
# Dairy Statistics

2003-2004

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 2003/04* 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 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 1.2 billion kilograms of milksolids processed***

In 2003/04, dairy companies processed 14.6 billion litres of milk and 1.25 billion kilograms of milksolids (see Table 2.1). At 1,254 million kilograms, total milksolids processed represents a 5.3% increase from the 1,191 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 |
| 2003/04 | 14,599 | 716 | 538 | 1,254 |

***Note:*** *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.*

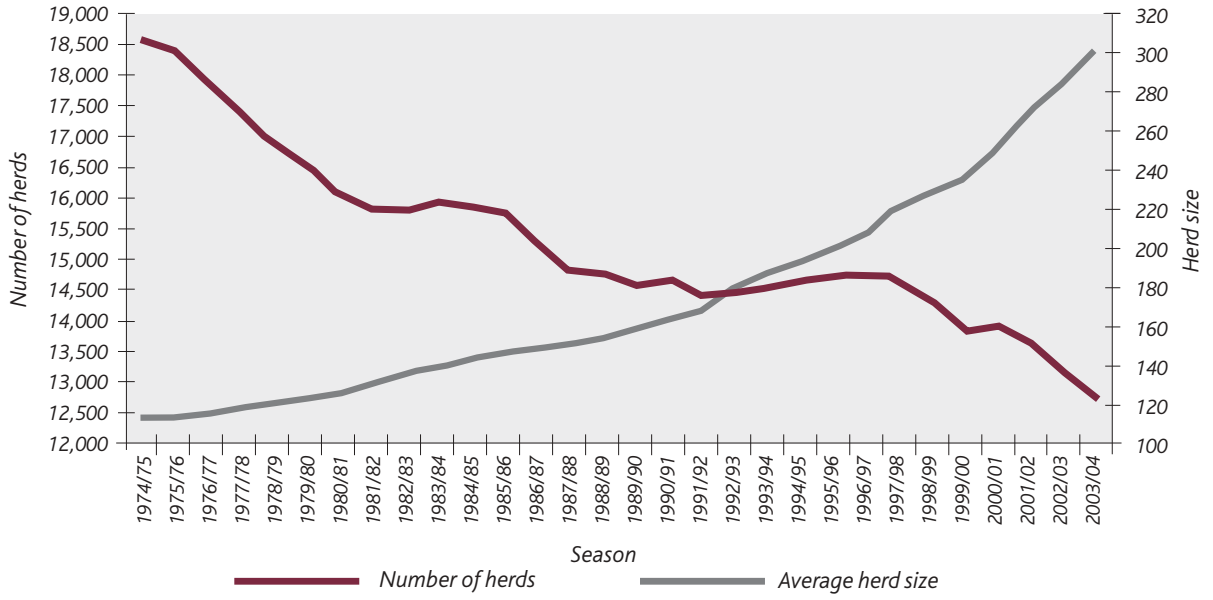
### ii) Population

- ***Number of herds continue to decline***
- ***Average herd size now over 300***
- ***Cow numbers increase by 110,000***

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 2003/04 season dropped by 389, to 12,751, compared with the previous season.

The average herd size increased to 302 in 2003/04, 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 2003/04 season to 3.851 million (Table 2.2), an increase of about 3%, compared with an increase of 1.3% in the previous season. Average effective hectares remained the same at 111 hectares. An average of 2.75 cows per hectare is the highest recorded. Total effective hectares (runoff excluded) were 1.42 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 |
| 2003/04 | 12,751 | 3,851,302 | 1,421,147 | 302 | 111 | 2.75 |

*– 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 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. Herd production statistics

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

Herd 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 effective hectare (889 kg) was considerably higher compared with the previous season (828 kg). Production per cow also increased in 2003/04 to an average of 322 kg milksolids (comprising 184 kg milkfat and 138 kg protein).

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

| Season | Average litres per herd | Average kg milkfat per herd | Average kg protein per herd | Average kg milksolids per herd | Average kg milkfat per effective hectare | Average kg protein per effective hectare | Average kg milksolids per effective hectare | Average 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 |
| 2003/04[b] | 1,144,938 | 56,150 | 42,171 | 98,321 | 509 | 380 | 889 | 184 | 138 | 322 |

*– Not available*

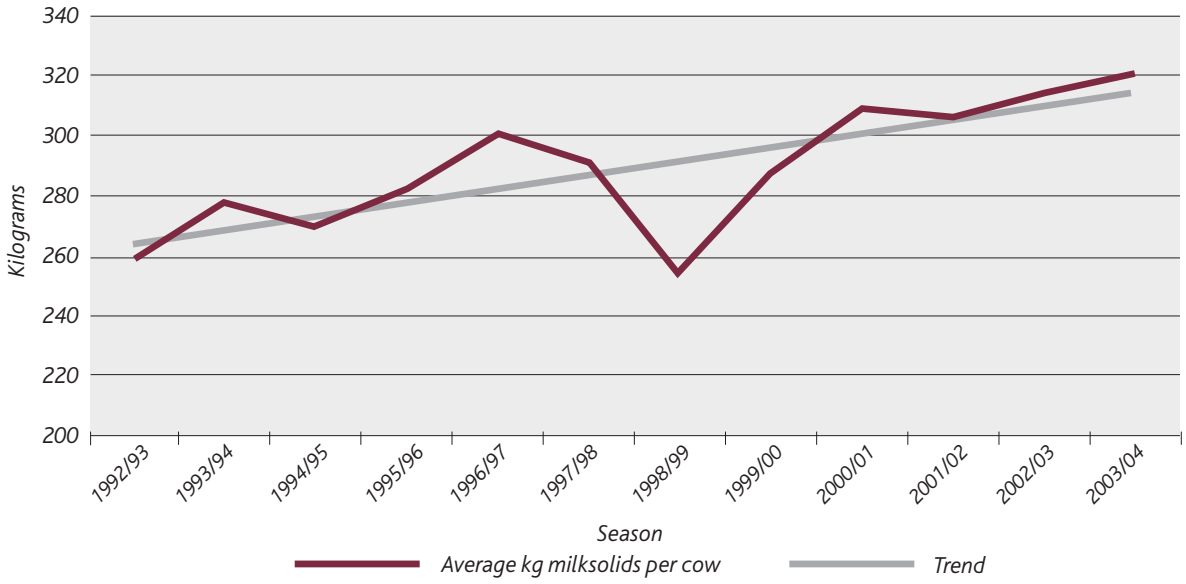
[a] *1991/92 figures include some town milk herds*

[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.

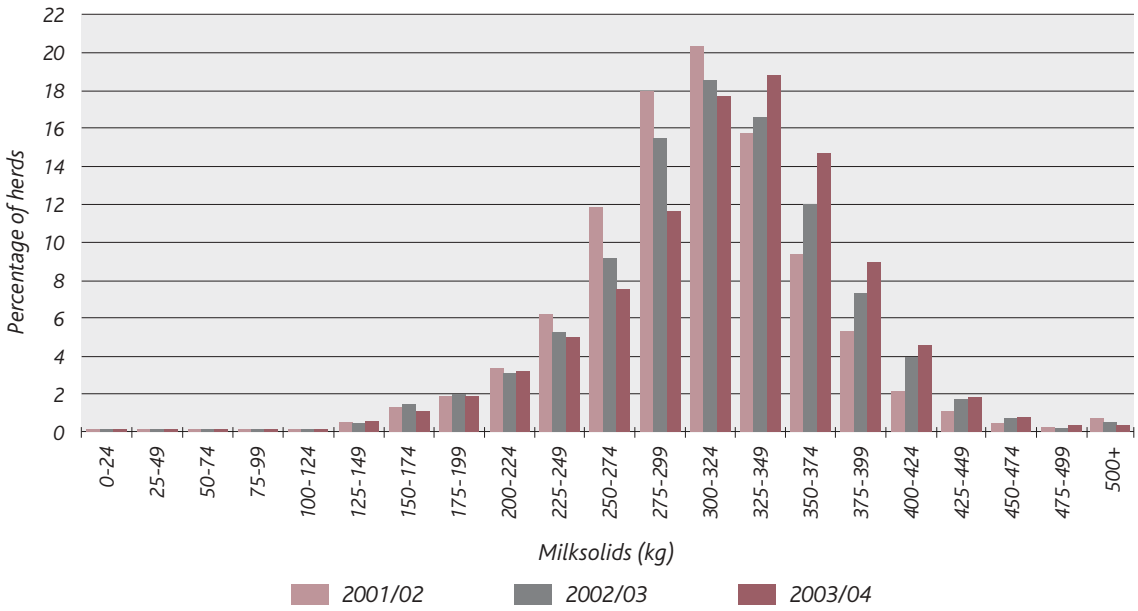
*Graph 2.2* ***Trend in milksolids production per cow since 1992/93***




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. Graph 2.3 shows that for the last three seasons, the percentage of herds producing less than 325 kg milksolids is declining, and an increasing percentage are producing more than 325 kg milksolids.



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



## ii) Herd size distribution

- *13% of herds have 500 or more cows*
- *Herds with between 650 and 699 cows have highest production per cow*

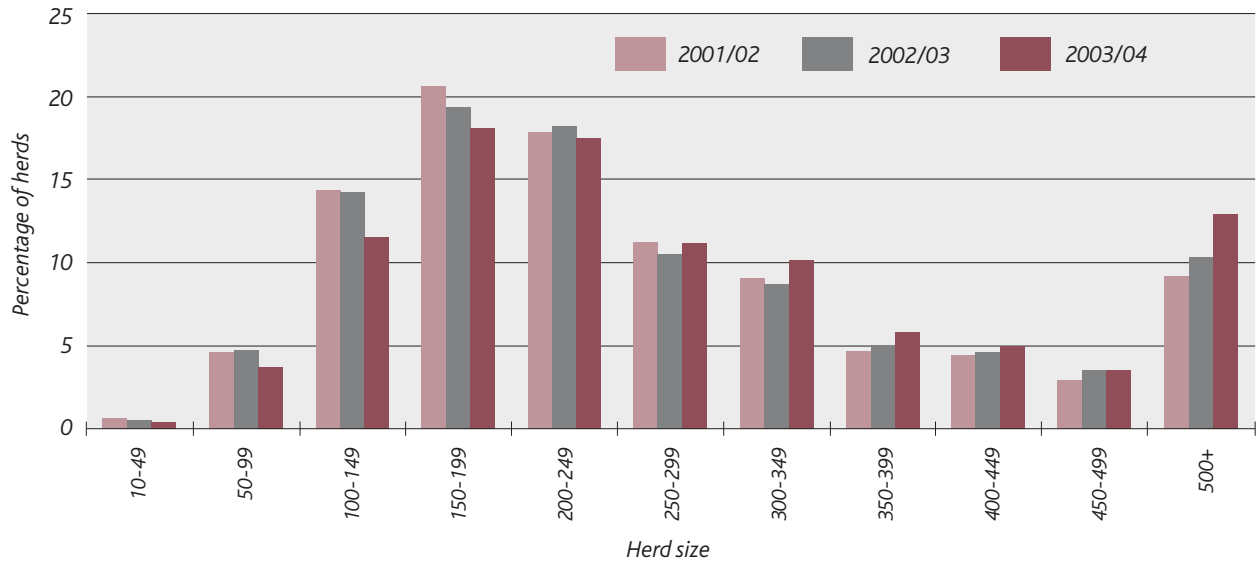
Eighteen percent (2,307) of herds have between 150 and 199 cows (see Table 2.4). Sixty-nine percent of all herds have between 100 and 349 cows. In 2003/04, 4,777 herds (37.5%) had 300 or more cows, and 1,652 (13.0%) had 500 or more cows. Average milkfat, protein and milksolids per cow by herd size are also included in Table 2.4. Average milksolids per cow varies between 132 kg (herds with 10-49 cows) and 343 kg (herds with 650-699 cows).

*Table 2.4* ***Average production per cow by herd size in 2003/04***

| 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 | 54 | 0.4 | 2,196 | 0.1 | 104 | 79 | 132 |
| 50-99 | 473 | 3.7 | 37,166 | 1.0 | 160 | 119 | 282 |
| 100-149 | 1,478 | 11.6 | 185,962 | 4.8 | 177 | 132 | 310 |
| 150-199 | 2,307 | 18.1 | 398,075 | 10.3 | 183 | 135 | 321 |
| 200-249 | 2,229 | 17.5 | 492,476 | 12.8 | 188 | 139 | 329 |
| 250-299 | 1,433 | 11.2 | 386,589 | 10.0 | 188 | 140 | 331 |
| 300-349 | 1,297 | 10.2 | 413,578 | 10.7 | 187 | 140 | 329 |
| 350-399 | 745 | 5.8 | 274,208 | 7.1 | 189 | 141 | 332 |
| 400-449 | 632 | 5.0 | 264,209 | 6.9 | 186 | 139 | 327 |
| 450-499 | 451 | 3.5 | 211,133 | 5.5 | 188 | 142 | 335 |
| 500-549 | 377 | 3.0 | 194,957 | 5.1 | 190 | 144 | 338 |
| 550-599 | 248 | 1.9 | 141,067 | 3.7 | 190 | 144 | 333 |
| 600-649 | 241 | 1.9 | 148,781 | 3.9 | 188 | 143 | 341 |
| 650-699 | 143 | 1.1 | 95,606 | 2.5 | 193 | 147 | 343 |
| 700-749 | 134 | 1.1 | 95,796 | 2.5 | 188 | 142 | 330 |
| 750-799 | 93 | 0.7 | 71,386 | 1.9 | 184 | 140 | 325 |
| 800-849 | 82 | 0.6 | 66,823 | 1.7 | 188 | 143 | 335 |
| 850-899 | 58 | 0.5 | 50,200 | 1.3 | 188 | 144 | 332 |
| 900-949 | 60 | 0.5 | 54,718 | 1.4 | 189 | 145 | 334 |
| 950-999 | 31 | 0.2 | 29,909 | 0.8 | 188 | 145 | 332 |
| 1000+ | 185 | 1.5 | 236,467 | 6.1 | 178 | 136 | 314 |
| **Total/Avg** | **12,751** | | **3,851,302** | | **184** | **138** | **322** |

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 herd size continues 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***



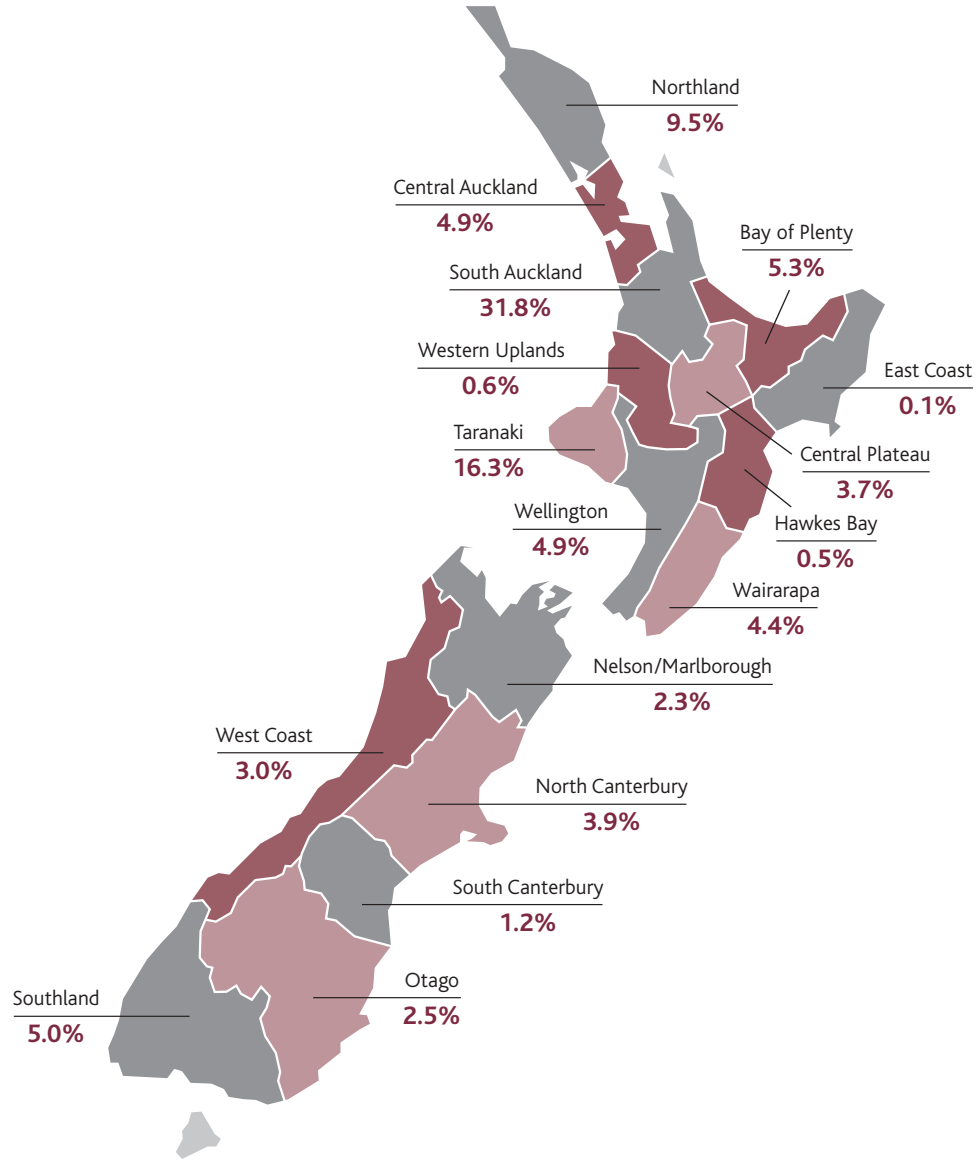
Regional dairy statistics

# 3. Regional dairy statistics

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

The vast majority of dairy herds (82%) 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 18% of the national total, but have 26.6% of the cows. The distribution of dairy herds within regions of each island in 2003/04 (Graph 3.1) has remained similar to previous seasons.

*Graph 3.1* ***Regional distribution of dairy herds in 2003/04***



- *Over one million cows in the South Island*
- *Largest average herd size (604) and average cows per hectare (3.08) in South Canterbury*
- *Average herd size in the South Island reaches 449*

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 (12,751) has dropped compared with the previous season, even though the number of herds in the South Island has increased slightly (Table 3.1). Seventy-three percent of the total cows are in the North Island, with 28% 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 604 cows; an increase from the previous season's figure of 591 cows. In the North Island, Hawkes Bay has the largest average herd size with 551 cows. The smallest herd averages are in Central Auckland, Taranaki and Northland, averaging 216, 237 and 240 cows respectively. South Canterbury has the highest average cows per hectare (3.08), followed by North Canterbury (2.96) and South Auckland (2.96). Herds with the lowest average cows per hectare are found in the West Coast (2.13) and Northland (2.19).

