

## 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 2006/07 (AmBreed and LIC) and were able to choose the frequency of testing.

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

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 cows with mastitis (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 LIC. Appendix 1 shows a list of districts included in each region.

- **75% of herds undertake herd testing in 2006/07**

The percentage of total herds using herd testing decreased to 74.7% in 2006/07 (Table 4.1). This figure is down 12.4% from the highest percentage of herd testing set in 1996/97. Although there are a record number of cows (3.91 million), fewer were tested (2.79 million) compared with last season (2.85 million). The percentage of total cows tested decreased to 71.2%.

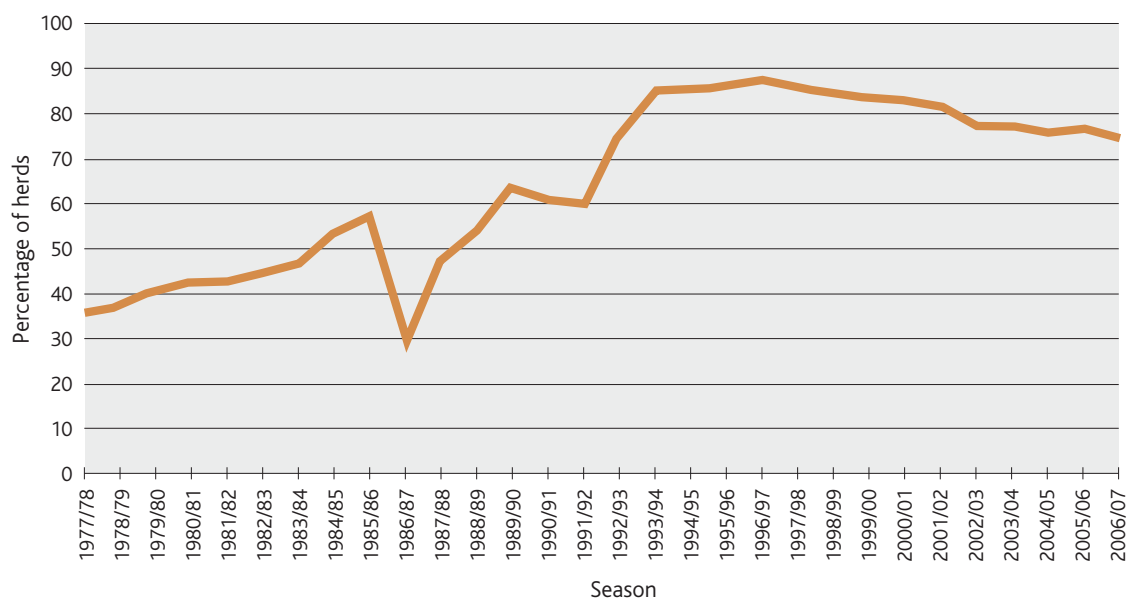
**Table 4.1** *Trend in the use of herd testing services for the last 20 seasons*

| Season  | Number of herds | % of total herds | Number of cows (000) | % of total cows | Total herds | Total cows |
|---------|-----------------|------------------|----------------------|-----------------|-------------|------------|
| 1986/87 | 4,555           | 29.7             | 753                  | 33.0            | 15,315      | 2,281,849  |
| 1987/88 | 6,930           | 46.8             | 1,175                | 52.5            | 14,818      | 2,236,290  |
| 1988/89 | 7,932           | 53.8             | 1,341                | 59.1            | 14,744      | 2,269,073  |
| 1989/90 | 9,213           | 63.1             | 1,604                | 69.3            | 14,595      | 2,313,822  |
| 1990/91 | 8,918           | 60.7             | 1,566                | 65.2            | 14,685      | 2,402,145  |
| 1991/92 | 8,661           | 59.9             | 1,611                | 66.1            | 14,452      | 2,438,641  |
| 1992/93 | 10,843          | 75.0             | 2,039                | 78.3            | 14,458      | 2,603,049  |
| 1993/94 | 12,372          | 84.8             | 2,377                | 86.9            | 14,597      | 2,736,452  |
| 1994/95 | 12,446          | 85.0             | 2,474                | 87.4            | 14,649      | 2,830,977  |
| 1995/96 | 12,620          | 85.6             | 2,592                | 88.3            | 14,736      | 2,935,759  |
| 1996/97 | 12,851          | 87.2             | 2,746                | 89.6            | 14,741      | 3,064,523  |
| 1997/98 | 12,510          | 85.3             | 2,826                | 87.7            | 14,673      | 3,222,591  |
| 1998/99 | 12,059          | 84.0             | 2,819                | 85.7            | 14,362      | 3,289,319  |
| 1999/00 | 11,521          | 83.1             | 2,806                | 85.8            | 13,861      | 3,269,362  |
| 2000/01 | 11,472          | 82.6             | 2,942                | 84.4            | 13,892      | 3,485,883  |
| 2001/02 | 11,113          | 81.4             | 2,974                | 80.5            | 13,649      | 3,692,703  |
| 2002/03 | 10,113          | 77.0             | 2,855                | 76.3            | 13,140      | 3,740,637  |
| 2003/04 | 9,772           | 76.6             | 2,842                | 73.8            | 12,751      | 3,851,302  |
| 2004/05 | 9,306           | 75.8             | 2,811                | 72.7            | 12,271      | 3,867,659  |
| 2005/06 | 9,082           | 76.4             | 2,846                | 74.3            | 11,883      | 3,832,145  |
| 2006/07 | 8,692           | 74.7             | 2,791                | 71.2            | 11,630      | 3,916,812  |

# Herd improvement – Use of herd testing

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 for the last 30 seasons*



The regional uptake of herd testing services in 2006/07 is shown in Table 4.2, where the number of cows tested refers to all cows tested at least once in the season. Taranaki had the highest percentage of herds using herd testing (79.6%) and also reported the highest percentage of cows herd testing (79.2%).

Table 4.2 *Use of herd testing by LIC region in 2006/07*

| LIC Region               | Herds tested | Total herds   | % of total herds | Cows tested      | Total cows       | % of total cows | Average herd size tested | Average herd size |
|--------------------------|--------------|---------------|------------------|------------------|------------------|-----------------|--------------------------|-------------------|
| Northland                | 860          | 1,150         | 74.8             | 225,356          | 307,705          | 73.2            | 262                      | 268               |
| Auckland                 | 3,379        | 4,544         | 74.4             | 997,880          | 1,388,548        | 71.9            | 295                      | 306               |
| Bay of Plenty/East Coast | 473          | 634           | 74.6             | 139,377          | 192,912          | 72.2            | 295                      | 304               |
| Taranaki                 | 1,494        | 1,877         | 79.6             | 380,691          | 480,781          | 79.2            | 255                      | 256               |
| Wellington/Hawkes Bay    | 851          | 1,133         | 75.1             | 277,368          | 390,049          | 71.1            | 326                      | 344               |
| South Island             | 1,635        | 2,292         | 71.3             | 769,861          | 1,156,817        | 66.5            | 471                      | 505               |
| <b>New Zealand</b>       | <b>8,692</b> | <b>11,630</b> | <b>74.7</b>      | <b>2,790,533</b> | <b>3,916,812</b> | <b>71.2</b>     | <b>321</b>               | <b>337</b>        |

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

Average per cow statistics for each LIC region is summarised in Table 4.3. The days-in-milk figure derived from tanker pick-up dates (production) more accurately reflects the lactation length than does the days-in-milk figure derived from herd tests and calving dates (herd testing).

The South Island recorded the highest per cow milk volume (4,512 litres), milkfat (210 kg) and protein (170 kg) of cows herd tested. Taranaki recorded the highest percentages for milkfat (5.24%), protein (3.91%) and milksolids (9.03%).

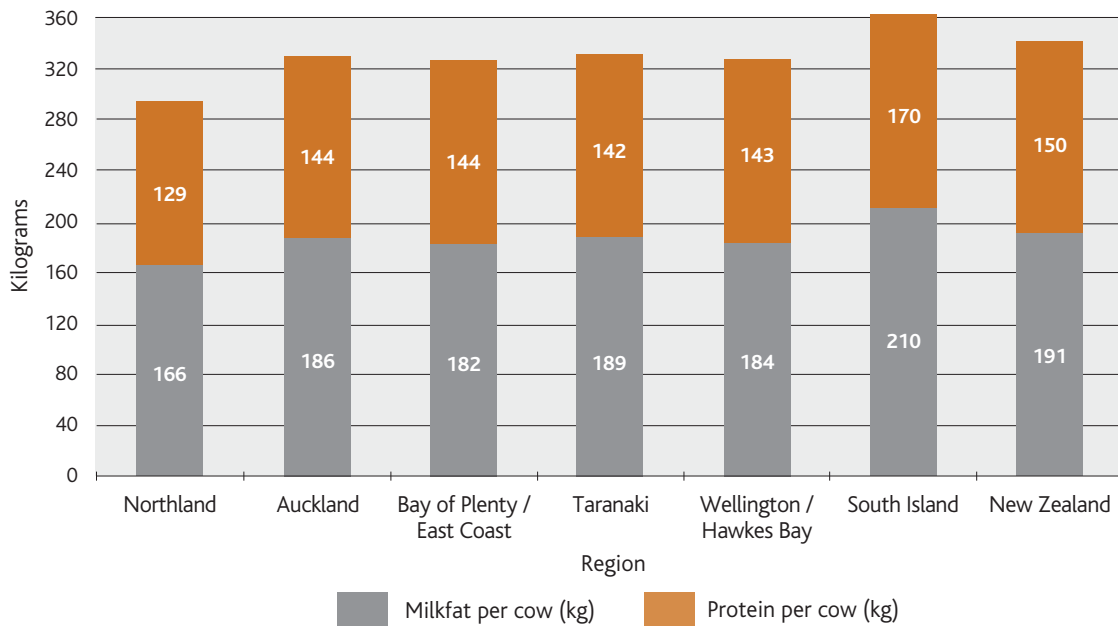
Table 4.3 *Season herd test averages per cow by LIC region in 2006/07*

