectively. Taranaki at 86.9% reported the highest percentage of cows herd tested.

Table 4.1 **Use of herd testing by region in 2001/02**

Livestock Improvement Region	*Herds tested*	*Total herds*	*% of total herds*	*Cows tested*	*Total cows*	*% of total cows*
Northland	1,248	1,623	76.9	283,965	351,048	80.9
Auckland	4,338	5,421	80.0	1,104,577	1,382,463	79.9
Bay of Plenty/East Coast	634	741	85.6	161,689	189,177	85.5
Taranaki	1,981	2,278	87.0	435,412	500,884	86.9
Wellington/Hawkes Bay	1,097	1,330	82.5	303,441	381,081	79.6
South Island	1,815	2,256	80.5	684,514	888,050	77.1
New Zealand	**11,113**	**13,649**	**81.4**	**2,973,598**	**3,692,703**	**80.5**

Herd improvement – Use of herd testing

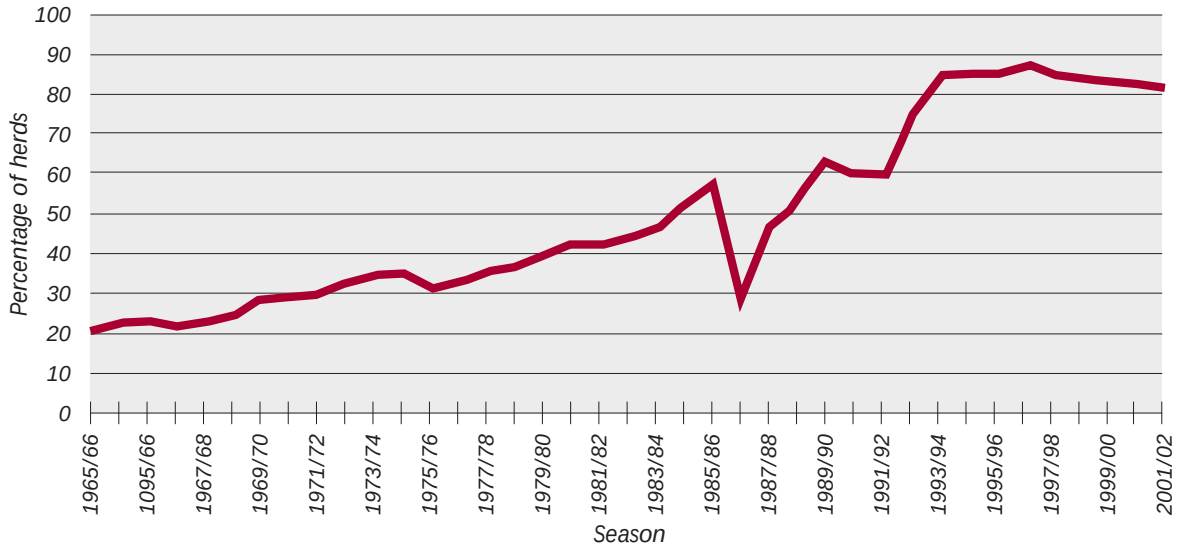
The percentage of total herds using herd testing decreased slightly to 81.4% in 2001/02 (Table 4.2). This figure is down 5.8% from the highest percentage of herd testing set in 1996/97. Although a record number of cows were tested (2.97 million), the percentage of total cows tested (80.5%) was lower compared with the previous season (84.4%).

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

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 1965/66**



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 new methodology provides a more accurate measure of the average lactation length of dairy cows.

i) Season averages

- **South Island has highest herd test production**

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. Days in milk (production) figures for Northland, Taranaki and Wellington/Hawkes Bay were unavailable for the 2001/02 season.

The South Island recorded the highest per cow per day milk volume (4,338 litres), milkfat (195kg) and protein (158kg) of cows herd tested. Taranaki recorded the highest milkfat and protein percentages.

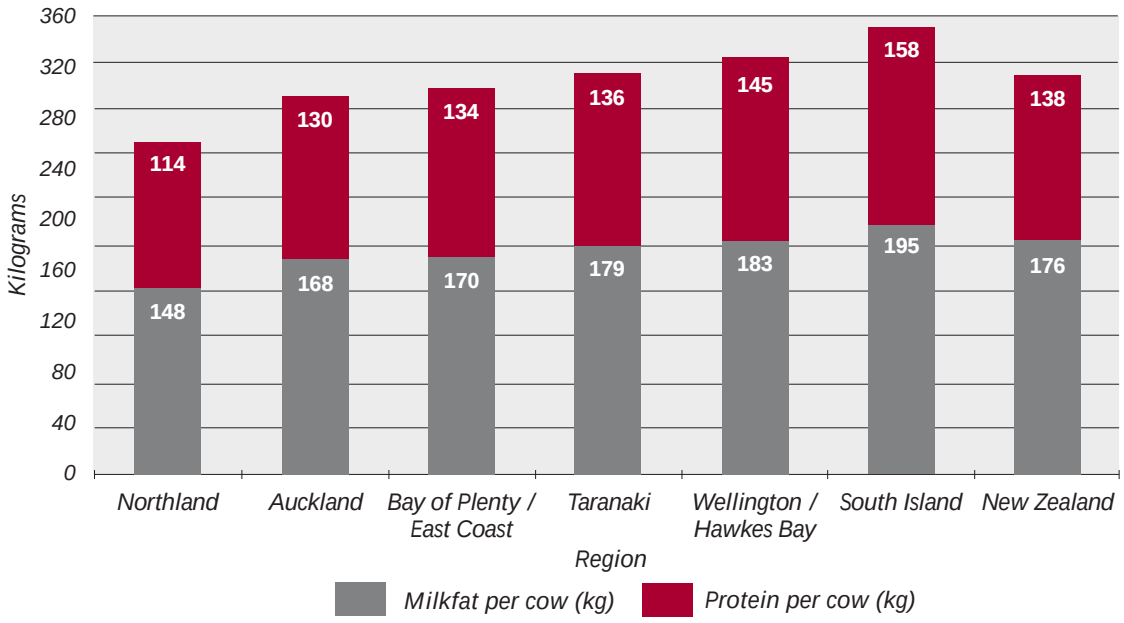
Table 4.3 **Season herd test averages per cow by region in 2001/02**

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	3,245	148	4.49	114	3.45	262	8.07	219	–	229
Auckland	3,616	168	4.62	130	3.55	298	8.24	225	203	203
Bay of Plenty / East Coast	3,805	170	4.47	134	3.50	304	7.99	223	259	230
Taranaki	3,581	179	5.02	136	3.81	315	8.80	231	–	198
Wellington / Hawkes Bay	4,010	183	4.60	145	3.63	328	8.18	230	–	220
South Island	4,338	195	4.52	158	3.65	353	8.14	230	265	221
New Zealand	3,791	176	4.64	138	3.61	314	8.28	227	268	210

– Not available

The 2001/02 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 148 (Northland) to 195kg per cow (South Island) and protein production from 114 (Northland) to 158kg per cow (South Island).

Graph 4.2 **Average milkfat and protein production per cow in 2001/02**



- **Increase in production per cow for 2001/02**

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 decrease in the average somatic cell count per millilitre of milk from 1992/93 to 1997/98, 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 (%)*	*Milk-solids (kg)*	*Milk-solids (%)*	*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

– Not available

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

ii) Monthly averages

- **Lowest Somatic Cell Count per cow per day recorded in Taranaki region**

The seasonal average figures presented in Table 4.5 are calculated using national monthly 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 2001/02**

Average litres of milk per cow per day

Livestock Improvement Region	*2001 Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*2002 Jan*	*Feb*	*Mar*	*Apr*	*May*	*Season average*
Northland	15.16	14.60	16.77	18.11	17.89	15.91	13.77	13.00	10.91	9.53	8.63	12.36	14.10
Auckland	15.57	15.64	19.39	20.84	20.46	17.23	15.48	14.54	13.14	10.40	9.14	11.04	15.43
BOP / East Coast	16.65	14.68	20.67	22.23	21.36	18.59	16.78	15.08	13.95	11.43	9.42	11.87	16.40
Taranaki	17.65	16.24	18.78	20.15	19.88	16.52	15.31	14.56	13.16	11.29	9.75	9.72	15.01
Wtgn / Hawkes Bay	15.40	16.24	18.02	21.82	21.79	18.92	17.28	16.06	15.02	13.18	11.74	12.07	16.81
South Island	16.69	17.26	18.30	22.95	23.69	21.48	19.65	17.90	16.64	14.93	12.59	11.77	18.07
New Zealand	**15.72**	**15.91**	**18.76**	**20.85**	**21.19**	**17.99**	**16.75**	**15.11**	**14.16**	**11.61**	**10.59**	**11.52**	**16.03**

Average kg of milkfat per cow per day

Livestock Improvement Region	*2001 Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*2002 Jan*	*Feb*	*Mar*	*Apr*	*May*	*Season average*
Northland	0.68	0.66	0.75	0.80	0.79	0.72	0.62	0.61	0.52	0.49	0.46	0.58	0.65
Auckland	0.68	0.69	0.87	0.92	0.91	0.78	0.71	0.69	0.64	0.54	0.50	0.57	0.72
BOP / East Coast	0.72	0.63	0.90	0.95	0.93	0.81	0.73	0.68	0.66	0.57	0.50	0.57	0.74
Taranaki	0.86	0.76	0.89	0.93	0.94	0.81	0.75	0.74	0.70	0.63	0.57	0.55	0.76
Wtgn / Hawkes Bay	0.70	0.72	0.79	0.94	0.95	0.84	0.76	0.75	0.72	0.67	0.62	0.62	0.78
South Island	0.75	0.76	0.78	0.97	1.01	0.93	0.85	0.80	0.78	0.73	0.66	0.62	0.82
New Zealand	**0.71**	**0.71**	**0.84**	**0.91**	**0.94**	**0.81**	**0.76**	**0.71**	**0.69**	**0.60**	**0.57**	**0.60**	**0.75**