*Table 3.1* ***Herd analysis by region in 2003/04***

| *Farming region* | *Number of herds* | *Percentage of herds* | *Number of cows* | *Percentage of cows* | *Number of effective hectares* | *Percentage of effective hectares* | *Average herd size* | *Average effective hectares* | *Average cows per hectares* |
|---|---|---|---|---|---|---|---|---|---|
| Northland | 1,216 | 9.5 | 292,154 | 7.6 | 134,482 | 9.5 | 240 | 111 | 2.19 |
| Central Auckland | 624 | 4.9 | 134,750 | 3.5 | 56,846 | 4.0 | 216 | 91 | 2.39 |
| South Auckland | 4,061 | 31.8 | 1,092,841 | 28.4 | 372,587 | 26.2 | 269 | 92 | 2.96 |
| Bay of Plenty | 674 | 5.3 | 191,157 | 5.0 | 67,587 | 4.8 | 284 | 100 | 2.84 |
| Central Plateau | 469 | 3.7 | 203,608 | 5.3 | 76,973 | 5.4 | 434 | 164 | 2.72 |
| Western Uplands | 79 | 0.6 | 26,791 | 0.7 | 10,944 | 0.8 | 339 | 139 | 2.58 |
| East Coast | 16 | 0.1 | 4,218 | 0.1 | 1,718 | 0.1 | 264 | 107 | 2.72 |
| Hawkes Bay | 64 | 0.5 | 35,288 | 0.9 | 12,326 | 0.9 | 551 | 193 | 2.77 |
| Taranaki | 2,081 | 16.3 | 494,040 | 12.8 | 176,353 | 12.4 | 237 | 85 | 2.83 |
| Wellington | 627 | 4.9 | 189,218 | 4.9 | 71,630 | 5.0 | 302 | 114 | 2.67 |
| Wairarapa | 557 | 4.4 | 161,898 | 4.2 | 59,608 | 4.2 | 291 | 107 | 2.73 |
| **North Island** | **10,468** | **82.1** | **2,825,963** | **73.4** | **1,041,054** | **73.3** | **270** | **99** | **2.76** |
| Nelson/Marlborough | 299 | 2.3 | 85,505 | 2.2 | 32,703 | 2.3 | 286 | 109 | 2.67 |
| West Coast | 380 | 3.0 | 115,548 | 3.0 | 56,012 | 3.9 | 304 | 147 | 2.13 |
| North Canterbury | 492 | 3.9 | 284,949 | 7.4 | 94,639 | 6.7 | 579 | 192 | 2.96 |
| South Canterbury | 152 | 1.2 | 91,748 | 2.4 | 29,897 | 2.1 | 604 | 197 | 3.08 |
| Otago | 323 | 2.5 | 146,768 | 3.8 | 54,464 | 3.8 | 454 | 169 | 2.72 |
| Southland | 637 | 5.0 | 300,821 | 7.8 | 112,378 | 7.9 | 472 | 176 | 2.67 |
| **South Island** | **2,283** | **17.9** | **1,025,339** | **26.6** | **380,093** | **26.7** | **449** | **166** | **2.68** |
| **New Zealand** | **12,751** | | **3,851,302** | | **1,421,147** | | **302** | **111** | **2.75** |

- *Highest average per herd 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 herd production than herds in the North Island, with South Canterbury recording the highest average herd production at 220,595 kilograms of milksolids (Table 3.2). In the North Island, the Hawkes Bay region recorded the highest average herd production with 179,300 kilograms of milksolids.

In 2003/04, 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 (1,130 kg), while South Auckland and Taranaki shared the highest average milksolid production in the North Island (950 kg each).

North Canterbury had the highest average milksolids per cow (373 kg). The lowest average milksolids per cow was recorded in Northland (247 kg).

*Table 3.2* ***Herd production analysis by region in 2003/04***

| *Farming region* | *Average litres per herd* | *Average kg milkfat per herd* | *Average kg protein per herd* | *Average kg milksolids per herd* | *Average kg milkfat per effective hectare* | *Average kg protein per effective hectare* | *Average kg milksolids per effective hectare* | *Average kg milkfat per cow* | *Average kg protein per cow* | *Average kg milksolids per cow* |
|---|---|---|---|---|---|---|---|---|---|---|
| Northland | 723,699 | 34,744 | 25,798 | 60,542 | 311 | 231 | 542 | 142 | 105 | 247 |
| Central Auckland | 776,396 | 36,953 | 27,844 | 64,796 | 408 | 307 | 715 | 170 | 128 | 298 |
| South Auckland | 1,003,873 | 49,461 | 36,614 | 86,075 | 547 | 403 | 950 | 184 | 136 | 320 |
| Bay of Plenty | 1,066,856 | 50,889 | 37,984 | 88,873 | 515 | 384 | 899 | 180 | 134 | 315 |
| Central Plateau | 1,608,905 | 77,233 | 57,490 | 134,723 | 497 | 369 | 866 | 184 | 136 | 320 |
| Western Uplands | 1,185,137 | 57,671 | 43,190 | 100,861 | 437 | 328 | 765 | 169 | 127 | 296 |
| East Coast | 1,094,442 | 45,967 | 38,087 | 84,053 | 481 | 398 | 879 | 180 | 149 | 330 |
| Hawkes Bay | 2,122,892 | 101,504 | 77,796 | 179,300 | 495 | 377 | 871 | 177 | 135 | 313 |
| Taranaki | 873,510 | 45,829 | 33,787 | 79,617 | 547 | 403 | 950 | 192 | 142 | 334 |
| Wellington | 1,216,553 | 57,883 | 44,348 | 102,231 | 513 | 393 | 905 | 192 | 147 | 340 |
| Wairarapa | 1,129,445 | 56,426 | 42,193 | 98,620 | 531 | 395 | 926 | 194 | 144 | 338 |
| **North Island** | **990,783** | **48,870** | **36,360** | **85,230** | **503** | **373** | **876** | **180** | **134** | **314** |
| Nelson/Marlborough | 1,068,061 | 53,597 | 39,613 | 93,210 | 512 | 379 | 891 | 191 | 142 | 333 |
| West Coast | 1,074,078 | 55,505 | 40,389 | 95,894 | 399 | 289 | 688 | 188 | 136 | 324 |
| North Canterbury | 2,506,530 | 119,801 | 92,458 | 212,259 | 624 | 482 | 1,107 | 210 | 163 | 373 |
| South Canterbury | 2,601,024 | 124,349 | 96,247 | 220,595 | 636 | 493 | 1,130 | 207 | 161 | 368 |
| Otago | 1,935,985 | 91,299 | 71,145 | 162,444 | 550 | 430 | 980 | 202 | 158 | 360 |
| Southland | 1,956,351 | 94,112 | 73,491 | 167,602 | 542 | 423 | 965 | 204 | 159 | 363 |
| **South Island** | **1,851,768** | **89,531** | **68,815** | **158,346** | **540** | **413** | **953** | **201** | **154** | **355** |
| **New Zealand** | **1,144,937** | **56,150** | **42,171** | **98,321** | **509** | **380** | **889** | **184** | **138** | **322** |

South Taranaki continues to be the district with the most herds (1,241) and cows (311,963), followed by Matamata-Piako (Table 3.3). Waimate in South Canterbury has the highest average herd size, with 742 cows and largest average effective hectares (240).

*Table 3.3* ***Herd analysis by district in 2003/04***

| *Region* | *District* | *Total herds* | *Total cows* | *Total effective hectares* | *Average herd size* | *Average effective hectares* | *Average cows per hectare* |
|---|---|---|---|---|---|---|---|
| **Northland** | Far North | 354 | 77,918 | 37,518 | 220 | 106 | 2.10 |
| | Whangarei | 393 | 102,722 | 45,586 | 261 | 116 | 2.26 |
| | Kaipara | 469 | 111,514 | 51,378 | 238 | 110 | 2.19 |
| **Central Auckland** | Rodney | 220 | 47,723 | 21,262 | 217 | 97 | 2.25 |
| | Manukau City | 23 | 5,126 | 2,041 | 223 | 89 | 2.53 |
| | Papakura | 10 | 1,982 | 754 | 198 | 75 | 2.54 |
| | Franklin | 371 | 79,919 | 32,789 | 215 | 88 | 2.46 |
| **South Auckland** | Waikato | 789 | 216,194 | 76,946 | 274 | 98 | 2.85 |
| | Hamilton City | 13 | 3,203 | 1,001 | 246 | 77 | 3.28 |
| | Waipa | 667 | 189,513 | 62,536 | 284 | 94 | 3.07 |
| | Otorohanga | 420 | 127,286 | 42,638 | 303 | 102 | 2.96 |
| | Thames-Coromandel | 107 | 25,510 | 10,073 | 238 | 94 | 2.55 |
| | Hauraki | 489 | 117,228 | 42,765 | 240 | 87 | 2.74 |
| | Matamata-Piako | 1,172 | 296,607 | 96,258 | 253 | 82 | 3.11 |
| | South Waikato | 404 | 117,300 | 40,370 | 290 | 100 | 2.95 |
| **Bay of Plenty** | Western Bay of Plenty | 225 | 69,944 | 23,828 | 311 | 106 | 2.95 |
| | Tauranga | 11 | 3,022 | 1,021 | 275 | 93 | 2.75 |
| | Kawerau/Whakatane | 344 | 93,284 | 33,976 | 271 | 99 | 2.78 |
| | Opotiki | 94 | 24,907 | 8,762 | 265 | 93 | 2.82 |
| **Central Plateau** | Taupo | 119 | 73,468 | 28,315 | 617 | 238 | 2.68 |
| | Rotorua | 350 | 130,140 | 48,658 | 372 | 139 | 2.74 |
| **Western Uplands** | Waitomo | 61 | 20,902 | 8,444 | 343 | 138 | 2.63 |
| | Ruapehu | 18 | 5,889 | 2,500 | 327 | 139 | 2.41 |
| **East Coast** | Gisborne | 6 | 1,900 | 785 | 317 | 131 | 3.09 |
| | Wairoa | 10 | 2,318 | 933 | 232 | 93 | 2.50 |
| **Hawkes Bay** | Napier/Hastings | 22 | 13,807 | 4,961 | 628 | 226 | 2.60 |
| | Central Hawkes Bay | 42 | 21,481 | 7,365 | 511 | 175 | 2.86 |
| **Taranaki** | New Plymouth | 524 | 115,669 | 43,787 | 221 | 84 | 2.68 |
| | Stratford | 316 | 66,408 | 25,518 | 210 | 81 | 2.61 |
| | South Taranaki | 1,241 | 311,963 | 107,048 | 251 | 86 | 2.96 |
| **Wellington** | Wanganui | 24 | 7,747 | 3,052 | 323 | 127 | 2.62 |
| | Rangitikei | 86 | 29,310 | 10,487 | 341 | 122 | 2.79 |
| | Manawatu | 297 | 87,172 | 33,090 | 294 | 111 | 2.67 |
| | Palmerston North City | 38 | 13,581 | 4,946 | 357 | 130 | 2.82 |
| | Horowhenua | 144 | 43,028 | 16,357 | 299 | 114 | 2.67 |
| | Kapiti Coast | 28 | 6,961 | 2,952 | 249 | 105 | 2.46 |
| | Upper Hutt City | 10 | 1,419 | 746 | 142 | 75 | 1.91 |
| **Wairarapa** | Tararua | 357 | 96,268 | 35,451 | 270 | 99 | 2.72 |
| | Masterton | 22 | 7,976 | 2,894 | 363 | 132 | 2.78 |
| | Carterton | 77 | 22,050 | 8,153 | 286 | 106 | 2.75 |
| | South Wairarapa | 101 | 35,604 | 13,110 | 353 | 130 | 2.75 |
| **North Island** | | **10,468** | **2,825,963** | **1,041,054** | **256** | **100** | **2.76** |

*(table 3.3 continued)*

| Region | District | Total herds | Total cows | Total effective hectares | Average herd size | Average effective hectares | Average cows per hectare |
|---|---|---|---|---|---|---|---|
| **Nelson/Marlborough** | Marlborough | 78 | 18,768 | 7,046 | 241 | 90 | 2.65 |
| | Kaikoura | 30 | 10,361 | 3,764 | 345 | 125 | 2.74 |
| | Tasman / Nelson City | 191 | 56,376 | 21,893 | 295 | 115 | 2.66 |
| **West Coast** | Buller | 139 | 42,354 | 19,304 | 305 | 139 | 2.27 |
| | Grey | 79 | 28,864 | 13,943 | 365 | 176 | 2.15 |
| | Westland | 162 | 44,330 | 22,765 | 274 | 141 | 1.99 |
| **North Canterbury** | Hurunui | 51 | 32,507 | 11,154 | 637 | 219 | 2.91 |
| | Waimakariri | 72 | 29,176 | 10,356 | 405 | 144 | 2.69 |
| | Christchurch City | 12 | 4,323 | 1,383 | 360 | 115 | 2.93 |
| | Banks Peninsula | 11 | 1,469 | 799 | 134 | 73 | 1.93 |
| | Selwyn | 162 | 92,065 | 31,261 | 568 | 193 | 2.96 |
| | Ashburton | 184 | 125,409 | 39,686 | 682 | 216 | 3.15 |
| **South Canterbury** | Timaru/MacKenzie | 103 | 55,375 | 18,155 | 538 | 176 | 3.06 |
| | Waimate | 49 | 36,373 | 11,742 | 742 | 240 | 3.11 |
| **Otago** | Waitaki/Central Otago | 92 | 52,761 | 19,071 | 573 | 207 | 2.88 |
| | Dunedin City | 80 | 22,309 | 8,767 | 279 | 110 | 2.51 |
| | Clutha | 151 | 71,698 | 26,626 | 475 | 176 | 2.73 |
| **Southland** | Gore | 101 | 48,184 | 17,379 | 477 | 172 | 2.74 |
| | Invercargill | 46 | 21,401 | 8,266 | 465 | 180 | 2.59 |
| | Southland | 490 | 231,236 | 86,733 | 472 | 177 | 2.66 |
| **South Island** | | **2,283** | **1,025,339** | **380,093** | **449** | **166** | **2.68** |
| **New Zealand** | | **12,751** | **3,851,302** | **1,421,147** | **302** | **111** | **2.75** |

***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 herd with 258,540 kilograms of milksolids (Table 3.4). Ashburton district recorded the highest average kilograms of milksolids per effective hectare (1,167), whereas the highest production per cow was recorded by Waimakariri (395 kg of milksolids). The North Island district with the highest production is Napier/Hastings, with an average of 206,225 kilograms of milksolids per herd.

*Table 3.4* ***Herd production analysis by district in 2003/04***

| Region | District | Average litres per herd | Average kg milkfat per herd | Average kg protein per herd | Average kg milksolids per herd | Average kg milkfat per effective hectare | Average kg protein per effective hectare | Average kg milksolids per effective hectare | Average kg milkfat per cow | Average kg protein per cow | Average kg milksolids per cow |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Northland** | Far North | 670,974 | 31,559 | 23,651 | 55,210 | 291 | 217 | 508 | 138 | 103 | 241 |
| | Whangarei | 771,006 | 37,861 | 27,785 | 65,646 | 325 | 238 | 563 | 143 | 105 | 248 |
| | Kaipara | 723,854 | 34,536 | 25,753 | 60,289 | 315 | 235 | 550 | 143 | 107 | 250 |
| **Central Auckland** | Rodney | 710,454 | 35,344 | 25,907 | 61,252 | 360 | 263 | 622 | 159 | 116 | 275 |
| | Manukau City | 842,754 | 38,082 | 29,423 | 67,504 | 445 | 343 | 788 | 174 | 134 | 309 |
| | Papakura | 735,629 | 33,911 | 26,163 | 60,074 | 427 | 328 | 755 | 167 | 129 | 296 |
| | Franklin | 812,484 | 37,918 | 28,940 | 66,858 | 434 | 331 | 765 | 176 | 134 | 311 |
| **South Auckland** | Waikato | 1,035,034 | 50,059 | 37,435 | 87,494 | 524 | 390 | 914 | 183 | 136 | 319 |
| | Hamilton City | 879,616 | 44,062 | 32,207 | 76,269 | 593 | 432 | 1,024 | 182 | 132 | 314 |
| | Waipa | 1,078,325 | 53,015 | 39,352 | 92,367 | 570 | 421 | 991 | 186 | 138 | 323 |
| | Otorahanga | 1,105,904 | 54,237 | 40,325 | 94,562 | 536 | 397 | 933 | 181 | 134 | 315 |
| | Thames-Coromandel | 788,192 | 37,974 | 28,282 | 66,256 | 411 | 305 | 715 | 159 | 118 | 277 |
| | Hauraki | 855,990 | 42,043 | 31,053 | 73,096 | 484 | 357 | 841 | 176 | 130 | 307 |
| | Matamata-Piako | 942,439 | 47,512 | 34,757 | 82,269 | 585 | 427 | 1,012 | 188 | 138 | 326 |
| | South Waikato | 1,132,364 | 55,307 | 41,099 | 96,406 | 565 | 418 | 983 | 191 | 142 | 333 |
| **Bay of Plenty** | Western Bay of Plenty | 1,106,131 | 53,914 | 39,829 | 93,742 | 514 | 379 | 893 | 174 | 128 | 302 |
| | Tauranga | 981,875 | 47,066 | 35,101 | 82,167 | 452 | 337 | 788 | 160 | 120 | 280 |
| | Kawerau/Whakatane | 1,065,650 | 50,023 | 37,634 | 87,657 | 522 | 392 | 914 | 186 | 140 | 326 |
| | Opotiki | 987,208 | 47,267 | 35,187 | 82,454 | 499 | 370 | 869 | 176 | 131 | 307 |