| LIC Region                 | Milk (litres) | Milkfat (kg) | Milkfat (%) | Protein (kg) | Protein (%) | Milksolids (kg) | Milksolids (%) | Days in milk (herd testing) | Days in milk (production) | Somatic cell count (000 cells/millilitre) |
|----------------------------|---------------|--------------|-------------|--------------|-------------|-----------------|----------------|-----------------------------|---------------------------|---|
| Northland                  | 3,530         | 166          | 4.76        | 129          | 3.66        | 295             | 8.35           | 226                         | 264                       | 243                                       |
| Auckland                   | 3,890         | 186          | 4.85        | 144          | 3.73        | 330             | 8.49           | 230                         | 268                       | 216                                       |
| Bay of Plenty / East Coast | 3,960         | 182          | 4.67        | 144          | 3.66        | 326             | 8.23           | 222                         | 264                       | 258                                       |
| Taranaki                   | 3,666         | 189          | 5.24        | 142          | 3.91        | 331             | 9.03           | 230                         | 266                       | 236                                       |
| Wellington / Hawkes Bay    | 3,900         | 184          | 4.79        | 143          | 3.70        | 327             | 8.39           | 229                         | 270                       | 259                                       |
| South Island               | 4,512         | 210          | 4.75        | 170          | 3.79        | 380             | 8.43           | 232                         | 268                       | 259                                       |
| <b>New Zealand</b>         | <b>4,014</b>  | <b>191</b>   | <b>4.85</b> | <b>150</b>   | <b>3.76</b> | <b>341</b>      | <b>8.50</b>    | <b>230</b>                  | <b>267</b>                | <b>232</b>                                |

The 2006/07 milkfat and protein lactation regional averages of herd tested cows (Graph 4.2) show some variability in figures between all regions, with milkfat production ranging from 166 (Northland) to 210 kg per cow (South Island) and protein production from 129 (Northland) to 170 kg per cow (South Island).

# Herd improvement – Herd test averages – Season averages

Graph 4.2 Average milkfat and protein production per cow in 2006/07



• Increase in production per cow (kg) for 2006/07

The last twenty years have 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 recorded 260kg milksolids 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. However, a steady trend upwards has appeared over the last several seasons.

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

| Season  | Milk (litres) | Milkfat (kg) | Milkfat (%) | Protein (kg) | Protein (%) | Milksolids (kg) | Milksolids (%) | Days in milk (herd testing) | Days in milk (production) | Somatic cell count (000 cells/ millilitre) |
|---------|---------------|--------------|-------------|--------------|-------------|-----------------|----------------|-----------------------------|---------------------------|--|
| 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 <sup>a</sup>          | 210  |
| 2002/03 | 3,736         | 175          | 4.68        | 138          | 3.66        | 313             | 8.38           | 219                         | -                         | 213  |
| 2003/04 | 3,871         | 184          | 4.75        | 142          | 3.64        | 326             | 8.42           | 224                         | 265                       | 220  |
| 2004/05 | 3,812         | 181          | 4.75        | 140          | 3.66        | 321             | 8.42           | 225                         | 265                       | 229  |
| 2005/06 | 3,951         | 186          | 4.72        | 146          | 3.68        | 332             | 8.40           | 227                         | 266                       | 213  |
| 2006/07 | 4,014         | 191          | 4.85        | 150          | 3.76        | 341             | 8.50           | 230                         | 267                       | 232  |

- Not available

<sup>a</sup> 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 2006/07*

### Average litres of milk per cow per day

| LIC Region         | 2006         |              |              |              |              |              |              | 2007         |              |              |              |              | Season average |
|--------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
|                    | Jun          | Jul          | Aug          | Sep          | Oct          | Nov          | Dec          | Jan          | Feb          | Mar          | Apr          | May          |                |
| Northland          | 15.33        | 15.42        | 18.27        | 19.95        | 18.85        | 16.90        | 15.04        | 12.81        | 11.79        | 9.58         | 9.02         | 12.05        | 14.68          |
| Auckland           | 16.59        | 16.28        | 19.75        | 21.60        | 21.41        | 18.54        | 17.38        | 15.53        | 13.61        | 10.37        | 10.16        | 11.70        | 16.05          |
| BOP / East Coast   | 12.49        | 12.36        | 21.11        | 21.97        | 21.92        | 19.43        | 17.91        | 16.00        | 14.54        | 11.05        | 10.10        | 11.94        | 16.71          |
| Taranaki           | 15.51        | 16.01        | 17.34        | 20.28        | 19.48        | 17.13        | 15.69        | 15.30        | 13.54        | 10.07        | 9.56         | 9.81         | 14.99          |
| Wgtn / Hawkes Bay  | 15.43        | 16.37        | 19.78        | 20.94        | 20.81        | 18.19        | 16.94        | 15.73        | 14.01        | 10.61        | 11.37        | 11.72        | 16.02          |
| South Island       | 16.49        | 17.23        | 18.60        | 22.82        | 24.11        | 21.87        | 20.73        | 18.55        | 16.97        | 14.68        | 12.51        | 12.09        | 18.39          |
| <b>New Zealand</b> | <b>15.77</b> | <b>16.17</b> | <b>19.39</b> | <b>21.41</b> | <b>21.83</b> | <b>19.06</b> | <b>18.13</b> | <b>16.05</b> | <b>14.61</b> | <b>11.43</b> | <b>10.97</b> | <b>11.74</b> | <b>16.50</b>   |

### Average kg of milkfat per cow per day

| LIC Region         | 2006        |             |             |             |             |             |             | 2007        |             |             |             |             | Season average |
|--------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------------|
|                    | Jun         | Jul         | Aug         | Sep         | Oct         | Nov         | Dec         | Jan         | Feb         | Mar         | Apr         | May         |                |
| Northland          | 0.73        | 0.72        | 0.85        | 0.90        | 0.87        | 0.78        | 0.70        | 0.63        | 0.59        | 0.52        | 0.51        | 0.63        | 0.70           |
| Auckland           | 0.75        | 0.72        | 0.91        | 0.99        | 0.98        | 0.87        | 0.82        | 0.76        | 0.69        | 0.58        | 0.58        | 0.65        | 0.78           |
| BOP / East Coast   | 0.58        | 0.56        | 0.94        | 0.96        | 0.97        | 0.87        | 0.81        | 0.76        | 0.71        | 0.59        | 0.57        | 0.62        | 0.78           |
| Taranaki           | 0.78        | 0.80        | 0.84        | 0.96        | 0.96        | 0.86        | 0.80        | 0.80        | 0.73        | 0.60        | 0.60        | 0.61        | 0.78           |
| Wgtn / Hawkes Bay  | 0.69        | 0.74        | 0.91        | 0.95        | 0.94        | 0.84        | 0.79        | 0.75        | 0.70        | 0.59        | 0.64        | 0.64        | 0.77           |
| South Island       | 0.77        | 0.78        | 0.83        | 1.00        | 1.06        | 1.00        | 0.95        | 0.86        | 0.83        | 0.77        | 0.70        | 0.68        | 0.88           |
| <b>New Zealand</b> | <b>0.73</b> | <b>0.73</b> | <b>0.90</b> | <b>0.97</b> | <b>0.99</b> | <b>0.89</b> | <b>0.85</b> | <b>0.78</b> | <b>0.74</b> | <b>0.63</b> | <b>0.63</b> | <b>0.66</b> | <b>0.80</b>    |

### Average kg of protein per cow per day

| LIC Region         | 2006        |             |             |             |             |             |             | 2007        |             |             |             |             | Season average |
|--------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------------|
|                    | Jun         | Jul         | Aug         | Sep         | Oct         | Nov         | Dec         | Jan         | Feb         | Mar         | Apr         | May         |                |
| Northland          | 0.55        | 0.56        | 0.67        | 0.72        | 0.68        | 0.61        | 0.55        | 0.47        | 0.45        | 0.39        | 0.38        | 0.49        | 0.54           |
| Auckland           | 0.60        | 0.58        | 0.72        | 0.79        | 0.78        | 0.68        | 0.64        | 0.58        | 0.51        | 0.42        | 0.43        | 0.49        | 0.60           |
| BOP / East Coast   | 0.46        | 0.44        | 0.76        | 0.79        | 0.78        | 0.70        | 0.64        | 0.58        | 0.54        | 0.44        | 0.43        | 0.48        | 0.62           |
| Taranaki           | 0.58        | 0.58        | 0.65        | 0.76        | 0.73        | 0.65        | 0.61        | 0.60        | 0.55        | 0.42        | 0.43        | 0.44        | 0.59           |
| Wgtn / Hawkes Bay  | 0.56        | 0.59        | 0.71        | 0.76        | 0.75        | 0.66        | 0.62        | 0.58        | 0.54        | 0.43        | 0.48        | 0.48        | 0.60           |
| South Island       | 0.58        | 0.60        | 0.64        | 0.82        | 0.88        | 0.81        | 0.78        | 0.70        | 0.66        | 0.59        | 0.54        | 0.53        | 0.71           |
| <b>New Zealand</b> | <b>0.57</b> | <b>0.58</b> | <b>0.71</b> | <b>0.78</b> | <b>0.80</b> | <b>0.70</b> | <b>0.68</b> | <b>0.60</b> | <b>0.56</b> | <b>0.46</b> | <b>0.47</b> | <b>0.50</b> | <b>0.63</b>    |

