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Association between polymorphism g.276T>G in the *FTO* gene and fatness related traits in Krškopolje pig and hybrid 12

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FTO gene

- *FTO* (Fat Mass and obesity associated gen)
  - BMI
  - Obesity in human
- Regulating food intake and/or lipolytic activity in adipose tissue
- Association with intramuscular fat
- Fontanesi *et al.* (2009): g.276T>G in duroc
- Li-Fan *et al.* (2009): g.1191A>G in jinhua x pietrain

Objective

Study the effect of polymorphisms in *FTO* gene on

- fatness traits
- fatty acid composition

in Krškopolje pig (88) and ybrid 12 (12)

Materials

	Krškopolje pig	Hybrid 12
Females	17	12
Castrates	6	12

- The same conditions during experiment
- Traits:
  - carcass traits related to fatness
  - nutritional quality
    - *m. longissimus dorsi*
    - subcutaneous fat

Genetic analyses

- DNA isolated from ear tissue
- 3 pairs of PCR primers for 3 regions of *FTO*

  part of intron 3, exon 4 and part of intron 4 - 397 bp (PCR-RFLP)

  part of 3'-UTR – 456 bp (sequenced by ABI)

  part of 3'-UTR – 491 bp (sequenced by ABI)

  } no polymorphisms

- PCR fragment restricted with *Tai*I (Fermentas)

