Genetic Evaluations to Include All Breeds and Crossbreds

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Beginning with the genetic evaluations published by the Animal Programs Improvement Laboratory of USDA in May, 2007 all cows and bulls will be calculated from a common base of animals from all breeds and will include crossbred cows. The evaluations are then converted to a traditional within-breed genetic base and published. This change is important because it allows crossbred animals to contribute to genetic evaluations as well as to receive evaluations which include the expected contribution of hybrid vigor (or heterosis).

The conversions take place use the following formula which involves both a breed average and the standard deviation (**SD**) ratio for traits with variance adjustment that differed by breed:

within-breed PTA = (all-breed PTA, breed average) × (breed SD/Holstein SD);
all-breed PTA = [within-breed PTA × (Holstein SD/breed SD)] + breed average.

The table below shows the breeds differ from Holstein in breeding value (2 X PTA) for different traits. While Holsteins are superior in breeding value for the yield traits other breeds are superior in breeding value for other traits and especially Daughter Pregnancy Rate.

Breed	Milk	Fat	Protein	Productive Life	Somatic Cell Score	Daughter Pregnancy Rate
Ayrshire	-5232	-135	-130	0.4	-0.15	2.6
Brown Swiss	-4234	-80	-71	0.9	-0.10	1.1
Guernsey	-6126	-81	-137	-8.5	0.06	1.2
Jersey	-6532	-74	-104	3.2	0.17	5.8
Milking Shorthorn	-7055	-245	-198	-1.8	-0.06	5.2

The table below shows the trait means for the base cows.

Breed	Milk	Fat	Protein	Productive Life	Somatic Cell Score	Daughter Pregnancy Rate
Ayrshire	18149	699	567	31.5	2.96	21.8
Brown Swiss	21340	859	705	30.2	2.92	20.4
Guernsey	16629	736	542	26.4	3.29	19.9
Holstein	25437	927	763	27.7	3.07	21.0
Jersey	17867	820	632	33.1	3.33	26.0
Milking Shorthorn	16959	605	523	29.8	3.09	23.8

The inclusion of crossbreds accounts for the contribution of hybrid vigor (heterosis) to performance. The table below shows how much F1 females are expected to outperform the average of their parental breeds.

Heterosis Value

Milk	Fat	Protein	Productive Life	Somatic Cell Score	Daughter Pregnancy Rate
700	35	26	0.3	0.02	1.8