

Leptin receptor (*LEPR*) gene is associated with reproductive seasonality in Rasa Aragonesa sheep breed

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Introduction

Leptin and its receptor are one of the most important hormonal signals involved in the control of energy homeostasis, feeding behaviour and reproductive function in mammals. However, research establishing a functional interaction between leptin and photoperiodism in seasonal breeders is limited.

Objective

Evaluate the association study between some polymorphisms detected in the exons 4 and 20 of the *LEPR* gene and three reproductive seasonality traits.

Material and Methods

Animals

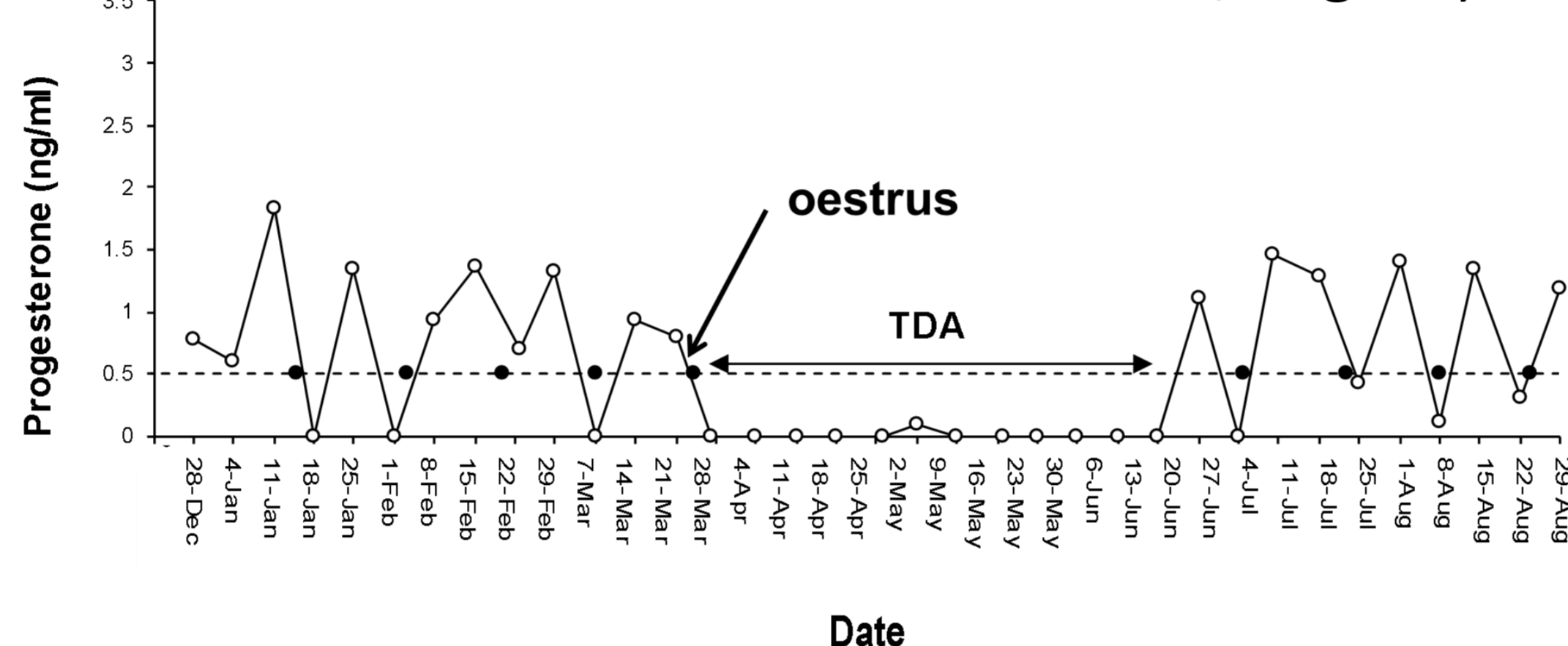


239 Rasa Aragonesa adult ewes

young (n=84; 1.9 y.) mature (n=155; 5.2-7.2 y.)

Traits

✓ **TDA** is the total days of anestrus (progesterone levels were under the threshold of 0,5 ng/ml).



✓ **P4CM** is the progesterone cycling months (based on progesterone determinations).

✓ **OCM** is the oestrus cycling months (based on daily oestrous records for each ewe).