Average kg of protein per cow per day

Livestock Improvement Region	*2001 Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*2002 Jan*	*Feb*	*Mar*	*Apr*	*May*	*Season average*
Northland	0.52	0.51	0.59	0.63	0.62	0.56	0.48	0.46	0.39	0.36	0.35	0.44	0.50
Auckland	0.53	0.54	0.70	0.75	0.72	0.61	0.54	0.52	0.48	0.40	0.37	0.44	0.56
BOP / East Coast	0.57	0.51	0.73	0.79	0.74	0.64	0.58	0.52	0.50	0.42	0.38	0.45	0.58
Taranaki	0.64	0.58	0.69	0.75	0.73	0.62	0.57	0.56	0.52	0.46	0.42	0.41	0.58
Wgtn / Hawkes Bay	0.54	0.57	0.63	0.79	0.77	0.67	0.61	0.58	0.56	0.51	0.47	0.48	0.61
South Island	0.57	0.57	0.60	0.82	0.84	0.76	0.70	0.65	0.62	0.58	0.51	0.48	0.66
New Zealand	**0.54**	**0.55**	**0.67**	**0.75**	**0.75**	**0.64**	**0.60**	**0.55**	**0.53**	**0.45**	**0.43**	**0.46**	**0.59**

Average somatic cell count (000 cells per millilitre)

Livestock Improvement Region	*2001 Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*2002 Jan*	*Feb*	*Mar*	*Apr*	*May*	*Season average*
Northland	234	230	196	203	203	200	219	238	254	266	297	278	229
Auckland	215	223	178	172	166	165	182	200	219	241	276	299	203
BOP / East Coast	264	286	218	185	199	191	212	227	236	252	305	274	230
Taranaki	263	221	183	170	171	163	177	188	200	215	225	250	198
Wgtn / Hawkes Bay	248	214	238	193	193	186	206	220	221	235	243	289	220
South Island	242	241	240	213	198	187	205	221	222	225	234	266	221
New Zealand	**236**	**231**	**194**	**183**	**181**	**176**	**193**	**210**	**220**	**237**	**255**	**276**	**210**

iii) Breed averages

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

Holstein-Friesian, Jersey, Ayrshire and Holstein-Friesian/Jersey crossbred herd test statistics were analysed for the 2001/02 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 crossbred 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, five-year-old cows produced more milk and six-year-olds produced more milkfat and protein than any other age group. Six-year-olds dominated production for Jerseys, Holstein-Friesian/Jersey crossbreds and Ayrshires.

A crossbred is defined as having at most 13/16 of any one breed. For example, a Holstein-Friesian/Jersey crossbred 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 2001/02**

Holstein-Friesian

Age	*Number*	*Days in milk*	*Milk (litres)*	*Milkfat (kg)*	*Protein (kg)*	*Milkfat (%)*	*Protein (%)*
2	224,142	228	3,383	143.6	117.1	4.28	3.47
3	202,654	221	3,836	162.4	134.1	4.27	3.50
4	180,276	222	4,205	182.0	148.1	4.36	3.53
5	170,559	222	4,438	190.8	154.5	4.34	3.49
6	150,892	223	4,408	192.8	154.7	4.41	3.52
7	122,487	221	4,357	188.5	151.4	4.36	3.49
8	87,675	220	4,312	184.5	148.7	4.31	3.46
9	62,493	218	4,170	179.5	144.9	4.34	3.48
10+	84,677	213	3,834	166.1	132.9	4.36	3.47
Total	**1,285,855**	**222**	**4,054**	**174.3**	**141.3**	**4.33**	**3.49**

Jersey

Age	*Number*	*Days in milk*	*Milk (litres)*	*Milkfat (kg)*	*Protein (kg)*	*Milkfat (%)*	*Protein (%)*
2	75,098	230	2,503	139.8	98.8	5.61	3.95
3	68,916	225	2,719	155.8	110.9	5.76	4.09
4	63,322	226	2,999	171.7	123.1	5.75	4.11
5	52,237	225	3,104	175.9	127.2	5.69	4.11
6	43,703	225	3,123	178.0	127.8	5.73	4.10
7	36,442	223	3,123	175.4	126.7	5.64	4.06
8	28,121	221	3,049	171.8	122.9	5.65	4.04
9	18,467	220	2,992	167.3	120.3	5.61	4.03
10+	27,004	215	2,795	158.0	112.6	5.68	4.04
Total	**413,310**	**225**	**2,889**	**163.7**	**117.2**	**5.69**	**4.06**

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

Age	*Number*	*Days in milk*	*Milk (litres)*	*Milkfat (kg)*	*Protein (kg)*	*Milkfat (%)*	*Protein (%)*
2	133,686	229	3,083	150.9	114.2	4.94	3.71
3	115,987	224	3,429	169.5	129.5	4.99	3.79
4	107,856	225	3,766	187.6	143.5	5.02	3.82
5	71,898	225	3,981	193.8	149.1	4.92	3.76
6	59,245	224	4,007	196.6	150.2	4.95	3.76
7	51,196	224	3,986	192.8	148.0	4.88	3.73
8	36,239	221	3,946	188.4	144.8	4.82	3.69
9	25,434	220	3,823	182.1	140.6	4.81	3.69
10+	38,504	215	3,554	170.6	130.6	4.84	3.69
Total	**640,045**	**224**	**3,626**	**177.4**	**135.6**	**4.94**	**3.75**

Ayrshire

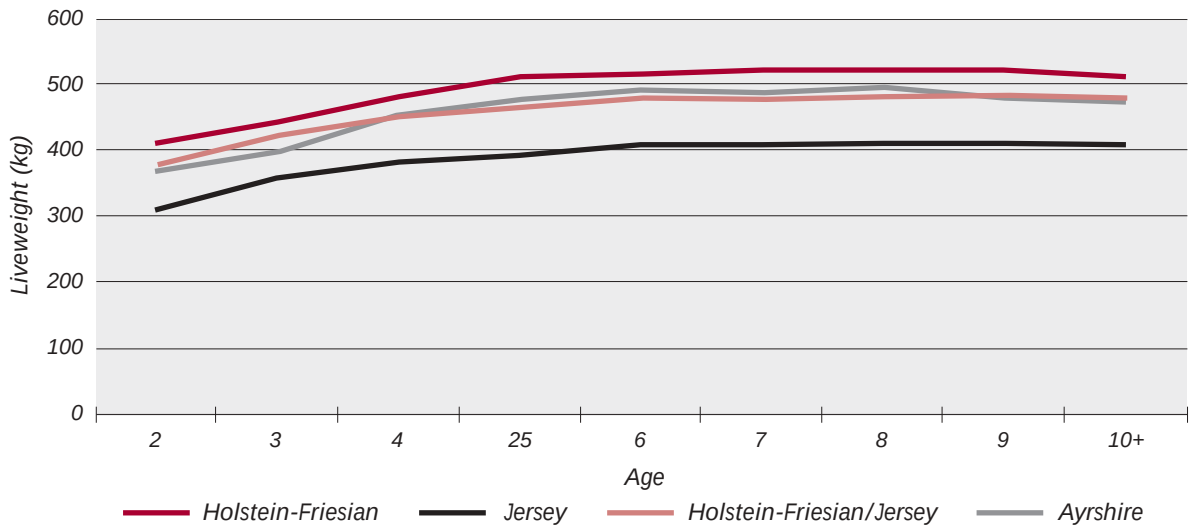
Age	Number	Days in milk	Milk (litres)	Milkfat (kg)	Protein (kg)	Milkfat (%)	Protein (%)
2	5,291	231	2,903	128.3	103.1	4.44	3.56
3	4,867	223	3,271	142.1	117.6	4.37	3.60
4	4,326	224	3,651	159.0	131.2	4.38	3.60
5	3,894	224	3,811	164.9	136.5	4.35	3.59
6	3,340	225	3,927	168.4	139.7	4.31	3.56
7	2,758	223	3,912	166.5	138.8	4.28	3.55
8	2,164	222	3,791	162.6	134.4	4.30	3.55
9	1,523	217	3,661	156.4	129.5	4.29	3.54
10+	2,296	215	3,493	149.5	123.5	4.29	3.54
Total	**30,459**	**224**	**3,533**	**152.9**	**126.0**	**4.35**	**3.57**

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. Holstein-Friesian/Jersey crossbreds and Ayrshires have similar average liveweights. Liveweight by age and breed is illustrated in Graph 4.3.

Table 4.7 **Liveweight by age and breed of cow in 2001/02**

	Holstein-Friesian		Jersey		Holstein-Friesian/Jersey		Ayrshire	
Age	Average liveweight (kg)	Number of cows	Average liveweight (kg)	Number of cows	Average liveweight (kg)	Number of cows	Average liveweight (kg)	Number of cows
2	409	14,255	311	4,790	374	8,798	367	163
3	445	1,563	358	753	423	1,703	401	25
4	486	1,469	385	683	454	1,534	453	17
5	513	1,344	395	503	467	1,047	478	11
6	520	1,147	409	438	480	948	495	17
7	525	879	411	340	478	766	490	8
8	526	587	413	221	484	529	499	12
9	525	394	414	141	488	306	484	8
10+	515	514	410	182	483	455	477	14
Total	**441**	**22,152**	**343**	**8,051**	**413**	**16,086**	**406**	**275**

Graph 4.3 **Liveweight by age and breed of cow in 2001/02**



C. Artificial Breeding statistics

- **3.3% increase in the number of cows to AB for 2001/02**

All artificial inseminations are recorded on the Livestock Improvement National Database. Table 4.8 provides a summary of cows mated to artificial breeding (AB) for the last nine seasons. The number of cows inseminated has increased every year, with the exception of 1998/99 which shows a minimal decrease of 0.1%. The percentage of cows to AB seems to have plateaued at around 80-85% for the last nine seasons (Graph 4.4). The number of yearlings to AB in the 2001/02 season is similar to that of the previous season (Table 4.8).

