

## Application of single-step GBLUP in Italian Comisana sheep

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### INTRODUCTION

- **Comisana** is a dairy sheep breed reared in central and southern Italian regions used to produce PDO cheeses.
- **Since 2000 a nucleus flock** has been established at the breeders association experimental station aiming at improving both milk yield and composition using pedigree-based EBVs and fitting a lactation model
- Recently, within the national **CHEESR** project, ewes of the experimental station were genotyped (Illumina OvineSNP50 Beadchip) and a repeated test-day model was implemented using both pedigree-based (**TD-PBLUP**) or single-step genomic best linear unbiased prediction (**TD-ssGBLUP**)



### RESULTS AND DISCUSSION

Heritability ranged from 0.09 (fat content) to 0.33 (daily milk yield).

Trait	h <sup>2</sup>
Milk	0.33
Fat	0.09
Protein	0.12

The average accuracy of TD-PBLUP and TD-ssGBLUP EBVs for the validation group was 0.43 and 0.45 for milk yield, 0.48 for fat content and 0.62 for protein content.

		TD-PBLUP					
Type		Milk		Fat		Prot	
Genotype	Phenotype	Mean	SD	Mean	SD	Mean	SD
NO	NO	0.45	0.08	0.50	0.08	0.63	0.08
YES	NO	0.40	0.06	0.45	0.07	0.60	0.08

When considering only ewes with genotypes the average accuracy of TD-ssGBLUP was higher for milk yield (0.40 vs 0.45) and for protein content (0.61 vs 0.60), and identical for fat content (0.48).

		TD-ssBLUP					
Type		Milk		Fat		Prot	
Genotype	Phenotype	Mean	SD	Mean	SD	Mean	SD
NO	NO	0.45	0.08	0.50	0.08	0.63	0.08
YES	NO	0.45	0.06	0.45	0.07	0.61	0.08

### AIM

- ❖ The main objective of this study was to compare results from **TD-PBLUP** and **TD-ssGBLUP**

### MATERIAL AND METHODS

- Data consisted of daily milk production and weekly fat and protein contents for **1,138** Comisana sheep, 50K SNP genotypes for **309** animals and **2062** animals in the pedigree.
- A total of 169 individual – dam pairs were available.
- A multiple-trait repeatability test-day model was fitted including year of birth, month of calving, class of days in milk as fixed effects, and flock-test-date, permanent environmental and additive genetic as random effects.
- Phenotypes of **100** ewes (50 with genotypes) were masked to create a validation group

### CONCLUSIONS

- ✓ Results confirm the **usefulness of a single-step approach** but it depends on
  1. the trait and its heritability,
  2. the percentage of genotyped individuals and the population structure.
- ✓ The upcoming inclusion of ram genotypes is expected to increase the accuracy of the TD-ssGBLUP EBVs.

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