Analysis

✓ **Sequencing to look for polymorphisms:** exón 4 (330 bp) and exón 20 (909 bp).

✓ **Genotyping by KASP technology:**

➤ exon 4: rs411478947.

➤ exon 20: rs412929474, rs428867159, rs405459906.

✓ **Haplotype (H) and SNP associations studies:**

Mixed procedure of SAS software:

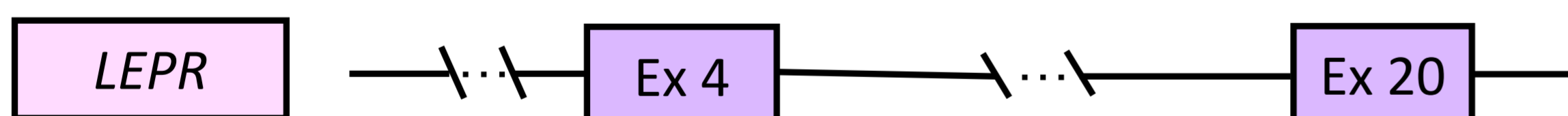
Trait= μ +Age+LW+BCS+SNP/H+ (SNP/H * age)

Conclusions

These results confirm for the first time the implication of *LEPR* gene in reproductive seasonality in ruminants. The SNPs found in this study could be in linkage disequilibrium with other SNP not detected in this study.

Results

Exon characterization and SNP association analysis results



✓ rs411478947 (Arg62Cys)
✓ rs159694506
✓ rs159694508.

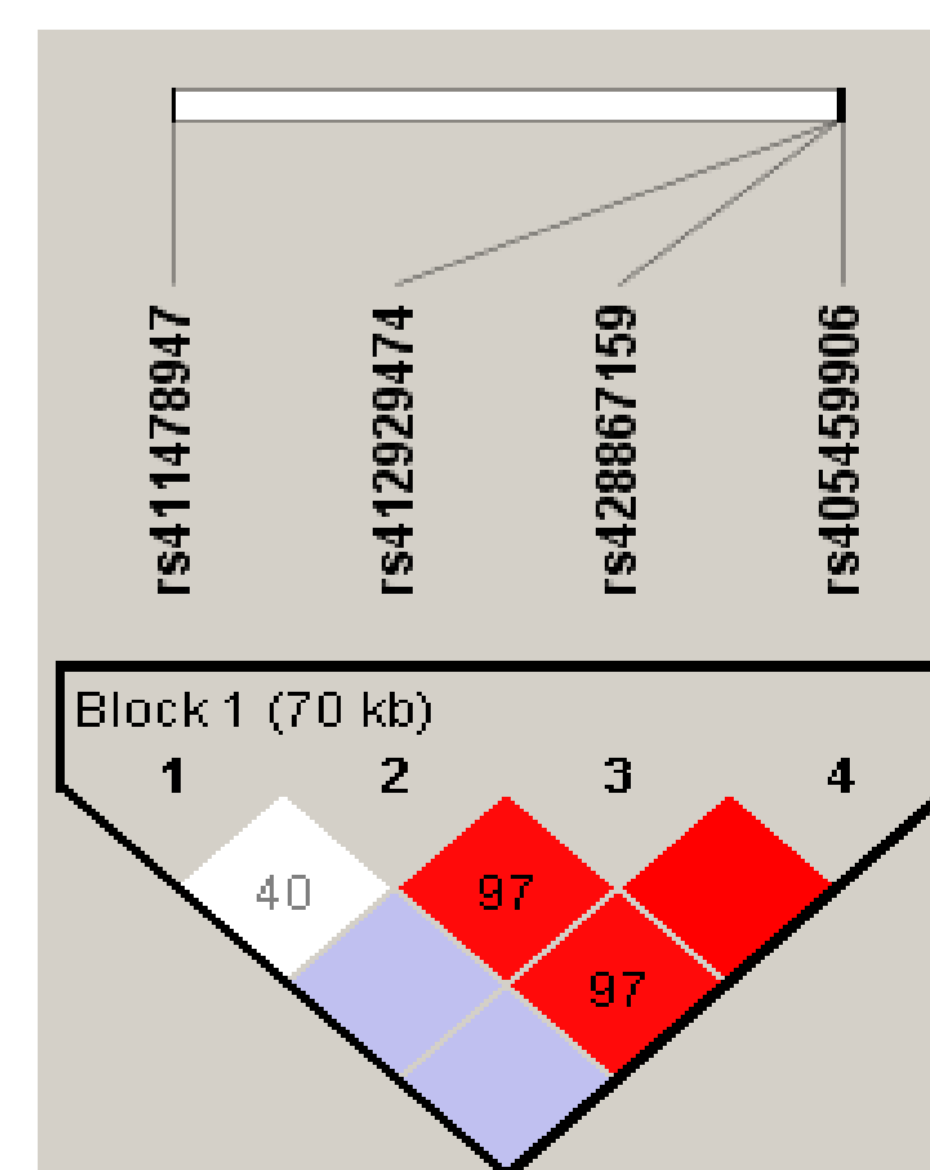
✓ rs403654953
✓ rs426037269
✓ rs415715948
✓ rs414501727
✓ rs427778198