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

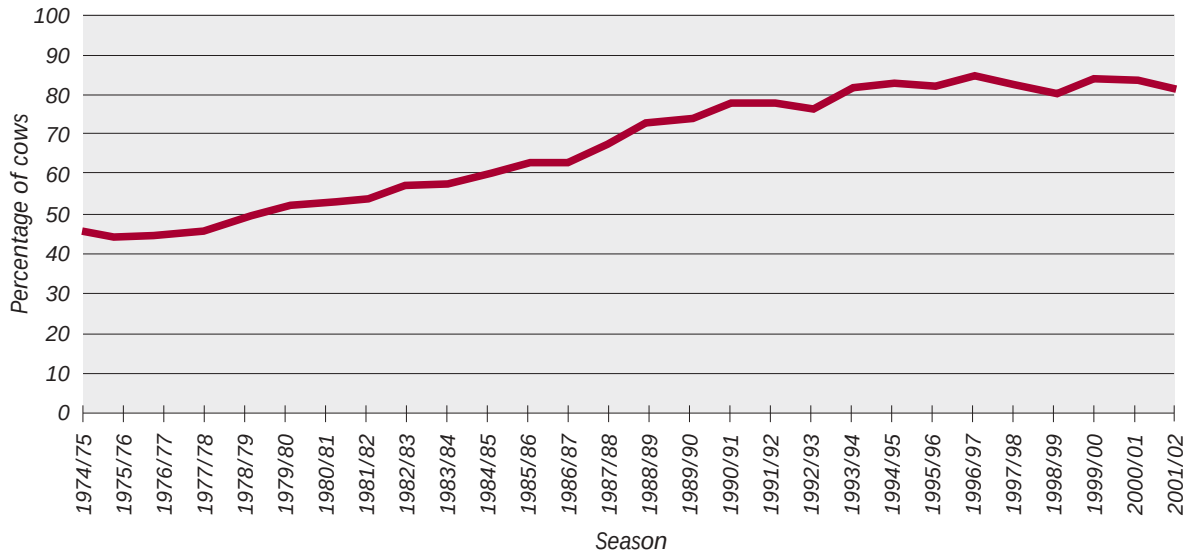
Cows to AB

Livestock Improvement Region	*1993/94*	*1994/95*	*1995/96*	*1996/97*	*1997/98*	*1998/99*	*1999/00*	*2000/01*	*2001/02*
Northland	249,293	253,662	257,557	262,429	258,057	244,115	246,617	257,752	260,377
Auckland	960,928	992,301	1,007,497	1,065,624	1,069,038	1,066,442	1,057,618	1,096,379	1,084,097
BOP / East Coast	147,388	151,469	152,836	155,267	156,602	153,294	152,751	157,162	154,154
Taranaki	388,152	398,201	398,571	399,435	404,930	395,636	405,605	427,683	421,905
Wgtn / Hawkes Bay	204,054	220,471	230,582	254,002	266,514	266,171	276,517	294,387	301,474
South Island	266,201	319,949	371,210	437,078	483,968	510,514	587,957	660,075	747,002
New Zealand	**2,216,016**	**2,336,053**	**2,418,253**	**2,573,835**	**2,639,109**	**2,636,172**	**2,727,065**	**2,893,438**	**2,969,009**

Yearlings to AB

Livestock Improvement Region	*1993/94*	*1994/95*	*1995/96*	*1996/97*	*1997/98*	*1998/99*	*1999/00*	*2000/01*	*2001/02*
Northland	19,555	21,159	22,034	20,613	15,966	11,188	9,825	10,437	10,942
Auckland	42,856	54,867	53,038	48,291	31,102	25,968	21,804	24,543	24,988
BOP / East Coast	13,286	16,773	17,501	15,753	10,317	7,854	7,250	8,492	8,929
Taranaki	15,740	19,099	17,864	11,909	8,428	5,748	5,700	7,698	7,528
Wgtn / Hawkes Bay	10,882	13,473	15,321	14,375	9,887	6,223	6,313	7,823	7,517
South Island	32,382	44,715	48,194	54,152	35,159	34,906	41,469	56,743	55,680
New Zealand	**134,701**	**170,086**	**173,952**	**165,093**	**110,859**	**91,887**	**92,361**	**115,736**	**115,584**

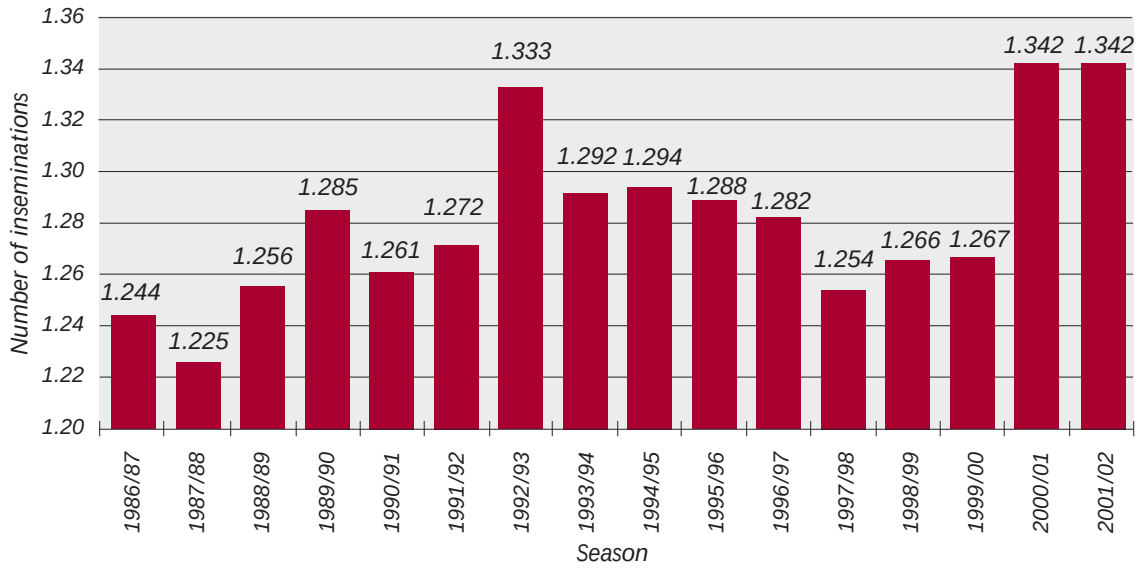
Graph 4.4 **Trend in the percentage of cows to Artificial Breeding since 1974/75**



Herd improvement – Artificial breeding statistics

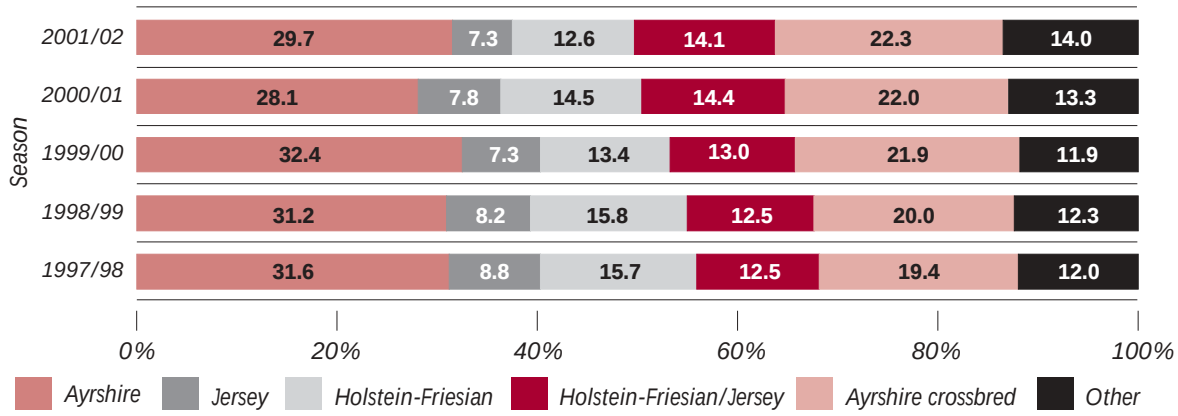
In 2001/02 the average number of inseminations per cow (1.34) as recorded on the Livestock Improvement Database, remained the same as the previous season (Graph 4.5).

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

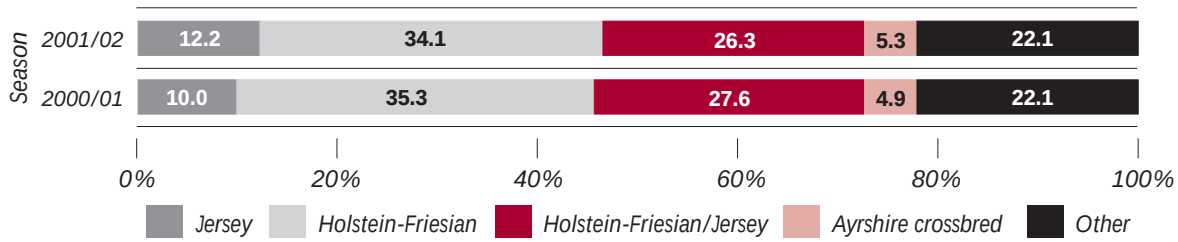


The use of Ayrshire, Holstein-Friesian, Jersey and semen over different cow breeds for the past five seasons is shown in the graphs below. The use of Crossbred semen is becoming more prevalent and is now included along with the other breeds (Graph 4.7). Ayrshire semen use over Ayrshire cows is 29.7% (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). The percentage of Holstein-Friesian semen over Holstein-Friesian cows continues to decrease (Graph 4.9).