*(table 3.4 continued)*

| Region | District | Average litres per herd | Average kg milkfat per herd | Average kg protein per herd | Average kg milksolids per herd | Average kg milkfat per effective hectare | Average kg protein per effective hectare | Average kg milksolids per effective hectare | Average kg milkfat per cow | Average kg protein per cow | Average kg milksolids per cow |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Central Plateau** | Taupo | 2,190,354 | 105,502 | 78,862 | 184,363 | 469 | 348 | 817 | 175 | 130 | 305 |
| | Rotorua | 1,411,212 | 67,621 | 50,224 | 117,845 | 507 | 376 | 883 | 186 | 138 | 325 |
| **Western Uplands** | Waitomo | 1,165,718 | 57,436 | 42,748 | 100,184 | 440 | 327 | 766 | 166 | 123 | 289 |
| | Ruapehu | 1,250,949 | 58,469 | 44,685 | 103,154 | 429 | 331 | 760 | 180 | 139 | 318 |
| **East Coast** | Gisborne | 1,160,486 | 48,740 | 40,385 | 89,125 | 471 | 390 | 862 | 147 | 122 | 270 |
| | Wairoa | 1,054,817 | 44,302 | 36,708 | 81,010 | 486 | 403 | 889 | 200 | 166 | 366 |
| **Hawkes Bay** | Napier/Hastings | 2,471,271 | 116,736 | 89,490 | 206,225 | 458 | 351 | 809 | 171 | 131 | 302 |
| | Central Hawkes Bay | 1,940,408 | 93,526 | 71,671 | 165,197 | 514 | 390 | 904 | 181 | 137 | 318 |
| **Taranaki** | New Plymouth | 784,456 | 40,905 | 29,962 | 70,867 | 492 | 360 | 851 | 183 | 134 | 317 |
| | Stratford | 784,195 | 40,031 | 29,932 | 69,963 | 499 | 373 | 871 | 190 | 143 | 333 |
| | South Taranaki | 933,855 | 49,385 | 36,384 | 85,769 | 583 | 428 | 1,011 | 196 | 145 | 341 |
| **Wellington** | Wanganui | 1,378,446 | 63,111 | 48,988 | 112,099 | 512 | 396 | 908 | 195 | 151 | 346 |
| | Rangitikei | 1,297,734 | 63,389 | 48,041 | 111,430 | 521 | 394 | 916 | 188 | 142 | 330 |
| | Manawatu | 1,195,923 | 57,209 | 43,760 | 100,969 | 516 | 395 | 911 | 193 | 148 | 341 |
| | Palmerston North City | 1,475,138 | 71,183 | 53,945 | 125,128 | 556 | 420 | 977 | 199 | 151 | 350 |
| | Horowhenua | 1,193,011 | 55,754 | 43,097 | 98,851 | 510 | 393 | 902 | 191 | 147 | 338 |
| | Kapiti Coast | 1,040,347 | 47,337 | 36,904 | 84,241 | 466 | 364 | 831 | 188 | 147 | 335 |
| | Upper Hutt City | 592,326 | 27,654 | 21,291 | 48,945 | 360 | 277 | 637 | 192 | 147 | 339 |
| **Wairarapa** | Tararua | 1,043,342 | 52,941 | 39,215 | 92,156 | 537 | 397 | 934 | 197 | 146 | 342 |
| | Masterton | 1,516,557 | 72,397 | 55,506 | 127,903 | 558 | 426 | 984 | 201 | 153 | 354 |
| | Carterton | 1,124,064 | 54,574 | 41,368 | 95,942 | 515 | 390 | 905 | 188 | 142 | 330 |
| | South Wairarapa | 1,353,571 | 66,679 | 50,448 | 117,128 | 514 | 387 | 901 | 185 | 140 | 325 |
| **North Island** | | **990,783** | **48,870** | **36,360** | **85,230** | **503** | **373** | **876** | **180** | **134** | **314** |
| **Nelson/Marlborough** | Marlborough | 917,244 | 45,365 | 33,836 | 79,201 | 504 | 374 | 878 | 188 | 140 | 329 |
| | Kaikoura | 1,300,521 | 64,125 | 47,566 | 111,691 | 526 | 393 | 920 | 193 | 144 | 338 |
| | Tasman/Nelson City | 1,093,139 | 55,305 | 40,723 | 96,028 | 513 | 378 | 891 | 192 | 142 | 333 |
| **West Coast** | Buller | 1,115,554 | 57,065 | 41,642 | 98,707 | 440 | 318 | 758 | 194 | 140 | 334 |
| | Grey | 1,295,439 | 65,937 | 48,629 | 114,567 | 399 | 293 | 692 | 187 | 137 | 323 |
| | Westland | 930,544 | 49,080 | 35,295 | 84,375 | 364 | 261 | 625 | 184 | 132 | 316 |
| **North Canterbury** | Hurunui | 2,710,058 | 130,636 | 99,568 | 230,204 | 607 | 462 | 1,069 | 209 | 159 | 368 |
| | Waimakariri | 1,937,631 | 89,468 | 69,978 | 159,446 | 593 | 465 | 1,058 | 221 | 174 | 395 |
| | Christchurch City | 1,607,322 | 74,908 | 57,755 | 132,663 | 573 | 445 | 1,018 | 192 | 149 | 340 |
| | Banks Peninsula | 489,095 | 22,493 | 17,198 | 39,690 | 325 | 249 | 574 | 169 | 129 | 298 |
| | Selwyn | 2,433,367 | 114,863 | 89,191 | 204,053 | 626 | 488 | 1,114 | 212 | 165 | 377 |
| | Ashburton | 2,916,396 | 141,759 | 108,924 | 250,683 | 660 | 507 | 1,167 | 209 | 160 | 370 |
| **South Canterbury** | Timaru/MacKenzie | 2,395,123 | 114,087 | 88,457 | 202,544 | 645 | 500 | 1,145 | 210 | 164 | 374 |
| | Waimate | 3,033,837 | 145,919 | 112,621 | 258,540 | 619 | 479 | 1,097 | 201 | 156 | 357 |
| **Otago** | Waitaki/Central Otago | 2,488,985 | 118,044 | 91,590 | 209,634 | 599 | 465 | 1,064 | 207 | 160 | 367 |
| | Dunedin City | 1,221,939 | 56,075 | 43,851 | 99,925 | 507 | 397 | 904 | 202 | 158 | 360 |
| | Clutha | 1,977,361 | 93,666 | 73,149 | 166,814 | 544 | 425 | 969 | 200 | 157 | 357 |
| **Southland** | Gore | 1,904,085 | 90,814 | 70,795 | 161,609 | 531 | 414 | 945 | 194 | 152 | 346 |
| | Invercargill | 2,021,587 | 95,496 | 75,414 | 170,909 | 535 | 422 | 956 | 210 | 166 | 376 |
| | Southland | 1,961,000 | 94,662 | 73,866 | 168,527 | 545 | 425 | 970 | 205 | 160 | 365 |
| **South Island** | | **1,851,768** | **89,531** | **68,815** | **158,346** | **540** | **413** | **953** | **201** | **154** | **355** |
| **New Zealand** | | **1,144,937** | **56,150** | **42,171** | **98,321** | **509** | **380** | **889** | **184** | **138** | **322** |

***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

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

Farmers had the choice of two herd testing service providers in 2003/04 (Ambreed and Livestock Improvement) and were able to choose the frequency of testing.

Herd testing involves the collection of individual milk samples from every milking animal in the herd. A full herd test will provide information on milk volumes, milkfat and protein yields, and somatic cell counts. However, herd testing may also be limited to specific purposes such as measuring milk volumes or somatic cell counts.

Information from herd testing cannot be gained in any other way. Herd test information identifies low producing cows (for culling or drying off), high producers (for breeding), and mastitis animals (for therapy or culling). Herd testing also provides an overall picture of the production of the herd, and enables the mastitis status to be monitored.

The regions in Chapter 4 refer to areas used by Livestock Improvement Corporation (LIC). The reader is referred to Appendix 1 for a list of districts included in each region.

- ***77% of herds undertake herd testing in 2003/04***

The percentage of total herds using herd testing decreased slightly to 76.6% in 2003/04 (Table 4.1). This figure is down 10.6% from the highest percentage of herd testing set in 1996/97. Although there are a record number of cows (3.85 million), fewer were tested (2.84 million) compared with last season (2.85 million). The percentage of total cows tested (73.8%) continues to decline steadily from a peak of 89.6% reached in 1996/97.

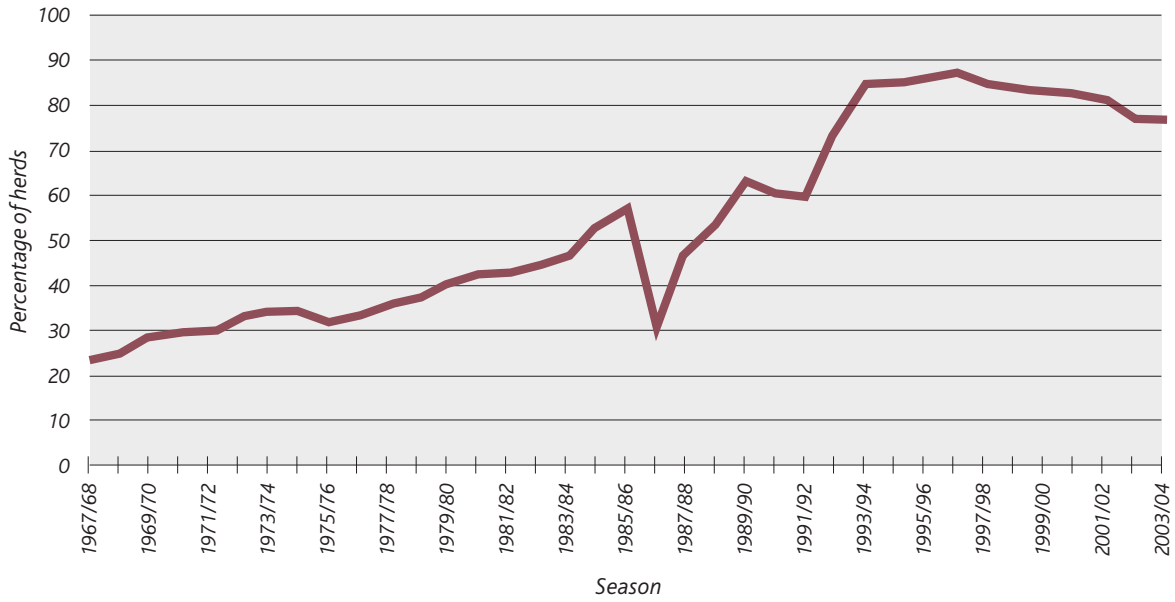


*Table 4.1* ***Trend in the use of herd testing services for the last 20 years***

| *Season* | *Number of herds* | *% of total herds* | *Number of cows (000)* | *% of total cows* |
|---|---|---|---|---|
| 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 |
| 2003/04 | 9,772 | 76.6 | 2,842 | 73.8 |

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 1967/68***




The regional uptake of herd testing services in 2003/04 is shown in Table 4.2, 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 81.2% and 80.0% respectively. Taranaki at 81.7% reported the highest percentage of cows herd tested.

*Table 4.2* ***Use of herd testing by LIC region in 2003/04***

| *Livestock Improvement Region* | *Herds tested* | *Total herds* | *% of total herds* | *Cows tested* | *Total cows* | *% of total cows* |
|---|---|---|---|---|---|---|
| Northland | 1,046 | 1,435 | 72.9 | 247,933 | 339,681 | 73.0 |
| Auckland | 3,790 | 5,012 | 75.6 | 1,025,709 | 1,409,165 | 72.8 |
| Bay of Plenty/East Coast | 549 | 686 | 80.0 | 149,336 | 194,382 | 76.8 |
| Taranaki | 1,694 | 2,086 | 81.2 | 404,753 | 495,285 | 81.7 |
| Wellington/Hawkes Bay | 928 | 1,249 | 74.3 | 271,437 | 387,450 | 70.1 |
| South Island | 1,765 | 2,283 | 77.3 | 742,552 | 1,025,339 | 72.4 |
| **New Zealand** | **9,772** | **12,751** | **76.6** | **2,841,720** | **3,851,302** | **73.8** |

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

## 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 Corporation (LIC) region is summarised in Table 4.3. The days in milk derived from tanker pick-up dates (production) more accurately reflects the lactation length compared with the days in milk derived from herd tests and calving dates (herd testing).

The South Island recorded the highest per cow milk volume (4,378 litres), milkfat (204 kg) and protein (161 kg) of cows herd tested. Taranaki recorded the highest percentages for milkfat (5.17%), protein (3.85%) and milksolids (9.00%).

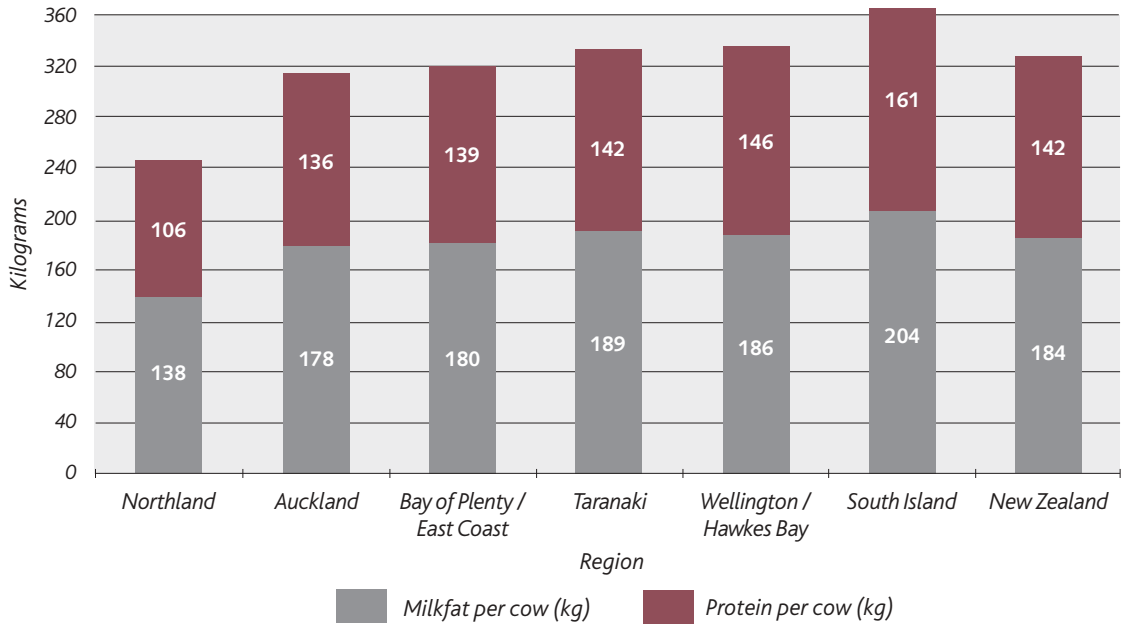


*Table 4.3* ***Season herd test averages per cow by LIC region in 2003/04***

| *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 | 2,987 | 138 | 4.58 | 106 | 3.48 | 244 | 8.17 | 211 | 263 | 260 |
| Auckland | 3,746 | 178 | 4.75 | 136 | 3.60 | 314 | 8.38 | 224 | 264 | 212 |
| Bay of Plenty / East Coast | 3,927 | 180 | 4.61 | 139 | 3.55 | 319 | 8.12 | 224 | 258 | 238 |
| Taranaki | 3,677 | 189 | 5.17 | 142 | 3.85 | 331 | 9.00 | 229 | 266 | 224 |
| Wellington / Hawkes Bay | 4,015 | 186 | 4.63 | 146 | 3.61 | 332 | 8.27 | 225 | 271 | 227 |
| South Island | 4,378 | 204 | 4.65 | 161 | 3.66 | 365 | 8.34 | 226 | 265 | 225 |
| **New Zealand** | **3,871** | **184** | **4.75** | **142** | **3.64** | **326** | **8.42** | **224** | **265** | **220** |

The 2003/04 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 138 (Northland) to 204 kg per cow (South Island) and protein production from 106 (Northland) to 161 kg per cow (South Island).

*Graph 4.2* ***Average milkfat and protein production per cow in 2003/04***




- ***Increase in production per cow (kg) for 2003/04***

The last twenty years has seen a general trend of increasing production in both milk volume and milksolids. 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 and farm management practice.



*Table 4.4* ***Trend in the national herd test averages for the last 20 years***

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
| 2003/04 | 3,871 | 184 | 4.75 | 142 | 3.64 | 326 | 8.42 | 224 | 265 | 220 |

[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 the number of samples processed. 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 LIC region in 2003/04***

**Average litres of milk per cow per day**

| Livestock Improvement Region | 2003 Jun | Jul | Aug | Sep | Oct | Nov | Dec | 2004 Jan | Feb | Mar | Apr | May | Season average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Northland | 15.88 | 14.57 | 16.05 | 16.75 | 16.24 | 15.99 | 14.04 | 11.19 | 10.88 | 10.00 | 8.06 | 11.85 | 13.48 |
| Auckland | 16.52 | 17.04 | 19.74 | 20.99 | 20.22 | 18.66 | 17.02 | 15.06 | 13.31 | 12.29 | 10.17 | 11.93 | 16.20 |
| BOP / East Coast | 16.25 | 15.32 | 21.47 | 22.39 | 21.16 | 19.54 | 17.94 | 15.08 | 13.96 | 12.48 | 10.71 | 11.59 | 16.84 |
| Taranaki | 18.28 | 16.79 | 19.09 | 20.18 | 20.13 | 18.07 | 16.66 | 14.67 | 12.86 | 11.63 | 10.23 | 9.95 | 15.63 |
| Wgtn / Hawkes Bay | 15.92 | 16.76 | 19.27 | 21.78 | 21.31 | 20.14 | 18.50 | 16.17 | 14.79 | 13.63 | 12.25 | 12.85 | 17.28 |
| South Island | 17.79 | 18.14 | 19.22 | 23.82 | 24.50 | 22.86 | 21.03 | 17.82 | 16.32 | 15.29 | 12.71 | 12.14 | 18.75 |
| **New Zealand** | **16.45** | **16.79** | **18.93** | **21.03** | **21.40** | **19.37** | **18.23** | **15.25** | **14.18** | **12.72** | **11.25** | **12.01** | **16.69** |

