

Comparison of dairy cattle breeding values based on test day or lactation records

S u m m a r y

A test day model (MUP) was recently used for genetic evaluation of dairy cattle in many countries. It has many advantages over the traditional lactation model (MR); it accounts for factors specific to each test day and for the shapes of the lactation curves. A test day model should be implemented in Poland in the nearest future. There were 12 614 342 test day records of milk, fat and protein on 850 985 Black-and-White cows calving from 1995 through 2004. The data were restricted to the first three lactations. The three-lactation random regression test day model included fixed effect of herd x test date, a fixed regression within subclasses of genetic group x age of calving x season of calving, and random regressions for animal and permanent environment effects. Breeding values (BV) of cows and sires were calculated using the solutions for random regression coefficients for animal effect. These values were compared with routine BV using such criteria as rank correlation between breeding values, the ranking of the best sires, genetic trend and Mendelian sampling. Correlations between breeding values of sires' with 50 or more daughters were 0.92 (milk) and 0.89 (fat and protein), whereas correlations between cows' BV were lower and equal to 0.83 (milk), 0.80 (fat) and 0.82 (protein). There were 63 and 394 best sires based on BV from the test day model among 100 and 500 best sires based on BV from the lactation model. Genetic trends in both groups, cows and sires, were significantly positive, but depended on the model of evaluation; genetic trend estimated by MR was twice the genetic trend estimated by MUP. Curves representing mean BV by birth year of sires and cows were similar in shape. Mean values of Mendelian sampling computed using BV based on MUP and MR were similar for sires born in 1989-1999, and differed considerably for older sires born in 1985-1988.