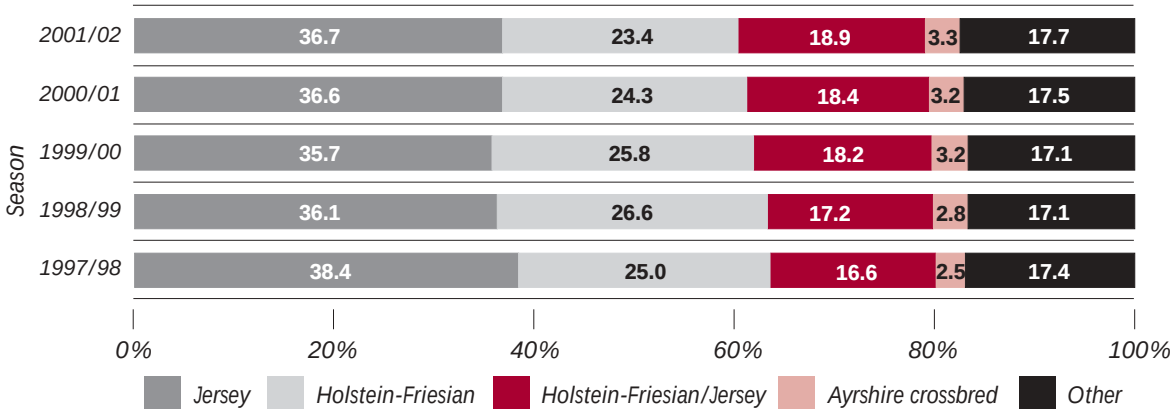
Graph 4.6 **Ayrshire semen usage (%) by cow breed for the last five seasons**



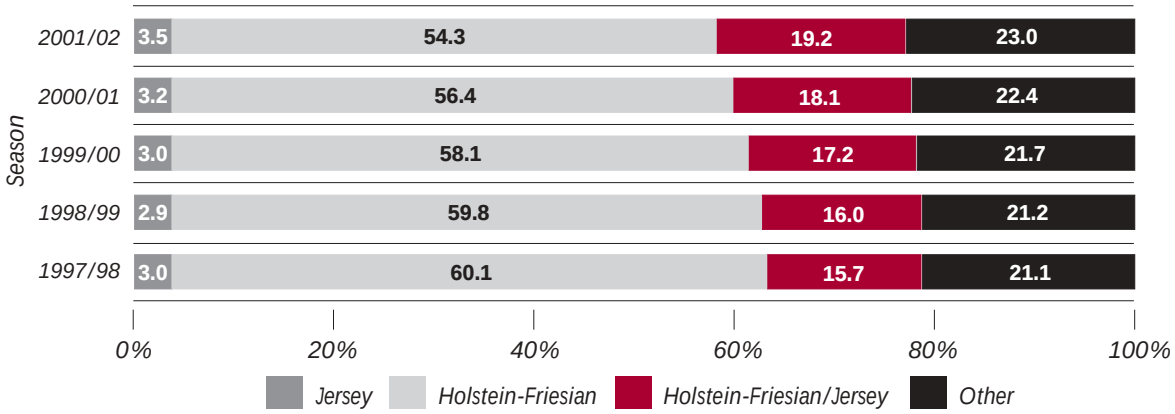
Graph 4.7 **Crossbred semen usage (%) by cow breed since 2000/01**



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

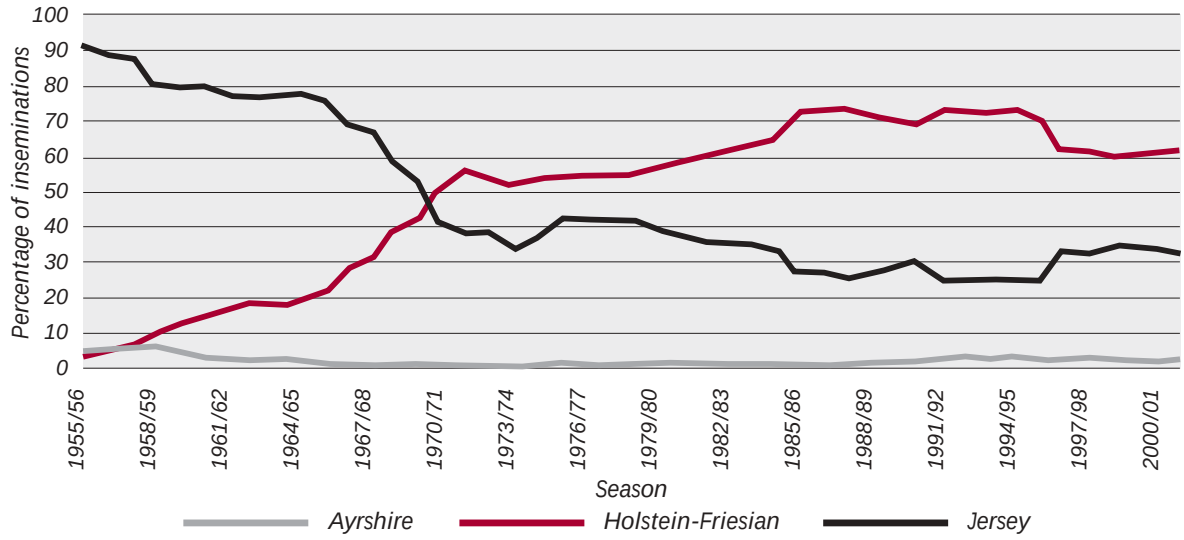


Graph 4.9 **Holstein-Friesian semen usage (%) by cow breed for the last five seasons**



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 Crossbred (not shown) reached 1% for the 2001/02 season and is expected to continue to increase.

Graph 4.10 **Trend in the percentage of inseminations of each major breed since 1955/56**



D. 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 allow farmers to select the most profitable animals for the future.

There are two types of evaluation 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 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 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 which 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 2002 are presented below (Table 4.9).

Table 4.9 **Economic values used from 18 May 2002**

	Milkfat ($/kg)	*Protein ($/kg)*	*Milk ($/kg)*	*Liveweight ($/kg)*	*Fertility (%)*	*Longevity ($/day)*
Breeding Worth	1.226	5.968	–0.074	–0.923	1.505	0.32
Production Worth	1.451	5.641	–0.072	–0.939	–	–
Lactation Worth	1.655	7.383	–0.090	–1.224	–	–

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 18 May 2002.

Table 4.10 shows the Breeding Values (BV) and BW by breed of all bulls born in 1997, first proven in the 2001/02 season, with a BW Reliability of 75% or greater.

Table 4.10 **Average Breeding Values and Breeding Worth of 1997 born bulls (reliability of 75% or greater)**

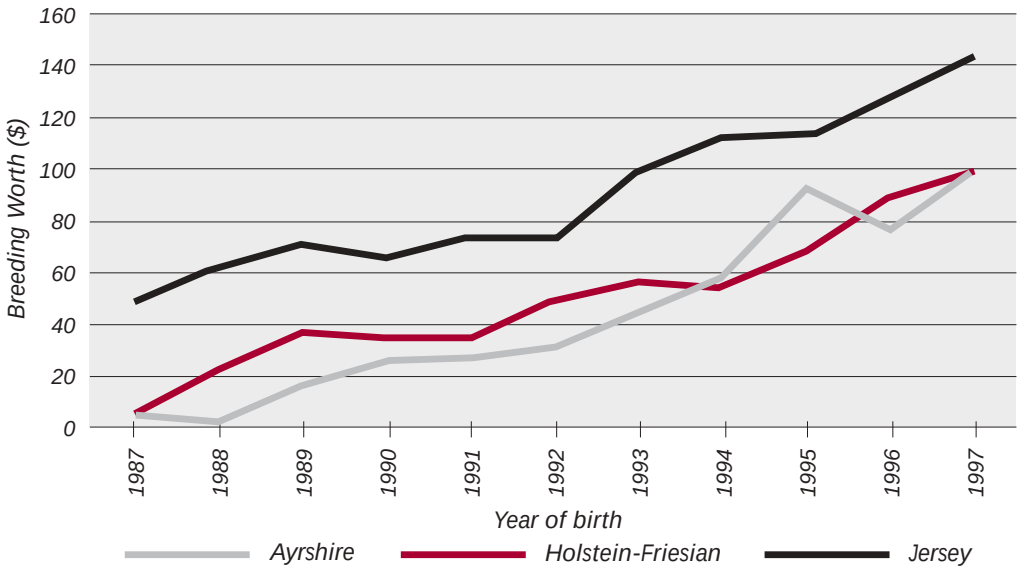
Breed	*Milkfat BV*	*Protein BV*	*Milk Volume BV*	*Liveweight BV*	*Fertility BV*	*Total Longevity BV[a]*	*BW*	*Number of Bulls*
Ayrshire	21.7	23.5	621	19.9	–2.2	121	100.2	14
Holstein Friesian	31.6	38.5	1154	81.8	–2.0	–5	99.7	197
Jersey	23.9	12.0	–59	–39.3	2.7	146	144.5	118

[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: 18 May 2002)

The genetic trend of proven dairy bulls is shown in Graph 4.11. Bulls born in 1997 are first proven in the 2001/02 season.

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



(Evaluation date: 18 May 2002)

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.

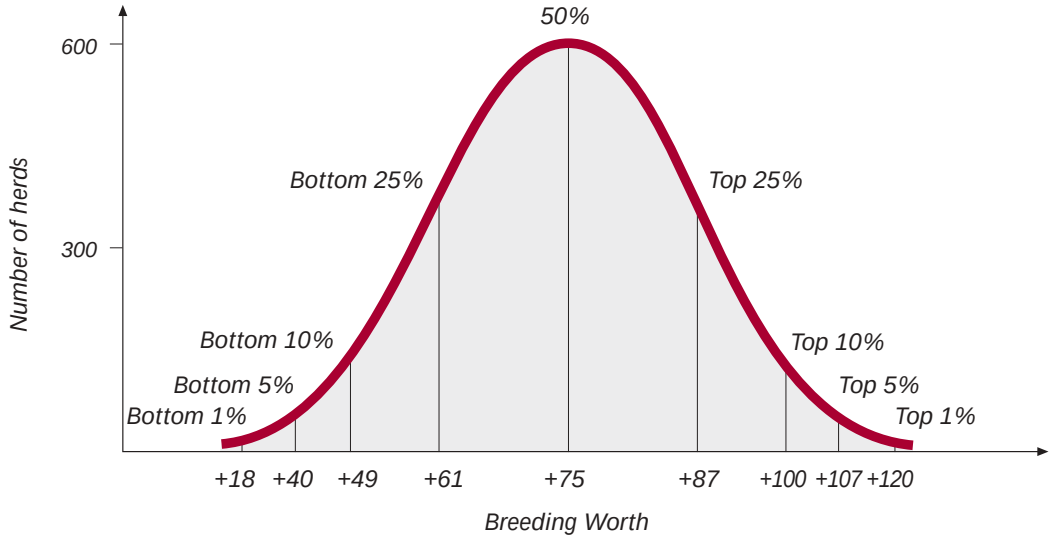
Table 4.11 **Number of Sires by birth year and breed (reliability of BW 75% or greater, includes overseas bulls)**

Year of Birth	Number of Sires	Holstein-Friesian	Jersey	Ayrshire	Other Breeds
1987	320	193	94	18	15
1988	322	194	97	22	9
1989	371	217	117	20	17
1990	357	216	105	25	11
1991	390	251	100	27	12
1992	392	245	113	27	7
1993	363	218	112	29	4
1994	390	233	122	31	4
1995	412	244	125	36	7
1996	372	208	134	26	4
1997	331	197	118	14	2

(Evaluation date: 18 May 2002)

The distributions of BW and PW for **herds** presented below (Graphs 4.12, 4.13) are based on all cows recorded on the Livestock Improvement Database with a test number in herds signed up for herd testing for the 2001/02 season. For example, Graph 4.12 shows that 50% of New Zealand herds had a BW of 75 or above and that 25% of New Zealand herds had a BW of 87 or above.