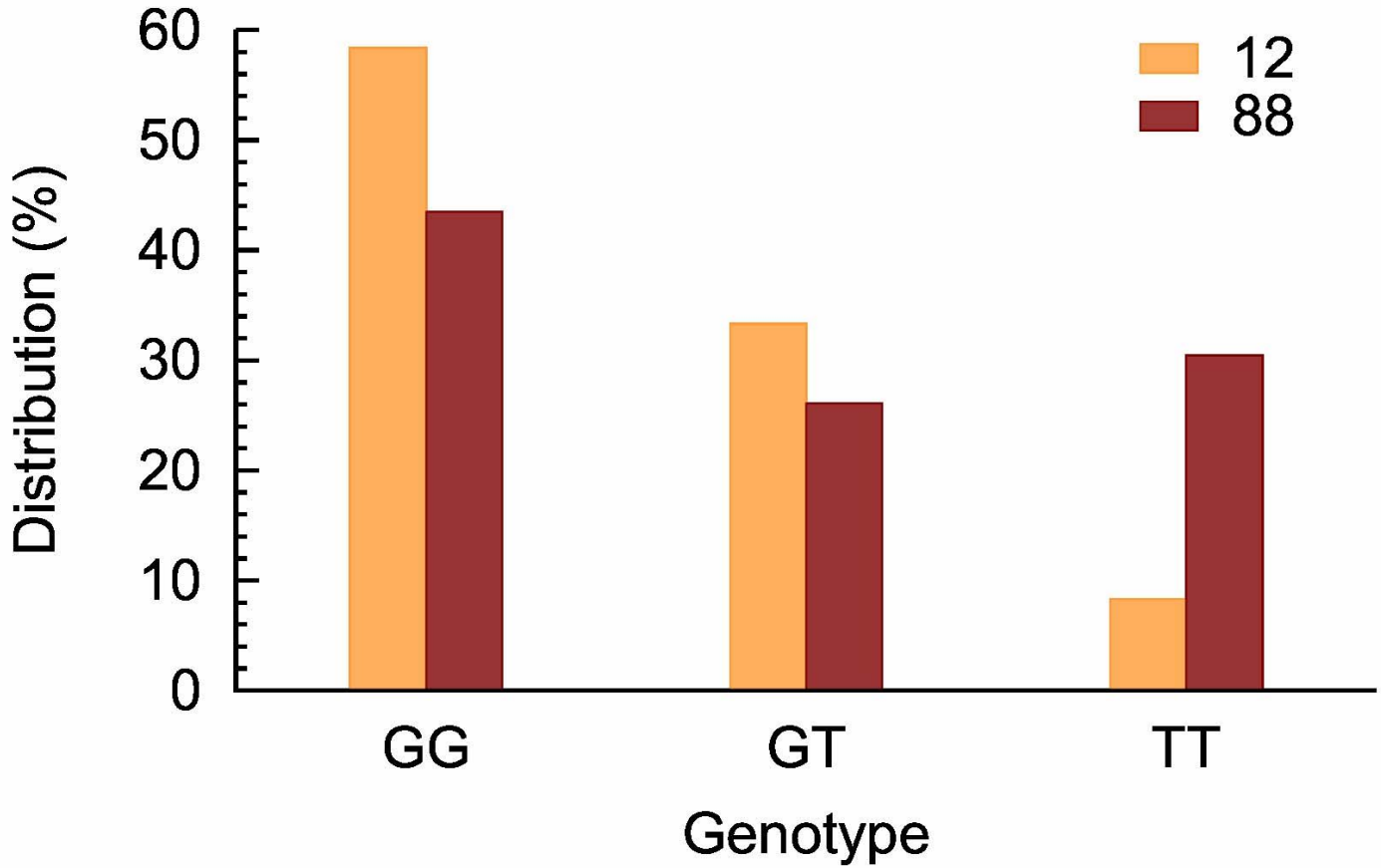
polymorphic site g.276T>G

Statistical analyses

Effect	**Fatness traits**	**Fatty acids & intramuscular fat**
Sex	✓	
FTO gene	✓	✓
Breed/hybrid	✓	✓
Interaction *FTO* x breed/hybrid	✓	✓
Carcass weight	✓	

