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Association of *DGAT1* with milk production traits in Romanian Spotted cattle

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Introduction

- Diacylglycerol acyl-CoA acyltransferase 1 (*DGAT1*) is a candidate gene for milk production traits. The polymorphisms in exon 8 of *DGAT1* (14:1802265 and 14:1802266, UMD3.1 reference genome) which results in the substitution of amino acid 232 (K232A, Lys232 → Ala) are significantly associated with variation in milk fat and protein.

Material and methods

Data were recorded at the Research and Development Station for Bovine Arad from 475 Romanian Simmental cattle.

Phenotypic data

- 27,634 records for the first three lactations (L1-L3), included: milk yield (MY), fat and protein percent (FP, PP) and fat and protein yield (FY, PY).

Molecular markers

- *DGAT1* 14:g.611019G>A/rs109234250/c.694G>A
- *DGAT1* 14:g.611020C>A/rs109326954/c.695C>A

Genotyping method

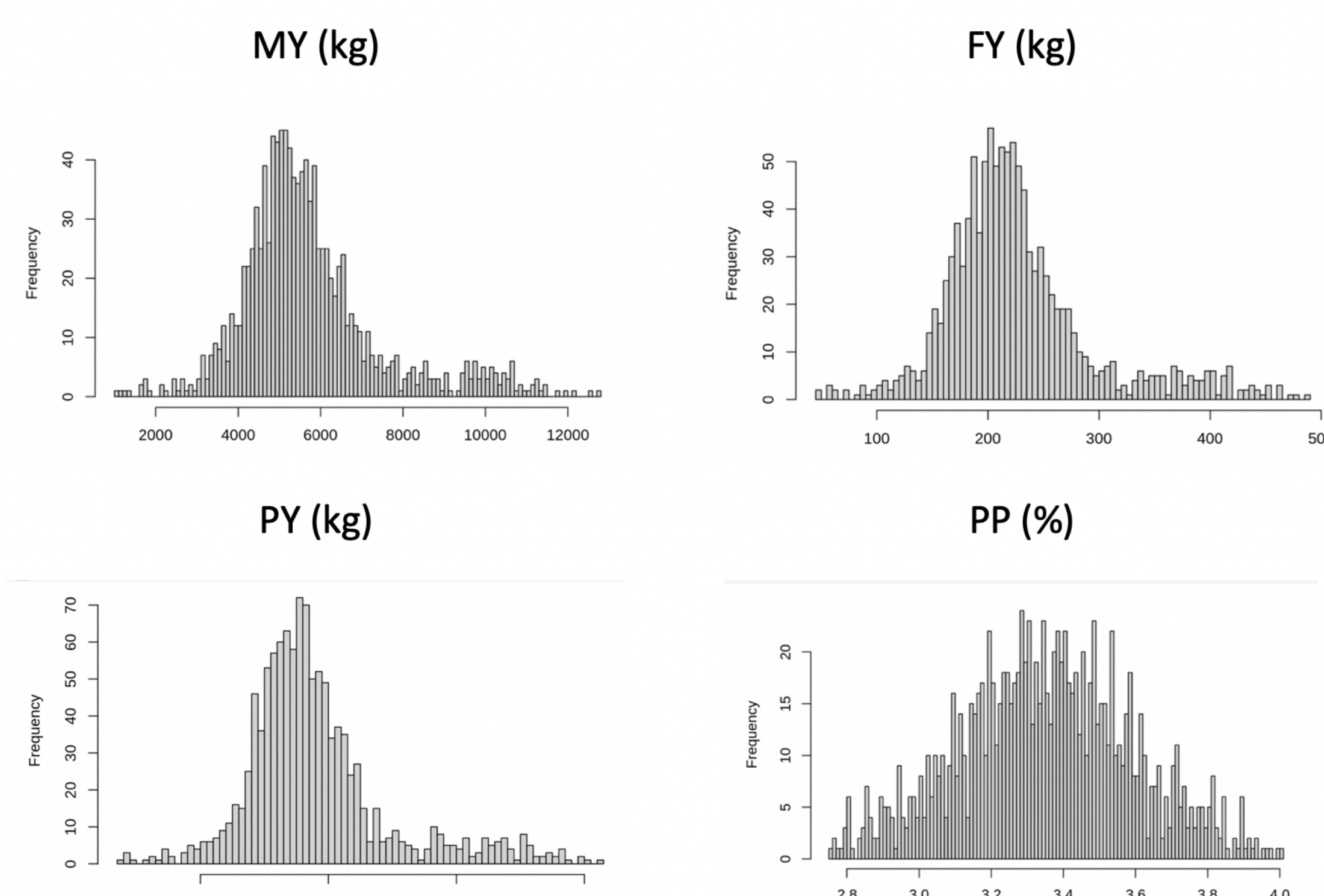
- Axiom Bovine v3 microarray (based on the reference genome Bos_taurus_UMD_3.1.1)

