Changes in USDA-DHIA genetic evaluations (January 1995)

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Base change

The genetic base was updated so that evaluations of cows born in 1990 average 0. Table 1 shows the average decreases in predicted transmitting abilities (PTA's) of bulls that were in active artificial insemination (AI) service in July 1994. Table 2 shows the averages for standardized yield traits, somatic cell score (SCS), and productive life (PL) of the new base cow populations.

Because of changes in the statistical model for January 1995 evaluations, average changes for yield traits don't accurately reflect each breed's progress. Average changes for SCS represent phenotypic rather than genetic trend. Changes in yield trait PTA's for cows and for older animals were less than those for current bulls. The base standard deviation has increased (by about 7% for Holsteins), and genetic merit has been rescaled relative to this new, more variable base population.

Previous evaluations shouldn't be displayed even for animals that don't receive a January 1995 PTA. The PTA's from the new and previous base are not comparable. The next base change is scheduled for January 2000.

TABLE 1. Average decreases in PTA's of bulls in active AI service.

	Decrease in PTA for				
Breed	Milk	Fat	Protein	PL	SCS
	lb	*lb*	*lb*	*mo*	
Ayrshire	278	12	8	.4	.08
Brown Swiss	441	17	15	.4	−.03
Guernsey	537	22	17	.5	.15
Holstein	1,136	37	31	.9	.09
Jersey	635	29	18	1.1	.27
Milking Shorthorn	544	18	18	.9	.02

Age-parity-season adjustment

New adjustment factors were implemented for calving age and season. Factors now differ for cows that are the same age but have different lactation number (parity) and also differ across time periods. Age adjustments for young cows generally are smaller than with previous factors, and season adjustments are less variable.

Estimates of genetic trend were reduced, and comparisons of animals born in different years were improved with the new factors. The animal model also now includes an age-parity effect so that any future changes in maturity rate will be estimated automatically.

The new age-parity-season factors and statistical model change combined with the genetic base update caused evaluations of current animals to decline by more than the amount of genetic improvement during the past 5 years. The three methodology changes were implemented together to minimize the number of large disruptions in evaluations.

Dairy industry funding for this important project and the research contribution of Dr. Michael Schutz are gratefully acknowledged. For further information, consult the authors or the *Journal of Dairy Science* [75(Suppl. 1):245 and 77(Suppl. 1):267].

Days open adjustment

Yield traits are affected by a cow's current and previous reproductive status. Effects of nonpregnancy (days open) were estimated using the same statistical model that produced the new age-parity-season adjustment factors. Cows with a long calving interval reach a given parity at a later age. Thus, age, parity, and previous days open are interrelated.

Standardized records now are adjusted for previous days open in addition to calving age and season, parity,

TABLE 2. Averages for standardized first lactation yield traits, PL, and SCS of cows born in 1990.

Breed	Milk	Fat		Protein		PL	SCS
	lb	*%*	*lb*	*%*	*lb*	*mo*	
Ayrshire	15,080	3.9	589	3.3	505	24.0	3.16
Brown Swiss	16,616	4.0	668	3.5	586	24.0	3.22
Guernsey	13,864	4.5	625	3.5	481	21.5	3.35
Holstein	20,845	3.7	763	3.1	656	24.6	3.20
Jersey	14,120	4.7	662	3.8	531	27.0	3.31
Milking Shorthorn	14,472	3.6	518	3.3	476	24.4	2.87

lactation length, and milking frequency. The adjustments for age, parity, season, and previous days open are combined into one multiplicative factor and applied to the record. Adjustments for previous days open by themselves range from 1.11 at 25 days to .94 at 295 days.

Adjustments for days open during the current lactation were overestimated and weren't implemented because the statistical model didn't distinguish between cause and effect. A cow's early yield affects breeding decisions and conception rates, but only the later portion of her yield is affected by the pregnancy. Reduced factors for current days open will be implemented at a future date.

Age adjustment for SCS records

Multiplicative factors to adjust SCS records for calving age were implemented to replace previous additive factors.

Evaluations from INTERBULL

In late February 1995, the International Bull Evaluation Service (INTERBULL) plans to release new international evaluations. The INTERBULL evaluations combine official evaluations from member nations by using genetic relationships among all bulls. Upon their release, the INTERBULL evaluations will replace current estimates from conversion equations for European Holstein bulls. The INTERBULL evaluations for U.S. and Canadian bulls will be considered unofficial and will receive only limited distribution.

Genetic trend

Previous estimates of genetic trend were too high. New estimates are about 75% of previous estimates for Holsteins and about 90% for other breeds. Despite these lower estimates, increases in milk, fat, and protein yields are caused more by genetic progress than by improved management. In the previous 5 years, genetic progress accounted for 74% of the increase in milk yield for Holsteins and from 60 to 100% for other breeds. Table 3 shows estimates of genetic trend obtained with the new adjustments and the new statistical model.

Table 4 shows estimated average PTA's for calves that will be born in 1996. These are calves expected to result from matings using 1995 semen purchases. Average sire merit was projected for these calves and also is shown in Table 4. The estimates were obtained by extending the increasing rates of progress observed for PTA's of cows born since 1981.

Tables 3 and 4 may help remind producers to update their selection standards to keep current with the genetic merit of the general population and to use the best bulls that become available each year.

TABLE 3. Average annual increase in PTA's for cow birth years 1985 to 1990.

Breed	Milk	Fat	Protein	PL	SCS
	lb	*lb*	*lb*	*mo*	
Ayrshire	64	3	2	.08	.008
Brown Swiss	69	3	2	.11	.007
Guernsey	102	4	3	.10	.007
Holstein	137	5	4	.13	.005
Jersey	117	5	4	.23	.003
Milking Shorthorn	79	3	3	.19	.007

TABLE 4. Expected average PTA's of calves born in 1996 and of their sires based on current estimates of trend for each breed.

	PTA milk		PTA fat		PTA protein		PTA PL		PTA SCS	
Breed	Calves	Sires	Calves	Sires	Calves	Sires	Calves	Sires	Calves	Sires
	lb	*lb*	*lb*	*lb*	*lb*	*lb*	*mo*	*mo*		
Ayrshire	454	720	19	31	16	26	.65	.87	3.20	3.25
Brown Swiss	455	607	20	27	16	21	.74	.89	3.24	3.27
Guernsey	649	954	29	46	22	32	.45	.49	3.38	3.43
Holstein	943	1,423	35	53	33	52	.83	1.10	3.22	3.23
Jersey	1,021	1,731	36	55	34	54	1.23	2.26	3.35	3.40
Milking Shorthorn	539	763	19	33	22	35	1.00	1.26	2.89	2.93