Smarter

SMAll RuminanTs breeding for Efficiency and Resilience

WP6

Practical Selection Tools to Benefit from International Cooperation

Low density SNP chip

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Task 6.1: Harmonisation of phenotypes, genotypes and pedigree to facilitate international evaluations

- Overview on selection programs and genetic/genomic evaluation (survey) – 19 countries x breeds
- 10 sharing agreements for pooling data signed → MS23
- File format for exchanging data (international ID, pedigree, phenotypes, genotypes) → D6.1
- Exchanged genomic data and completed research on allele frequency across country x breeds – 18 breeds, 5 countries → Panel SNP on SMARTER website

Focus (Donagh Berry)

- Recommendations/guidelines for recording novel traits → D6.3

Focus (J.M. Astruc)

Aim and objective

- The aim was to in silico develop a low density genotype panel for sheep that would be as informative as possible to a range of different breeds and populations represented in SMARTER
  - Identify the SNPs that are segregating across breeds* jurisdiction
  - Develop lower density panels 1000, 2000, 3000, 6000, 9000, 12000

High imputation accuracy from informative low-to-medium density single nucleotide polymorphism genotypes is achievable in sheep[1]

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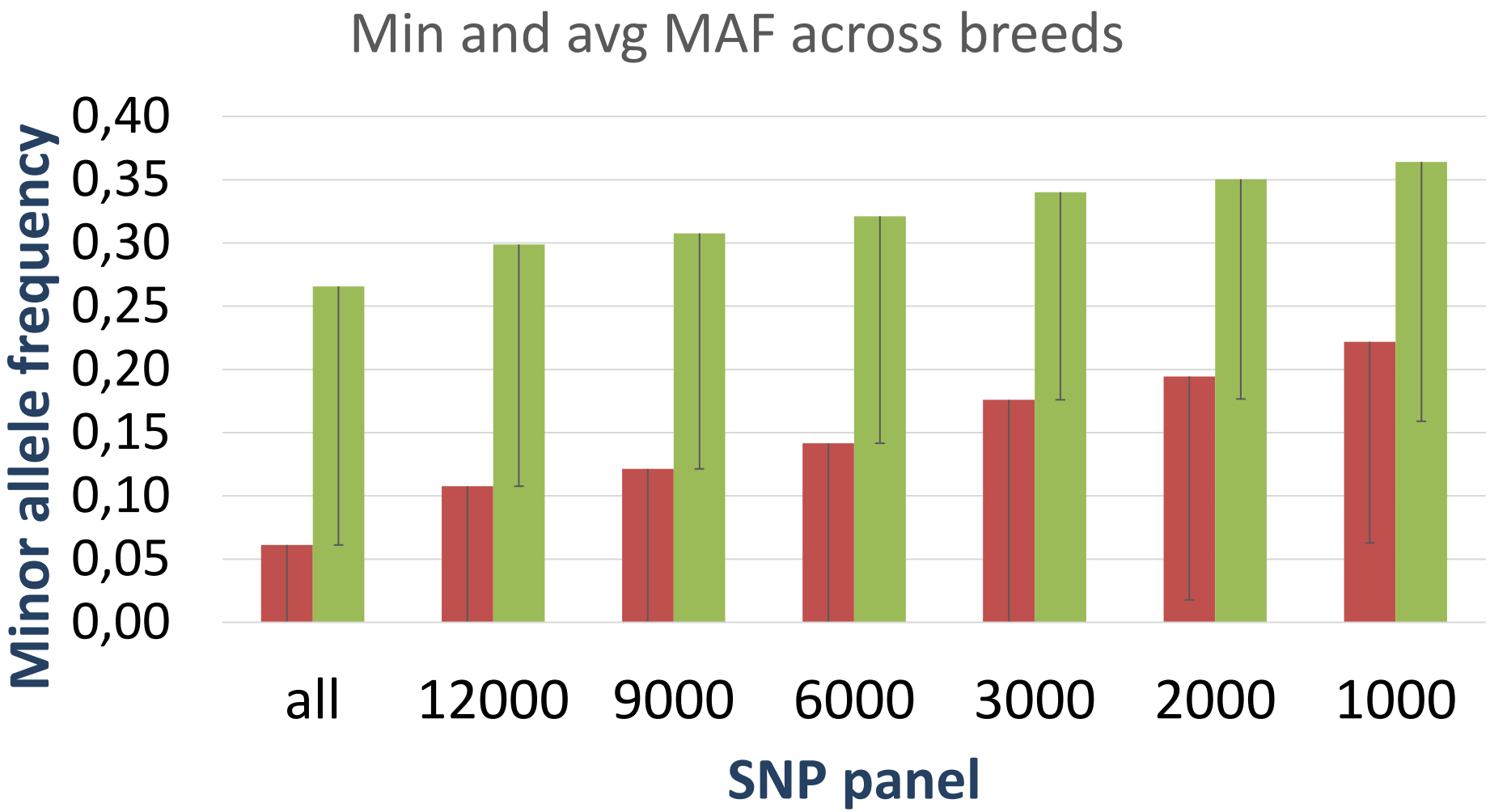
Data

- **Allele frequency per SNP**
- 5 meat sheep breeds from Ireland (44,040 SNPs)
  - Belclare, Charollais, Suffolk, Texel and Vendeen
- 2 meat sheep breeds from the UK (577,400 SNPs)
  - Scottish Blackface and Texel,
- 5 French dairy sheep breeds (48,059 SNPs)
  - Basco-Béarnaise, Black-faced Manech, Corse, Lacaune, and Red-faced Manech
- **38,883 SNPs in common**

Approach

- Average and minimum MAF per SNPs
- Genome broken into N blocks
- SNPs with greatest minimum MAF followed by greatest average MAF were chosen per block

Results


Min and avg MAF across breeds
Minor allele frequency
0,40
0,35
0,30
0,25
0,20
0,15
0,10
0,05
0,00
all
12000
9000
6000
3000
2000
1000
SNP panel
Average of min_MAF
Average of avg_MAF

Conclusions

– Common SNP panels are possible with SNPs segregating in most populations

SMARTER PARTNERS

Thank you for your attention

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