**Average kg of milkfat per cow per day**

| Livestock Improvement Region | 2003 Jun | Jul | Aug | Sep | Oct | Nov | Dec | 2004 Jan | Feb | Mar | Apr | May | Season average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Northland | 0.71 | 0.67 | 0.74 | 0.77 | 0.73 | 0.73 | 0.63 | 0.53 | 0.53 | 0.52 | 0.44 | 0.57 | 0.63 |
| Auckland | 0.72 | 0.77 | 0.92 | 0.97 | 0.92 | 0.87 | 0.78 | 0.71 | 0.66 | 0.64 | 0.56 | 0.62 | 0.77 |
| BOP / East Coast | 0.70 | 0.68 | 0.95 | 1.00 | 0.94 | 0.87 | 0.79 | 0.69 | 0.67 | 0.63 | 0.57 | 0.54 | 0.78 |
| Taranaki | 0.88 | 0.85 | 0.91 | 0.98 | 0.96 | 0.92 | 0.84 | 0.77 | 0.70 | 0.67 | 0.61 | 0.59 | 0.81 |
| Wgtn / Hawkes Bay | 0.72 | 0.76 | 0.83 | 0.97 | 0.95 | 0.92 | 0.84 | 0.75 | 0.72 | 0.70 | 0.65 | 0.66 | 0.81 |
| South Island | 0.79 | 0.80 | 0.84 | 1.07 | 1.08 | 1.03 | 0.96 | 0.82 | 0.80 | 0.78 | 0.69 | 0.64 | 0.88 |
| **New Zealand** | **0.73** | **0.76** | **0.87** | **0.97** | **0.97** | **0.90** | **0.84** | **0.73** | **0.71** | **0.67** | **0.62** | **0.63** | **0.80** |

**Average kg of protein per cow per day**

| Livestock Improvement Region | 2003 Jun | Jul | Aug | Sep | Oct | Nov | Dec | 2004 Jan | Feb | Mar | Apr | May | Season average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Northland | 0.55 | 0.52 | 0.57 | 0.58 | 0.57 | 0.58 | 0.49 | 0.39 | 0.39 | 0.39 | 0.33 | 0.43 | 0.48 |
| Auckland | 0.57 | 0.59 | 0.70 | 0.75 | 0.71 | 0.68 | 0.60 | 0.54 | 0.49 | 0.48 | 0.42 | 0.46 | 0.59 |
| BOP / East Coast | 0.57 | 0.54 | 0.77 | 0.79 | 0.73 | 0.69 | 0.62 | 0.52 | 0.50 | 0.48 | 0.43 | 0.43 | 0.60 |
| Taranaki | 0.64 | 0.64 | 0.71 | 0.75 | 0.75 | 0.70 | 0.63 | 0.56 | 0.50 | 0.49 | 0.44 | 0.43 | 0.61 |
| Wgtn / Hawkes Bay | 0.56 | 0.59 | 0.68 | 0.78 | 0.76 | 0.73 | 0.67 | 0.58 | 0.54 | 0.53 | 0.49 | 0.50 | 0.63 |
| South Island | 0.62 | 0.61 | 0.65 | 0.85 | 0.88 | 0.83 | 0.76 | 0.64 | 0.61 | 0.60 | 0.53 | 0.50 | 0.70 |
| **New Zealand** | **0.57** | **0.58** | **0.67** | **0.75** | **0.77** | **0.71** | **0.66** | **0.55** | **0.53** | **0.50** | **0.47** | **0.48** | **0.62** |

**Average somatic cell count (000 cells per millilitre)**

| Livestock Improvement Region | 2003 Jun | Jul | Aug | Sep | Oct | Nov | Dec | 2004 Jan | Feb | Mar | Apr | May | Season average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Northland | 238 | 264 | 217 | 242 | 242 | 219 | 242 | 270 | 272 | 278 | 330 | 384 | 260 |
| Auckland | 227 | 251 | 206 | 179 | 185 | 163 | 185 | 202 | 222 | 230 | 275 | 296 | 212 |
| BOP / East Coast | 301 | 277 | 228 | 207 | 202 | 191 | 207 | 223 | 230 | 249 | 283 | 339 | 238 |
| Taranaki | 331 | 322 | 239 | 176 | 178 | 165 | 179 | 195 | 211 | 212 | 233 | 262 | 224 |
| Wgtn / Hawkes Bay | 255 | 226 | 232 | 200 | 209 | 193 | 208 | 232 | 251 | 242 | 249 | 276 | 227 |
| South Island | 236 | 247 | 260 | 214 | 206 | 196 | 196 | 222 | 218 | 223 | 257 | 275 | 225 |
| **New Zealand** | **244** | **251** | **218** | **193** | **197** | **179** | **194** | **216** | **227** | **233** | **262** | **290** | **220** |

## iii) Breed averages

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

Holstein-Friesian, Jersey, Holstein-Friesian/Jersey Crossbreed and Ayrshire herd test statistics include 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, seven-year-old cows produced more milk, and six-year-olds more milkfat and protein than any other age group. Six-year-olds dominated production for Jerseys and Holstein-Friesian/Jersey Crossbreeds, while eight-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 2003/04***

**Holstein-Friesian**

| *Age* | *Number* | *Days in milk* | *Milk (litres)* | *Milkfat (kg)* | *Protein (kg)* | *Milksolids (kg)* | *Milkfat (%)* | *Protein (%)* | *Milksolids (%)* |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 208,045 | 224 | 3,382 | 152.2 | 119.3 | 271.4 | 4.54 | 3.53 | 8.07 |
| 3 | 169,588 | 221 | 4,052 | 176.8 | 142.8 | 319.6 | 4.40 | 3.53 | 7.93 |
| 4 | 141,099 | 219 | 4,433 | 191.1 | 156.0 | 347.1 | 4.35 | 3.53 | 7.87 |
| 5 | 129,981 | 219 | 4,551 | 196.5 | 159.7 | 356.2 | 4.35 | 3.52 | 7.87 |
| 6 | 113,043 | 219 | 4,562 | 200.8 | 160.9 | 361.7 | 4.43 | 3.54 | 7.97 |
| 7 | 96,993 | 218 | 4,587 | 200.4 | 159.7 | 360.0 | 4.40 | 3.49 | 7.89 |
| 8 | 79,230 | 217 | 4,415 | 196.6 | 154.7 | 351.3 | 4.48 | 3.51 | 7.99 |
| 9 | 56,488 | 214 | 4,250 | 187.1 | 147.5 | 334.6 | 4.43 | 3.48 | 7.91 |
| 10+ | 70,128 | 209 | 3,958 | 172.5 | 136.6 | 309.1 | 4.39 | 3.46 | 7.85 |
| **Total** | **1,064,595** | **219** | **4,167** | **182.7** | **146.2** | **328.9** | **4.42** | **3.52** | **7.94** |

**Jersey**

| *Age* | *Number* | *Days in milk* | *Milk (litres)* | *Milkfat (kg)* | *Protein (kg)* | *Milksolids (kg)* | *Milkfat (%)* | *Protein (%)* | *Milksolids (%)* |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 72,770 | 227 | 2,530 | 145.9 | 101.1 | 247.0 | 5.79 | 4.01 | 9.79 |
| 3 | 62,188 | 224 | 2,929 | 169.2 | 119.0 | 288.2 | 5.80 | 4.07 | 9.87 |
| 4 | 52,470 | 225 | 3,156 | 184.2 | 130.1 | 314.4 | 5.86 | 4.13 | 9.99 |
| 5 | 46,256 | 224 | 3,141 | 185.5 | 130.7 | 316.2 | 5.93 | 4.17 | 10.11 |
| 6 | 40,965 | 223 | 3,194 | 186.6 | 132.5 | 319.1 | 5.87 | 4.16 | 10.03 |
| 7 | 30,552 | 222 | 3,173 | 182.9 | 130.9 | 313.8 | 5.79 | 4.14 | 9.92 |
| 8 | 22,833 | 220 | 3,118 | 179.9 | 128.0 | 307.9 | 5.79 | 4.11 | 9.91 |
| 9 | 15,989 | 217 | 3,073 | 174.7 | 125.0 | 299.7 | 5.70 | 4.08 | 9.78 |
| 10+ | 21,112 | 213 | 2,883 | 163.6 | 115.9 | 279.5 | 5.70 | 4.03 | 9.73 |
| **Total** | **365,135** | **223** | **2,974** | **172.5** | **121.7** | **294.1** | **5.82** | **4.10** | **9.91** |

**Holstein-Friesian/Jersey crossbreed**

| *Age* | *Number* | *Days in milk* | *Milk (litres)* | *Milkfat (kg)* | *Protein (kg)* | *Milksolids (kg)* | *Milkfat (%)* | *Protein (%)* | *Milksolids (%)* |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 149,484 | 226 | 3,119 | 158.3 | 117.0 | 275.3 | 5.12 | 3.76 | 8.88 |
| 3 | 118,032 | 224 | 3,692 | 185.0 | 139.6 | 324.6 | 5.06 | 3.79 | 8.85 |
| 4 | 93,615 | 223 | 3,963 | 199.6 | 151.2 | 350.8 | 5.08 | 3.83 | 8.91 |
| 5 | 78,395 | 222 | 4,011 | 203.1 | 153.2 | 356.4 | 5.12 | 3.84 | 8.96 |
| 6 | 70,538 | 223 | 4,065 | 206.0 | 155.6 | 361.5 | 5.11 | 3.84 | 8.95 |
| 7 | 43,451 | 220 | 4,105 | 203.2 | 154.0 | 357.2 | 5.00 | 3.77 | 8.77 |
| 8 | 32,500 | 219 | 4,018 | 200.2 | 150.6 | 350.8 | 5.02 | 3.76 | 8.79 |
| 9 | 24,932 | 216 | 3,897 | 191.0 | 144.2 | 335.2 | 4.94 | 3.72 | 8.65 |
| 10+ | 31,425 | 211 | 3,655 | 176.7 | 133.8 | 310.6 | 4.87 | 3.68 | 8.55 |
| **Total** | **642,372** | **222** | **3,729** | **187.3** | **140.9** | **328.1** | **5.07** | **3.79** | **8.86** |

**Ayrshire**

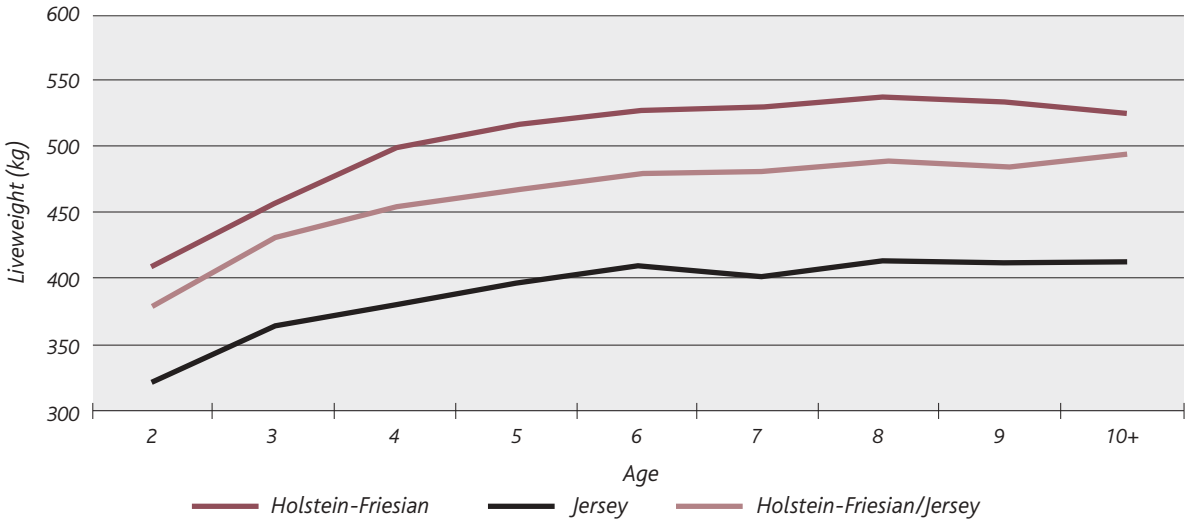
| Age | Number | Days in milk | Milk (litres) | Milkfat (kg) | Protein (kg) | Milksolids (kg) | Milkfat (%) | Protein (%) | Milksolids (%) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 4,589 | 229 | 3,068 | 136.6 | 109.3 | 245.9 | 4.47 | 3.56 | 8.03 |
| 3 | 3,789 | 226 | 3,556 | 157.6 | 128.0 | 285.6 | 4.45 | 3.60 | 8.05 |
| 4 | 3,252 | 227 | 3,893 | 171.6 | 140.2 | 311.8 | 4.43 | 3.61 | 8.04 |
| 5 | 2,971 | 226 | 4,057 | 177.3 | 146.3 | 323.5 | 4.39 | 3.61 | 8.00 |
| 6 | 2,665 | 222 | 4,059 | 177.8 | 146.0 | 323.8 | 4.40 | 3.60 | 7.99 |
| 7 | 2,171 | 225 | 4,077 | 177.8 | 145.5 | 323.3 | 4.37 | 3.57 | 7.94 |
| 8 | 1,753 | 224 | 4,116 | 178.0 | 146.3 | 324.3 | 4.35 | 3.56 | 7.90 |
| 9 | 1,195 | 219 | 3,954 | 168.7 | 139.9 | 308.6 | 4.28 | 3.54 | 7.82 |
| 10+ | 1,822 | 214 | 3,643 | 156.6 | 128.1 | 284.7 | 4.31 | 3.51 | 7.82 |
| **Total** | **24,207** | **225** | **3,739** | **163.9** | **133.8** | **297.7** | **4.40** | **3.58** | **7.98** |

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. Liveweight by age and breed is illustrated in Graph 4.3.

*Table 4.7* ***Liveweight by age and breed of cow in 2003/04***

| | 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 | 411 | 11,120 | 319 | 3,754 | 378 | 9,111 |
| 3 | 457 | 1,120 | 363 | 521 | 431 | 1,116 |
| 4 | 500 | 835 | 382 | 365 | 457 | 774 |
| 5 | 516 | 678 | 396 | 294 | 467 | 545 |
| 6 | 527 | 564 | 409 | 292 | 478 | 489 |
| 7 | 532 | 531 | 401 | 221 | 482 | 302 |
| 8 | 540 | 492 | 414 | 150 | 490 | 287 |
| 9 | 535 | 293 | 413 | 119 | 485 | 173 |
| 10+ | 528 | 383 | 414 | 133 | 494 | 254 |
| **Total** | **490** | | **378** | | **444** | |

*Graph 4.3* ***Liveweight by age and breed of cow in 2003/04***



## C. Artificial Breeding statistics

- ***South Island is the only region with an increase in the number of cows to AB for 2003/04***

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 second consecutive season since 1993/94 where the percentage of cows to AB is below the 80% mark (Graph 4.4). The number of yearlings to AB has decreased over the last three seasons and is now 30% lower than the peak of 115,736 in 2000/01 (Table 4.8).

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

**Cows to AB**

| *Livestock Improvement Region* | *1995/96* | *1996/97* | *1997/98* | *1998/99* | *1999/00* | *2000/01* | *2001/02* | *2002/03* | *2003/04* |
|---|---|---|---|---|---|---|---|---|---|
| Northland | 257,557 | 262,429 | 258,057 | 244,115 | 246,617 | 257,752 | 261,197 | 228,988 | 218,488 |
| Auckland | 1,007,497 | 1,065,624 | 1,069,038 | 1,066,442 | 1,057,618 | 1,096,379 | 1,089,655 | 1,030,788 | 1,025,071 |
| BOP / East Coast | 152,836 | 155,267 | 156,602 | 153,294 | 152,751 | 157,162 | 154,762 | 147,047 | 145,464 |
| Taranaki | 398,571 | 399,435 | 404,930 | 395,636 | 405,605 | 427,683 | 423,723 | 400,322 | 398,794 |
| Wellington/Hawkes Bay | 230,582 | 254,002 | 266,514 | 266,171 | 276,517 | 294,387 | 302,349 | 291,188 | 281,448 |
| South Island | 371,210 | 437,078 | 483,968 | 510,514 | 587,957 | 660,075 | 756,874 | 769,954 | 817,952 |
| **New Zealand** | **2,418,253** | **2,573,835** | **2,639,109** | **2,636,172** | **2,727,065** | **2,893,438** | **2,988,560** | **2,868,287** | **2,887,217** |

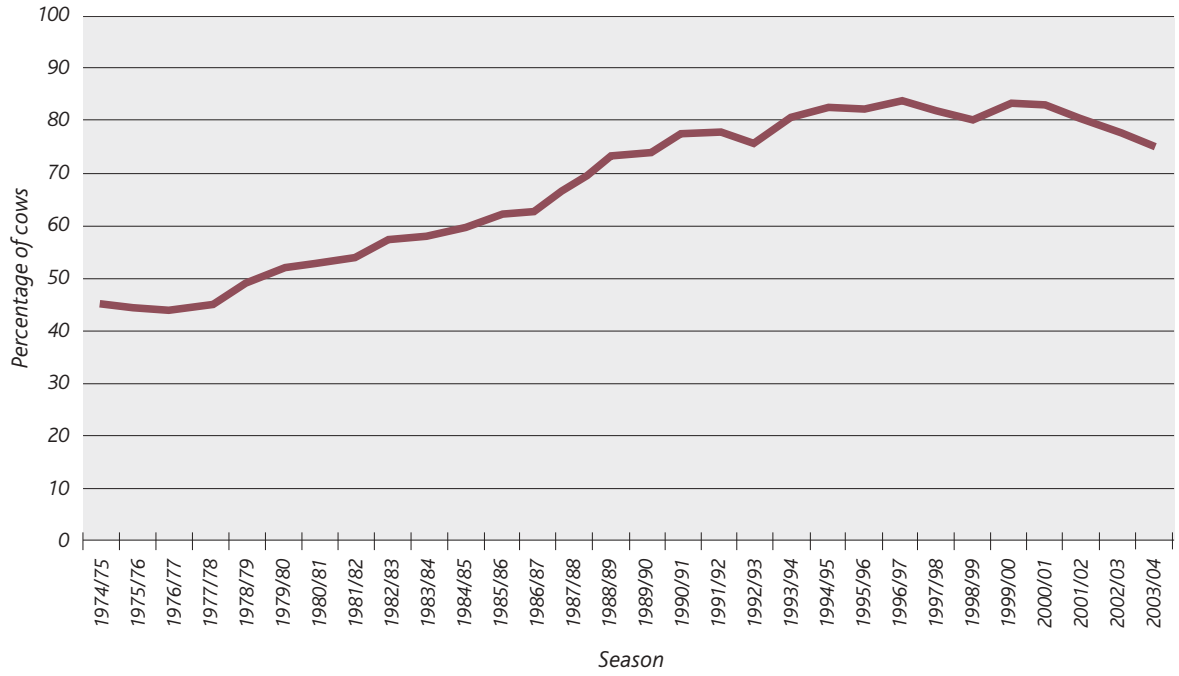
**% Cows to AB**

| *Livestock Improvement Region* | *1995/96* | *1996/97* | *1997/98* | *1998/99* | *1999/00* | *2000/01* | *2001/02* | *2002/03* | *2003/04* |
|---|---|---|---|---|---|---|---|---|---|
| Northland | 83.0 | 81.0 | 83.1 | 71.0 | 69.5 | 76.4 | 74.4 | 66.3 | 64.3 |
| Auckland | 81.7 | 86.2 | 82.8 | 84.7 | 79.6 | 92.9 | 78.8 | 74.7 | 72.7 |
| BOP / East Coast | 84.3 | 81.6 | 84.8 | 80.7 | 81.6 | 85.2 | 81.8 | 77.9 | 74.8 |
| Taranaki | 93.0 | 89.8 | 84.4 | 82.2 | 81.8 | 88.7 | 84.6 | 82.7 | 80.5 |
| Wellington / Hawkes Bay | 79.3 | 78.8 | 80.7 | 76.9 | 74.2 | 81.5 | 79.3 | 76.1 | 72.6 |
| South Island | 75.5 | 79.8 | 77.3 | 76.3 | 78.7 | 91.2 | 85.2 | 80.3 | 79.8 |
| **New Zealand** | **82.4** | **84.0** | **81.9** | **80.1** | **78.2** | **88.5** | **80.9** | **76.7** | **75.0** |