Methods for association analysis

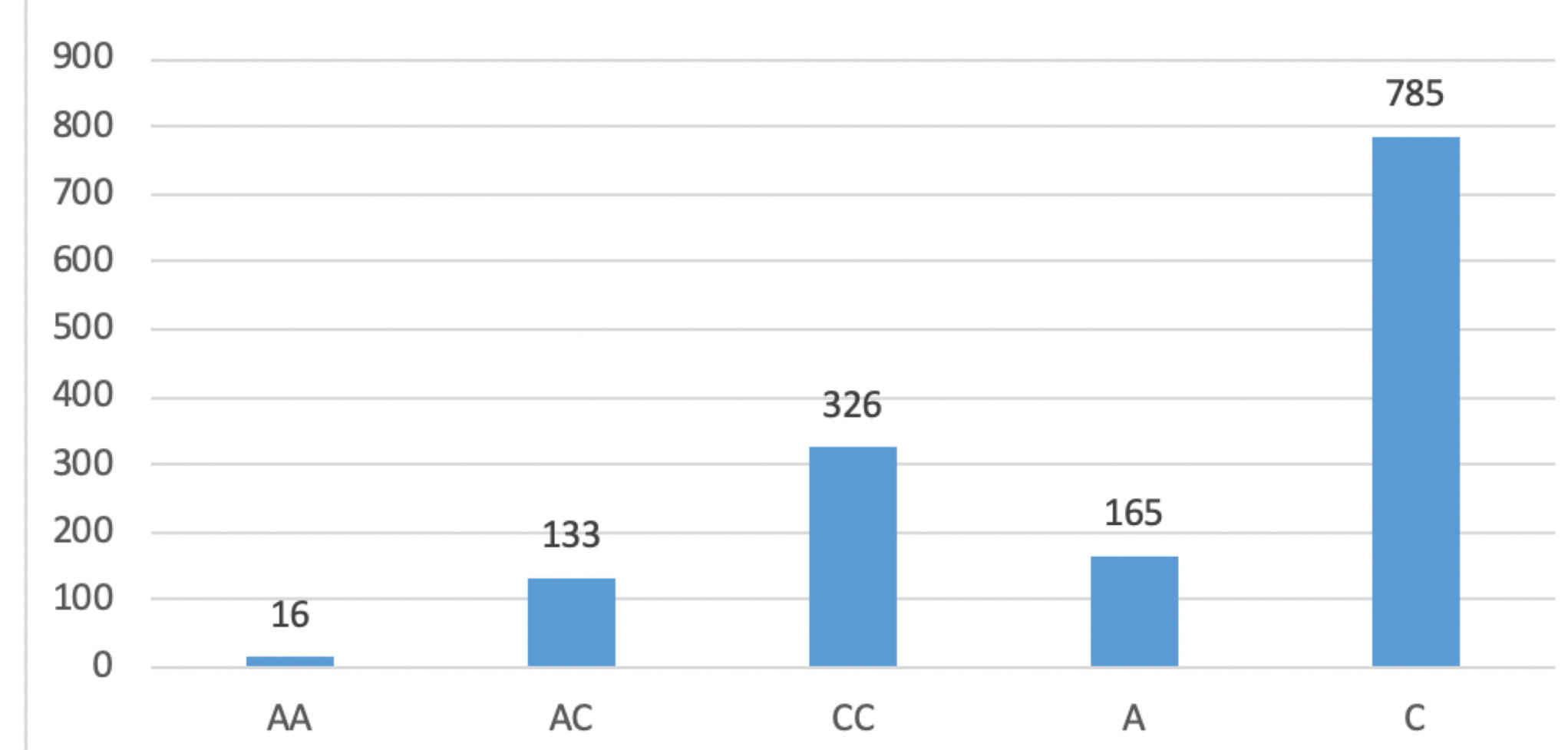
- The effect of SNP genotypes on milk production traits was assessed using ANOVA. Tukey pairwise comparisons were also performed on genotype effects.

Results

Histograms for phenotypic data



Allele and genotype frequencies for the studied SNPs in *DGAT1* gene in Romanian Spotted cattle



- The frequencies of the AA/AA, GC/AA, and GC/GC genotypes were 0.033, 0.280, and 0.687, respectively.
- The minor allele frequency (AA variant) was 0.173.

Conclusions

- The *DGAT1* A232K variant was significantly associated ($p < 0.05$) to MY in lactation L3, and with FP and PP in all three lactations. This study confirms that the previously reported associations between the two variants of *DGAT1* and milk production traits are also found in Romanian Spotted cattle.

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