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

| LIC Region         | 2006       |            |            |            |            |            |            | 2007       |            |            |            |            | Season average |
|--------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------------|
|                    | Jun        | Jul        | Aug        | Sep        | Oct        | Nov        | Dec        | Jan        | Feb        | Mar        | Apr        | May        |                |
| Northland          | 250        | 276        | 212        | 205        | 199        | 195        | 209        | 256        | 271        | 305        | 355        | 306        | 243            |
| Auckland           | 249        | 275        | 199        | 178        | 174        | 163        | 173        | 193        | 228        | 274        | 295        | 304        | 216            |
| BOP / East Coast   | 356        | 535        | 255        | 212        | 195        | 186        | 198        | 222        | 240        | 279        | 313        | 287        | 258            |
| Taranaki           | 340        | 318        | 240        | 185        | 180        | 182        | 189        | 202        | 233        | 263        | 280        | 303        | 236            |
| Wgtn / Hawkes Bay  | 238        | 282        | 248        | 243        | 230        | 231        | 232        | 255        | 273        | 324        | 300        | 331        | 259            |
| South Island       | 285        | 340        | 362        | 228        | 215        | 210        | 215        | 235        | 244        | 269        | 270        | 292        | 259            |
| <b>New Zealand</b> | <b>260</b> | <b>303</b> | <b>220</b> | <b>197</b> | <b>193</b> | <b>185</b> | <b>196</b> | <b>216</b> | <b>241</b> | <b>278</b> | <b>287</b> | <b>301</b> | <b>232</b>     |

## iii) Breed averages

- *Holstein-Friesian cows show highest milksolids (kg) production*

Herd test statistics by breed (Table 4.6) 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, six-year-old cows produced more milk and milksolids than any other age group. Five and six-year-olds dominated production for Jerseys and Ayrshires, while six-year-olds had the highest production for Holstein-Friesian/Jersey Crossbreeds.

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

Table 4.6 *Herd test breed averages by age of cow in 2006/07*

### Holstein-Friesian

| Age          | Number         | Days in milk | Milk (litres) | Milkfat (kg) | Protein (kg) | Milksolids (kg) | Milkfat (%) | Protein (%) | Milksolids (%) |
|--------------|----------------|--------------|---------------|--------------|--------------|-----------------|-------------|-------------|----------------|
| 2            | 176,592        | 226          | 3,498         | 153.5        | 125.2        | 278.7           | 4.43        | 3.59        | 8.02           |
| 3            | 142,685        | 221          | 4,048         | 176.5        | 146.0        | 322.5           | 4.40        | 3.62        | 8.02           |
| 4            | 135,413        | 220          | 4,404         | 194.7        | 158.4        | 353.1           | 4.47        | 3.61        | 8.08           |
| 5            | 130,854        | 221          | 4,555         | 203.3        | 163.8        | 367.2           | 4.51        | 3.61        | 8.12           |
| 6            | 104,729        | 220          | 4,675         | 203.3        | 166.5        | 369.7           | 4.39        | 3.58        | 7.97           |
| 7            | 77,024         | 218          | 4,601         | 197.8        | 163.1        | 360.8           | 4.34        | 3.56        | 7.90           |
| 8            | 59,408         | 216          | 4,481         | 192.3        | 157.9        | 350.2           | 4.33        | 3.54        | 7.87           |
| 9            | 46,154         | 215          | 4,315         | 188.4        | 152.7        | 341.1           | 4.40        | 3.55        | 7.95           |
| 10+          | 69,262         | 210          | 3,994         | 174.8        | 139.6        | 314.4           | 4.41        | 3.51        | 7.92           |
| <b>Total</b> | <b>942,121</b> | <b>220</b>   | <b>4,218</b>  | <b>184.7</b> | <b>150.6</b> | <b>335.4</b>    | <b>4.42</b> | <b>3.59</b> | <b>8.01</b>    |

### Jersey

| Age          | Number         | Days in milk | Milk (litres) | Milkfat (kg) | Protein (kg) | Milksolids (kg) | Milkfat (%) | Protein (%) | Milksolids (%) |
|--------------|----------------|--------------|---------------|--------------|--------------|-----------------|-------------|-------------|----------------|
| 2            | 61,385         | 228          | 2,559         | 145.1        | 103.2        | 248.3           | 5.70        | 4.05        | 9.75           |
| 3            | 56,124         | 224          | 2,883         | 166.5        | 119.6        | 286.1           | 5.80        | 4.16        | 9.96           |
| 4            | 52,670         | 224          | 3,125         | 182.0        | 130.2        | 312.2           | 5.85        | 4.18        | 10.03          |
| 5            | 47,547         | 224          | 3,204         | 187.0        | 133.5        | 320.5           | 5.87        | 4.18        | 10.05          |
| 6            | 39,254         | 223          | 3,249         | 186.3        | 134.0        | 320.4           | 5.76        | 4.14        | 9.90           |
| 7            | 29,623         | 222          | 3,192         | 183.6        | 132.3        | 315.8           | 5.78        | 4.16        | 9.94           |
| 8            | 22,169         | 219          | 3,053         | 176.9        | 127.1        | 304.0           | 5.82        | 4.18        | 10.00          |
| 9            | 16,995         | 218          | 3,026         | 173.3        | 125.2        | 298.5           | 5.75        | 4.15        | 9.90           |
| 10+          | 19,018         | 212          | 2,845         | 159.4        | 116.2        | 275.6           | 5.63        | 4.10        | 9.73           |
| <b>Total</b> | <b>344,785</b> | <b>223</b>   | <b>2,991</b>  | <b>172.2</b> | <b>123.5</b> | <b>295.7</b>    | <b>5.78</b> | <b>4.14</b> | <b>9.92</b>    |

### Holstein-Friesian/Jersey crossbreed

| Age          | Number         | Days in milk | Milk (litres) | Milkfat (kg) | Protein (kg) | Milksolids (kg) | Milkfat (%) | Protein (%) | Milksolids (%) |
|--------------|----------------|--------------|---------------|--------------|--------------|-----------------|-------------|-------------|----------------|
| 2            | 153,031        | 227          | 3,180         | 157.4        | 120.4        | 277.8           | 5.00        | 3.80        | 8.80           |
| 3            | 131,574        | 224          | 3,675         | 182.3        | 141.7        | 323.9           | 5.01        | 3.87        | 8.88           |
| 4            | 118,916        | 223          | 3,991         | 200.3        | 154.0        | 354.4           | 5.07        | 3.88        | 8.95           |
| 5            | 102,927        | 223          | 4,109         | 207.6        | 158.5        | 366.0           | 5.11        | 3.88        | 8.99           |
| 6            | 79,384         | 223          | 4,187         | 208.4        | 160.3        | 368.7           | 5.03        | 3.85        | 8.88           |
| 7            | 57,261         | 221          | 4,082         | 203.4        | 156.6        | 360.0           | 5.03        | 3.86        | 8.89           |
| 8            | 41,356         | 219          | 3,939         | 197.3        | 151.0        | 348.4           | 5.06        | 3.86        | 8.92           |
| 9            | 32,714         | 218          | 3,852         | 192.6        | 147.7        | 340.3           | 5.04        | 3.85        | 8.89           |
| 10+          | 32,550         | 211          | 3,629         | 176.8        | 135.5        | 312.3           | 4.91        | 3.75        | 8.66           |
| <b>Total</b> | <b>749,713</b> | <b>223</b>   | <b>3,789</b>  | <b>188.9</b> | <b>145.2</b> | <b>334.2</b>    | <b>5.03</b> | <b>3.85</b> | <b>8.88</b>    |

# Herd improvement – Herd test averages – Breed averages

## Ayrshire

| Age          | Number        | Days in milk | Milk (litres) | Milkfat (kg) | Protein (kg) | Milksolids (kg) | Milkfat (%) | Protein (%) | Milksolids (%) |
|--------------|---------------|--------------|---------------|--------------|--------------|-----------------|-------------|-------------|----------------|
| 2            | 3,869         | 232          | 3,082         | 137.7        | 110.1        | 247.8           | 4.50        | 3.58        | 8.08           |
| 3            | 3,255         | 226          | 3,492         | 155.1        | 126.5        | 281.7           | 4.47        | 3.63        | 8.10           |
| 4            | 3,000         | 227          | 3,867         | 170.6        | 139.8        | 310.3           | 4.44        | 3.62        | 8.06           |
| 5            | 2,826         | 227          | 4,035         | 176.6        | 146.1        | 322.7           | 4.41        | 3.63        | 8.04           |
| 6            | 2,307         | 226          | 4,036         | 177.0        | 145.6        | 322.7           | 4.42        | 3.62        | 8.04           |
| 7            | 1,857         | 225          | 4,026         | 175.8        | 144.9        | 320.7           | 4.40        | 3.61        | 8.01           |
| 8            | 1,457         | 223          | 3,935         | 170.6        | 141.5        | 312.1           | 4.36        | 3.61        | 7.97           |
| 9            | 1,169         | 223          | 3,909         | 170.4        | 140.2        | 310.6           | 4.39        | 3.60        | 7.99           |
| 10+          | 1,847         | 218          | 3,642         | 156.7        | 129.1        | 285.8           | 4.33        | 3.55        | 7.88           |
| <b>Total</b> | <b>21,587</b> | <b>226</b>   | <b>3,711</b>  | <b>163.1</b> | <b>133.6</b> | <b>296.7</b>    | <b>4.43</b> | <b>3.61</b> | <b>8.04</b>    |