**Yearlings to AB**

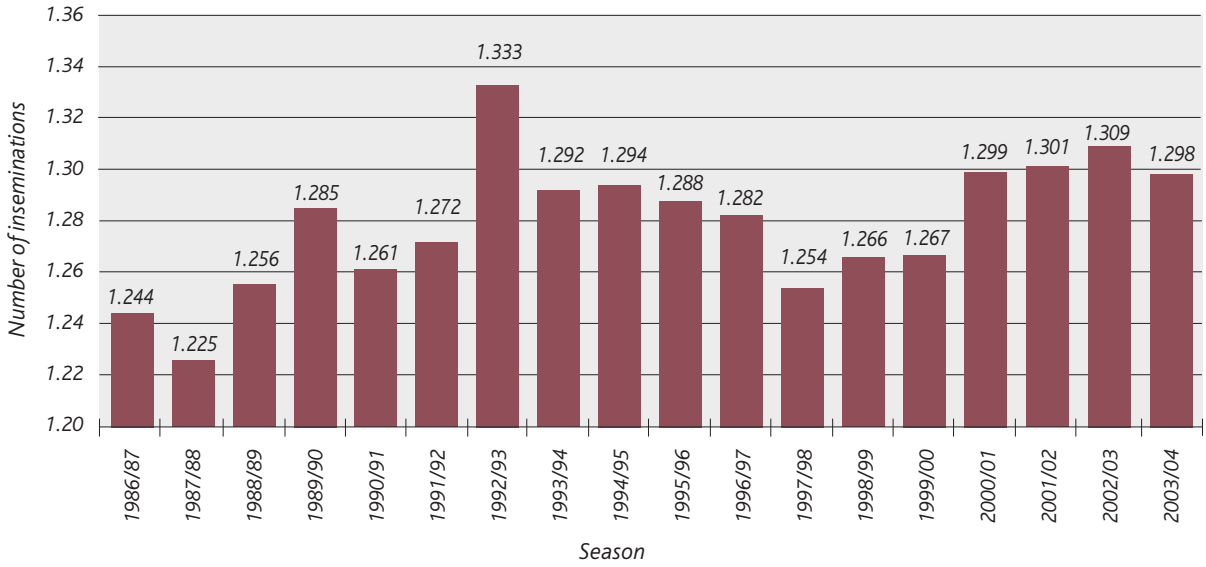
| *Livestock Improvement Region* | *1995/96* | *1996/97* | *1997/98* | *1998/99* | *1999/00* | *2000/01* | *2001/02* | *2002/03* | *2003/04* |
|---|---|---|---|---|---|---|---|---|---|
| Northland | 22,034 | 20,613 | 15,966 | 11,188 | 9,825 | 10,437 | 10,942 | 7,982 | 7,765 |
| Auckland | 53,038 | 48,291 | 31,102 | 25,968 | 21,804 | 24,543 | 24,988 | 20,143 | 17,264 |
| BOP / East Coast | 17,501 | 15,753 | 10,317 | 7,854 | 7,250 | 8,492 | 8,929 | 6,763 | 4,691 |
| Taranaki | 17,864 | 11,909 | 8,428 | 5,748 | 5,700 | 7,698 | 7,528 | 8,220 | 3,703 |
| Wellington / Hawkes Bay | 15,321 | 14,375 | 9,887 | 6,223 | 6,313 | 7,823 | 7,517 | 5,948 | 5,076 |
| South Island | 48,194 | 54,152 | 35,159 | 34,906 | 41,469 | 56,743 | 55,680 | 47,162 | 39,401 |
| **New Zealand** | **173,952** | **165,093** | **110,859** | **91,887** | **92,361** | **115,736** | **115,584** | **96,218** | **77,900** |

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



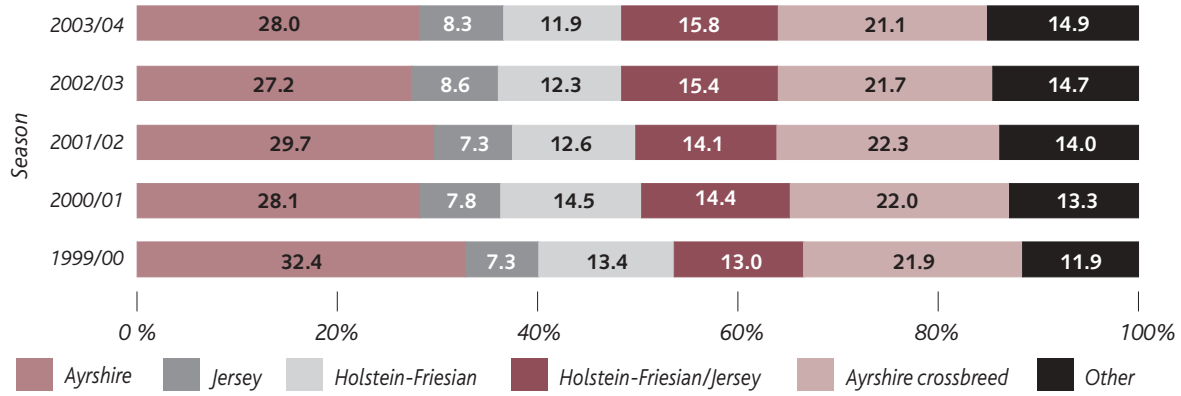

In 2003/04 the average number of inseminations per cow (1.30) as recorded on the Livestock Improvement Database, was down slightly on the previous season (Graph 4.5).

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

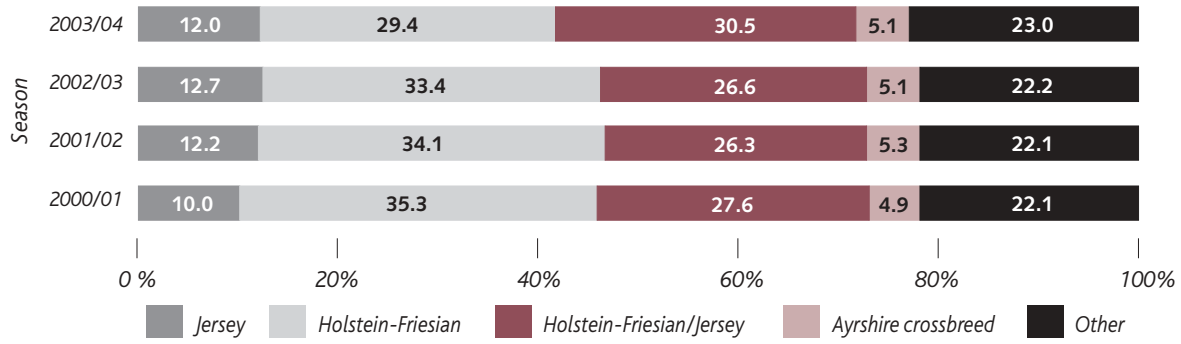


The use of Ayrshire, Holstein-Friesian, and Jersey semen over different cow breeds for the past five seasons is shown in the graphs below. The use of crossbred semen is now included along with the other breeds (Graph 4.7). Ayrshire semen use over Ayrshire cows is 28.0% (Graph 4.6). Crossbred semen is used predominantly over Friesian/Jersey crosses followed closely by Friesian cows (Graph 4.7). The trend in the use of Jersey semen over other breeds remains similar to previous seasons (Graph 4.8), with increasing use over Friesian/Jersey cows and decreasing use over Jerseys and Holstein-Friesians. The percentage of Holstein-Friesian semen over Holstein-Friesian cows continues to decrease (Graph 4.9).

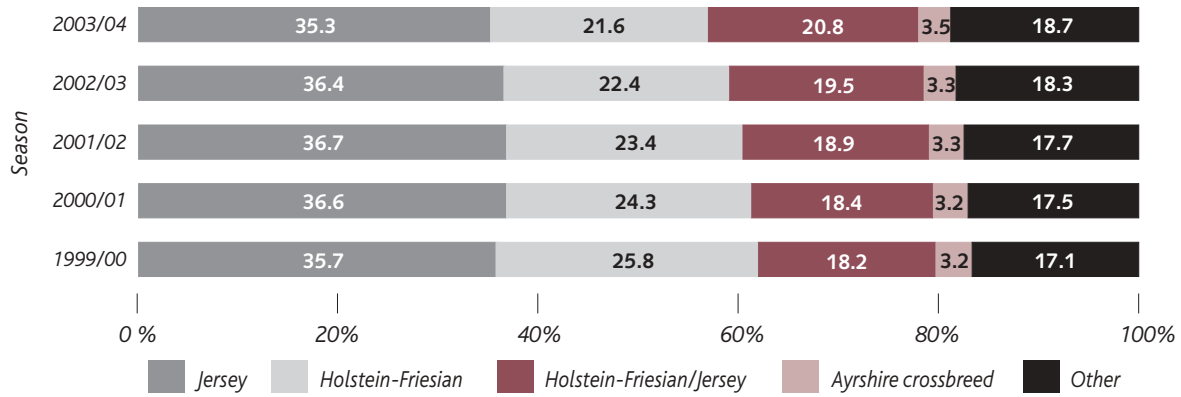
*Graph 4.6* ***Ayrshire semen usage (%) over cow breed for the last five seasons***



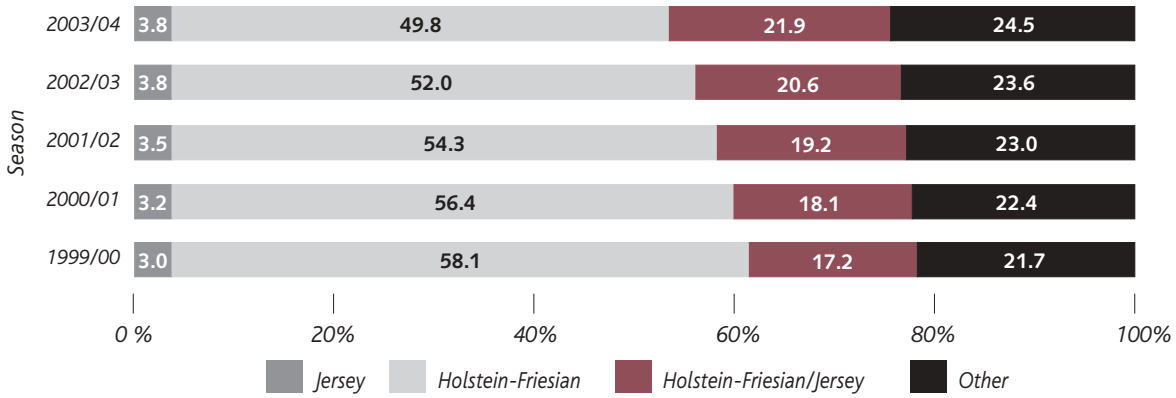

*Graph 4.7* ***Crossbreed semen usage (%) over cow breed since 2000/01***




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

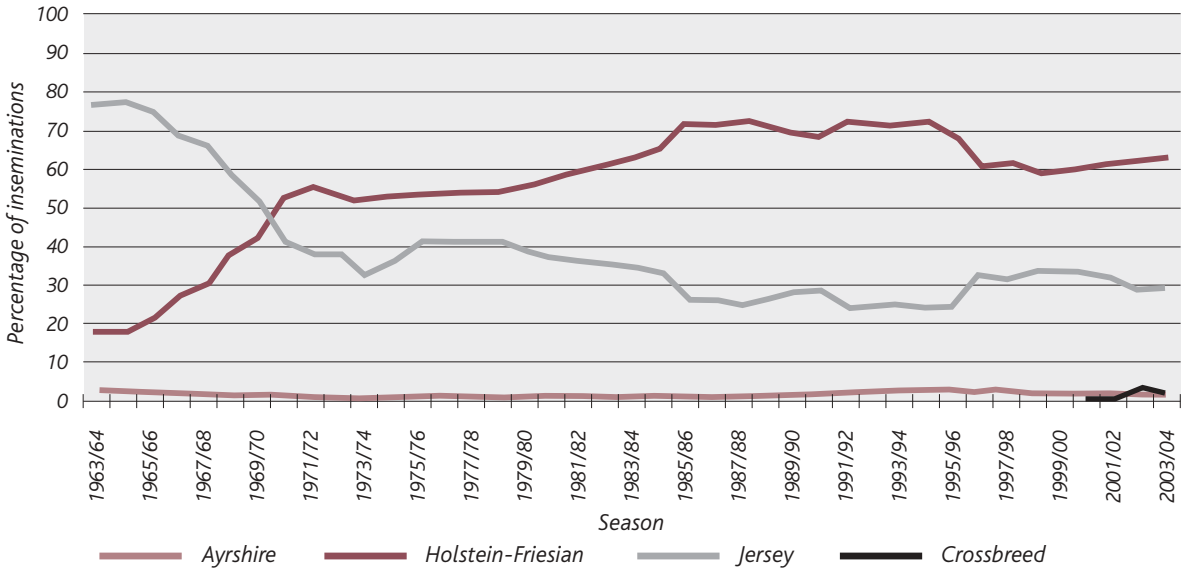


Graph 4.9 ***Holstein-Friesian semen usage (%) over cow breed for the last five seasons***




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 three seasons) dropped from 3.5% in 2002/03 to 2.3% for the 2003/04 season.

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 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. The national evaluation system is designed to compare animals irrespective of breed, both nationally and within herd, to assist farmers to select the most profitable animals for the future.

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

1. **Trait evaluations** are estimates 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 residual survival.
2. **Economic evaluations** combine an animal's individual trait evaluations to estimate its comparative ability to convert feed into profit, through breeding replacements (*Breeding Worth*), 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** | **$EV** | **+** |
| | | **Residual Survival BV** | **x** | **$EV** | |

where BV = Breeding Value for each trait

$EV = economic value for each trait for breeding replacements

Animal Evaluation ranks animals in terms of their expected profit per unit of feed eaten. 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 2004 are presented below (Table 4.9). The economic values are reviewed annually and therefore may change from year to year.

*Table 4.9* ***Economic values used from 14 February 2004***

| | *Milkfat ($/kg)* | *Protein ($/kg)* | *Milk ($/kg)* | *Liveweight ($/kg)* | *Fertility (%)* | *Residual Survival ($/day)* |
|---|---|---|---|---|---|---|
| Breeding Worth | 0.902 | 6.895 | -0.078 | -0.915 | 1.682 | 0.032 |
| Production Worth | 1.101 | 5.834 | -0.069 | -0.856 | – | – |
| Lactation Worth | 1.275 | 6.299 | -0.071 | -0.973 | – | – |

The information for all Animal Evaluation statistics was sourced from cows and sires recorded on the Livestock Improvement National Database as at 15 May 2004.

Table 4.10 shows the average Breeding Values (BV) and BW by breed, of all bulls born in 1999 first proven in the 2003/04 season with a BW Reliability of 75% or greater. Reliability of BW is reported on a scale from 0% to 99%. 0% is the case where there are no performance records for any related animal used in the bull's evaluation. 99% is the case where the bull has a very large number of performance-recorded daughters.

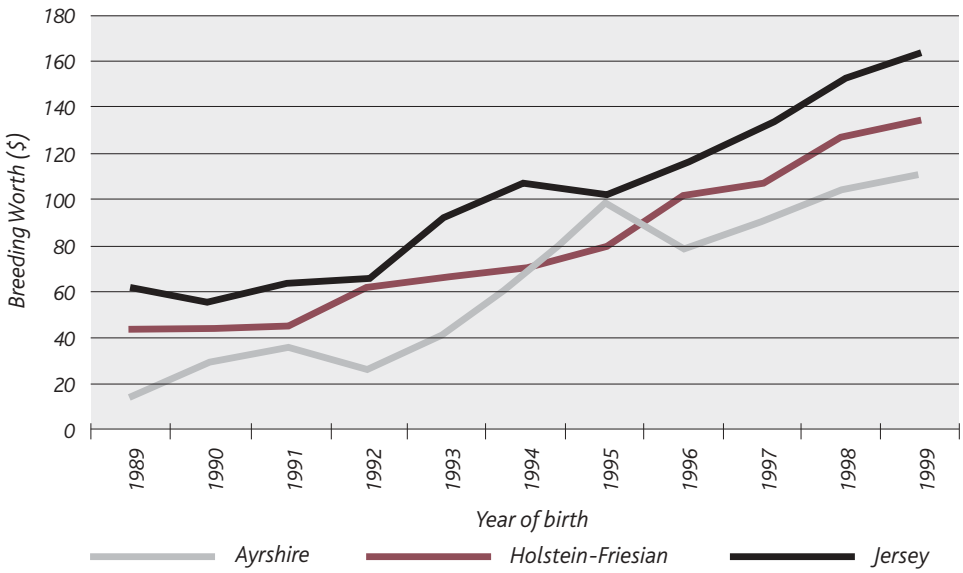
*Table 4.10* ***Average Breeding Values and Breeding Worth of 1999 born bulls (reliability of 75% or greater)***

| Breed | Milkfat BV | Protein BV | Milk Volume BV | Liveweight BV | Fertility BV | Residual Survival BV | BW | Number of Bulls |
|---|---|---|---|---|---|---|---|---|
| Ayrshire | 25.7 | 27.5 | 849 | 29.0 | -5.3 | -26 | 110.5 | 12 |
| Holstein Friesian | 35.0 | 38.8 | 1125 | 73.4 | -2.4 | -160 | 134.6 | 187 |
| Jersey | 32.5 | 16.3 | 113 | -32.2 | 1.2 | -17 | 164.0 | 133 |

*(Evaluation Date: 15 May 2004)*

The genetic trend of proven dairy bulls is shown in Graph 4.11. Bulls born in 1999 are first proven in the 2003/04 season.

