Updated genomic gains in reliability and validation statistics from the addition of Holstein Italian Bulls

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A total of 3,038 50K Holstein bull genotypes were received from Italy. A validation study was conducted to evaluate the impact of including the Italian bulls in the predictor population on US genomic evaluations. Animals that had PTA reliabilities that were higher than PA reliabilities in August 2007 were used as predictor animals and consisted of 10,442 animals in the data set with North American animals only and 12,405 animals in the data set that consisted of North American and the Italian animals. The validation data set consisted of 3,518 USA ID Holsteins bulls that were unproven in August 2007 and proven with daughters in the US by April 2011. Results for regressions, bias, and gains in reliability can be found in Table 1. In general, gains in reliability were in the range of 1 to 3%. There were, however, 3 traits that did not gain in reliability with the addition of the Italian animals. Body depth did not have any advantage for adding the Italian bulls, this was slightly surprising because the genetic correlation between the US and Italy is 0.93 for body depth. Both sire and daughter stillbirth had decreases in the gains in reliability when the Italian data is used. This was not surprising because the genetic correlation is 0.45 and 0.50 for sire and daughter stillbirth respectively. It is not advised to use the Italian data for genomic predictions of stillbirth in the U.S, but is advised to use all other traits in August (or earlier if the parties agree). Further research on multi-trait modeling of foreign data will proceed using both Italian and Great Britain data.

Table 1. Holstein comparison of genomic validation using training EBV from North American bulls only or from North American and Italian bulls jointly

	North America Only (NA)			North America + Italy			Difference in Gain
	Bias	Regression	Gain in Rel	Bias	Regression	Gain in Rel	((Italy+ NA) – NA)
Milk (lbs)	-76.26	0.88	0.241	-134.45	0.91	0.272	0.031
Fat (lbs)	-3.12	0.88	0.270	-5.77	0.91	0.299	0.029
Protein (lbs)	0.61	0.80	0.181	-1.22	0.84	0.212	0.031
Productive Life	-1.64	0.99	0.206	-1.75	0.98	0.218	0.012
SCS	-0.03	0.88	0.245	-0.02	0.88	0.270	0.025
DPR	0.05	0.93	0.203	0.05	0.92	0.217	0.014
Final Score	0.25	0.81	0.224	0.24	0.82	0.235	0.011
Stature	0.40	0.95	0.312	0.38	0.96	0.333	0.021
Strength	0.34	0.94	0.319	0.34	0.94	0.340	0.021
Dairy Form	0.77	0.95	0.287	0.78	0.96	0.314	0.027
Foot Angle	0.69	0.82	0.141	0.67	0.82	0.162	0.021
Rear Legs Side	0.04	0.88	0.241	0.05	0.89	0.262	0.021
Body Depth	0.50	0.96	0.345	0.49	0.97	0.345	0
Rump Angle	-0.18	0.90	0.322	-0.17	0.90	0.344	0.022
Rear Udder Width	0.31	0.90	0.289	0.32	0.91	0.302	0.013
Fore Udder Att.	0.54	0.92	0.346	0.55	0.92	0.359	0.013
Rear Udder Height	0.78	0.90	0.221	0.76	0.92	0.240	0.019
Udder Depth	0.08	0.86	0.404	0.08	0.86	0.438	0.034
Udder Cleft	0.51	0.94	0.219	0.51	0.94	0.237	0.018
Front Teat Placement	0.32	0.83	0.329	0.33	0.83	0.341	0.012
Teat Length	-0.07	0.98	0.351	-0.09	0.97	0.361	0.010
Rear Legs Rear	0.43	0.80	0.165	0.43	0.81	0.180	0.015
Sire Calving Ease	0.77	0.71	0.092	0.79	0.73	0.104	0.012
Dtr Calving Ease	-1.07	0.80	0.190	-1.07	0.81	0.199	0.009
Sire Stillbirth	1.55	0.91	0.103	1.48	0.92	0.037	-0.066

| Dtr Stillbirth | -0.23 | 0.81 | 0.153 | -0.20 | 0.83 | 0.132 | -0.021 |