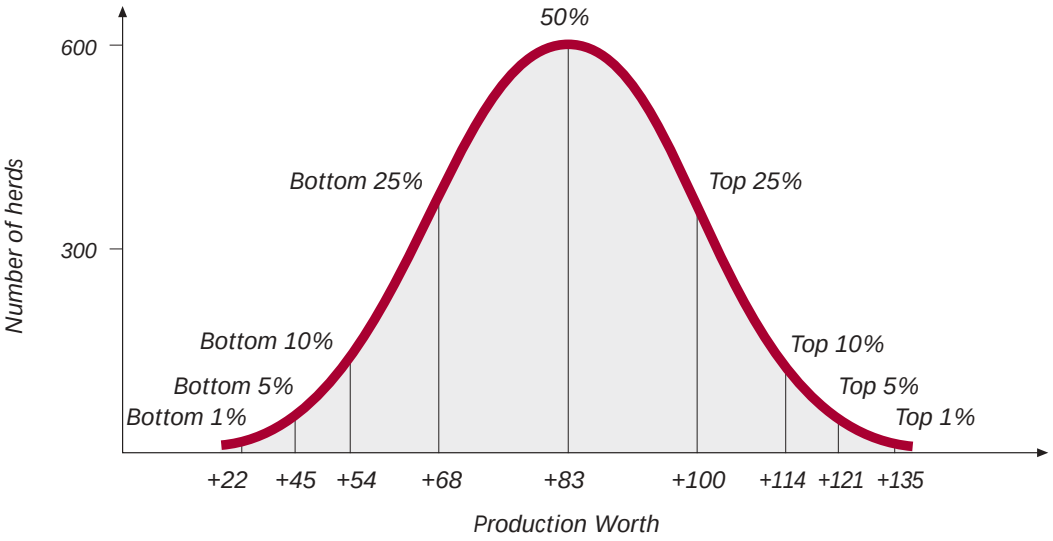
Graph 4.12 **Distribution of herd Breeding Worth in 2001/02**



(Evaluation date: 18 May 2002)

The distribution graph for PW for **herds** in the 2001/02 season is based on all cows recorded with a test number in herds signed up for herd testing for 2001/02. Graph 4.13 shows that 50% of New Zealand herds had a PW of 83 or above and that 25% of New Zealand herds had a PW of 100 or above.

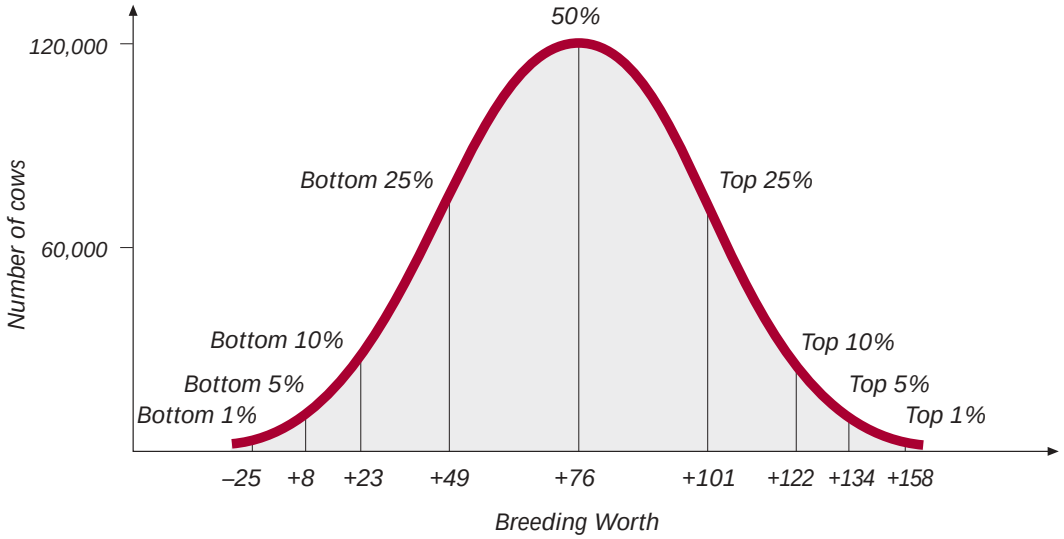
Graph 4.13 **Distribution of herd Production Worth in 2001/02**



(Evaluation date: 18 May 2002)

The distribution graphs for **cows** presented below (Graphs 4.14, 4.15) are based on all cows recorded on the Livestock Improvement Database with a test number in herds signed up for herd testing for the 2001/02 season. Graph 4.14 shows that 50% of New Zealand cows had a BW of 76 or above and that 25% of New Zealand cows had a BW of 101 or above.

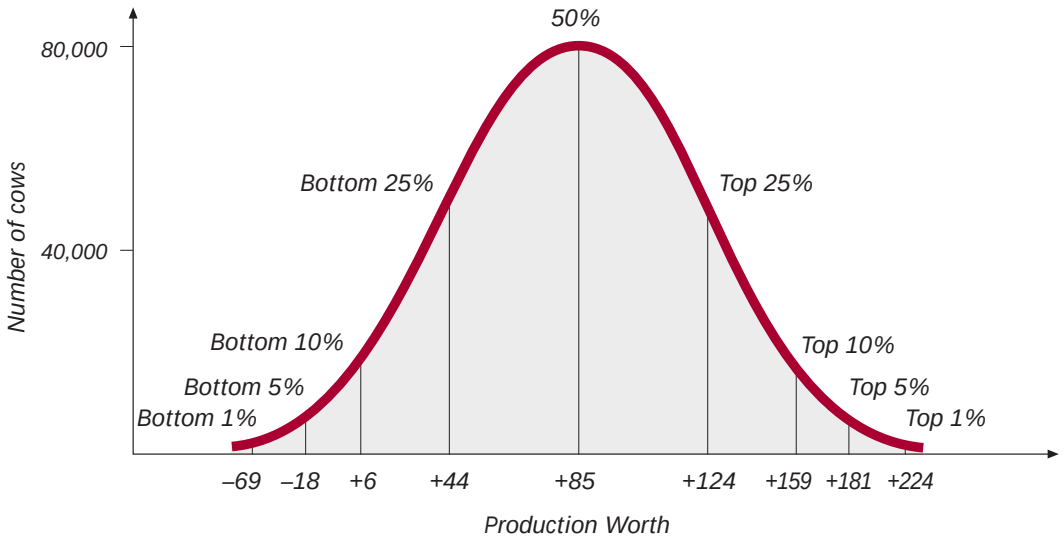
Graph 4.14 **Distribution of cow Breeding Worth in 2001/02**



(Evaluation date: 18 May 2002)

The distribution graph for **cows** presented below (Graph 4.15) are based on all cows recorded with a test number in herds signed up for herd testing for the 2001/02 season. Graph 4.15 shows that 50% of New Zealand cows had a PW of 85 or above and that 25% of New Zealand cows had a PW of 124 or above.

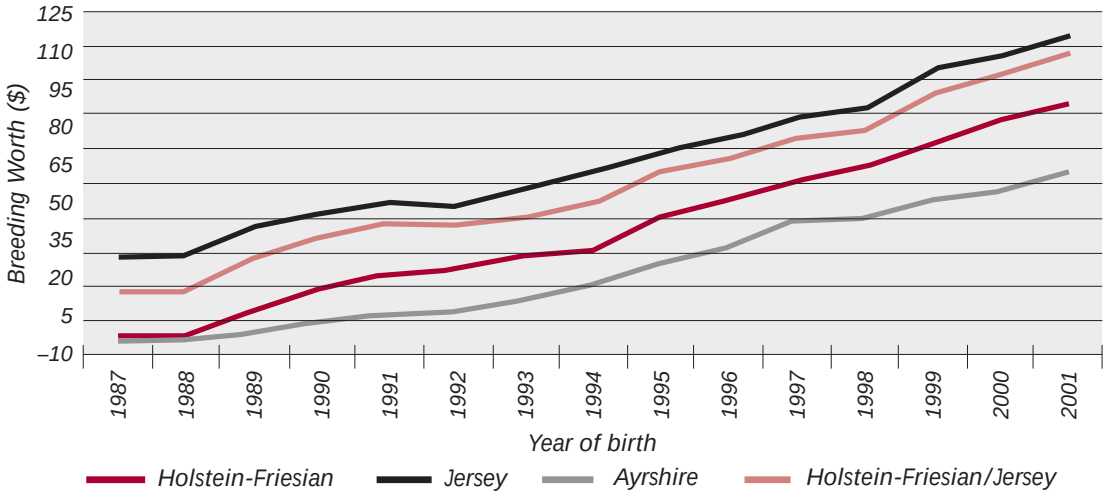
Graph 4.15 **Distribution of cow Production Worth in 2001/02**



(Evaluation date: 18 May 2002)

The genetic trend for cows is based on all cows (alive or dead) recorded on the Livestock Improvement Database in the 2001/02 season. Also included are the estimated BW and PW for replacement stock (2000 and 2001 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.