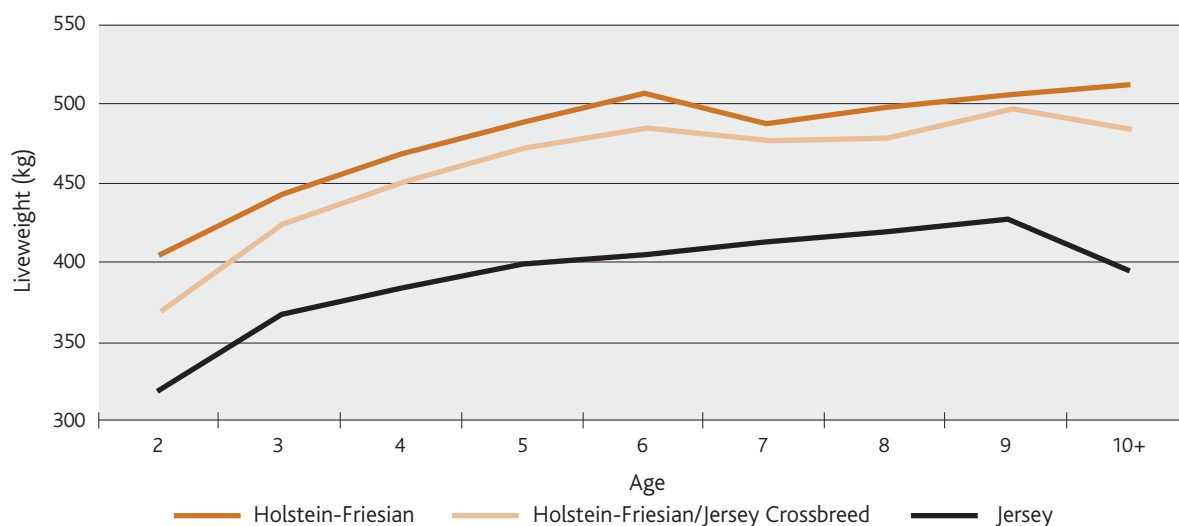
Holstein-Friesians have the highest average liveweight across all ages for the breeds shown in Table 4.7. In contrast, Jerseys have the lowest average liveweight for all ages. Liveweight by age and breed is illustrated in Graph 4.3.

Table 4.7 *Liveweight by age and breed of cow in 2006/07*

| Age          | Holstein-Friesian       |                | Jersey                  |                | Holstein-Friesian/Jersey Crossbreed |                |
|--------------|-------------------------|----------------|-------------------------|----------------|-------------------------------------|----------------|
|              | Average liveweight (kg) | Number of cows | Average liveweight (kg) | Number of cows | Average liveweight (kg)             | Number of cows |
| 2            | 404                     | 10,067         | 320                     | 4,447          | 369                                 | 12,538         |
| 3            | 443                     | 376            | 367                     | 244            | 423                                 | 614            |
| 4            | 468                     | 355            | 384                     | 151            | 451                                 | 506            |
| 5            | 489                     | 376            | 398                     | 158            | 471                                 | 447            |
| 6            | 505                     | 262            | 404                     | 154            | 485                                 | 291            |
| 7            | 488                     | 217            | 413                     | 76             | 476                                 | 198            |
| 8            | 496                     | 146            | 419                     | 75             | 477                                 | 140            |
| 9            | 505                     | 109            | 427                     | 51             | 496                                 | 102            |
| 10+          | 512                     | 168            | 394                     | 52             | 483                                 | 100            |
| <b>Total</b> | <b>468</b>              |                | <b>381</b>              |                | <b>442</b>                          |                |

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Graph 4.3 *Liveweight by age and breed of cow in 2006/07*



## C. Artificial Breeding statistics

- *South Island and BOP/East Coast are the only regions with an increase in the number of cows to AB for 2006/07*

All artificial inseminations are recorded on the LIC Database. Table 4.8 provides a summary of cows mated to artificial breeding (AB) for the last nine seasons. This is the fifth consecutive season where the percentage of cows to AB is below 80% (Graph 4.4). The number of yearlings to AB has increased to 110,007 in 2006/07 (Table 4.8).

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

### Cows to AB

| LIC Region              | 1998/99          | 1999/00          | 2000/01          | 2001/02          | 2002/03          | 2003/04          | 2004/05          | 2005/06          | 2006/07          |
|-------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Northland               | 244,115          | 246,617          | 257,752          | 261,197          | 228,988          | 218,488          | 212,210          | 205,352          | 197,676          |
| Auckland                | 1,066,442        | 1,057,618        | 1,096,379        | 1,089,655        | 1,030,788        | 1,025,071        | 1,019,596        | 981,242          | 979,605          |
| BOP / East Coast        | 153,294          | 152,751          | 157,162          | 154,762          | 147,047          | 145,464          | 140,493          | 139,975          | 140,961          |
| Taranaki                | 395,636          | 405,605          | 427,683          | 423,723          | 400,322          | 398,794          | 388,277          | 380,160          | 370,379          |
| Wellington / Hawkes Bay | 266,171          | 276,517          | 294,387          | 302,349          | 291,188          | 281,448          | 279,240          | 286,348          | 281,315          |
| South Island            | 510,514          | 587,957          | 660,075          | 756,874          | 769,954          | 817,952          | 829,141          | 854,850          | 888,964          |
| <b>New Zealand</b>      | <b>2,636,172</b> | <b>2,727,065</b> | <b>2,893,438</b> | <b>2,988,560</b> | <b>2,868,287</b> | <b>2,887,217</b> | <b>2,868,957</b> | <b>2,847,927</b> | <b>2,858,900</b> |

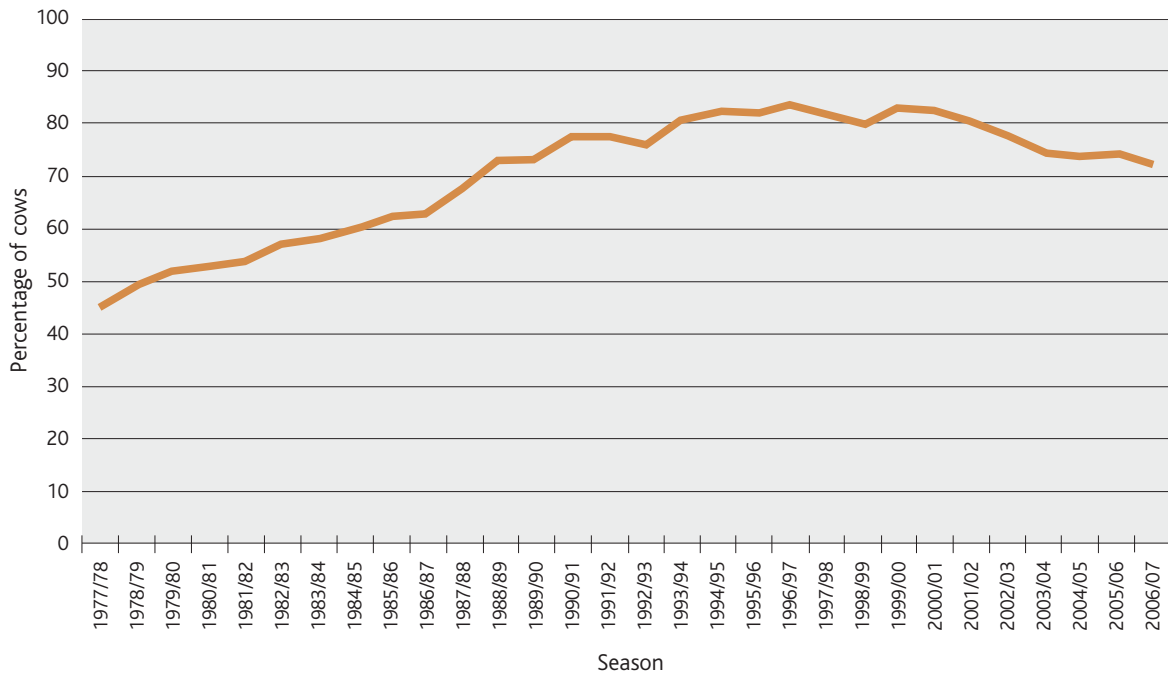
### % Cows to AB

| LIC Region              | 1998/99     | 1999/00     | 2000/01     | 2001/02     | 2002/03     | 2003/04     | 2004/05     | 2005/06     | 2006/07     |
|-------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Northland               | 71.0        | 69.5        | 76.4        | 74.4        | 66.3        | 64.3        | 64.2        | 66.0        | 64.2        |
| Auckland                | 84.7        | 79.6        | 92.9        | 78.8        | 74.7        | 72.7        | 72.7        | 71.1        | 70.5        |
| BOP / East Coast        | 80.7        | 81.6        | 85.2        | 81.8        | 77.9        | 74.8        | 73.2        | 73.5        | 73.1        |
| Taranaki                | 82.2        | 81.8        | 88.7        | 84.6        | 82.7        | 80.5        | 78.5        | 78.8        | 77.0        |
| Wellington / Hawkes Bay | 76.9        | 74.2        | 81.5        | 79.3        | 76.1        | 72.6        | 72.8        | 76.7        | 72.1        |
| South Island            | 76.3        | 78.7        | 91.2        | 85.2        | 80.3        | 79.8        | 78.0        | 78.1        | 76.8        |
| <b>New Zealand</b>      | <b>80.1</b> | <b>78.2</b> | <b>88.5</b> | <b>80.9</b> | <b>76.7</b> | <b>75.0</b> | <b>74.2</b> | <b>74.3</b> | <b>73.0</b> |