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




*(Evaluation date: 15 May 2004)*

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 |
|---|---|---|---|---|---|
| 1989 | 380 | 225 | 117 | 20 | 18 |
| 1990 | 369 | 221 | 108 | 29 | 11 |
| 1991 | 415 | 266 | 104 | 29 | 16 |
| 1992 | 419 | 260 | 120 | 29 | 10 |
| 1993 | 403 | 241 | 120 | 34 | 8 |
| 1994 | 425 | 253 | 130 | 37 | 5 |
| 1995 | 452 | 272 | 133 | 38 | 9 |
| 1996 | 393 | 219 | 140 | 29 | 5 |
| 1997 | 397 | 244 | 123 | 24 | 6 |
| 1998 | 380 | 219 | 140 | 20 | 1 |
| 1999 | 333 | 187 | 133 | 12 | 1 |

*(Evaluation date: 15 May 2004)*

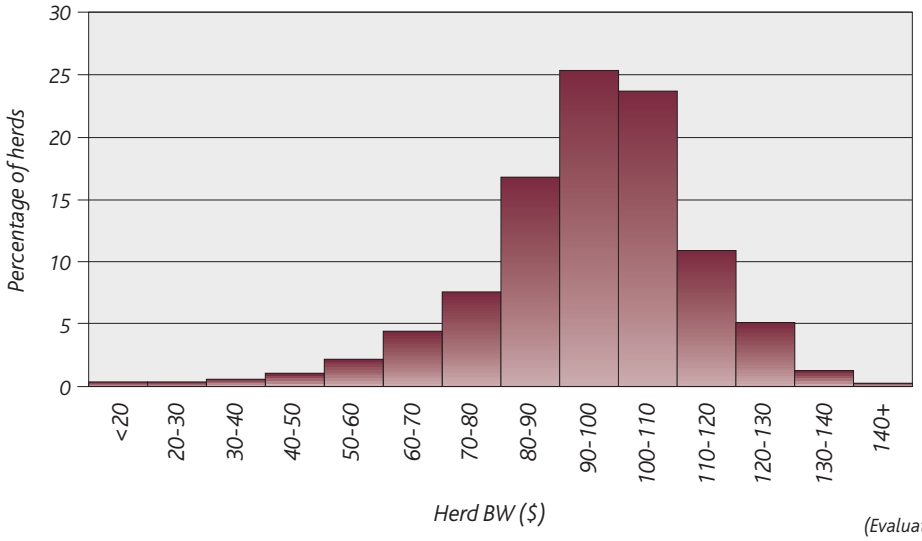
The Breeding Worth for **herds** presented below (Table 4.12 and Graph 4.12) is based on cows of the users of the Livestock Improvement herd testing service, in herds with at least 80 cows, and signed up for herd testing in the 2003/04 season. Table 4.12 shows that 50% of these herds had a BW of 98 or above and 25% of these herds had a BW of 108 or above.

*Table 4.12* ***Herd Breeding Worth in 2003/04***

| | Median | Top 5% | Top 10% | Top 25% | Bottom 25% | Bottom 10% | Bottom 5% |
|---|---|---|---|---|---|---|---|
| Herd BW | 98 | > 123 | > 117 | > 108 | < 86 | < 73 | < 64 |

*(Evaluation date: 15 May 2004)*

*Graph 4.12* ***Distribution of Herd Breeding Worth in 2003/04***




*(Evaluation date: 15 May 2004)*

The Production Worth (PW) for **herds** presented below (Table 4.13 and Graph 4.13) is based on cows of the users of the Livestock Improvement herd testing service, in herds with at least 80 cows, and signed up for herd testing in the 2003/04 season. Table 4.13 shows that 50% of these herds had a PW of 97 or above and 25% of these herds had a PW of 110 or above.

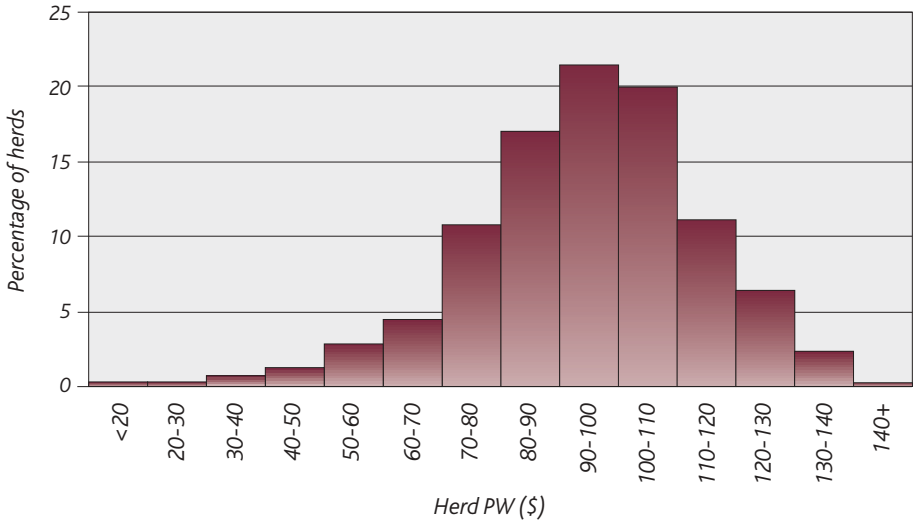


*Table 4.13* ***Herd Production Worth in 2003/04***

| | Median | Top 5% | Top 10% | Top 25% | Bottom 25% | Bottom 10% | Bottom 5% |
|---|---|---|---|---|---|---|---|
| Herd BW | 97 | > 127 | > 120 | > 110 | < 84 | < 71 | < 61 |

*(Evaluation date: 15 May 2004)*

*Graph 4.13* ***Distribution of Herd Production Worth in 2003/04***




*(Evaluation date: 15 May 2004)*

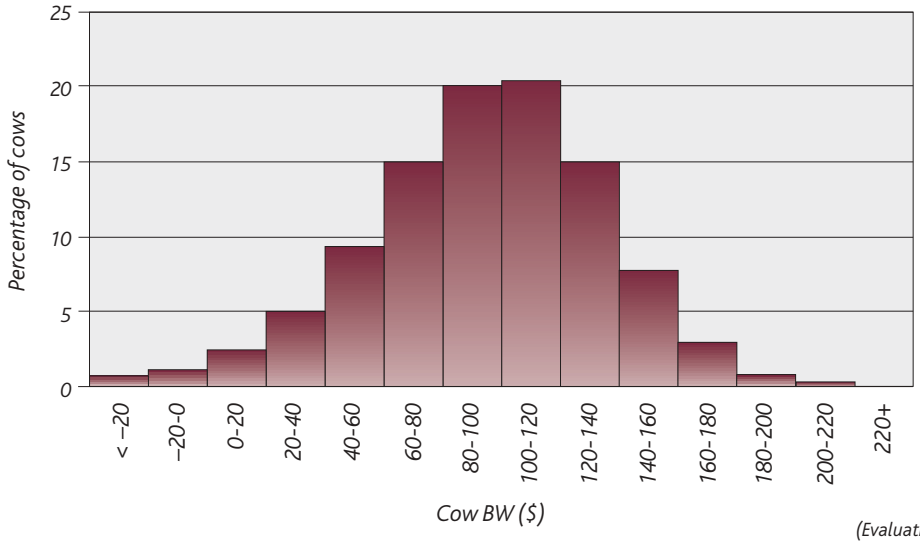
The Breeding Worth (BW) for **cows** presented below (Table 4.14 and Graph 4.14) is based on all cows of the users of the Livestock Improvement herd testing service, in herds with at least 80 cows, and signed up for herd testing in the 2003/04 season. Table 4.14 shows that 50% of these cows had a BW of 98 or above and that 25% of these cows had a BW of 123 or above.

*Table 4.14* ***Cow Breeding Worth in 2003/04***

| | Median | Top 5% | Top 10% | Top 25% | Bottom 25% | Bottom 10% | Bottom 5% |
|---|---|---|---|---|---|---|---|
| Cow BW | 98 | > 157 | > 144 | > 123 | < 72 | < 45 | < 27 |

*(Evaluation date: 15 May 2004)*

*Graph 4.14* ***Distribution of Cow Breeding Worth in 2003/04***




*(Evaluation date: 15 May 2004)*



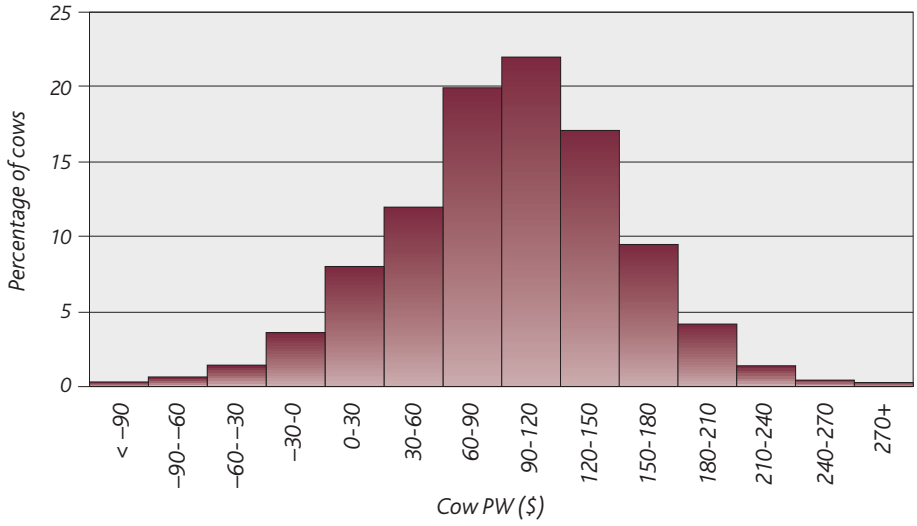
The Production Worth (PW) for **cows** presented below (Table 4.15 and Graph 4.15) is based on cows of the users of the Livestock Improvement herd testing service, in herds with at least 80 cows, and signed up for herd testing in the 2003/04 season. Table 4.15 shows that 50% of these cows had a PW of 97 or above and that 25% of these cows had a PW of 134 or above.

*Table 4.15* ***Cow Production Worth in 2003/04***

| | Median | Top 5% | Top 10% | Top 25% | Bottom 25% | Bottom 10% | Bottom 5% |
|---|---|---|---|---|---|---|---|
| Cow BW | 97 | > 188 | > 167 | > 134 | < 59 | < 23 | < 0 |

*(Evaluation date: 15 May 2004)*

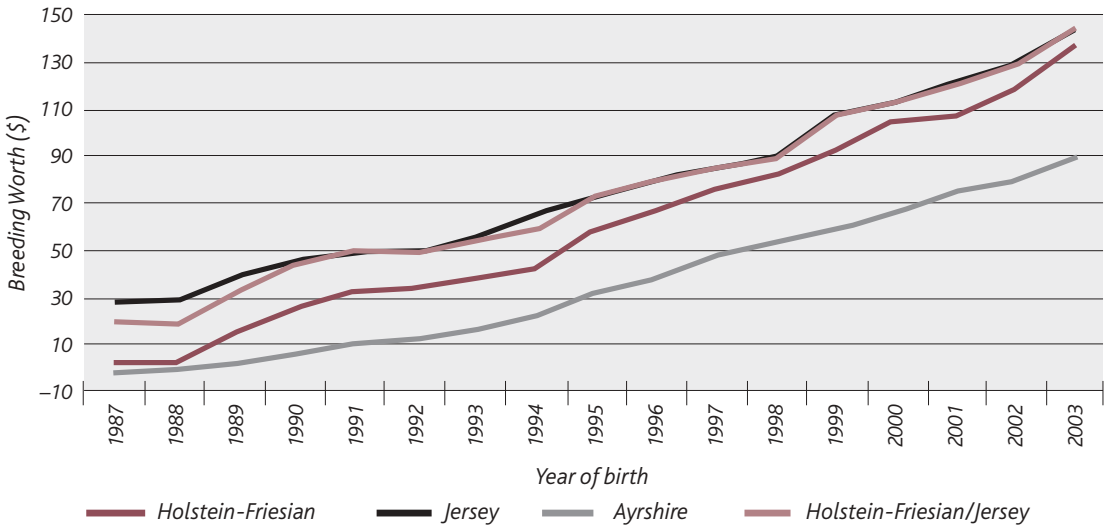
*Graph 4.15* ***Distribution of Cow Production Worth in 2003/04***




*(Evaluation date: 15 May 2004)*

The genetic trend for cows is based on all cows (alive or dead) recorded on the Livestock Improvement Database in the 2003/04 season. Also included are the estimated BW and PW for replacement stock (2002 and 2003 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.

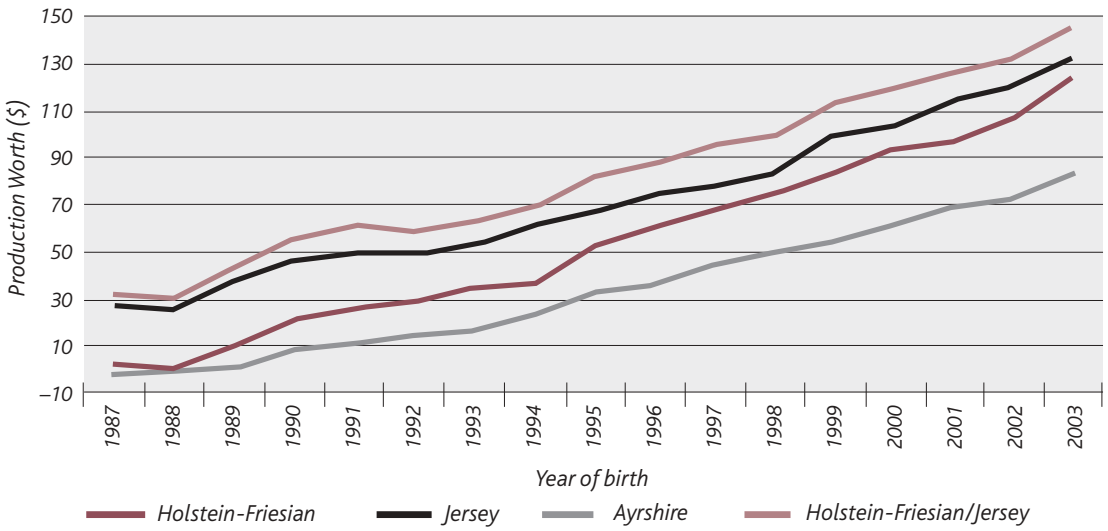
*Graph 4.16* ***Trend in Breeding Worth for all cows in 2003/04***




*(Evaluation date: 15 May 2004)*

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 effects of heterosis (hybrid vigour) in the crossbreds.

*Graph 4.17* ***Trend in Production Worth for all cows in 2003/4***




*(Evaluation date: 15 May 2004)*

Table 4.16 shows the average BVs and BW by breed, of all 2001 born cows. The Jersey cows had the highest average BW at 121.4. The Holstein-Friesian cows had the highest milkfat, protein, and milk volume BVs. All evaluations are comparable across breeds.

*Table 4.16* ***Average Breeding Worth and Breeding Value of all cows by breed born in 2001***

| 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 | 106.3 | 30.9 | 30.2 | 893 | 62.3 | -0.4 | -73 | 445,016 |
| Jersey | 121.4 | 20.8 | 8.9 | -22 | -41.5 | 1.0 | -12 | 135,629 |
| Ayrshire | 74.5 | 12.2 | 17.3 | 521 | 12.2 | -2.9 | -34 | 10,040 |
| Holstein-Friesian /Jersey | 118.9 | 27.3 | 20.7 | 468 | 11.9 | 0.4 | -35 | 284,884 |
| Guernsey | -19.7 | -2.3 | 2.3 | 70 | 22.5 | 0.5 | -264 | 160 |
| Milking Shorthorn | 11.9 | -1.5 | 8.4 | 245 | 23.6 | -1.4 | -40 | 929 |
| Brown Swiss | -11.1 | -2.4 | 10.1 | 288 | 48.1 | -5.1 | -112 | 138 |
| Other | 87.6 | 19.3 | 18.9 | 505 | 18.6 | -0.9 | -44 | 31,491 |
| **Weighted Average** | **111.4** | **27.6** | **23.5** | **605** | **28.9** | **0.0** | **-51** | **908,287** |

*(Evaluation date: 15 May 2004)*

Survivability is measured by the percentage of cows that have a lactation recorded for consecutive years. The 2003/04 season 2-3 years figure is the percentage of cows that were milking as two-year-olds in the 2002/03 season and are now milking as three-year-olds in the 2003/04 season. Table 4.17 shows that for the 2003/04 season the highest percentage of survival is in animals ageing from 3-4 years (86.9%), followed by animals ageing from 4-5 years (86.0%).

*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 |
| 2003/04 | 85.2 | 86.9 | 86.0 | 83.0 | 78.7 | 74.8 | 69.4 |

# 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 $4.25*
- *14% increase for inflation adjusted payout*

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.

