

# Fine mapping of production and meat quality QTL in Large White pigs using the *PorcineSNP60* Beadchip

S32 - 25

M.P. SANCHEZ\*<sup>1</sup>, T. TRIBOUT<sup>1</sup>, N. IANNUCELLI<sup>2</sup>, M. BOUFFAUD<sup>3</sup>, B. SERVIN<sup>2</sup>, P. DEHAIS<sup>2</sup>, N. MULLER<sup>3</sup>, M.J. MERCAT<sup>4</sup>, J. ESTELLE<sup>1</sup>, J.P. BIDANEL<sup>1</sup>, C. ROGEL-GAILLARD<sup>1</sup>, D. MILAN<sup>2</sup>, H. GILBERT<sup>2</sup>  
<sup>1</sup>INRA & AgroParisTech, UMR1313 GABI, 78350 Jouy-en-Josas; <sup>2</sup>INRA, UMR444 LGC, 31326 Castanet-Tolosan; <sup>3</sup>INRA, UE450 TP, 35651 Le Rheu; <sup>4</sup>IFIP, 35651 Le Rheu; France. \*marie-pierre.sanchez@jouy.inra.fr

M  
A  
T  
E  
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S

**GWAS** in a French Large White (FLW) population

using the Illumina *PorcineSNP60* Beadchip



Localise **QTL** segregating in the selection populations

Identify **haplotypes** associated with major effects

**Animals** - 389 FLW castrated males from 106 boars tested in Le Rheu test station

**22 traits** – growth rate, feed intake and feed efficiency (4), carcass composition(12) and meat quality (6)

**Genotyping** - 44,412 SNP retained after quality control

**Genome Wide Association Analyses (GWAA)** - FASTA method

**Haplotype Analyses** - Haploview & mixed model with multiple reg.

O  
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J  
E  
C  
T  
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V  
E  
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G  
W  
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R  
E  
S  
U  
L  
T  
S

99 significant results ( $P < 10^{-4}$ )  
(4 expected false positives)