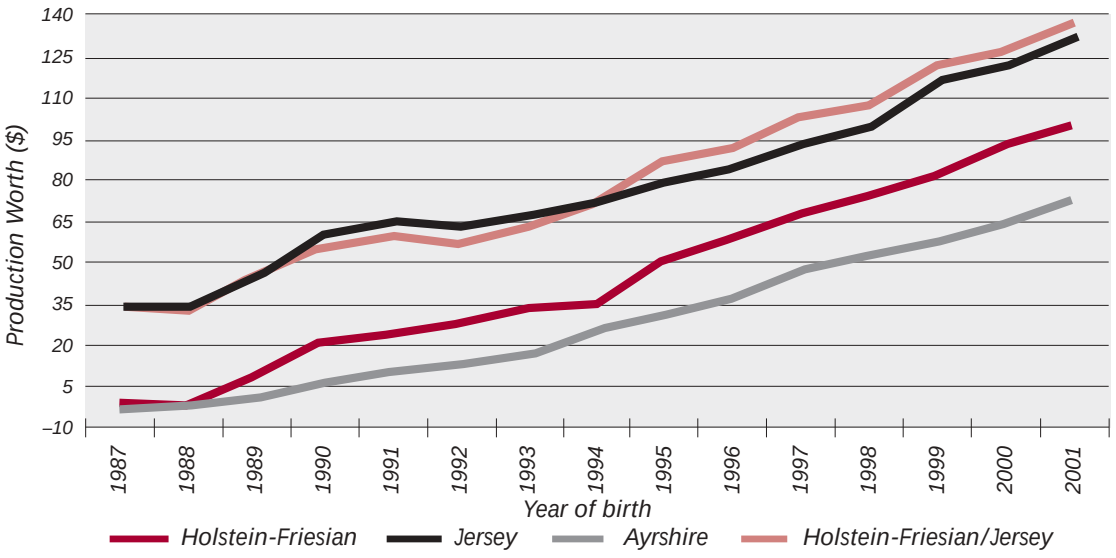
Graph 4.16 **Genetic trend in Breeding Worth for all cows in 2001/02**



(Evaluation date: 18 May 2002)

The trend for PW by breed is presented in Graph 4.17. Holstein-Friesian/Jersey crossbreds 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 2001/02**



(Evaluation date: 18 May 2002)

Table 4.12 shows the average BV and BW by breed, of all 1999 born cows. The Jersey breed has the highest BW at 114.8. The Holstein-Friesian cows have the highest milkfat, protein, and milk volume BVs. All evaluations are comparable across breeds.

Table 4.12 **Average Breeding Worth and Breeding Value of all cows by breed born in 1999**

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	83.0	26.2	29.1	898	58.3	0.0	96	400146
Jersey	114.8	18.7	7.8	–50	–44.0	0.9	93	118750
Ayrshire	57.5	10.3	15.3	458	10.8	–1.8	50	9453
Holstein-Friesian /Jersey	104.6	24.3	19.0	435	6.9	0.5	110	218039
Guernsey	–7.0	–0.3	4.5	117	19.4	0.4	–222	157
Milking Shorthorn	0.0	–2.5	6.8	198	21.8	–1.4	–34	901
Brown Swiss	–16.6	–1.8	9.5	241	46.7	–4.0	–206	115
Other	71.7	16.8	17.2	465	16.6	–0.3	47	26804
Weighted Average	93.1	24.0	22.4	601	26.1	0.2	97	774365

[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: 18 May 2002

Survivability is measured by the percentage of cows that have a lactation recorded for consecutive years. The 2001/02 season 2-3 years figure is the percentage of cows that were milking as two-year-olds in the 2000/01 season and are now milking as three-year-olds in the 2001/02 season. Table 4.13 shows that for the 2001/02 season the highest percentage of survival is in animals ageing from 3-4 years (88.4%), followed by animals ageing from 4-5 years (86.8%).

Table 4.13 **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

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 their own commercial arrangements for sale of dairy products.

Payments to seasonal supply farmers are still based upon 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.

- **Average dairy company payout was $5.35**

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	*NZDB advance payout ($/kg milksolids)*[a]	*Average Dairy Company total payout ($/kg milksolids)*	*Dairy Company payout (inflation adjusted)*[b]
1973/74	–	0.76	6.55
1974/75	0.78	0.75	5.87
1975/76	0.81	0.83	5.66
1976/77	0.88	0.87	5.08
1977/78	0.96	0.98	5.00
1978/79	0.99	1.03	4.67
1979/80	1.20	1.22	4.94
1980/81	1.52	1.52	5.19
1981/82	1.91	1.95	5.80
1982/83	2.07	2.11	5.35
1983/84	2.01	2.09	4.91
1984/85	2.28	2.33	5.23
1985/86	2.30	2.29	4.40
1986/87	1.90	2.03	3.54
1987/88	2.07	2.34	3.42
1988/89	3.05	3.28	4.50
1989/90	3.33	3.59	4.73
1990/91	2.12	2.42	2.96
1991/92	2.98	3.34	3.98
1992/93	3.25	3.66	4.31
1993/94	2.90	3.32	3.86
1994/95	3.00	3.40	3.91
1995/96	3.60	3.99	4.39
1996/97	3.18	3.63	3.92
1997/98	3.00	3.42	3.64
1998/99	3.25	3.58	3.75
1999/00	3.35	3.78	3.98
2000/01	4.60	5.01	5.17
2001/02	–	5.35	5.35

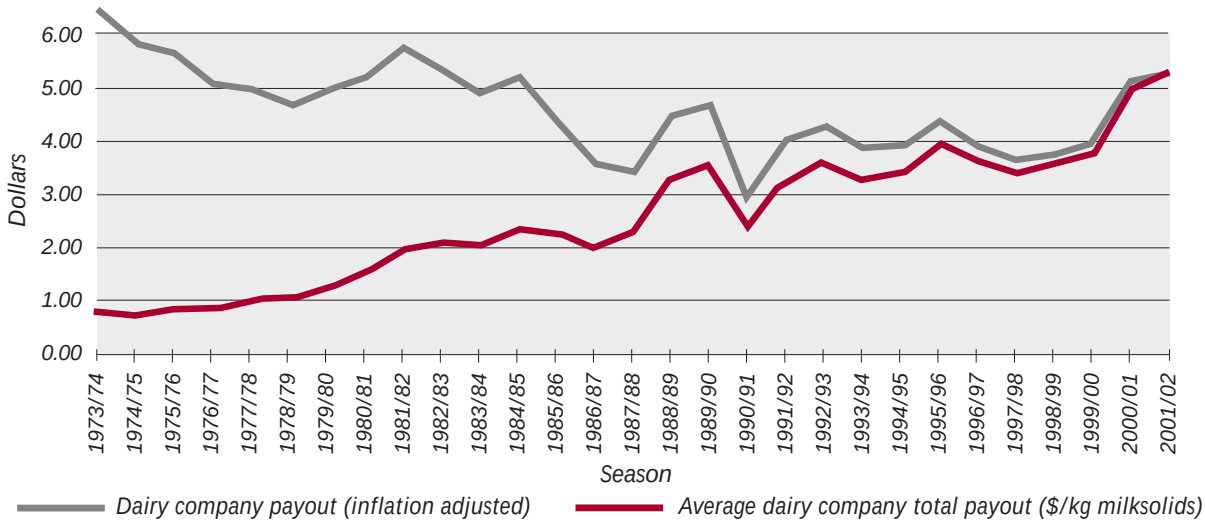
[a] *No longer applicable*

[b] *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

- **High payout sustained for second season**

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



ii) Dairy farm land sale values

- **Average sale price of farms exceeds $1,000,000**

The average sale price of dairy farms ($1.06 million) continues to increase compared with previous seasons (Table 5.2). The average dairy farm price per kilogram of milksolids continues to gain steadily.

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	Price per hectare	Inflation adjusted average price per hectare[a]	Price per kg milkfat[b]	Price per kg milksolids[c]
1982	813	276,042	719,705	52	5,309	13,842	21.3	12.2
1983	527	257,373	620,217	46	5,587	13,464	20.4	11.7
1984	618	301,076	693,115	49	6,189	14,248	21.9	12.6
1985	505	298,746	589,860	49	6,044	11,934	21.0	12.1
1986	274	251,165	449,191	47	5,298	9,475	18.4	10.6
1987	504	270,180	406,021	52	5,212	7,832	16.8	9.7
1988	576	278,650	393,602	56	5,013	7,081	16.0	9.2
1989	1,013	325,847	440,708	59	5,561	7,521	17.8	10.2
1990	868	373,553	469,436	58	6,467	8,127	21.8	12.5
1991	538	362,819	443,582	58	6,283	7,682	21.7	12.5
1992	897	446,979	540,975	62	7,183	8,694	23.1	13.3
1993	834	543,984	650,376	61	8,903	10,644	31.0	17.8
1994	784	704,245	832,779	61	11,640	13,764	37.5	21.6
1995	672	775,110	876,352	58	13,400	15,150	41.9	24.1
1996	784	785,510	870,822	60	13,187	14,619	41.6	23.9
1997	520	674,809	739,760	54	12,388	13,580	38.5	22.1
1998	496	704,309	759,026	64	11,076	11,936	32.0	18.4
1999	600	769,606	832,714	72	10,759	11,641	33.1	19.0
2000	576	856,374	908,428	80	10,740	11,393	35.3	20.3
2001	941	1,032,618	1,061,057	74	13,959	14,343	41.2	23.7
2002[d]	378	1,062,630	1,062,630	73	14,554	14,554	46.3	26.6