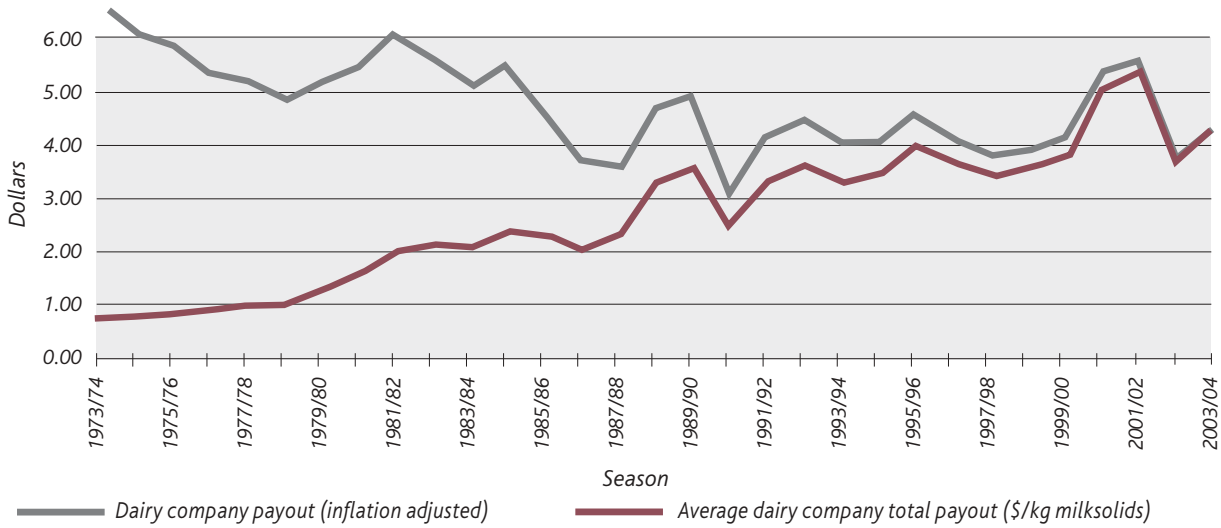
*Table 5.1* ***Trend in prices received for milksolids for the last 20 years***

| Season | Average Dairy Company total payout ($/kg milksolids) | Dairy Company payout (inflation adjusted)[a] |
|---|---|---|
| 1983/84 | 2.09 | 5.12 |
| 1984/85 | 2.33 | 5.45 |
| 1985/86 | 2.29 | 4.58 |
| 1986/87 | 2.03 | 3.69 |
| 1987/88 | 2.34 | 3.57 |
| 1988/89 | 3.28 | 4.70 |
| 1989/90 | 3.59 | 4.93 |
| 1990/91 | 2.42 | 3.09 |
| 1991/92 | 3.34 | 4.15 |
| 1992/93 | 3.66 | 4.49 |
| 1993/94 | 3.32 | 4.02 |
| 1994/95 | 3.40 | 4.08 |
| 1995/96 | 3.99 | 4.58 |
| 1996/97 | 3.63 | 4.08 |
| 1997/98 | 3.42 | 3.80 |
| 1998/99 | 3.58 | 3.92 |
| 1999/00 | 3.78 | 4.15 |
| 2000/01 | 5.01 | 5.39 |
| 2001/02 | 5.35 | 5.58 |
| 2002/03 | 3.66 | 3.71 |
| 2003/04 | 4.25 | 4.25 |

[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 prior to 1989/90 has been derived from$/kg milkfat*

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



## ii) Dairy farm land sale values

- ***Average sale price of farms just under $1.5 million***

The average sale price of dairy farms ($1.49 million) continues to increase compared with previous years (Table 5.2). The 2004 half-yearly average dairy farm price per kilogram of milksolids has increased on the 2003 figure.

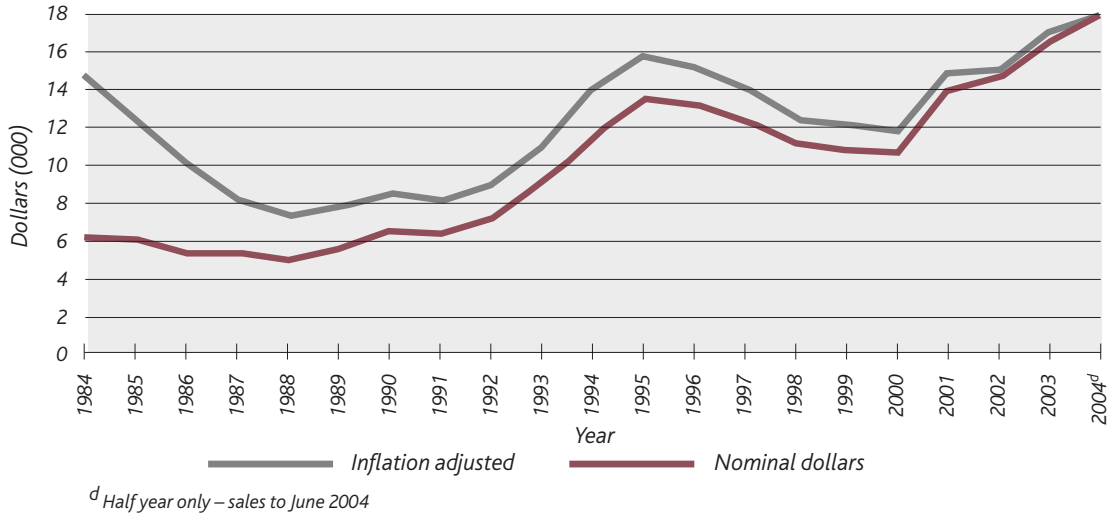
*Table 5.2* ***Trend in dairy land sale values for the last 20 years***

| 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] |
|---|---|---|---|---|---|---|---|---|
| 1984 | 618 | 301,076 | 720,020 | 49 | 6,189 | 14,801 | 21.9 | 12.6 |
| 1985 | 505 | 298,746 | 612,756 | 49 | 6,044 | 12,397 | 21.0 | 12.1 |
| 1986 | 274 | 251,165 | 466,627 | 47 | 5,298 | 9,843 | 18.4 | 10.6 |
| 1987 | 504 | 270,180 | 421,781 | 52 | 5,212 | 8,137 | 16.8 | 9.7 |
| 1988 | 576 | 278,650 | 408,881 | 56 | 5,013 | 7,356 | 16.0 | 9.2 |
| 1989 | 1,013 | 325,847 | 457,815 | 59 | 5,561 | 7,813 | 17.8 | 10.2 |
| 1990 | 868 | 373,553 | 487,658 | 58 | 6,467 | 8,442 | 21.8 | 12.5 |
| 1991 | 538 | 362,819 | 460,801 | 58 | 6,283 | 7,980 | 21.7 | 12.5 |
| 1992 | 897 | 446,979 | 561,974 | 62 | 7,183 | 9,031 | 23.1 | 13.3 |
| 1993 | 834 | 543,984 | 675,622 | 61 | 8,903 | 11,057 | 31.0 | 17.8 |
| 1994 | 784 | 704,245 | 865,105 | 61 | 11,640 | 14,299 | 37.5 | 21.6 |
| 1995 | 672 | 775,110 | 910,370 | 58 | 13,400 | 15,738 | 41.9 | 24.1 |
| 1996 | 784 | 785,510 | 904,624 | 60 | 13,187 | 15,187 | 41.6 | 23.9 |
| 1997 | 520 | 674,809 | 768,475 | 54 | 12,388 | 14,108 | 38.5 | 22.1 |
| 1998 | 496 | 704,309 | 788,489 | 64 | 11,076 | 12,400 | 32.0 | 18.4 |
| 1999 | 600 | 769,606 | 865,037 | 72 | 10,759 | 12,093 | 33.1 | 19.0 |
| 2000 | 576 | 856,374 | 943,691 | 80 | 10,740 | 11,835 | 35.3 | 20.3 |
| 2001 | 941 | 1,032,618 | 1,102,244 | 74 | 13,959 | 14,900 | 41.2 | 23.7 |
| 2002 | 704 | 1,049,939 | 1,090,694 | 72 | 14,658 | 15,227 | 45.6 | 26.2 |
| 2003 | 711 | 1,339,273 | 1,370,986 | 80 | 16,655 | 17,049 | 45.4 | 26.1 |
| 2004[d] | 371 | 1,493,321 | 1,493,321 | 82 | 18,104 | 18,104 | 50.5 | 29.0 |

***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 2004*

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 $18,104. 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 2004*

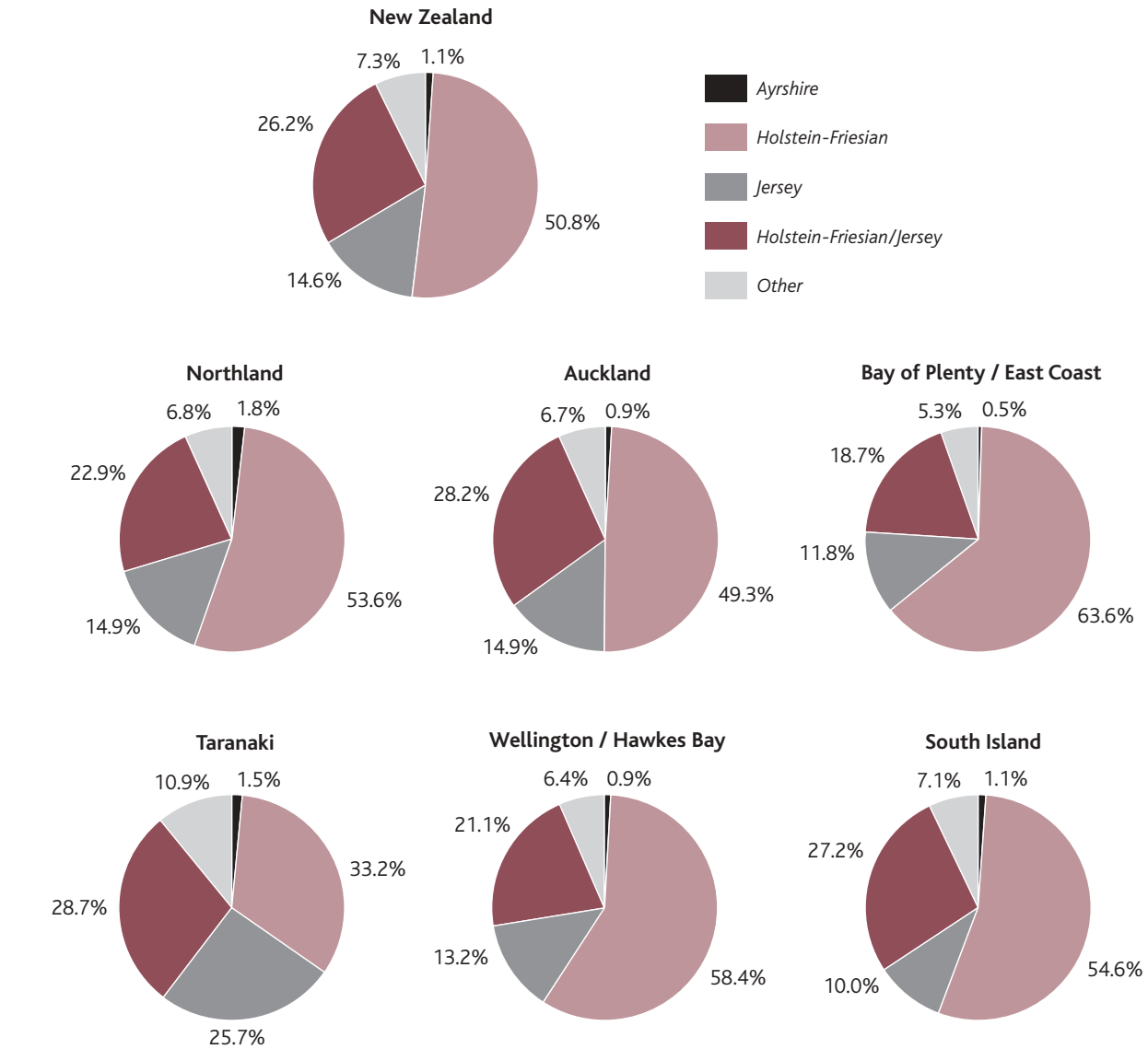
## B. Breed breakdown

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. Holstein-Friesian/Jersey 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 (63.6%), whereas Taranaki has the highest proportion of Jerseys (25.7%) and Holstein-Friesian/Jersey Crossbreeds (28.7%).

*Graph 5.3* ***Breed percentages of cows in each region in 2003/04***



# C. Calving

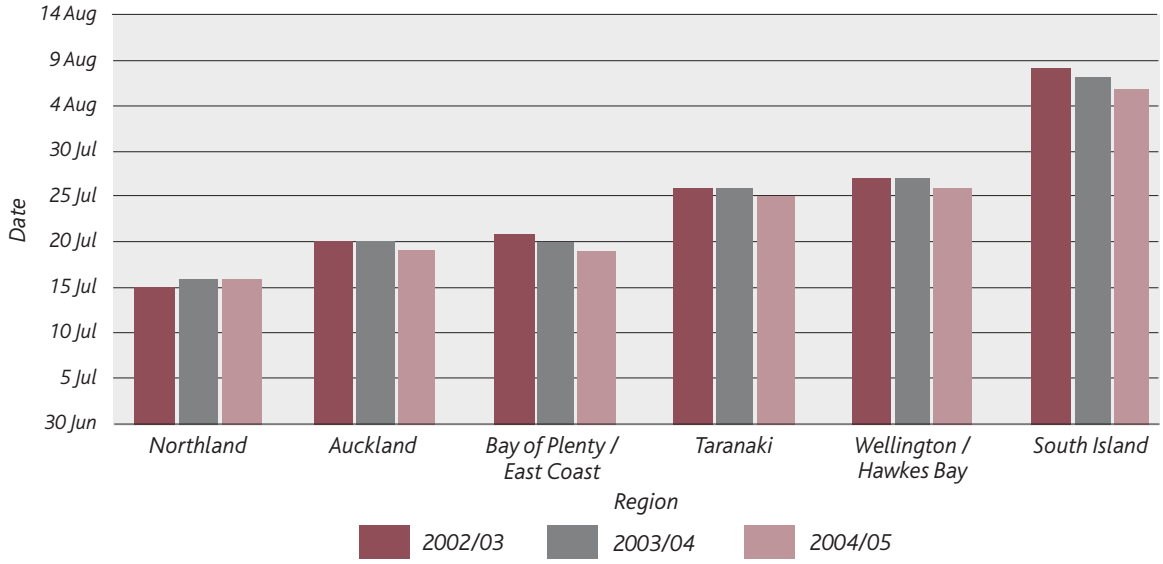
## i) Planned start of calving dates

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.

The forecast planned start of calving dates for cows (excluding first calvers) for the 2004/05 season compared to the dates previously forecast for 2002/03 and 2003/04 seasons are shown in Graph 5.4.

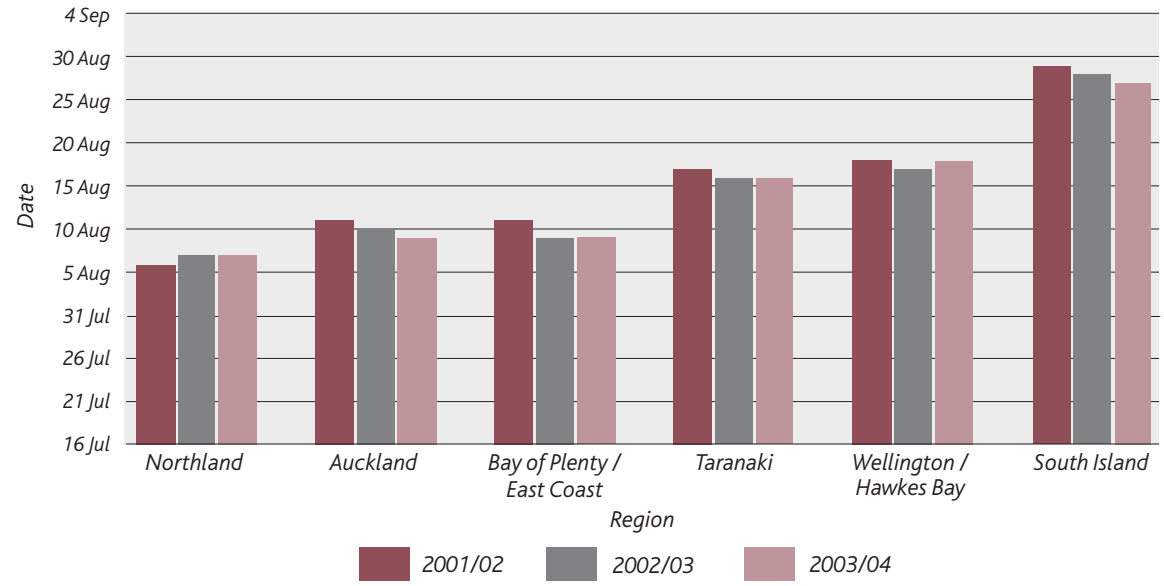
*Graph 5.4* ***Planned start of calving dates for cows (excluding first calvers) by region***




## ii) Median calving dates

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 (the date that occupies the middle position after the dates are arranged in ascending order) is used as an indicator of actual calving spread. Graph 5.5 compares median calving dates for cows (excluding first calvers) for the three most recent seasons.

*Graph 5.5* ***Median calving dates for cows (excluding first calvers) by region***



### iii) Calving interval

The calving interval for a herd tested cow is the number of days between her calving date in the current season and her calving date in the preceding season. No interval is calculated for first-calving heifers. The average calving interval is based on all recorded calving dates for herd tested cows calving during the period from 1 June to 31 November. All records where pregnancy terminated prematurely or resulted in abortion or induction were excluded.

*Table 5.3* ***Mean calving interval***

| | *All breeds* | | *Holstein-Friesian* | | *Jersey* | | *Friesian/Jersey Cross* | | *Ayrshire* | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Average number of days* | *Number of records* | *Average number of days* | *Number of records* | *Average number of days* | *Number of records* | *Average number of days* | *Number of records* | *Average number of days* | *Number of records* |
| 2000/01 | 368.2 | 2,075,300 | 368.4 | 1,120,489 | 368.4 | 355,463 | 367.7 | 491,090 | 369.3 | 25,941 |
| 2001/02 | 368.3 | 2,093,134 | 368.7 | 1,091,334 | 367.8 | 363,278 | 367.7 | 526,610 | 369.7 | 25,572 |
| 2002/03 | 368.4 | 2,109,651 | 368.6 | 1,068,842 | 368.3 | 365,913 | 368.0 | 562,974 | 369.4 | 24,175 |

## 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 2003/04, all farms with contract milkers could not be identified, consequently, any farms with contract milkers are included with owner-operators.

- ***37% of all milkers are sharemilkers***
- ***65% of all sharemilkers are 50/50 sharemilkers***

The number of herds farmed, average herd size, effective area and number of cows per hectare for each of the main operating structures are shown in Table 5.4. In 2003/04, 4,730 (37%) New Zealand dairy herds operated under a sharemilking agreement. Sixty-five percent (3,072) 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 5.4* ***Herd analysis by operating structure in 2003/04***

| *Operating structure* | *Number of herds* | *Percentage of herds* | *Average herd size* | *Average effective hectares* | *Average cows per effective hectare* |
|---|---|---|---|---|---|
| Owner-operators | 8,000 | 62.7 | 286 | 107 | 2.69 |
| **Sharemilkers:** | | | | | |
| Less than 20% | 78 | 0.6 | 507 | 168 | 3.00 |
| 20-29% | 1,094 | 8.6 | 342 | 122 | 2.89 |
| 30-39% | 212 | 1.7 | 271 | 101 | 2.71 |
| 40-44% | 43 | 0.3 | 285 | 114 | 2.58 |
| 50/50 (45-54%) | 3,072 | 24.1 | 326 | 117 | 2.83 |
| over 54% | 231 | 1.8 | 314 | 112 | 2.85 |
| All sharemilkers | 4,730 | 37.1 | 329 | 118 | 2.84 |
| Unknown | 21 | 0.2 | 334 | 133 | 2.50 |
| **All farms** | **12,751** | | **302** | **111** | **2.75** |

***Note:*** *Contract milkers are included with owner-operators*

Herd production in each of the main operating structure groups is shown in Table 5.5. The table shows that on average, sharemilkers on less than 20% agreements have the highest production per herd, followed by 20-29% and 50/50 sharemilkers.