### Yearlings to AB

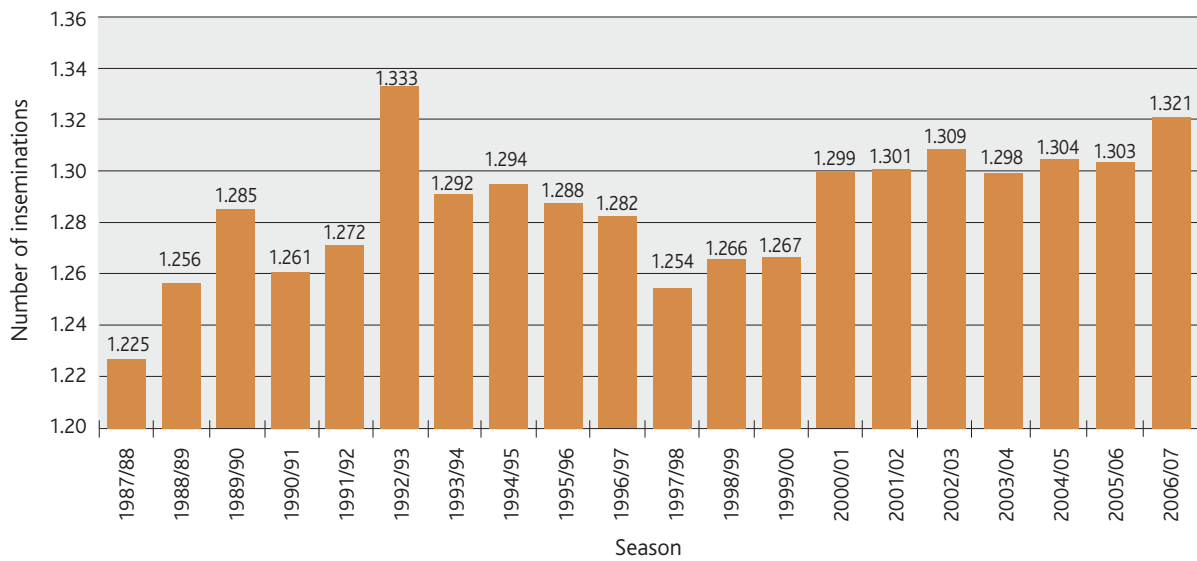
| LIC Region              | 1998/99       | 1999/00       | 2000/01        | 2001/02        | 2002/03       | 2003/04       | 2004/05       | 2005/06       | 2006/07        |
|-------------------------|---------------|---------------|----------------|----------------|---------------|---------------|---------------|---------------|----------------|
| Northland               | 11,188        | 9,825         | 10,437         | 10,942         | 7,982         | 7,765         | 7,428         | 8,490         | 9,334          |
| Auckland                | 25,968        | 21,804        | 24,543         | 24,988         | 20,143        | 17,264        | 17,275        | 16,972        | 20,973         |
| BOP / East Coast        | 7,854         | 7,250         | 8,492          | 8,929          | 6,763         | 4,691         | 5,014         | 6,645         | 7,579          |
| Taranaki                | 5,748         | 5,700         | 7,698          | 7,528          | 8,220         | 3,703         | 3,268         | 3,373         | 3,408          |
| Wellington / Hawkes Bay | 6,223         | 6,313         | 7,823          | 7,517          | 5,948         | 5,076         | 5,960         | 7,330         | 7,613          |
| South Island            | 34,906        | 41,469        | 56,743         | 55,680         | 47,162        | 39,401        | 40,019        | 52,985        | 61,100         |
| <b>New Zealand</b>      | <b>91,887</b> | <b>92,361</b> | <b>115,736</b> | <b>115,584</b> | <b>96,218</b> | <b>77,900</b> | <b>78,964</b> | <b>95,795</b> | <b>110,007</b> |

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



In 2006/07 the average number of inseminations per cow (1.32) as recorded on the LIC Database, was higher compared with the previous season (1.30) (Graph 4.5).

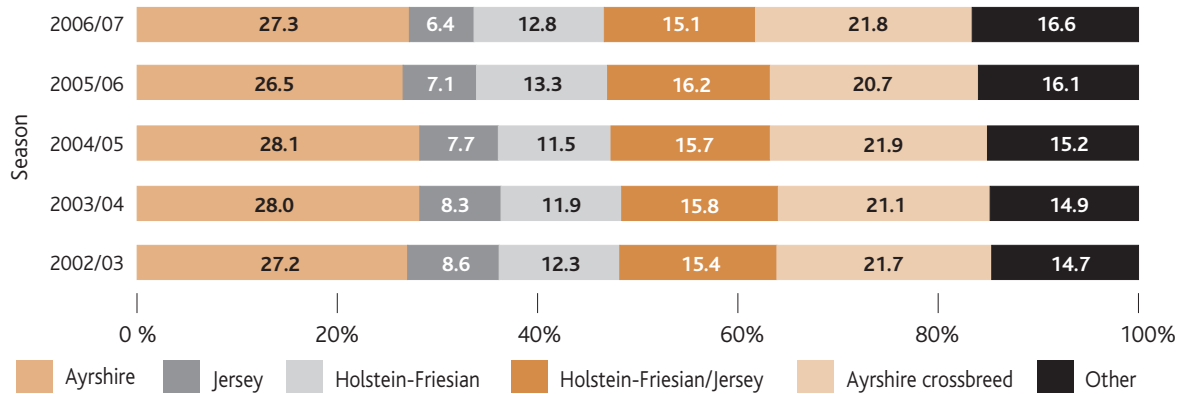
Graph 4.5 *Average number of inseminations per cow for the last 20 seasons*



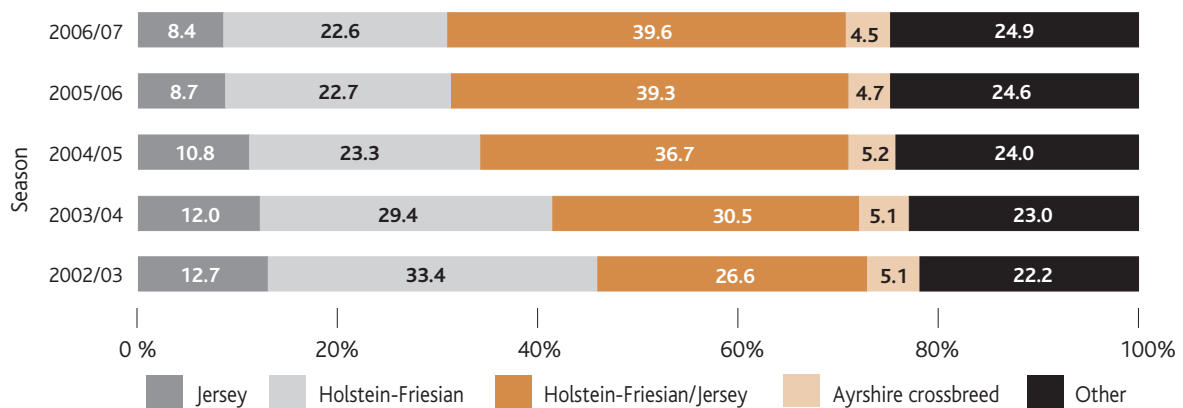
# Herd improvement – Artificial breeding statistics

The use of Ayrshire, Holstein-Friesian, and Jersey semen over different cow breeds for the past five seasons is shown in the graphs below. Ayrshire semen use over Ayrshire cows is 27.3% (Graph 4.6). Crossbreed semen is used increasingly over Friesian/Jersey crosses followed by Friesian cows (Graph 4.7). The use of Jersey semen over other breeds remains similar to the previous season (Graph 4.8). The percentage of Holstein-Friesian semen over Holstein-Friesian cows continues to decrease, and has been increasing over Friesian/Jersey crosses (Graph 4.9).

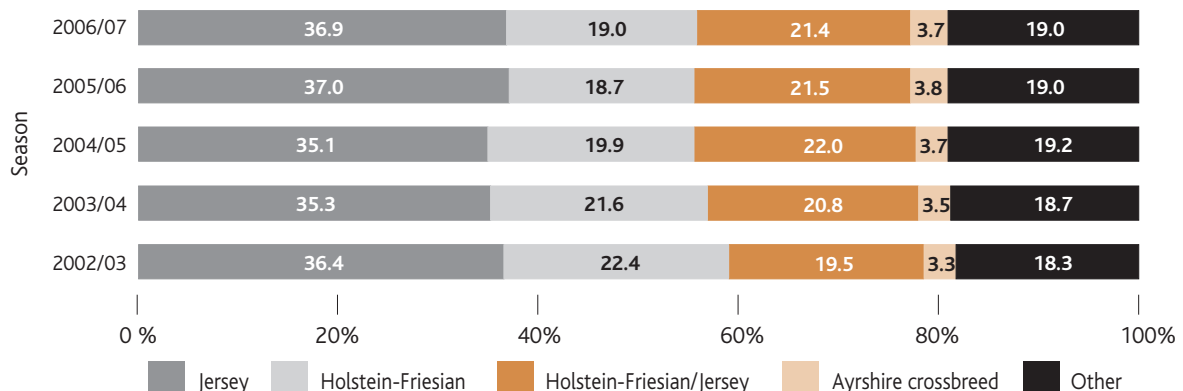
Graph 4.6 *Ayrshire semen usage (%) over cow breed for the last five seasons*



