average daily temperatures ranging from -5°C to 38°C (median of 13°C), and **THI** ranging from 33.8 to 81.0 (median 56.6).

The proportion of additive variance in cow slope in relation to milk, fat and protein yields were 0.14, 0.16 and 0.13 in Holsteins and 0.27, 0.26 and 0.21 in Jerseys, respectively. The corresponding proportions of variance explained by SNP in sire slope were 0.32, 0.34 and 0.30 in Holsteins and 0.49, 0.44 and 0.45 in Jerseys. This confirms that selection for heat tolerance is possible and could be particularly effective in the geographical regions with high heat load. Correlations of sire slopes among milk, fat and protein yield ranged from 0.46 – 0.86 for Holsteins and 0.60 – 0.86 for Jerseys.

Genetic correlations between heat tolerance and production traits in cows were negative. For example, in Holsteins the correlations between heat tolerance with milk, fat and protein yields were -0.38, -0.40 and -0.54, respectively. This confirms the antagonistic relationships between heat tolerance and production traits reported in previous studies (Ravagnolo and Misztal 2000).

Correlations between sire slopes and GEBV, and accuracies of genomic prediction are presented in Table 1. When only genotyped sires were included in the reference population, accuracies of genomic prediction ranged from 0.38 to 0.53 in Holsteins and 0.49 to 0.63 in Jerseys. When the reference set was expanded to include genotyped cows, the accuracies of genomic predictions showed a slight increase in some cases but not all.

The accuracies of genomic predictions for heat tolerance we have reported indicate that genomic selection offers a promising tool to predict heat tolerance for individual animals based on their genotypes. This will enable farmers to improve the milk production at higher heat load conditions of their herd over time through selection decisions.

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