*Table 5.5* ***Herd production analysis by operating structure in 2003/04***

| *Operating structure* | *Average litres per herd* | *Average kg milkfat per herd* | *Average kg milksolids per herd* | *Average kg milkfat per effective hectare* | *Average kg milksolids per effective hectare* | *Average kg milkfat per cow* | *Average kg milksolids per cow* |
|---|---|---|---|---|---|---|---|
| Owner-operators | 1,086,385 | 53,042 | 92,952 | 496.2 | 867 | 182.8 | 320 |
| **Sharemilkers:** | | | | | | | |
| Less than 20% | 2,038,595 | 100,880 | 176,707 | 596.8 | 1042 | 199.9 | 349 |
| 20 – 29% | 1,283,691 | 63,350 | 110,733 | 541.5 | 944 | 186.9 | 326 |
| 30 – 39% | 969,922 | 48,751 | 84,981 | 491.8 | 855 | 180.6 | 314 |
| 40 – 44% | 1,117,412 | 56,065 | 97,790 | 496.6 | 866 | 191.0 | 334 |
| 50/50 (45-54%) | 1,231,658 | 60,784 | 106,328 | 529.7 | 924 | 185.8 | 324 |
| over 54% | 1,224,259 | 59,592 | 104,639 | 535.6 | 937 | 188.0 | 329 |
| All Sharemilkers | 1,243,868 | 61,399 | 107,391 | 531.8 | 927 | 186.2 | 325 |
| Unknown | 1,167,730 | 57,784 | 100,912 | 454.5 | 792 | 183.0 | 319 |
| **All farms** | **1,144,937** | **56,150** | **98,321** | **509.4** | **889** | **184.1** | **322** |

***Note:*** *Contract milkers are included with owner-operators*

# General statistics – Operating structures

Changes to the operating structure in the last ten seasons are minimal. Table 5.6 shows the percentage of herds in each operating structure type, whereas Table 5.7 gives the actual number of herds.

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

| *Operating structure* | *1994/95* | *1995/96* | *1996/97* | *1997/98* | *1998/99* | *1999/00* | *2000/01* | *2001/02* | *2002/03* | *2003/04* |
|---|---|---|---|---|---|---|---|---|---|---|
| Owner-operators | 65.7 | 65.0 | 63.6 | 63.1 | 62.7 | 62.7 | 61.8 | 62.1 | 62.5 | 62.7 |
| Contract | 0.6 | 0.8 | 1.3 | 1.2 | 1.1 | 0.9 | 0.8 | ** | ** | ** |
| **Sharemilkers:** | | | | | | | | | | |
| 29% | 1.1 | 0.9 | 0.8 | 0.8 | 0.8 | 0.7 | * | * | * | * |
| 39% | 0.9 | 0.9 | 0.7 | 0.6 | 0.5 | 0.5 | * | * | * | * |
| 50% | 24.9 | 24.5 | 23.4 | 24.0 | 23.7 | 23.7 | 24.3 | 23.7 | 23.7 | 24.1 |
| Other | 6.8 | 7.8 | 9.3 | 10.2 | 11.2 | 11.5 | 13.1 | 14.1 | 13.2 | 13.0 |
| All Sharemilkers | 33.7 | 34.2 | 34.3 | 35.7 | 36.2 | 36.4 | 37.3 | 37.8 | 36.9 | 37.1 |
| Unknown | 0.0 | 0.0 | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.5 | 0.2 |

*** Included with owner-operators*
** Included in "Other"*
*From 1989/90 owner-operators includes leased farms*

*Table 5.7* ***Trend in the number of herds in each operating structure for the last 10 seasons***

| *Operating structure* | *1994/95* | *1995/96* | *1996/97* | *1997/98* | *1998/99* | *1999/00* | *2000/01* | *2001/02* | *2002/03* | *2003/04* |
|---|---|---|---|---|---|---|---|---|---|---|
| Owner-operators | 9,627 | 9,581 | 9,368 | 9,263 | 9,005 | 8,694 | 8,592 | 8,476 | 8,215 | 8,000 |
| Contract | 84 | 121 | 195 | 172 | 154 | 126 | 113 | ** | ** | ** |
| **Sharemilkers:** | | | | | | | | | | |
| 29% | 158 | 133 | 120 | 124 | 114 | 98 | * | * | * | * |
| 39% | 138 | 138 | 108 | 95 | 76 | 66 | * | * | * | * |
| 50% | 3,642 | 3,614 | 3,455 | 3,522 | 3,403 | 3,280 | 3,372 | 3,240 | 3,114 | 3072 |
| Other | 994 | 1,149 | 1,367 | 1,497 | 1,610 | 1,597 | 1,815 | 1,924 | 1,740 | 1,658 |
| All Sharemilkers | 4,932 | 5,034 | 5,050 | 5,238 | 5,203 | 5,041 | 5,187 | 5,164 | 4,854 | 4730 |
| Unknown | 6 | 0 | 128 | 0 | 0 | 0 | 0 | 9 | 71 | 21 |
| **Total** | **14,649** | **14,736** | **14,741** | **14,673** | **14,362** | **13,861** | **13,892** | **13,649** | **13,140** | **12,751** |

*** Included with owner-operators*
** Included in "Other"*
*From 1989/90 owner-operators includes leased farms*

Table 5.8 compares the number (and percentage) of owner-operators with sharemilkers by region. A greater relative percentage of owner-operators are in Northland, and in the North and West of the South Island. Conversely, there is a greater relative percentage of sharemilkers in South Auckland, Taranaki, and the South of the South Island.

*Table 5.8* **Operating structure by region in 2003/04**

| Farming region | Owner-operators | Owner-operators % | All sharemilkers | All sharemilkers % | 50/50 sharemilkers | 50/50 sharemilkers % | Variable order sharemilkers | Variable order share-milkers % | Total herds (excl. unknown) |
|---|---|---|---|---|---|---|---|---|---|
| Northland | 839 | 10.5 | 373 | 7.9 | 239 | 7.8 | 134 | 8.1 | 1,212 |
| Central Auckland | 411 | 5.1 | 213 | 4.5 | 156 | 5.1 | 57 | 3.4 | 624 |
| South Auckland | 2,438 | 30.5 | 1,622 | 34.3 | 1,125 | 36.6 | 497 | 30.0 | 4,060 |
| Bay of Plenty | 437 | 5.5 | 237 | 5.0 | 146 | 4.8 | 91 | 5.5 | 674 |
| Central Plateau | 285 | 3.6 | 184 | 3.9 | 112 | 3.6 | 72 | 4.3 | 469 |
| Western Uplands | 48 | 0.6 | 31 | 0.7 | 20 | 0.7 | 11 | 0.7 | 79 |
| East Coast | 15 | 0.2 | 1 | 0.0 | 1 | 0.0 | 0 | 0.0 | 16 |
| Hawkes Bay | 45 | 0.6 | 18 | 0.4 | 14 | 0.5 | 4 | 0.2 | 63 |
| Taranaki | 1,230 | 15.4 | 851 | 18.0 | 485 | 15.8 | 366 | 22.1 | 2,081 |
| Wellington | 408 | 5.1 | 209 | 4.4 | 132 | 4.3 | 77 | 4.6 | 617 |
| Wairarapa | 351 | 4.4 | 206 | 4.4 | 134 | 4.4 | 72 | 4.3 | 557 |
| **North Island** | **6,507** | **81.3** | **3,945** | **83.4** | **2,564** | **83.5** | **1,381** | **83.3** | **10,452** |
| Nelson/Marlborough | 224 | 2.8 | 72 | 1.5 | 47 | 1.5 | 25 | 1.5 | 296 |
| West Coast | 283 | 3.5 | 96 | 2.0 | 41 | 1.3 | 55 | 3.3 | 379 |
| North Canterbury | 340 | 4.3 | 151 | 3.2 | 103 | 3.4 | 48 | 2.9 | 491 |
| South Canterbury | 98 | 1.2 | 54 | 1.1 | 29 | 0.9 | 25 | 1.5 | 152 |
| Otago | 170 | 2.1 | 153 | 3.2 | 116 | 3.8 | 37 | 2.2 | 323 |
| Southland | 378 | 4.7 | 259 | 5.5 | 172 | 5.6 | 87 | 5.2 | 637 |
| **South Island** | **1,493** | **18.7** | **785** | **16.6** | **508** | **16.5** | **277** | **16.7** | **2,278** |
| **New Zealand** | **8,000** | **100.0** | **4,730** | **100.0** | **3,072** | **100.0** | **1,658** | **100.0** | **12,730** |

Smaller herds (less than 200 cows) are predominantly farmed by owner-operators, while a greater relative percentage of sharemilkers operate larger herds (over 200 cows) (see table 5.9). Very large herds (over 650 cows) are operated by both owner-operators and sharemilkers in similar percentages.



*Table 5.9* **Operating structure by herd size in 2003/04**

| Herd size | Owner-operators | Owner-operators % | All sharemilkers | All sharemilkers % | 50/50 sharemilkers | 50/50 sharemilkers % | Variable order sharemilkers | Variable order share-milkers % | Total herds (excl. unknown) |
|---|---|---|---|---|---|---|---|---|---|
| 10-49 | 51 | 0.6 | 3 | 0.1 | 3 | 0.1 | 0 | 0.0 | 54 |
| 50-99 | 425 | 5.3 | 46 | 1.0 | 29 | 0.9 | 17 | 1.0 | 471 |
| 100-149 | 1,188 | 14.9 | 288 | 6.1 | 186 | 6.1 | 102 | 6.2 | 1,476 |
| 150-199 | 1,557 | 19.5 | 747 | 15.8 | 520 | 16.9 | 227 | 13.7 | 2,304 |
| 200-249 | 1,332 | 16.7 | 895 | 18.9 | 593 | 19.3 | 302 | 18.2 | 2,227 |
| 250-299 | 800 | 10.0 | 631 | 13.3 | 437 | 14.2 | 194 | 11.7 | 1,431 |
| 300-349 | 712 | 8.9 | 582 | 12.3 | 330 | 10.7 | 252 | 15.2 | 1,294 |
| 350-399 | 385 | 4.8 | 358 | 7.6 | 217 | 7.1 | 141 | 8.5 | 743 |
| 400-449 | 340 | 4.3 | 291 | 6.2 | 181 | 5.9 | 110 | 6.6 | 631 |
| 450-499 | 263 | 3.3 | 188 | 4.0 | 117 | 3.8 | 71 | 4.3 | 451 |
| 500-549 | 221 | 2.8 | 155 | 3.3 | 106 | 3.5 | 49 | 3.0 | 376 |
| 550-599 | 129 | 1.6 | 118 | 2.5 | 70 | 2.3 | 48 | 2.9 | 247 |
| 600-649 | 122 | 1.5 | 119 | 2.5 | 72 | 2.3 | 47 | 2.8 | 241 |
| 650-699 | 90 | 1.1 | 53 | 1.1 | 32 | 1.0 | 21 | 1.3 | 143 |
| 700-749 | 77 | 1.0 | 57 | 1.2 | 38 | 1.2 | 19 | 1.1 | 134 |
| 750-799 | 58 | 0.7 | 35 | 0.7 | 28 | 0.9 | 7 | 0.4 | 93 |
| 800-849 | 48 | 0.6 | 34 | 0.7 | 27 | 0.9 | 7 | 0.4 | 82 |
| 850-899 | 30 | 0.4 | 27 | 0.6 | 21 | 0.7 | 6 | 0.4 | 57 |
| 900-949 | 35 | 0.4 | 25 | 0.5 | 18 | 0.6 | 7 | 0.4 | 60 |
| 950-999 | 21 | 0.3 | 10 | 0.2 | 7 | 0.2 | 3 | 0.2 | 31 |
| 1000+ | 116 | 1.5 | 68 | 1.4 | 40 | 1.3 | 28 | 1.7 | 184 |
| **Total/Av** | **8,000** | **100.0** | **4,730** | **100.0** | **3,072** | **100.0** | **1,658** | **100.0** | **12,730** |

# 6. Disease control

## A. Enzootic Bovine Leucosis (EBL) eradication scheme

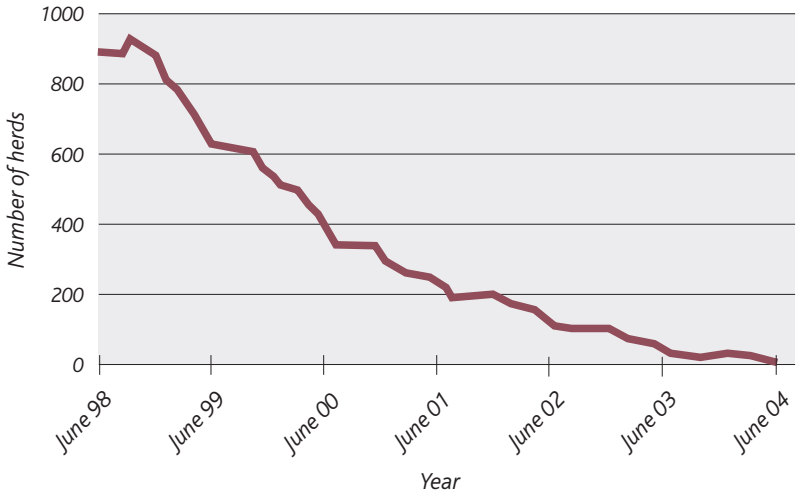
- *Close to achieving eradication of EBL*
- *Only 9 herds have an EBL blood positive status*
- *11,401 herds have an EBL Free status*

The New Zealand dairy industry Enzootic Bovine Leucosis (EBL) eradication scheme is close to achieving dairy industry freedom. The annual incidence of newly infected herds has been less than 0.1% since 2002 and there were only 9 remaining EBL blood positive herds at the conclusion of testing for the 2003/2004 season.

### Herd EBL status and progress toward eradication

Testing of all dairy herds continued through the 2003/2004 season. Additional efforts were focused on reducing the higher levels of EBL infection among large herds with excellent progress being achieved. EBL herd prevalence has reduced from 928 (6.3%) herds in September 1998 to 9 (0.07%) herds in June 2004.

*Graph 6.1* ***The number of EBL positive herds from June 1998 to June 2004***



There was also a significant reduction in suspect herds this year from 141 in April 2003 to 9 in June 2004 (Table 6.1). By June 2004, 11,401 herds (89.41%) had achieved 'EBL Free' status. The scheme continues to achieve excellent surveillance with few untested herds.

*Table 6.1* ***EBL status for dairy herds (June 2004).***

| *Herd EBL Status* | *Number of herds* | *%* |
|---|---|---|
| EBL free | 11,401 | 89.41 |
| Negative | 1,020 | 8.00 |
| Provisionally Negative | 43 | 0.34 |
| Untested | 266 | 2.09 |
| Suspect | 9 | 0.07 |
| Blood Positive | 9 | 0.07 |
| Milk Test Positive | 3 | 0.02 |
| **Total** | **12,751** | **100.00** |

***Definitions:*** *EBL Free herds have previously 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.*
*Provisionally negative herds were previously infected herds.*
*Untested 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.*

## Incidence of new EBL infected herds

A total of 11 newly confirmed positive herds were identified by annual testing over the 12 month period ending 1 May 2004. The annual herd incidence or rate of newly infected herds was therefore under 0.1%. Three of these were new dairy herds formed at the beginning of the season. Two previously positive herds had achieved a 'provisionally negative' status but then returned positive test results on annual screening. The remaining six herds had been screened negative in previous seasons. Annual incidence rates remain low and evidence indicates these are due to residual disease within the dairy cow population and movement of dairy animals between herds rather than a result of introductions from beef herds.

## Dairy Industry Freedom

The EBL scheme has developed strategies for long-term surveillance once disease freedom is achieved so that continued freedom from EBL can be demonstrated. Incidence rates for EBL positive herds are below international requirements for disease freedom and levels of surveillance remain high. The scheme is now well placed to seek international recognition for EBL disease freedom for the New Zealand Dairy Industry.

## B. Tuberculosis (Tb) control

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).

*Table 6.2:* ***Tuberculosis (Tb) testing and results in 2003/04***

| *Region* | *Vector Status* | *Number of infected dairy herds June 2004* | *Number of dairy cattle primary tested* | *Number of Tuberculous[a] dairy cattle* |
|---|---|---|---|---|
| Northland | Free | 1 | 96,865 | 1 |
| Auckland | Free | 0 | 41,452 | 0 |
| | Risk | 0 | 7,369 | 0 |
| Waikato | Free | 5 | 1,236,183 | 71 |
| | Risk | 4 | 175,660 | 56 |
| Bay of Plenty | Free | 0 | 82,007 | 0 |
| | Risk | 0 | 17,929 | 0 |
| Gisborne | Free | 0 | 304 | 0 |
| Hawkes Bay | Free | 1 | 16,663 | 0 |
| | Risk | 2 | 22,055 | 2 |
| Taranaki | Free | 0 | 147,047 | 0 |
| Manawatu / Wanganui | Free | 0 | 139,494 | 0 |
| | Risk | 0 | 78,416 | 0 |
| Wellington | Risk | 3 | 109,614 | 19 |
| North Island | Free | 7 | 1,760,015 | 72 |
| | Risk | 9 | 411,043 | 77 |
| **North Island** | **Total** | **16** | **2,171,058** | **149** |
| Nelson / Marlborough | Free | 2 | 80,697 | 3 |
| | Risk | 4 | 16,081 | 3 |
| West Coast | Free | 1 | 8,925 | 1 |
| | Risk | 38 | 181,576 | 86 |
| Canterbury | Free | 4 | 222,976 | 5 |
| | Risk | 1 | 107,231 | 2 |
| Otago | Free | 3 | 106,147 | 33 |
| | Risk | 7 | 130,704 | 8 |
| Southland | Free | 1 | 158,639 | 1 |
| | Risk | 2 | 127,201 | 5 |
| South Island | Free | 11 | 577,384 | 43 |
| | Risk | 52 | 562,793 | 104 |
| **South Island** | **Total** | **63** | **1,140,177** | **147** |
| New Zealand | Free | 18 | 2,337,399 | 115 |
| | Risk | 61 | 973,836 | 181 |
| **New Zealand** | **Total** | **79** | **3,311,235** | **296** |

*Sourced from Animal Health Board – Annual Report for the year ending 30 June 2004*
[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, which follow local authority boundaries, 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