



Whole Genome Association Study for Reproductive Seasonality Trait in the Rasa Aragonesa Sheep breed

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Many sheep breeds from Mediterranean area have seasonal breeding patterns due to reduction of reproductive activity, generally from February to August. However, in the Rasa Aragonesa breed around 20% of ewes show spontaneous ovulation in springtime. The present work focuses on the characterization of the phenotype "seasonal" vs. "cyclic" by recording progesterone levels in plasma and heat data, and on the presentation of some preliminary whole genome association studies to pinpoint candidate regions related to reproductive seasonality.





Fig.2

The representation of the Components Principal (C1,C2,C4) identifies clear within substructure the dataset and revels four principal clusters in the experimental flock.

Genotyping by the Illumina 50kb ovine BeadChip using 49289 SNPs in 141 samples. Analysis performed by PLINK v1.07



Fig.3

Representation of extreme values of the trait TDAC* superimposed over a IBS-similarity-matrix tree diagram (Ward's minimum variance clustering method, SAS v.9.1). Ewes expressing extreme values in (A) and (B) are presented in almost each cluster:

(A) highest values of TDAC* (days > 102 ± 3) (B) lowest values of TDAC* (days < 17 ± 3)



High significant effect (p < 0.00001; asymptotic) was found in two SNPs: s67952.1 (p = 3.01e-6;) and 14608581.1 (p = 7.38e-6) mapping on OAR3 and OAR23, respectively. Additionally, up to 15 markers were significant at p < 0.0001 level depending on different association tests accounting for cluster. Although they were scattered individually along the ovine genome in chromosomes 1, 2, 3, 4, 5, 8, 11, 12, 15, 16, 19, 22 and 23, we identified groups of genes associated with circadian rhythms, photoperiod and reproductive activity in mammal species (data not shown). Further studies must be undertaken in order to determine positional and functional candidate genes related to reproductive activity which could be in linkage equilibrium with significant markers in the Rasa Aragonesa sheep breed.

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