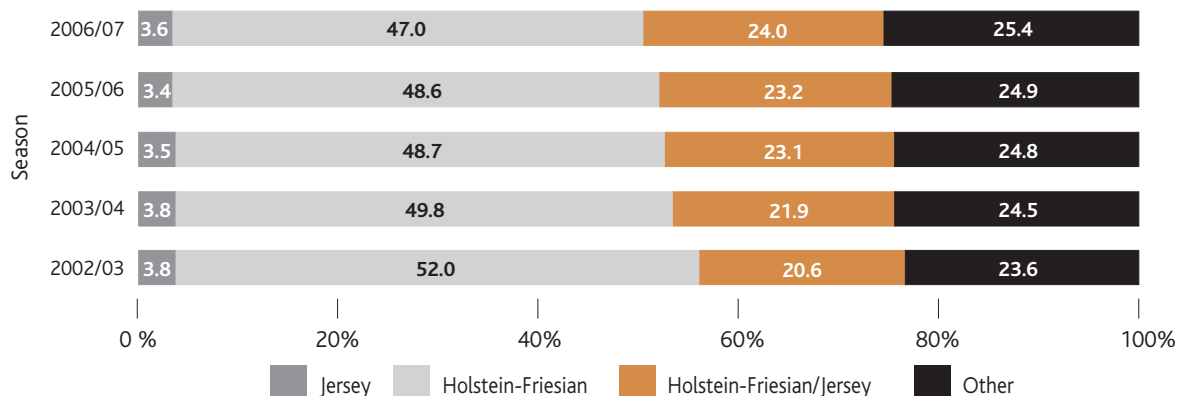
Graph 4.7 *Crossbreed semen usage (%) over cow breed for the last five seasons*



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

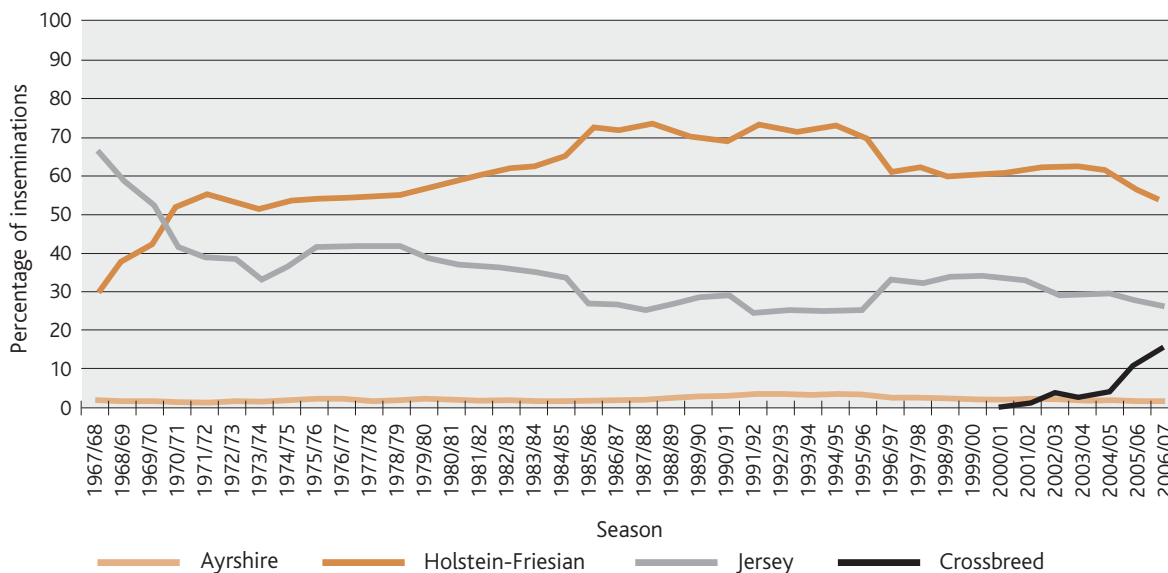


Graph 4.9 *Holstein-Friesian semen usage (%) over cow breed for the last five seasons*



The percentage of inseminations for each major breed (Holstein-Friesian, Jersey and Ayrshire) as recorded on the LIC Database is shown in Graph 4.10. The percentage of inseminations for the three breeds has decreased compared to the previous season. The percentage of inseminations for Crossbred (shown for the last six seasons) increased from 11.2% in 2005/06 to 15.2% for the 2006/07 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. For this reason the national evaluation system is designed to compare animals irrespective of breed, both nationally and within herd, to assist farmers to select the most profitable animals for the future.

There are two types of evaluation 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, somatic cell, 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 :

$$\begin{array}{rclclcl}
 \text{Breeding Worth} & = & \text{Milkfat BV} & \times & \$\text{EV (Milkfat)} & + \\
 & & \text{Protein BV} & \times & \$\text{EV (Protein)} & + \\
 & & \text{Milk BV} & \times & \$\text{EV (Milk)} & + \\
 & & \text{Liveweight BV} & \times & \$\text{EV (Liveweight)} & + \\
 & & \text{Somatic Cell BV} & \times & \$\text{EV (Somatic cell)} & + \\
 & & \text{Fertility BV} & \times & \$\text{EV (Fertility)} & + \\
 & & \text{Residual Survival BV} & \times & \$\text{EV (Residual Survival)} & +
 \end{array}$$

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 2007 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 17 February 2007*

|                  | Milkfat<br>(\$/kg) | Protein<br>(\$/kg) | Milk<br>(\$/kg) | Liveweight<br>(\$/kg) | Somatic Cell<br>(\$/score) | Fertility<br>(\$/%) | Residual Survival<br>(\$/day) |
|------------------|--------------------|--------------------|-----------------|-----------------------|----------------------------|---------------------|-------------------------------|
| Breeding Worth   | 1.347              | 6.665              | -0.074          | -1.060                | -25.378                    | 2.346               | 0.035                         |
| Production Worth | 1.310              | 5.870              | -0.069          | -0.940                | -                          | -                   | -                             |
| Lactation Worth  | 1.549              | 6.668              | -0.079          | -1.071                | -                          | -                   | -                             |

The information for all Animal Evaluation statistics was sourced from cows and sires recorded on the LIC Database as at 19 May 2007.



# Herd improvement – Animal evaluation

Table 4.10 shows the Breeding Values (BV) and Breeding Worth (BW) by breed, of all bulls born in 2002 first proven in the 2006/07 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.

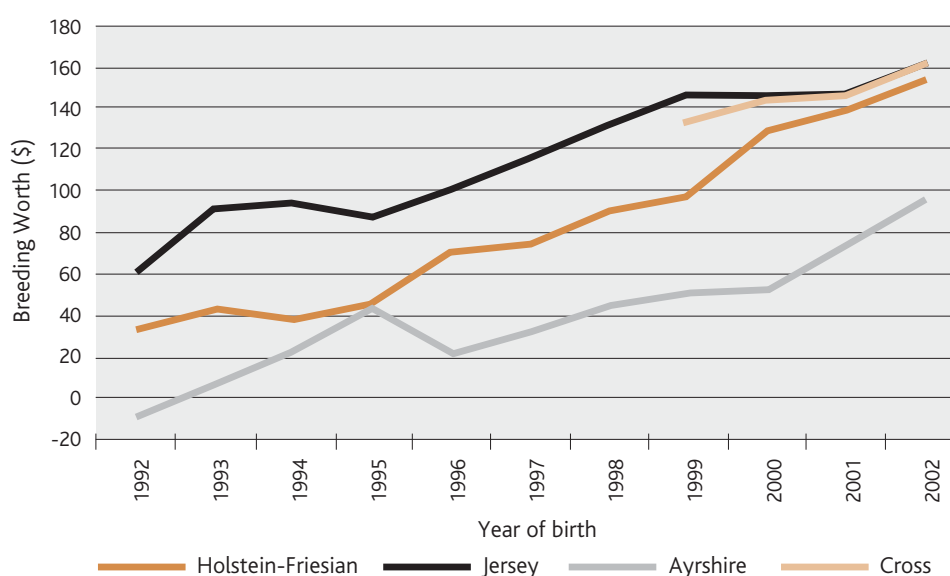
**Table 4.10 Average Breeding Values and Breeding Worth of 2002 born bulls (reliability of 75% or greater)**

| Breed                          | Milkfat BV | Protein BV | Milk Volume BV | Liveweight BV | Somatic Cell BV | Fertility BV | Residual Survival BV | BW    | Number of Bulls |
|--------------------------------|------------|------------|----------------|---------------|-----------------|--------------|----------------------|-------|-----------------|
| Ayrshire                       | 20.1       | 25.0       | 753.4          | 30.6          | 0.08            | -5.2         | 146.2                | 96.4  | 9               |
| Holstein Friesian              | 40.7       | 42.7       | 1274.0         | 72.2          | 0.32            | -2.6         | 1.5                  | 154.4 | 218             |
| Jersey                         | 24.8       | 14.1       | 14.1           | -34.2         | 0.36            | 0.9          | -0.7                 | 158.4 | 122             |
| Holstein Friesian Jersey Cross | 33.9       | 26.2       | 504.2          | 15.2          | 0.38            | 0.8          | 6.0                  | 159.6 | 64              |

(Evaluation date: 19 May 2007)

The genetic trend of proven dairy bulls is shown in Graph 4.11. Bulls born in 2002 are first proven in the 2006/07 season.

