Carcass and colostrum quality of Angus cattle with different Myostatine-Genotypes

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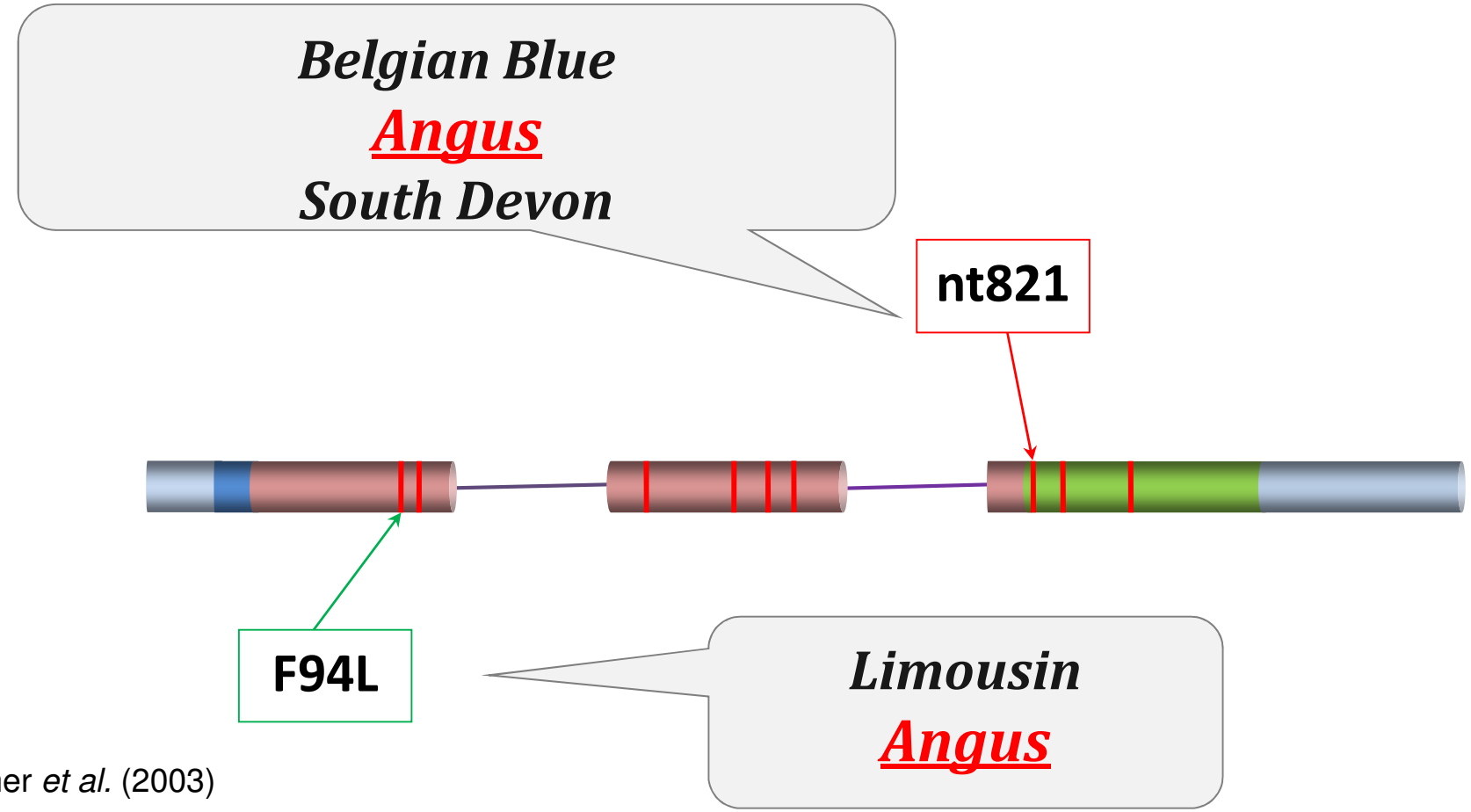
Objectives of the present study

