

Genotype x Environment Interactions in Dual Purpose Cattle in Harsh Environments

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In Switzerland cattle are kept in a range of different production systems and environments: From lowland to mountain area, from intensive to extensive feeding systems and from conventional to organic production systems. Some of these environments can be classified as harsh environments. It is assumed that some genotypes affect traits differently in diverging environments. If that would be the case, genotype x environment (GxE) interactions would cause re-rankings of the cattle's corresponding breeding values in the breeding value list.

First steps of our investigations addressed the question whether dual purpose cattle are affected by GxE interactions. Specifically, we treated the yield traits (milk kg (mkg), fat kg (fkg) and protein kg (ekg)) of Swiss Original Braunvieh cattle in lowland and mountain area as different traits. We analyzed 104,984 lactation records of 35,614 Original Braunvieh cows by applying an animal model with repeated measurements. These records were divided into different environments. The extent of the genetic correlation (r_a) between the traits in opposite environments indicates whether GxE interaction exists. In a preliminary analysis r_a of the 3 split traits was found to be between 0.98 and 1. This indicates almost no GxE interaction exists for yield traits in Original Braunvieh cattle in these two environments.

Further investigations applying different methodology and environment definitions will be carried out to verify these results.