# Genotype-environment interaction for milk yield between grass-based and conventional dairy cattle production in Portugal

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## INTRODUCTION

- Dairy cattle in Portugal:
  - ~320000 dairy cows
  - nearly one-third are in the Azores region
- Typical production systems
  - Mainland Portugal (**MP**) - mostly intensive systems
  - Azores (**AZ**) - mostly grass-based dairy production
- Systematic genetic evaluation practiced in Portugal since 1994
  - until now AZ information has not been included.

## OBJECTIVE

• Assess importance of G*E interactions for milk yield among the Azores (**AZ**) and Mainland Portugal (**MP**).

## MATERIAL & METHODS

### Records for Milk Yield at 305 d (after editing)

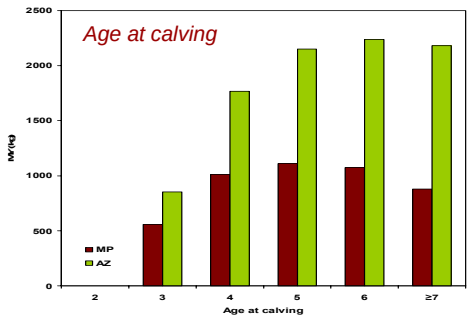
| | Azores | Mainland Portugal |
|---|---|---|
| Period | 1997-2006 | 1994-2006 |
| No. lactations | 17608 | 450687 |
| No. cows | 7975 | 191935 |
| No. HY | 833 | 22039 |
| No. animals in A | 13379 | 349839 |

### Statistical analyses

- Animal Model in uni- and bivariate analyses
  - Fixed effects
    - HY, month of calving, age of cow
  - Random effects
    - Breeding value, fixed effect of the cow
- MTDFREML (Boldman et al., 1995)

## RESULTS

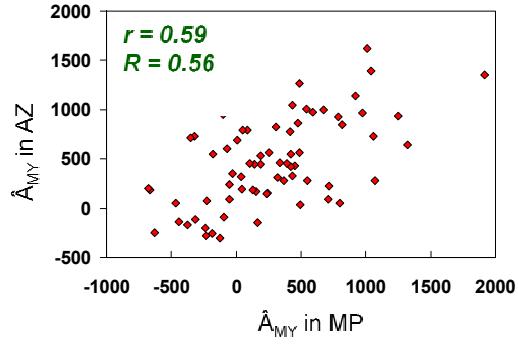
### Fixed effects




### Estimated genetic an phenotypic parameters from bivariate analyses

| | Azores | Mainland Portugal |
|---|---|---|
| Mean MY | 7653 | 8078 |
| $\sigma_P$ | 1141 | 1267 |
| $h^2$ | 0.30 | 0.21 |
| $r_e$ | 0.49 | 0.40 |
| $r_G$ | 0.85 | |

### Joint distribution of estimated breeding values of bulls (n=70 bulls with publishable results in the two regions)




## CONCLUSIONS

▪ A slight G*E interaction for milk yield may exist between the grass-based system typical of AZ and the more conventional production system used in MP.

▪ A joint evaluation considering the two regions as separate traits might be appropriate.

▪ Further research including more information, especially from AZ, should be conducted to confirm this suspicion.