Results

Genotype frequency for g.276T>G

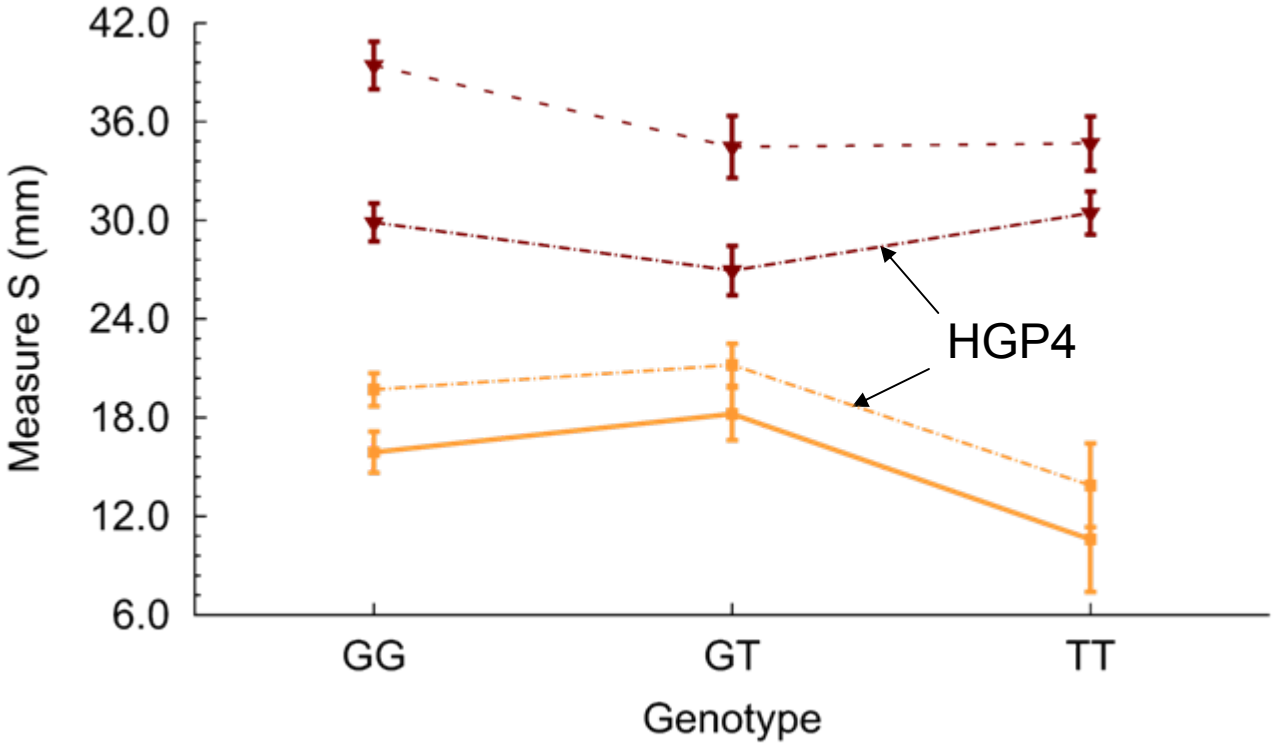


Effect of interaction of 276T>G and breed/hybrid on fatness

Trait (mm)	**p-value**
Measure S by DM5	**0.0456**
Measure S by HGP4	**0.0085**
Fat thickness on rump	
First	0.0990
Second	0.1079
Third	0.8100
Backfat	0.1176
Fat thickness on withers	0.1476

g.276T>G x breed/hybrid

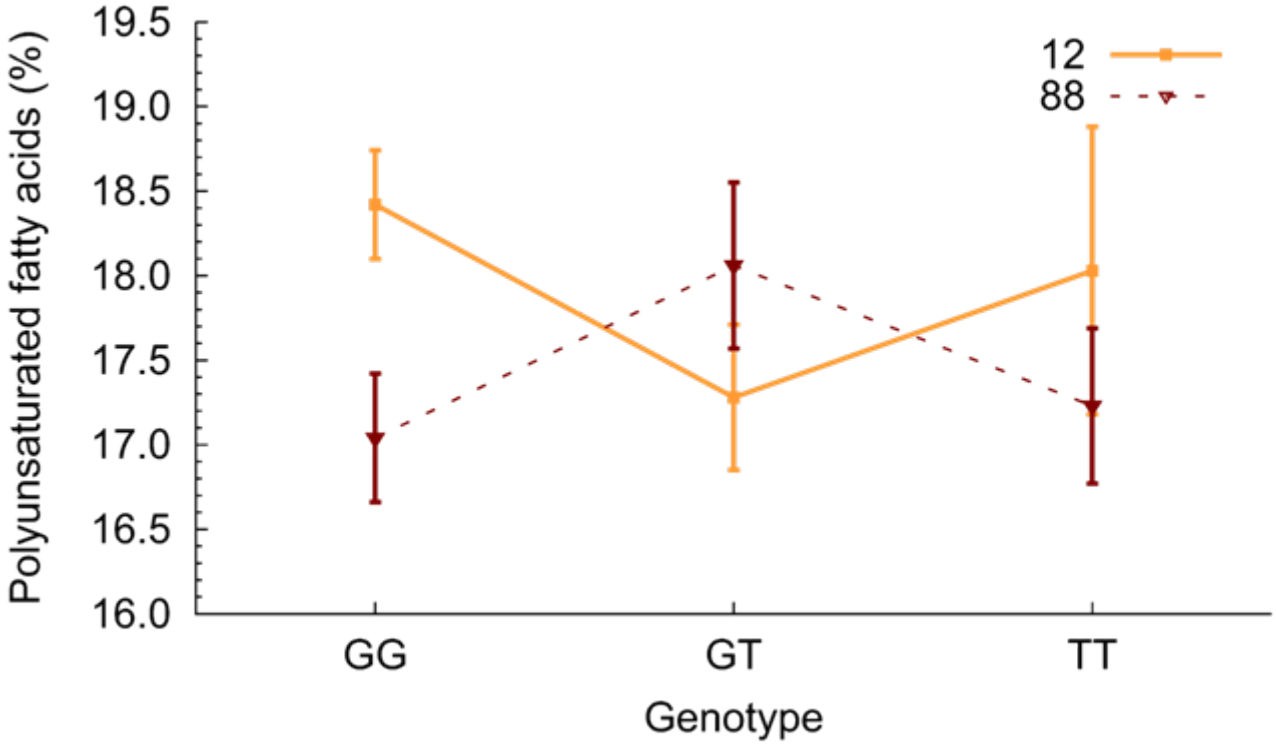
Fat thickness measured at carcass grading