✓ **rs412929474 (Val923Ile) ***
✓ rs428867159 (Pro1019Ser)
✓ rs405459906 (Lys1069Glu) *

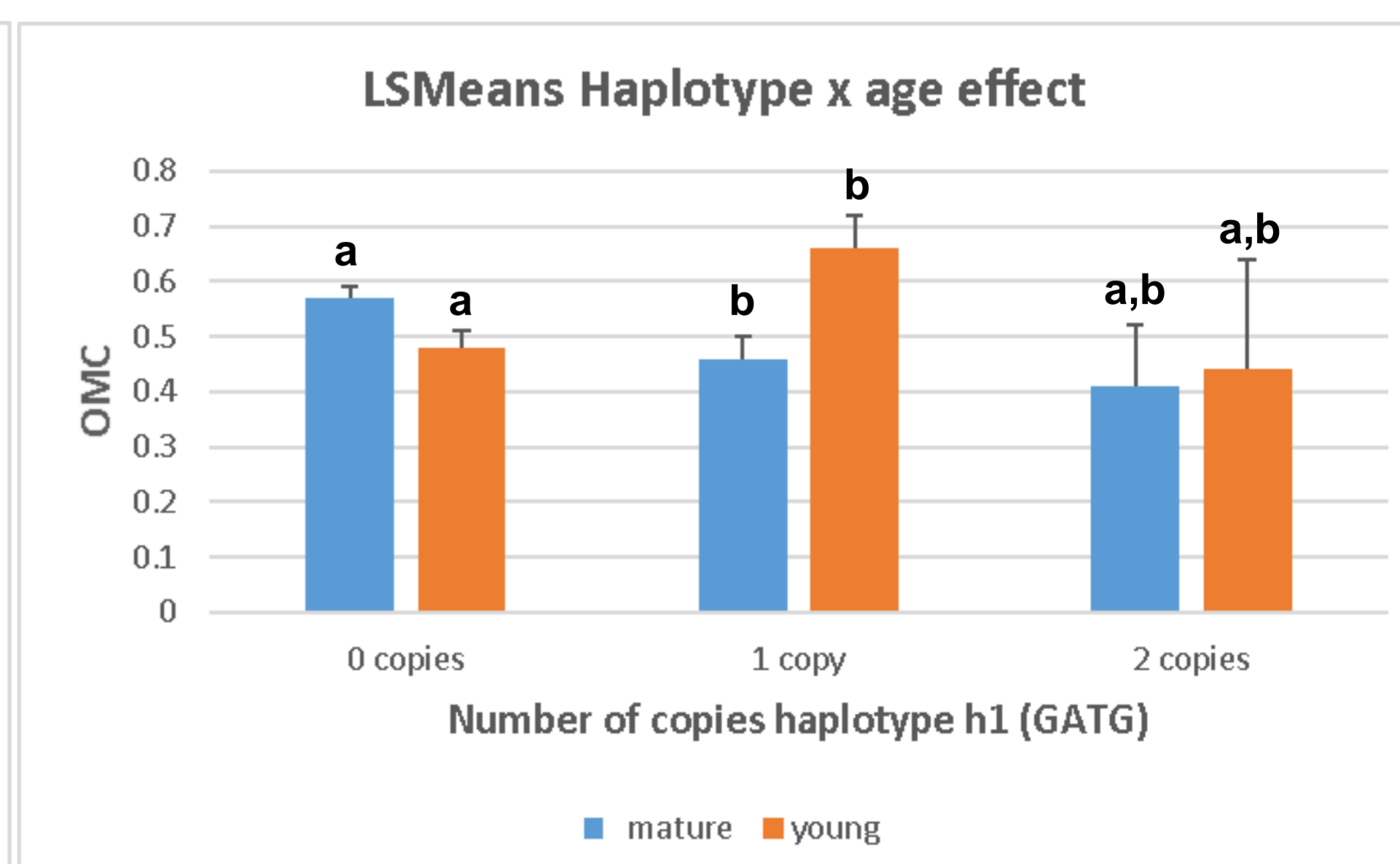
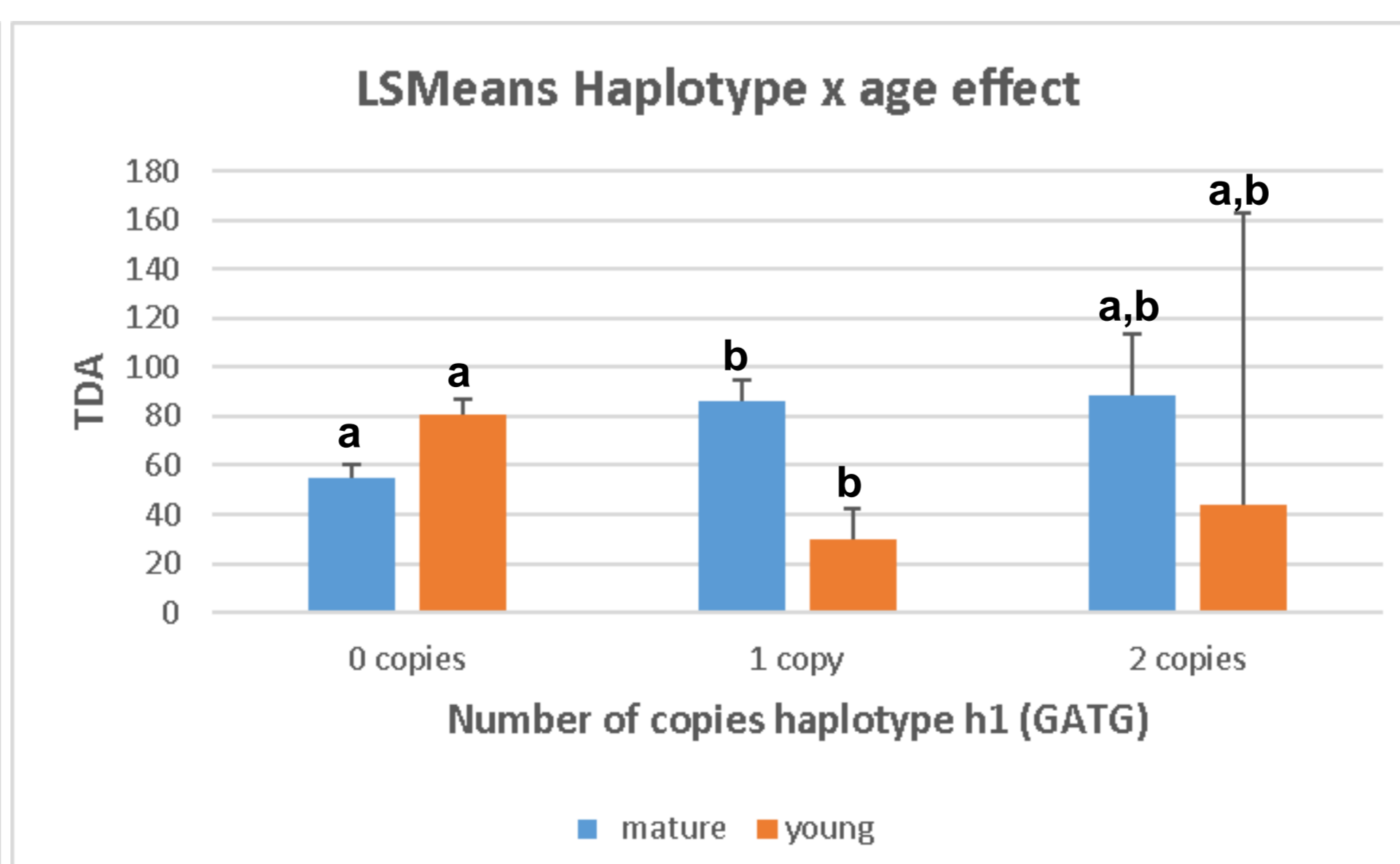
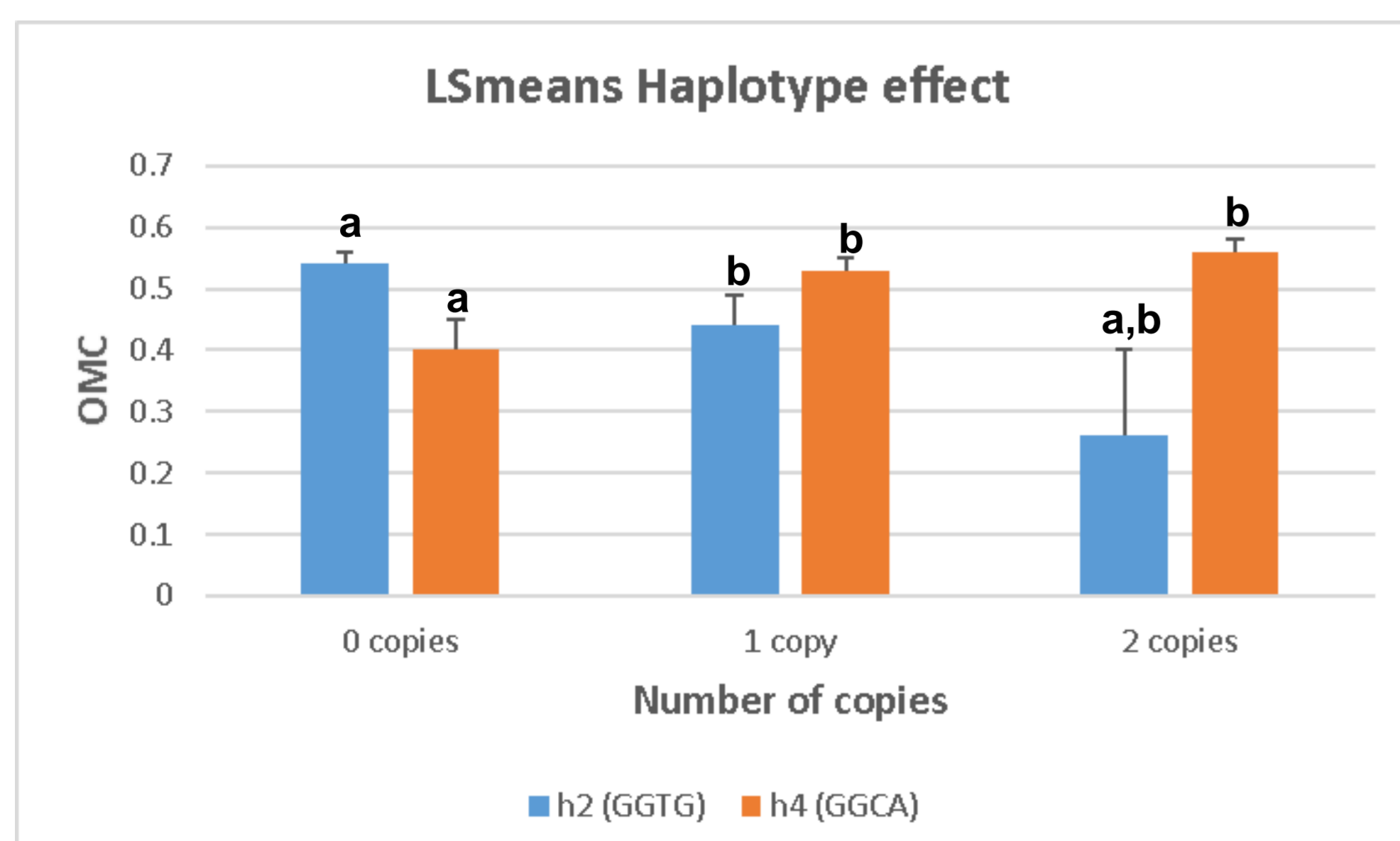
* Significant for SNPxAge

After Bonferroni correction, only the TDA phenotype differed among genotypes (P<0.05) at young ewes.

LD plot among the for non-conservative SNPs in *LEPR*



Haplotype association analysis results



Different letters indicate significant differences between number of copies within haplotype and age group at P<0.05 after Bonferroni correction.