Source: Valuation 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)*

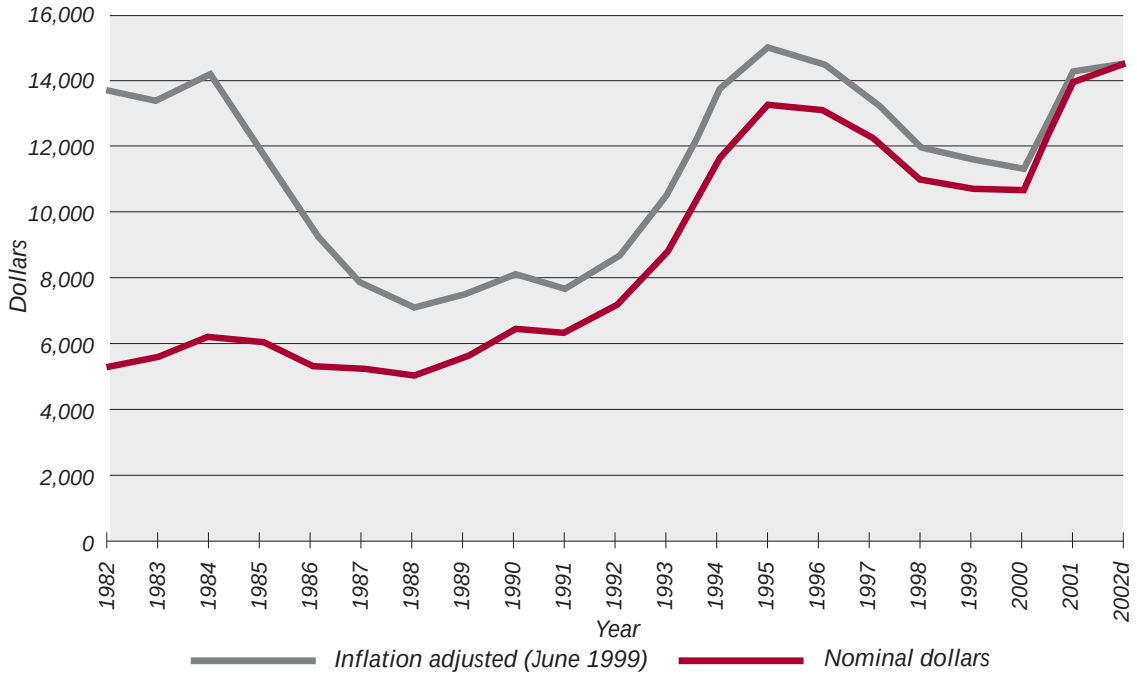
[c] *Price per kg milksolids has been derived from price per kg milkfat (1978 to 1995)*

[d] *Half year only – sales to June 2002*

- **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. Since 1995 there has been a decrease in average price per hectare. However, this trend reversed decisively in 2001 and the price per hectare is currently $14,554. 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**



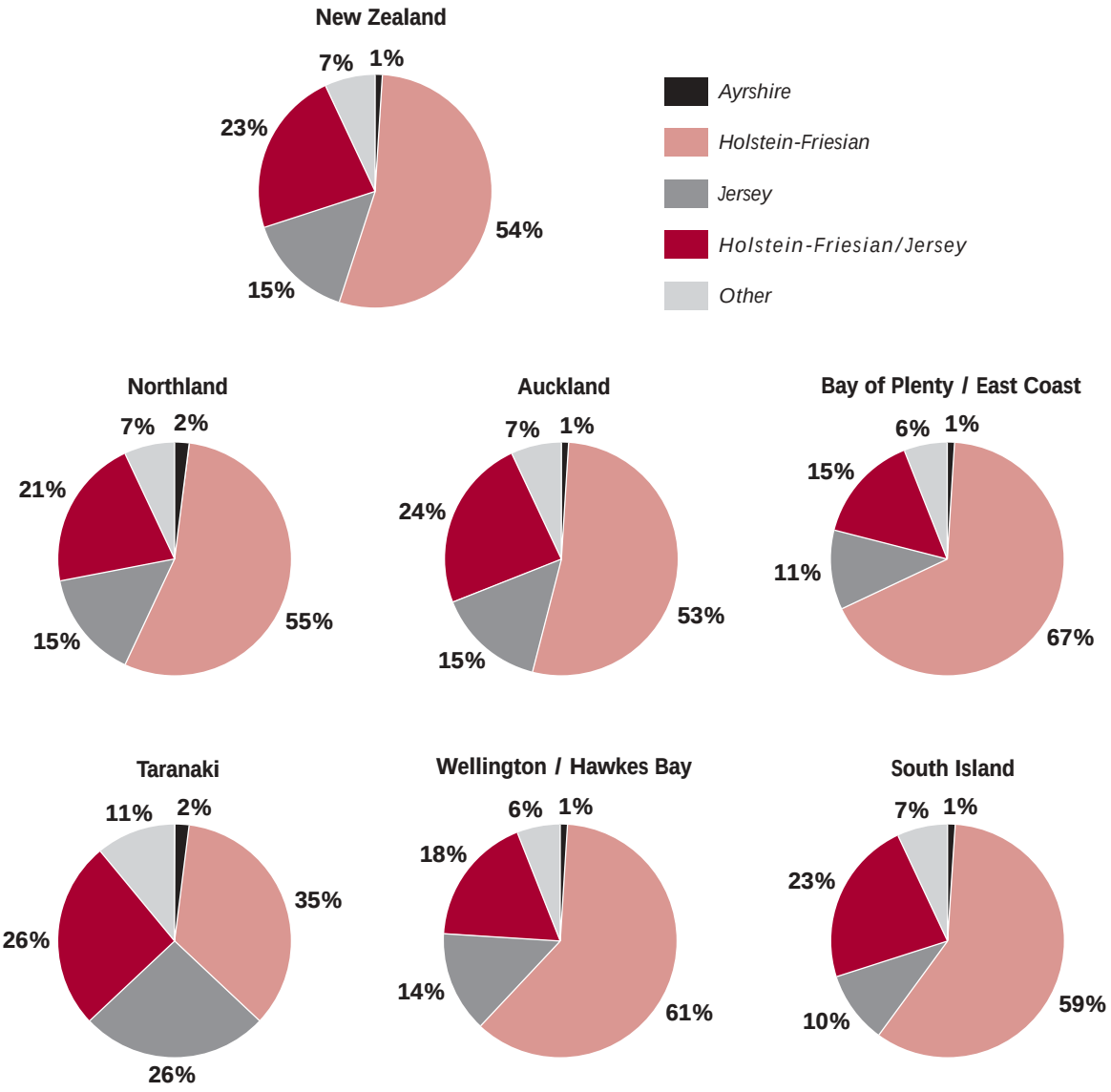
B. Breed breakdown

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. Crossbred 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 crossbred and Ayrshire cows with the remaining breeds grouped into Other. Holstein-Friesian is the prevalent breed in every region except Taranaki. Bay of Plenty/East Coast region continues to have the highest percentage of Holstein-Friesian cows (68%), whereas Taranaki has the highest proportion of Jerseys (26%) and Holstein-Friesian/Jersey crossbreds (25%).

Graph 5.3 **Breed percentages of cows in each region in 2001/02**



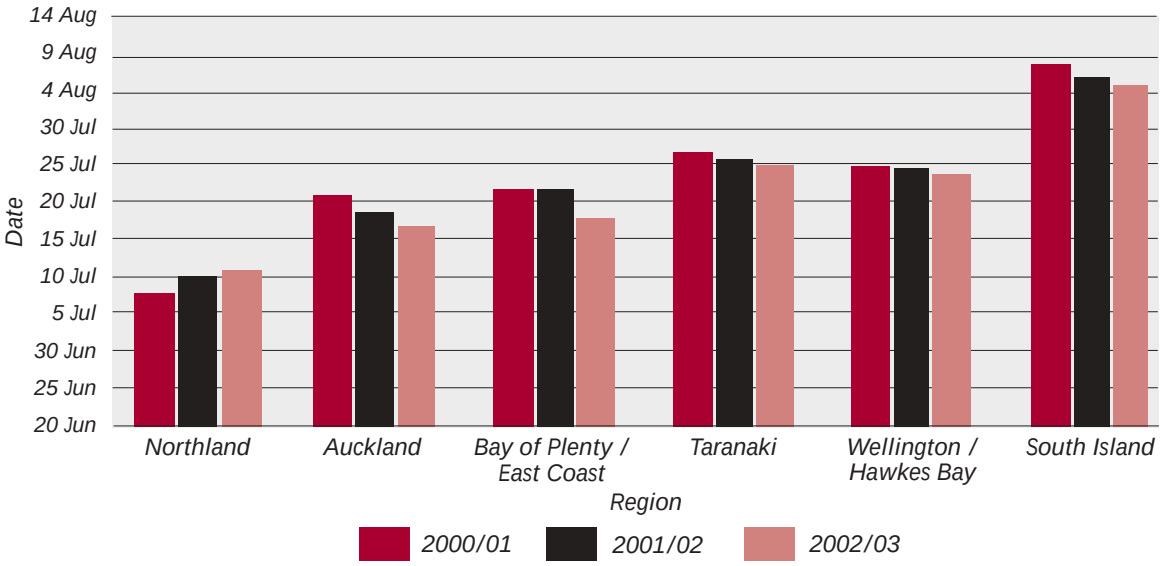
C. Planned start of calving and median calving dates

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.

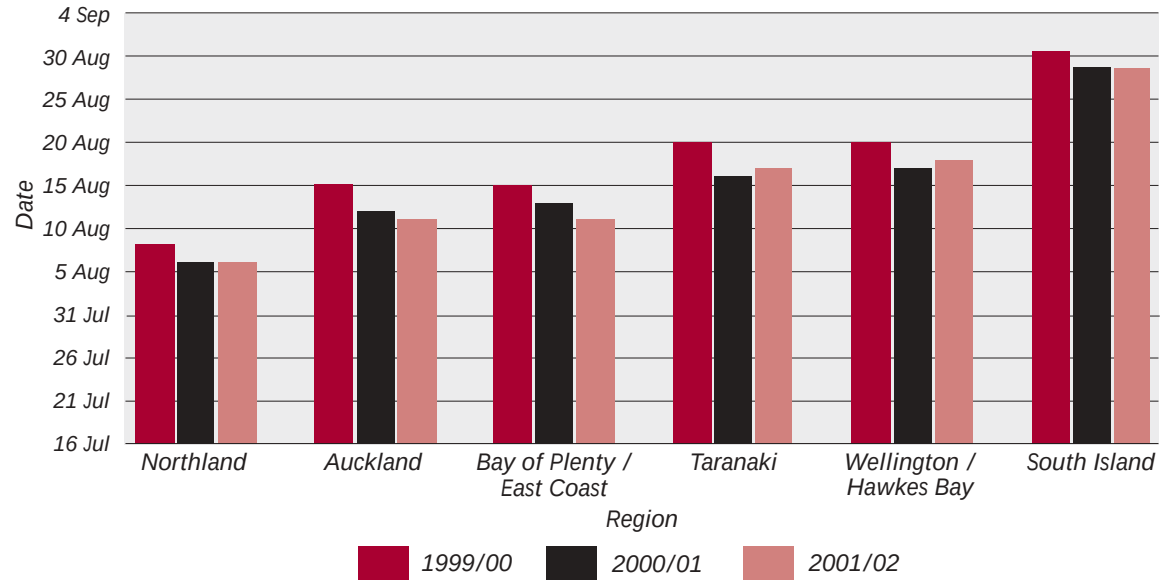
The forecast planned start of calving dates for mature cows for the 2002/03 season compared to the dates previously forecast for 2000/01 and 2001/02 seasons are shown in Graph 5.4.