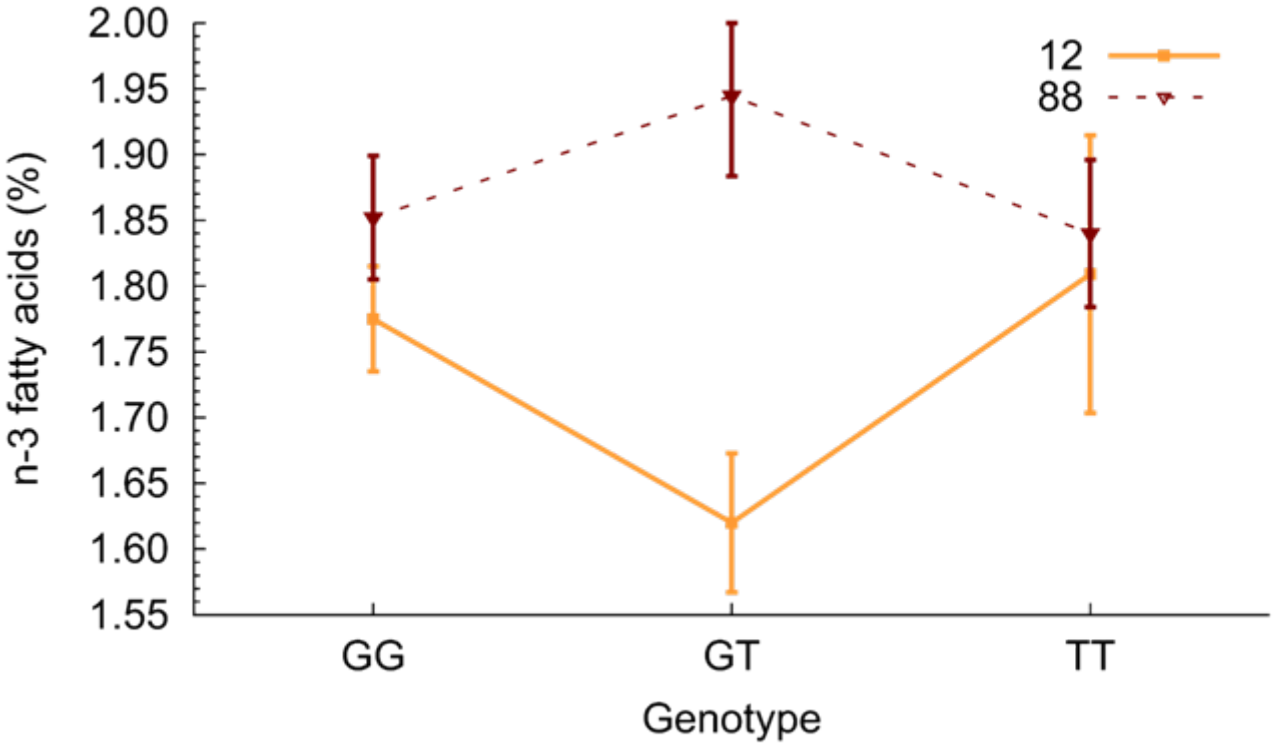
Interaction between g.276T>G and breed/hybrid on nutritional quality

Trait	IMF in *m. longissimus dorsi*	Subcutaneous fat
IMF (%)	0.1651	/
Fatty acids (%)		
Saturated	**0.0132**	0.9555
Monounsaturated	0.5384	**0.0394**
Polyunsaturated	0.1872	**0.0415**
n-3	0.4645	**0.0432**
n-6	0.1733	**0.0446**
n-6/n-3	**0.0428**	0.1686
PUFA/SFA	0.1179	0.2715
Atherogenic index	**0.0493**	0.9112

g.276T>G x breed/hybrid polyunsaturated FA



g.276T>G x breed/hybrid
n-3 FA



Conclusions

- Genotypes differed in fatness (fat thickness)
- No effect on IMF content
- Association between the g.276T>G in *FTO* gene and SFA, n-3/n-6 FA and aterogenic index in IMF confirmed
- Interaction g.276T>G x breed/hybrid existed for MUFA and PUFA in subcutaneous fat
- Due to different influence of genotypes in 88 and 12, g.276T>G might be used as a marker, linked to the locus with an effect on fatness and related traits.