Evaluate possible influences of different Myostatine-Genotypes with respect to:

- carcass yield and quality
- colostrum quality

in German Angus

Variants of mutations of the Myostatine-Gene



Dunner *et al.* (2003)

Impacts of Myostatine-Gene for fattening and slaughter

- CASAS *et al.* (2004):
  No difference between homozygous free and heterozygous animals in daily gain

- GILL *et al.* (2010) and ALLAIS *et al.* (2010) :
  Heterozygous animals were heavier at slaughter and had a better score for beefiness in the EUROP-System

Frequency (%) of the three Myostatine – Genotypes (nt821) of German Angus

	n	Double Muscling Genotype*		
		MH+/MH+	MH+/mh-	mh-/mh-
Cows	936	78.50%	21.40%	0.10%
Bulls	106	85.80%	14.20%	-

MH+/MH+ = homozygous free genotype; MH+/mh- = heterozygous genotype; mh-/mh- = homozygous double musling genotype

Eder *et al.* (2011)

Components of German Angus colostrum

Constituents of colostrum	Arithmetic mean (min – max)
Calcium (mg/kg)	9250 (4910 - 13900)
Magnesium (mg/kg)	1500 (967 - 2850)
Selen (mg/kg)	0.12 (0.01 – 0.20)

Eder *et al.* (2011)

Data Collection

Data collection colostrum

- September 2009
- 24 cows from one herd in Germany

Data collection carcass

- April 2010 until August 2010
- 77 young bulls from another herd in Germany

Genotyping of the Myostatine-Gene

- SNP – Genotyping (Eurofins Medigenomix GmbH®)

Statistical model „Carcass“

$$Y_{ijklm} = \mu + D_i + S_j + H_k + b\,(M_{ijk} - \overline{M}) + e_{ijklm}$$

Y = observation

μ = sample mean

D = fixed effect (double muscling gene)

S = fixed effect (slaughter period)

H = fixed effect (breeding farm)

$b\,(M_{ijk} - \overline{M})$ = *linear* covariate (feeding period)

e = residual random error

Statistical model „Colostrum“

$$Y_{ijkl} = \mu + D_i + L_j + C_k + b\,(E_{ijk} - \overline{E}) + e_{ijkl}$$

Y = observation

μ = sample mean

D = fixed effect (double muscling gene)

L = fixed effect (number of lactation)

C = fixed effect (body condition score)

$b\,(E_{ijk} - \overline{E})$ = linear covariate (sampling time)

e = residual random error

LSMeans (SE as Index) for colostrum constituents of genotypes

Traits	Myostatine-Genotypes	
	homozygous free (n=13)	heterozygous (n=11)
Calcium [mg/kg]	**8662** $_{552}$	**10139** $_{655}$
Magnesium [mg/kg]	**1341** $_{78}^{a}$	**1730** $_{92}^{b}$

a,b significant differences ($p \leq 0.05$)

LSMeans (SE as Index) for carcass traits of genotypes

Traits	Myostatine-Genotypes	
	homozygous free (n=61)	heterozygous (n=16)
Weight at slaughter [kg]	**680.8** $_{4.1}^{a}$	**694.3** $_{6.3}^{b}$
Carcass weight [kg]	**382.2** $_{3.8}^{a}$	**410.8** $_{5.9}^{b}$
Dressing percentage [%]	**56.1** $_{0.4}^{a}$	**59.2** $_{0.6}^{b}$

a,b significant differences ($p \leq 0.05$)

Myostatine-Gene in German Angus Cattle, nt821(del11)

Conclusions

- About 20 % of the German Angus herdbook cows have the heterozygous myostatine-genotype
- Heterozygous cows…
  - …show an increased Magnesium content in the colostrum
- Heterozygous young bulls …
  - … are heavier at slaughter
  - … have an increased carcass weight
  - … show an increased dressing percentage

BVN

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Thank You

RMV

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ANGUS

MASTERRIND RINDERZUCHT UND VERMARKTUNG