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 2001/02, all farms with contract milkers could not be identified, consequently, any farms with contract milkers are included with owner-operators.

- **38% of all milkers are sharemilkers**
- **63% 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 2001/02, 5,164 (38%) New Zealand dairy farms operated under a sharemilking agreement. Sixty-three percent (3,240) of all sharemilkers have 50/50 agreements. On average, owner-operators tend to farm smaller herds on smaller properties, while lower order sharemilkers tend to farm larger herds on larger properties.

Table 5.3 **Herd analysis by operating structure in 2001/02**

Operating structure	*Number of herds*	*Percentage of herds*	*Average herd size*	*Average effective hectares*	*Average cows per effective hectare*
Owner-operators	8,476	62.1	251	97	2.61
Sharemilkers:					
Less than 20%	127	0.9	444	153	2.94
20-29%	1,259	9.2	300	111	2.80
30-39%	259	1.9	239	94	2.62
40-44%	43	0.3	299	114	2.80
50/50 (45-54%)	3,240	23.7	306	113	2.78
over 54%	236	1.7	281	108	2.70
All sharemilkers	5,164	37.8	303	112	2.78
Unknown	9	0.1			
All farms	**13,649**		**271**	**103**	**2.67**

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 higher production per farm, followed by 50/50 sharemilkers. Owner-operators and 30-39% sharemilkers have the lowest average production.

Table 5.4 **Farm production analysis by operating structure in 2001/02**

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	926,906	44,562	78,207	458	802	175	306
Sharemilkers:							
Less than 20%	1,690,486	80,996	142,594	546	960	187	329
20 - 29%	1,093,580	53,057	92,921	496	867	177	309
30 - 39%	836,695	41,532	72,369	456	793	174	303
40 - 44%	1,067,831	53,059	92,711	491	856	173	302
50/50 (45-54%)	1,122,500	54,547	95,633	493	862	177	310
over 54%	1,066,188	51,202	90,088	482	845	177	311
All Sharemilkers	1,112,054	54,016	94,682	493	862	177	310
Unknown	848,763	41,096	71,965	447	783	177	308
All farms	996,904	48,137	84,437	471	824	176	307

Note: Contract milkers included with owner-operators

General statistics – Operating structures

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 farms.

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

Operating structure	*1992/93*	*1993/94*	*1994/95*	*1995/96*	*1996/97*	*1997/98*	*1998/99*	*1999/00*	*2000/01*	*2001/02*
Owner-operators	56.7	57.2	65.7	65.0	63.6	63.1	62.7	62.7	61.8	62.1
Contract	–	0.7	0.6	0.8	1.3	1.2	1.1	0.9	0.8	–
Sharemilkers:										
29%	0.9	0.8	1.1	0.9	0.8	0.8	0.8	0.7	*	*
39%	0.9	0.7	0.9	0.9	0.7	0.6	0.5	0.5	*	*
50%	19.4	18.6	24.9	24.5	23.4	24.0	23.7	23.7	24.3	23.7
Other	4.0	4.0	6.8	7.8	9.3	10.2	11.2	11.5	13.1	14.1
All Sharemilkers	25.1	24.1	33.7	34.2	34.3	35.7	36.2	36.4	37.3	37.8
Unknown	18.2	18.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.1

– Not available

** Included in "Other"*

Note: From 1989/90 owner-operators includes leased farms

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

Operating structure	*1992/93*	*1993/94*	*1994/95*	*1995/96*	*1996/97*	*1997/98*	*1998/99*	*1999/00*	*2000/01*	*2001/02*
Owner-operators	8,201	8,344	9,627	9,581	9,368	9,263	9,005	8,694	8,592	8476
Contract	–	97	84	121	195	172	154	126	113	–
Sharemilkers:										
29%	130	118	158	133	120	124	114	98	*	*
39%	126	108	138	138	108	95	76	66	*	*
50%	2,803	2,714	3,642	3,614	3,455	3,522	3,403	3,280	3,372	3,240
Other	572	583	994	1,149	1,367	1,497	1,610	1,597	1,815	1,924
All Sharemilkers	3,631	3,523	4,932	5,034	5,050	5,238	5,203	5,041	5,187	5,164
Unknown	2,626	2,633	6	0	128	0	0	0	0	9
Total	**14,458**	**14,597**	**14,649**	**14,736**	**14,741**	**14,673**	**14,362**	**13,861**	**13,892**	**13,649**

– Not available

** Included in "Other"*

6 Disease control

A. Enzootic Bovine Leucosis (EBL) eradication scheme

- **Continued progress since the scheme began in 1997**
- **Testing and the culling of all positive animals to slaughter are now conditions of supplying milk to dairy companies**
- **159 herds (1.2%) have a Positive EBL status**
- **10,348 herds (76%) achieve a Free herd status**

Livestock Improvement Animal Health Section is responsible for scheme operations including herd surveillance screening, individual animal testing, database operations and the recording of stock movements. Veterinarians and AgriQuality staff are contracted to collect the required blood samples from infected herds.

To achieve the scheme objective to eradicate EBL the main requirements are:

- **Remove all known infected animals from positive herds**
- **Screen all dairy herds to a level sufficient to demonstrate disease freedom**

The 2001/02 season is the fifth year of an eight-year national programme to eradicate EBL. Dairy companies have now incorporated EBL testing and culling requirements into their conditions of supply for all dairy farmers. When EBL disease freedom is achieved a lower level of continuing surveillance will be required to assure the industry remains free of EBL.

Progress to date

The number of infected Blood Positive status herds has been reduced from a peak of 928 (6.3%) in 1998 to 159 (1.2%) in May 2002. Within this group there were 71 herds with 252 known positive animals recorded on database. The remaining Blood Positive status herds have no identified positive animals and are scheduled for confirmatory testing to identify any new infected animals or achieve an EBL negative in the 2002/03 season.

A total of 8,579 EBL positive animals have been culled since the scheme commenced.

At May 2002 there were 10,348 herds with an EBL Free status (Table 1). These herds have been tested negative for at least three years using the aggregate ELISA testing on milk samples and represent 76% of all dairy herds that supply milk to a dairy company. These herds that have achieved an EBL Free status are then screened every second season. A further 2,410 herds have had at least one negative annual screen by the beginning of May 2002. One hundred and ninety-six herds had a Suspect status resulting from the purchase of animals from infected or other suspect herds. There were 40 Milk Test Positive herds that have not undertaken the necessary blood testing.

Table 6.1 **EBL status summary for dairy herds near the end of the 2001/02 season (May 2002).**

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.

Herd EBL Status	*Herds 01/02*	*% 01/02*
EBL Free	10,348	75.8
Negative	2,410	17.7
Untested/New locations	496	3.6
Suspect	196	1.4
Blood Positive	159	1.2
Milk Test Positive	40	0.3
Total	**13,649**	**100.0**

Table 6.2 **EBL Scheme testing activity for the 2001/02 dairy season and the percentage returning a positive result.**

Dairy herds are screened annually except those that have achieved an EBL Free status. These are screened every second season.

Testing activity 2001/02	*Number tested*	*Number tested positive*	*% tested positive*
Non Herd Test milk screening	1,455	54	3.7
Herd Test milk screening	7,162	108	1.5
Positive and Suspect re-screen tests of milk	481	76	15.8
Positive herd blood testing farm visits	513	84	16.4

B. Tuberculosis (Tb) control

- **Number of infected dairy herds about the same as 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 2001/02 the number of infected dairy herds (96) and number of dairy cattle with Tb (328) continues to a decrease compared with previous seasons. Wellington, with 109 Tb dairy cattle experienced a large increase compared with previous seasons (16 in 2000/01 and 22 in 1999/00), although the number of infected herds remained similar.

Table 6.3 **Tuberculosis (Tb) testing and results in 2001/02**

Region	*Vector Status*	*Number of infected dairy herds June 2002*	*Number of dairy cattle primary tested*	*Number of Tuberculous[a] dairy cattle*
Northland	Free	0	104,912	0
Auckland	Free	0	48,405	0
	Risk	–	9,203	0
Waikato	Free	11	1,246,478	27
	Risk	6	172,886	26
Bay of Plenty	Free	0	86,290	1
	Risk	1	27,523	5
Gisborne	Free	0	–	–
Hawkes Bay	Free	0	24,941	0
	Risk	0	3,345	0
Taranaki	Free	0	163,505	1
Manawatu/Wanganui	Free	2	131,210	2
	Risk	0	86,465	0
Wellington	Risk	12	117,871	109
Nelson/Marlborough	Free	1	81,023	2
	Risk	5	12,541	12
West Coast	Free	3	4,620	2
	Risk	27	166,784	100
Canterbury	Free	3	200,310	4
	Risk	2	89,930	6
Otago	Free	2	96,316	6
	Risk	13	117,976	13
Southland	Free	3	165,590	4
	Risk	5	95,287	8
North Island	Total	32	2,223,034	171
	Free	13	1,805,741	31
	Risk	19	417,293	140
South Island	Total	64	1,030,377	157
	Free	12	547,859	18
	Risk	52	482,518	139
New Zealand	Free	25	2,353,600	49
	Risk	71	899,811	279
New Zealand	Total	96	3,253,411	328

Sourced from Animal Health Board Annual Report for the year ending 30 June 2001

[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