

Exploring the genetic basis of cattle grazing behaviour for the sustainable use of the Swiss Alps

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Aim

Breeding for site-adapted livestock better suited to graze mountainous grasslands. Therefore, identifying grazing genes associated with the use of steep and rugged grasslands is key.

Former research

The metabotropic glutamate receptor 5 gene (*GRM5*) was associated with grazing behaviours of New Zealand cattle.

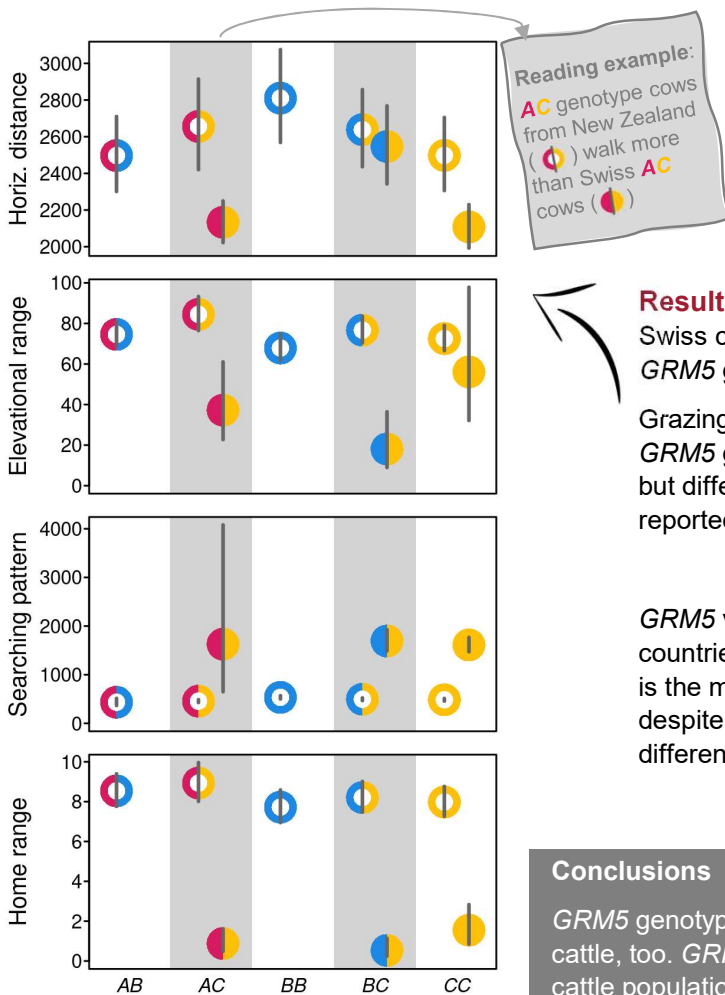
Materials and Methods

- GPS-tracked cows in New Zealand ($n = 306$ Hereford) and Switzerland ($n = 12$ Highland + 5 Original Brown) in steep and rugged grasslands
- PCR - Single-Stranded Conformation Polymorphism
- Mixed-model associations of grazing behaviours and *GRM5* genotypes



Questions

- Is *GRM5* associated with grazing behaviours (horizontal distance, elevation range, searching pattern, home range) of European cattle, too?
- Are *GRM5* variant frequencies similar in European and New Zealand cattle?



Results

Swiss cows present three of six potential *GRM5* genotypes: AC, BC and CC.

Grazing behaviours differ among *GRM5* genotypes in Swiss cows, but differences did not reflect those reported in the New Zealand cows.

GRM5 variant frequencies differ among countries. However, the *GRM5* variant C is the most common in both populations, despite geographic distance, breed differences and livestock systems.

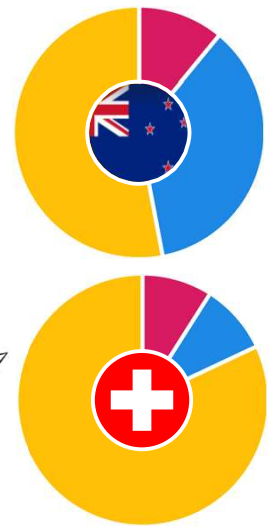


Figure: Differences in frequency of gene variants A, B, C between New Zealand and Swiss cattle

Conclusions

GRM5 genotypes may be associated with grazing behaviours of Swiss cattle, too. *GRM5* variant C is the most common in Swiss and New Zealand cattle populations, with differences in variant B.

This pilot study observed a very limited sample size, but highlights the potential for genetic selection of site-adapted cattle.

Figure: Grazing behaviours of ● Swiss and ○ New Zealand cows with *GRM5* variants A, B, C. Output of Linear mixed models; dots: marginal means, bars: SE