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



(Evaluation date: 19 May 2007)

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 | Holstein-Friesian Jersey Cross | Ayrshire | Other Breeds |
|---------------|-----------------|-------------------|--------|--------------------------------|----------|--------------|
| 1992          | 421             | 260               | 120    | 1                              | 29       | 11           |
| 1993          | 411             | 242               | 121    | 0                              | 37       | 11           |
| 1994          | 440             | 265               | 133    | 2                              | 36       | 4            |
| 1995          | 487             | 298               | 139    | 0                              | 41       | 9            |
| 1996          | 430             | 241               | 147    | 2                              | 35       | 5            |
| 1997          | 423             | 260               | 128    | 3                              | 26       | 6            |
| 1998          | 432             | 251               | 143    | 6                              | 29       | 3            |
| 1999          | 395             | 209               | 129    | 23                             | 31       | 3            |
| 2000          | 465             | 245               | 124    | 66                             | 27       | 3            |
| 2001          | 452             | 219               | 141    | 69                             | 20       | 3            |
| 2002          | 413             | 218               | 122    | 64                             | 9        | 0            |

(Evaluation date: 19 May 2007)

# Herd improvement – Animal evaluation

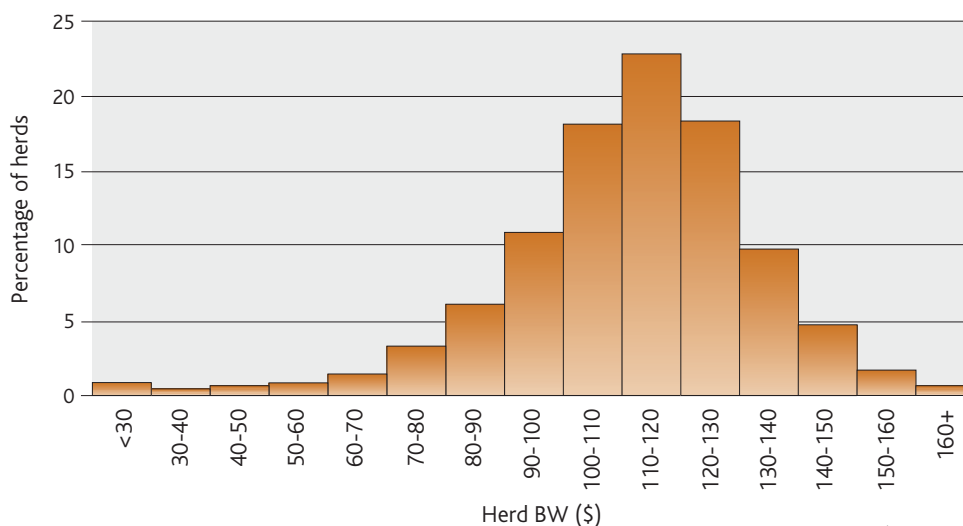
The Breeding Worth for **herds** presented below (Table 4.12 and Graph 4.12) is based on cows of the users of the LIC herd testing service, in herds with at least 80 cows, and signed up for herd testing in the 2006/07 season. Table 4.12 shows that 50% of these herds had a BW of 113 or above and 25% of these herds had a BW of 126 or above.

Table 4.12 **Herd Breeding Worth in 2006/07**

|         | Median | Top 5% | Top 10% | Top 25% | Bottom 25% | Bottom 10% | Bottom 5% |
|---------|--------|--------|---------|---------|------------|------------|-----------|
| Herd BW | 113    | > 143  | > 136   | > 126   | < 101      | < 85       | < 74      |

(Evaluation date: 19 May 2007)

Graph 4.12 **Distribution of Herd Breeding Worth in 2006/07**



(Evaluation date: 19 May 2007)

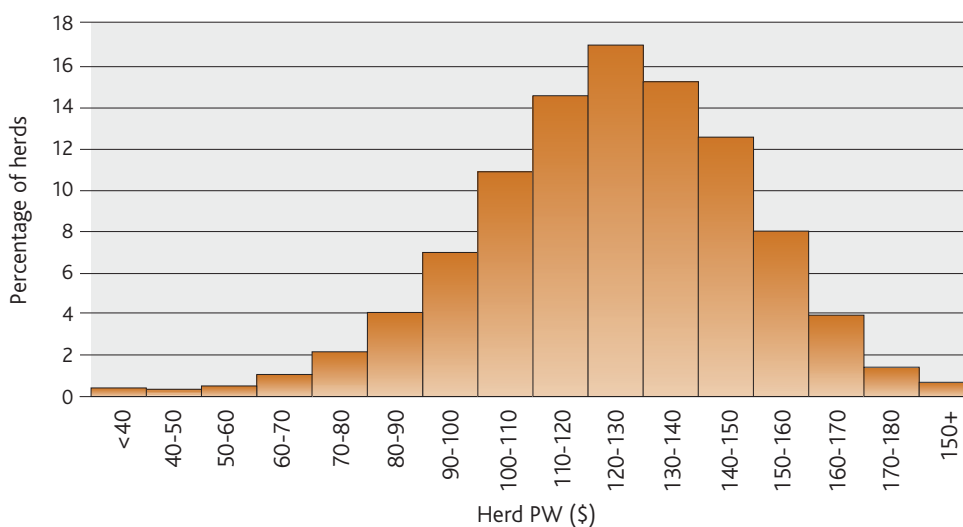
The Production Worth (PW) for **herds** presented below (Table 4.13 and Graph 4.13) is based on cows of the users of the LIC herd testing service, in herds with at least 80 cows, and signed up for herd testing in the 2006/07 season. Table 4.13 shows that 50% of these herds had a PW of 125 or above and 25% of these herds had a PW of 141 or above.

Table 4.13 **Herd Production Worth in 2006/07**

|         | Median | Top 5% | Top 10% | Top 25% | Bottom 25% | Bottom 10% | Bottom 5% |
|---------|--------|--------|---------|---------|------------|------------|-----------|
| Herd PW | 125    | > 162  | > 154   | > 141   | < 109      | < 92       | < 80      |

(Evaluation date: 19 May 2007)

Graph 4.13 **Distribution of Herd Production Worth in 2006/07**



(Evaluation date: 19 May 2007)

# Herd improvement – Animal evaluation

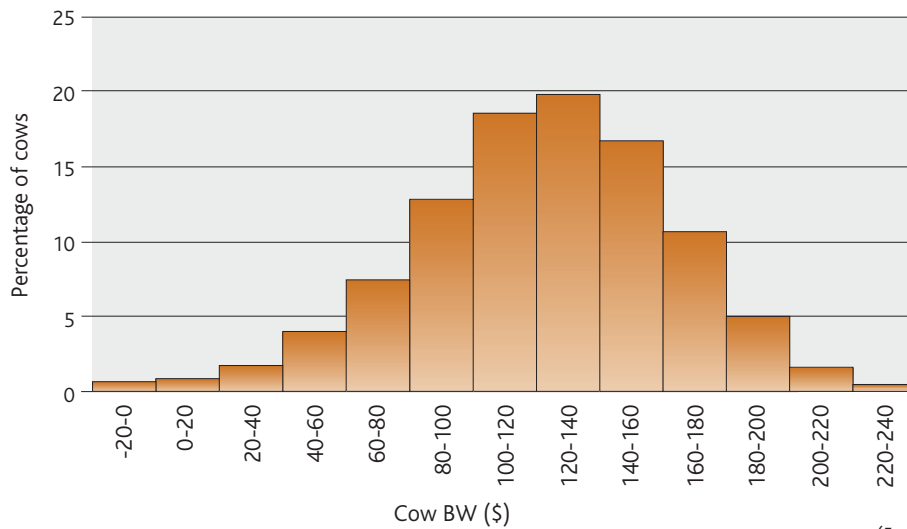
The Breeding Worth (BW) for **cows** presented below (Table 4.14 and Graph 4.14) is based on all cows of the users of the LIC herd testing service, in herds with at least 80 cows, and signed up for herd testing in the 2006/07 season. Table 4.14 shows that 50% of these cows had a BW of 112 or above and that 25% of these cows had a BW of 138 or above.

Table 4.14 **Cow Breeding Worth in 2006/07**

|        | Median | Top 5% | Top 10% | Top 25% | Bottom 25% | Bottom 10% | Bottom 5% |
|--------|--------|--------|---------|---------|------------|------------|-----------|
| Cow BW | 112    | > 174  | > 161   | > 138   | < 84       | < 57       | < 38      |

(Evaluation date: 19 May 2007)

Graph 4.14 **Distribution of Cow Breeding Worth in 2006/07**



(Evaluation date: 19 May 2007)

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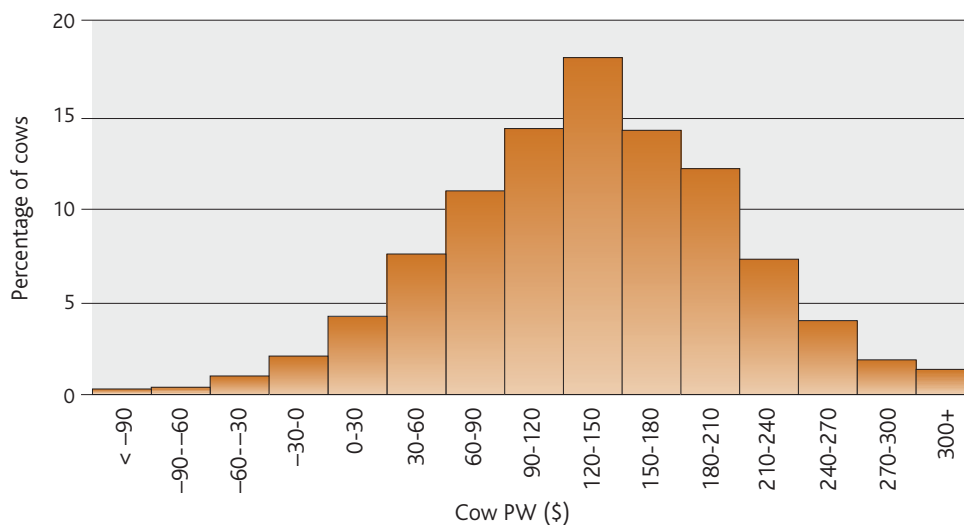
The Production Worth (PW) for **cows** presented below (Table 4.15 and Graph 4.15) is based on cows of the users of the LIC herd testing service, in herds with at least 80 cows, and signed up for herd testing for the 2006/07 season. Table 4.15 shows that 50% of these cows had a PW of 123 or above and that 25% of these cows had a PW of 171 or above.

