Bred To Respond

It's time for a genetic base change, the adjustment that occurs every five years to subtract accumulated genetic gain from evaluations so that all animals are compared with a more current cow population. With the December 2014 genetic evaluations, the average PTAs of sire-identified cows born in 2010 will be set to zero, except for somatic cell score, which is centered at 3.0.

For Jersey, this base change brings positive news about both the direction and magnitude of genetic progress since 2005. Jersey genetic trend increased for milk, fat, protein and daughter pregnancy rate (DPR), was maintained for Productive Life (PL), and was very slightly less for somatic cell score. PTA adjustments due to the base change will be 327 lbs. milk, 19 lbs. fat, 12 lbs. protein, 0.8 PL, 0.0 for DPR and 0.04 for SCS.

There's another chapter in this story, however, and that's the information included in the USDA-Animal Improvement Program report that shows Jersey phenotypic progress over base change periods.

Across the past decade, from 2000 to 2005 then from 2005 to 2010 *(Table 1)*, Jersey total phenotypic progress has been 1,698 lbs. milk, 114 lbs. fat and 75 lbs. protein—with the number of Jersey cows nearly doubling across that period of time.

Total phenotypic progress is the sum of genetic progress and gains due to environmental factors such as management. Table 2 breaks down how much of the progress in production over this decade is attributable to genetic progress and how much is the result of management practices.

From 2000 to 2005, genetic improvement was responsible for 95% of the increase in milk yield, 94% of the increase in fat yield, and 77% of the increase in protein yield.

From 2005 to 2010, genetic progress was equal to the gains of 2000-2005. The surge in total phenotypic progress from 2005 to 2010 was a function of environment. Management factors were responsible for 36%, 50% and 43% of the increases in milk, fat and protein yields.

So, this base change is not just a story about continuing genetic progress, but also how today's Jersey responds when given what she needs to demonstrate her bred-in productive capabilities. A Jersey cow this responsive to management excites interest from dairy herd owners, challenges nutritionists to see how much she is capable of producing, and above all, drives breed growth.

This is just the beginning. Cows born in 2010 were before genomic selection had much impact; official genomic evaluations for Jersey bulls were first released in January of 2009. Phenotypic and genetic trends are faster for animals born since. Cows born in 2011 average 19,958–955–721, those in 2012, 20,784–987–746.

Genetic change is permanent. Continue to build the genetic base, so that management can make the most of it.

Table 1. Phenotypic averages for standardized first-lactation protein, fat and milk of Jersey cows born in genetic evaluation base years 2000, 2005 and 2010.

	Birth Year 2000	2005	2010	Change 2000-2010
Milk *(pounds)*	17,776	18,457	19,474	1,698
Fat *(pounds)*	810	846	924	114
Protein *(pounds)*	626	657	701	75
Number of Cows	41,347	50,673	80,871	39,524

Source: Council on Dairy Cattle Breeding, www.cdcb.us/eval/summary/trend.cfm

Table 2. Comparison of total phenotypic, genetic and environmental progress for base change intervals 2000-2005 and 2005-2010.

	Progress 2000-2005	% of Increase for Trait	Progress 2005-2010	% of Increase for Trait
Milk:				
Phenotypic *(total)*	682		1,016	
Genetic *(BV)*	646	95%	655	64%
Environmental	36	5%	362	36%
Fat:				
Phenotypic *(total)*	36		78	
Genetic *(BV)*	34	94%	39	50%
Environmental	2	6%	39	50%
Protein:				
Phenotypic *(total)*	31		44	
Genetic *(BV)*[1]	24	77%	25	57%
Environmental	7	23%	19	43%

[1] *Genetic progress based on breeding value (BV) is twice PTA progress.*

Source: AIPL Research Report Base2 (8-09), AIP Research Report Base3 (10-14)