



Changes in USDA-DHIA genetic evaluations (July 1996)

P.M. VanRaden, H.D. Norman, R.L. Powell, and G.R. Wiggins
Animal Improvement Programs Laboratory
USDA-ARS, Beltsville, MD 20705-2350

AIPL RESEARCH REPORT
 CH6 (7-96)

Lactation weights

Lactation records that are less accurate receive less weight in the animal model. New lactation weights were calculated from record-standards variables. Previously, weights depended on weighing frequency of the test plan (standard or a.m.-p.m.), parity (lactation number), and lactation length (days in milk). The numbers of supervised test days, other test days, supervised samples, and other samples now provide further information about accuracy. The main change for July is reduced weighting for less frequent testing. Instead of lactation length, weights for new records are now based on numbers of test days and samples.

Milk and fat records are assigned the same weight in current computer programs and formats. When present, protein records also receive this same weight. The weight for all traits is obtained from Table 1 by first averaging the adjusted numbers of test days and samples and then finding the lactation weight based on parity and type of test.

The new weights are used only if the new weight is less than or equal to the previous weight based on lactation length. Records will be less accurate if producers reduce the frequency of testing, but only minimal increases in accuracy are expected from much more frequent testing. Weights for records received prior to 1996 are still based on lactation length be

cause record-standards variables became available only recently.

In 1997, records from unsupervised and unofficial test plans (codes 40 through 79) will be included in evaluations. Supervised test days will receive full credit; owner-sampler test days will receive 50% credit. For example, a cow with 10 owner-sampler tests will be credited only for 5, which results in a lactation weight of .76 or .77 depending on parity (Table 1). The lower credit for owner-sampler tests already affected a few innovative records with partial supervision included in the current evaluation.

Evaluation dates

Genetic evaluations from the International Bull Evaluation Service (INTERBULL) will be released on August 25. The INTERBULL evaluations on a U.S. basis are official for any bull that does not have a USDA-DHIA evaluation. The INTERBULL release dates in 1997 will be February 10 and August 11. To coordinate national and international evaluations, the schedule for USDA-DHIA evaluations will be changed (subject to approval by the Council on Dairy Cattle Breeding) so that national evaluations will be released on or about those same dates. Deadline dates for receipt of input data will be announced this fall.

TABLE 1. Weights for lactation records based on number of tests (new data) or lactation length (old data) according to parity and weighing frequency of test plan.

Number of tests	Days in milk	First parity weights		Later parity weights	
		Standard	a.m.-p.m.	Standard	a.m.-p.m.
1	15-45	.40	.30	.33	.24
2	46-75	.51	.42	.46	.37
3	76-106	.60	.53	.57	.50
4	107-136	.69	.63	.68	.61
5	137-167	.76	.73	.77	.72
6	168-197	.83	.80	.86	.80
7	198-228	.90	.86	.92	.86
8	229-258	.95	.92	.97	.93
9	259-289	.99	.96	.99	.96
10	290-305	1.00	.97	1.00	.97

Evaluation changes

Evaluations in January 1996 were slightly lower for many bulls of interest, and the standard deviation (SD) of evaluations was about 2.5% smaller. In July, evaluations were stable and SD returned almost to the level of July 1995. Domestic rankings were affected little by these scaling changes. International rankings also are expected to be affected little by the scaling changes because new intercepts and slopes would compensate for any changes in base or variance.

Because scale changes are annoying to producers, researchers hoped to discover why the evaluations changed in January 1996 when no new procedures had been introduced and characteristics of the input data seemed normal. Three topics were investigated: 1) minor technical changes in animal model programs, 2) reduced variation, and 3) reduced genetic trend.

January 1996 and July 1996 versions of the computer programs produced the same SD when compared using the same data set. Although INTER-BULL evaluations account for changes in variance, estimates of the reduction in U.S. SD were smaller than USDA estimates.

Genetic trend from first parity only, which may be less biased by selection, were compared with trend

from all parities. Genetic trend for all-parity evaluations in January 1996 (although lower than for all-parity evaluations in July 1995) was higher than trend for January 1996 first-parity only evaluations. A history of genetic trend estimates for Holstein milk yield was constructed from average breeding values of cows born in 1975 and 1985 from each semiannual evaluation since January 1989 (Table 2). Estimates of genetic trend can change as a result of model changes, insufficient iteration (rounds of computer processing used to calculate evaluations), and perhaps chance. The decline over the last 2 years could continue if due to insufficient iteration. Currently, iteration is limited to about 50 rounds for Holsteins to keep processing time reasonable.

A change in estimated genetic trend may affect international comparisons of bulls and also the average evaluation for bulls in active artificial-insemination service. If trend changes, averages of current bulls, older bulls, or both must change. Only the average evaluation for cows born in 1990 (which is set to 0 as the genetic base) is guaranteed to remain unchanged from one semiannual evaluation to the next. Animals of the same generation in the same country evaluated at the same time are compared the most accurately.

TABLE 2. Genetic trend for milk yield based on average Holstein cow breeding values from USDA-DHIA genetic evaluations since January 1989.

Evaluation date	Genetic trend ¹ (lb/yr)	Change in trend (lb/yr)	Other information about evaluation
January 1989	195	. . .	Last Modified Contemporary Comparison evaluation
July 1989	225	+30	First animal model evaluation
January 1990	252	+27	Insufficient iteration?
July 1990	Data not available
January 1991	260	+8 ²	
July 1991	267	+7	First adjustment for heterogeneous variance
January 1992	269	+2	
July 1992	273	+4	
January 1993	278	+5	
July 1993	278	0	
January 1994	277	-1	
July 1994	277	0	
January 1995	237	-40	New age-parity-season factors
July 1995	223	-14	Insufficient iteration?
January 1996	216	-7	Active bulls declined
July 1996	211	-5	

¹1985 breeding value minus 1975 breeding value divided by 10.

²Change from January 1990 to January 1991.