Table 4.15 **Cow Production Worth in 2006/07**

|        | Median | Top 5% | Top 10% | Top 25% | Bottom 25% | Bottom 10% | Bottom 5% |
|--------|--------|--------|---------|---------|------------|------------|-----------|
| Cow PW | 123    | > 243  | > 215   | > 171   | < 75       | < 28       | < -2      |

(Evaluation date: 19 May 2007)

Graph 4.15 **Distribution of Cow Production Worth in 2006/07**

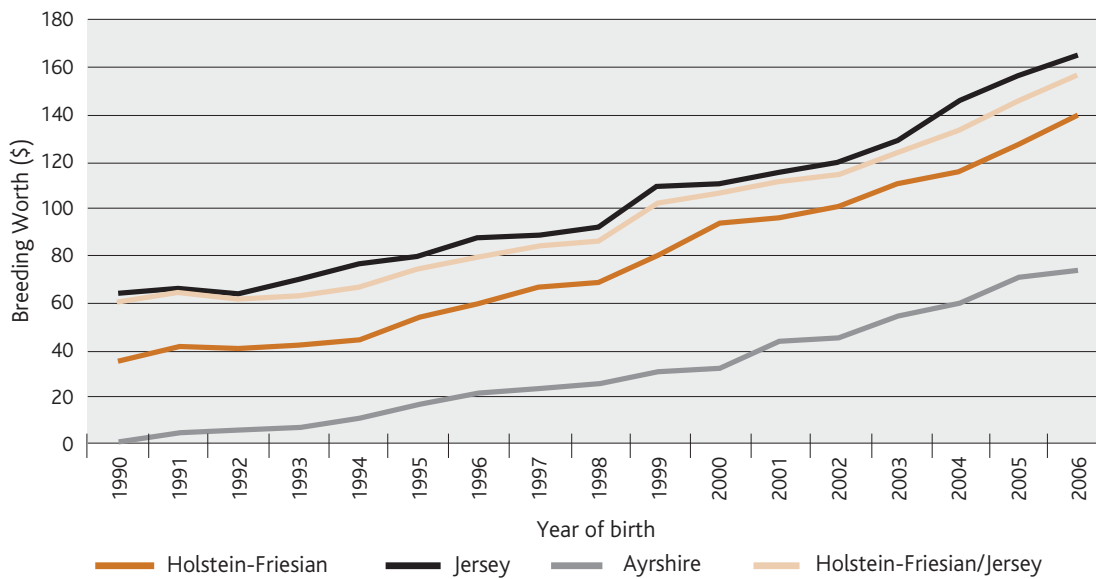


(Evaluation date: 19 May 2007)

# Herd improvement – Animal evaluation

The genetic trend for cows is based on all cows (alive or dead) recorded on the LIC National Database in the 2006/07 season. Also included are the estimated BW and PW for replacement stock (2005 and 2006 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.

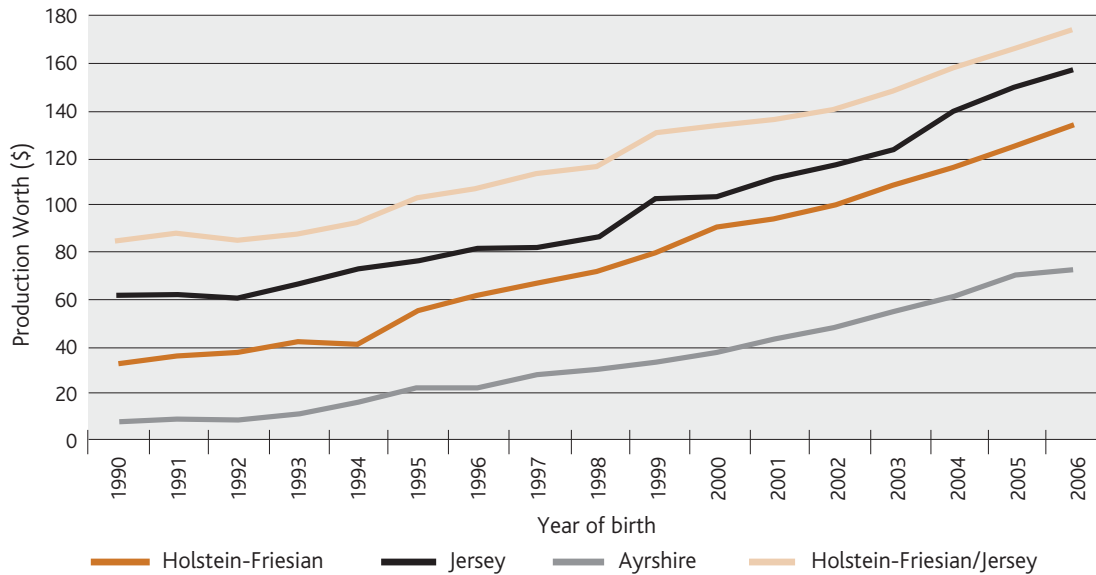
Graph 4.16 **Trend in Breeding Worth for all cows in 2006/07**



(Evaluation date: 19 May 2007)

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

Graph 4.17 **Trend in Production Worth for all cows in 2006/07**



(Evaluation date: 19 May 2007)

Table 4.16 shows the average BVs and BW by breed, of all 2004 born cows. The Jersey cows had the highest average BW at 146.4. 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 2004*

| Breed                     | BW<br>\$     | Milkfat BV<br>(kg) | Protein BV<br>(kg) | Milk Volume BV<br>(l) | Liveweight BV<br>(kg) | Somatic Cell<br>BV (score) | Fertility BV<br>(%) | Residual Survival<br>BV (days) | Cow<br>Numbers |
|---------------------------|--------------|--------------------|--------------------|-----------------------|-----------------------|----------------------------|---------------------|--------------------------------|----------------|
| Holstein-Friesian         | 115.4        | 30.9               | 33.3               | 982                   | 59.8                  | 0.34                       | -0.6                | -46                            | 406,740        |
| Jersey                    | 146.4        | 23.1               | 12.9               | 39                    | -35.1                 | 0.24                       | 0.9                 | -36                            | 128,433        |
| Ayrshire                  | 59.5         | 11.0               | 17.2               | 509                   | 23.2                  | -0.01                      | -5.8                | 163                            | 8,594          |
| Holstein-Friesian /Jersey | 133.4        | 28.2               | 24.3               | 555                   | 16.3                  | 0.29                       | 0.4                 | -38                            | 258,530        |
| Guernsey                  | -64.9        | -3.6               | 2.2                | 44                    | 38.1                  | 0.52                       | -5.4                | -152                           | 125            |
| Milking Shorthorn         | -20.2        | -3.9               | 7.0                | 196                   | 36.1                  | 0.19                       | -2.8                | 89                             | 723            |
| Brown Swiss               | -48.1        | -6.6               | 8.1                | 222                   | 54.6                  | 0.02                       | -11.2               | 169                            | 80             |
| Other                     | 98.2         | 21.2               | 21.5               | 541                   | 23.0                  | 0.20                       | -1.7                | 11                             | 38,664         |
| <b>Weighted Average</b>   | <b>124.1</b> | <b>28.2</b>        | <b>26.7</b>        | <b>681</b>            | <b>29.9</b>           | <b>0.06</b>                | <b>-0.2</b>         | <b>-37</b>                     | <b>841,889</b> |

(Evaluation date: 19 May 2007)

Survivability is measured by the percentage of cows that have a lactation recorded for consecutive years. The 2006/07 season 2-3 years figure is the percentage of cows that were milking as two-year-olds in the 2005/06 season and are now milking as three-year-olds in the 2006/07 season. Table 4.17 shows that for the 2006/07 season the highest percentage of survival is in animals ageing from 4-5 years (88.2%), followed by animals ageing from 3-4 years (87.8%).

**Table 4.17** *Survivability percentages since 1996/97*

| Season  | Percentage (%) of age group surviving to next lactation |           |           |           |           |           |           |
|---------|---|-----------|-----------|-----------|-----------|-----------|-----------|
|         | 2-3 years   | 3-4 years | 4-5 years | 5-6 years | 6-7 years | 7-8 years | 8-9 years |
| 1996/97 | 84.9  | 85.1      | 84.8      | 81.6      | 78.2      | 74.2      | 69.0      |
| 1997/98 | 85.9  | 86.7      | 85.6      | 81.9      | 77.7      | 73.9      | 68.3      |
| 1998/99 | 84.5  | 86.1      | 85.8      | 83.0      | 80.0      | 75.5      | 70.5      |
| 1999/00 | 84.1  | 86.2      | 85.8      | 82.8      | 80.7      | 76.3      | 70.8      |
| 2000/01 | 85.3  | 86.7      | 86.5      | 83.2      | 80.1      | 76.5      | 71.7      |
| 2001/02 | 85.6  | 88.4      | 86.8      | 84.3      | 80.8      | 77.1      | 73.5      |
| 2002/03 | 85.7  | 85.9      | 86.6      | 83.8      | 80.8      | 76.0      | 71.2      |
| 2003/04 | 85.2  | 86.9      | 86.0      | 83.0      | 78.7      | 74.8      | 69.4      |
| 2004/05 | 85.7  | 87.3      | 86.7      | 82.7      | 79.7      | 74.6      | 69.6      |
| 2005/06 | 85.0  | 87.5      | 87.6      | 84.2      | 79.7      | 76.7      | 70.6      |
| 2006/07 | 84.8  | 87.8      | 88.2      | 84.7      | 79.5      | 74.9      | 71.2      |