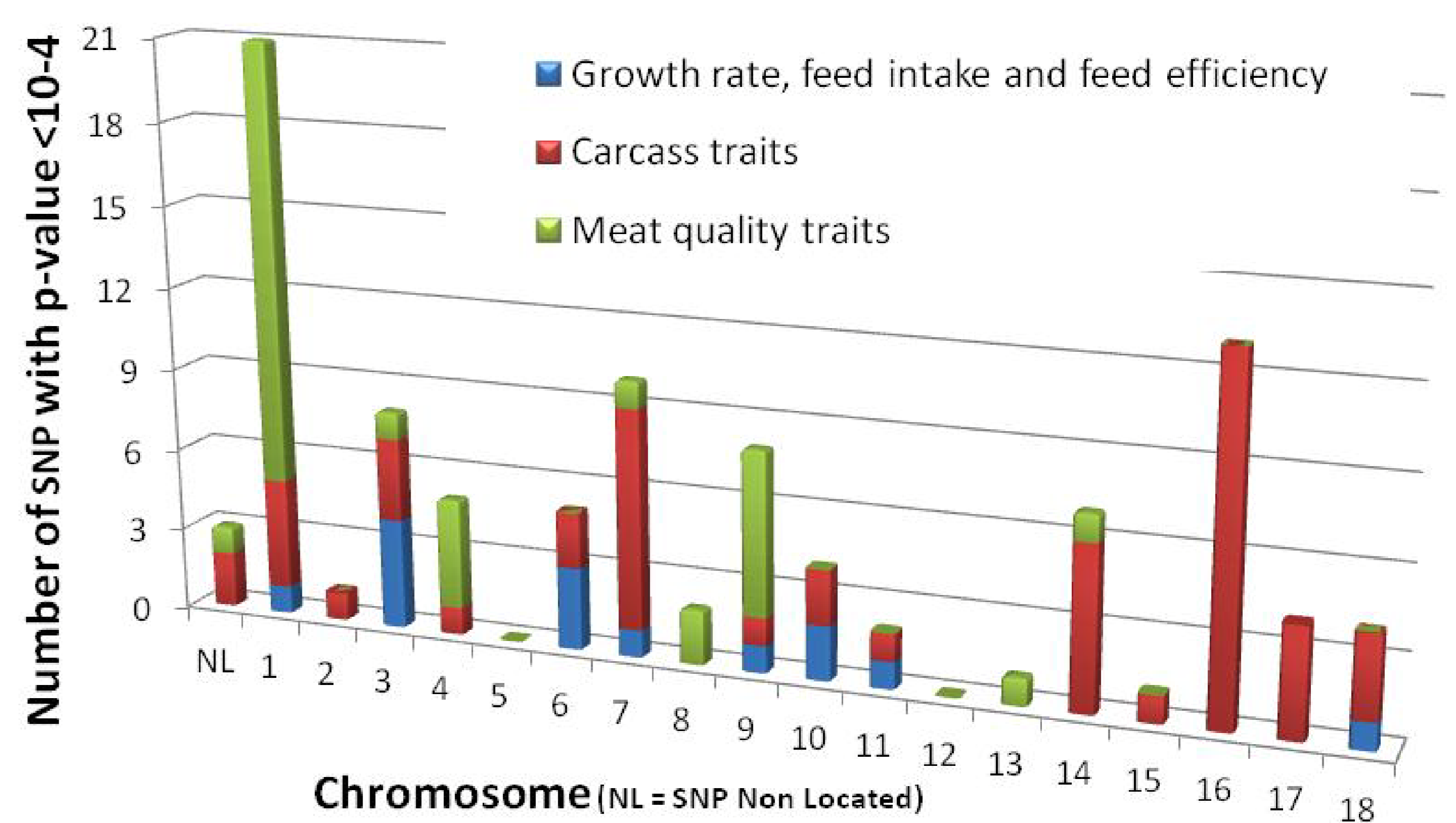


**19 regions** with at least 2 SNP with significant effect

**3** for growth rate, feed intake and feed efficiency

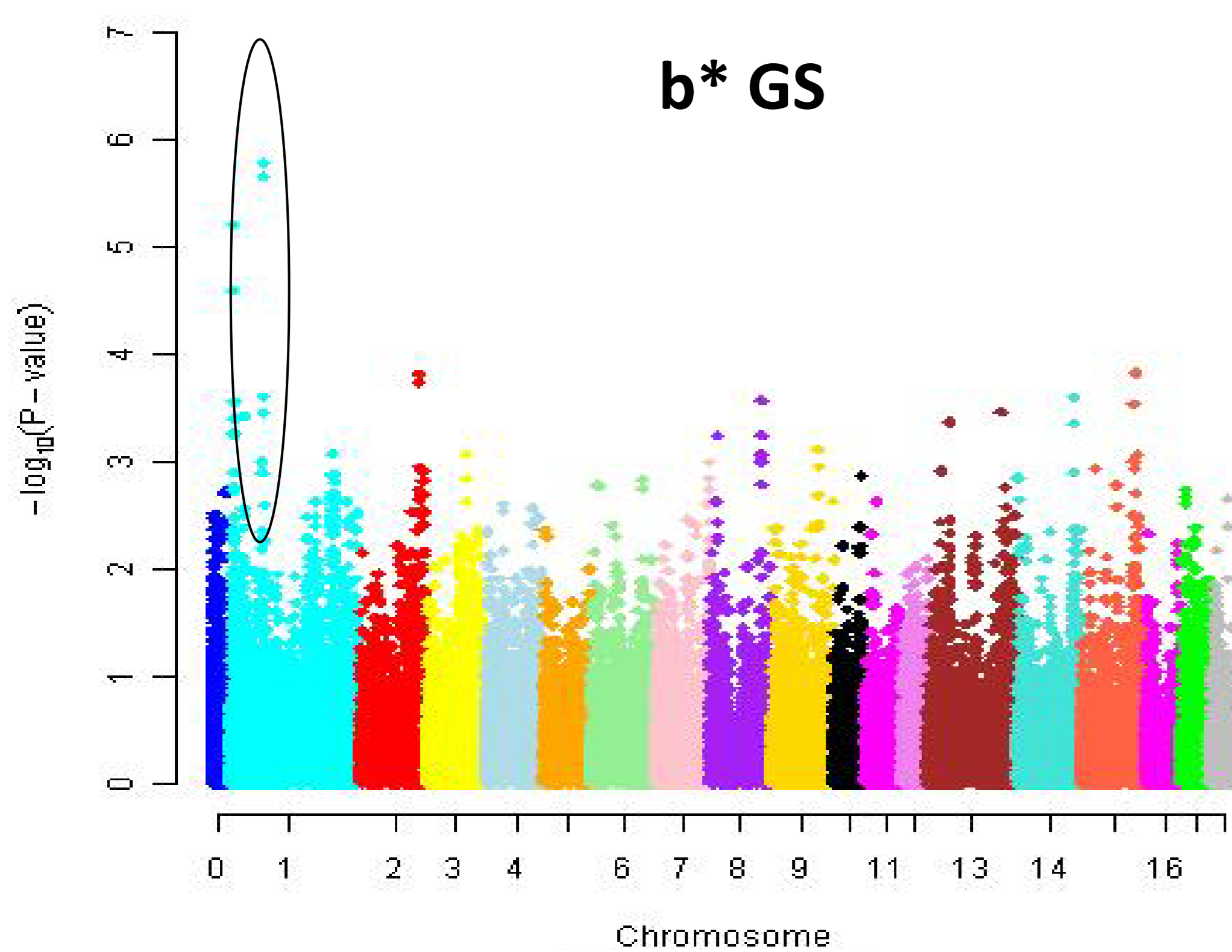
**11** for carcass traits

**5** for meat quality traits



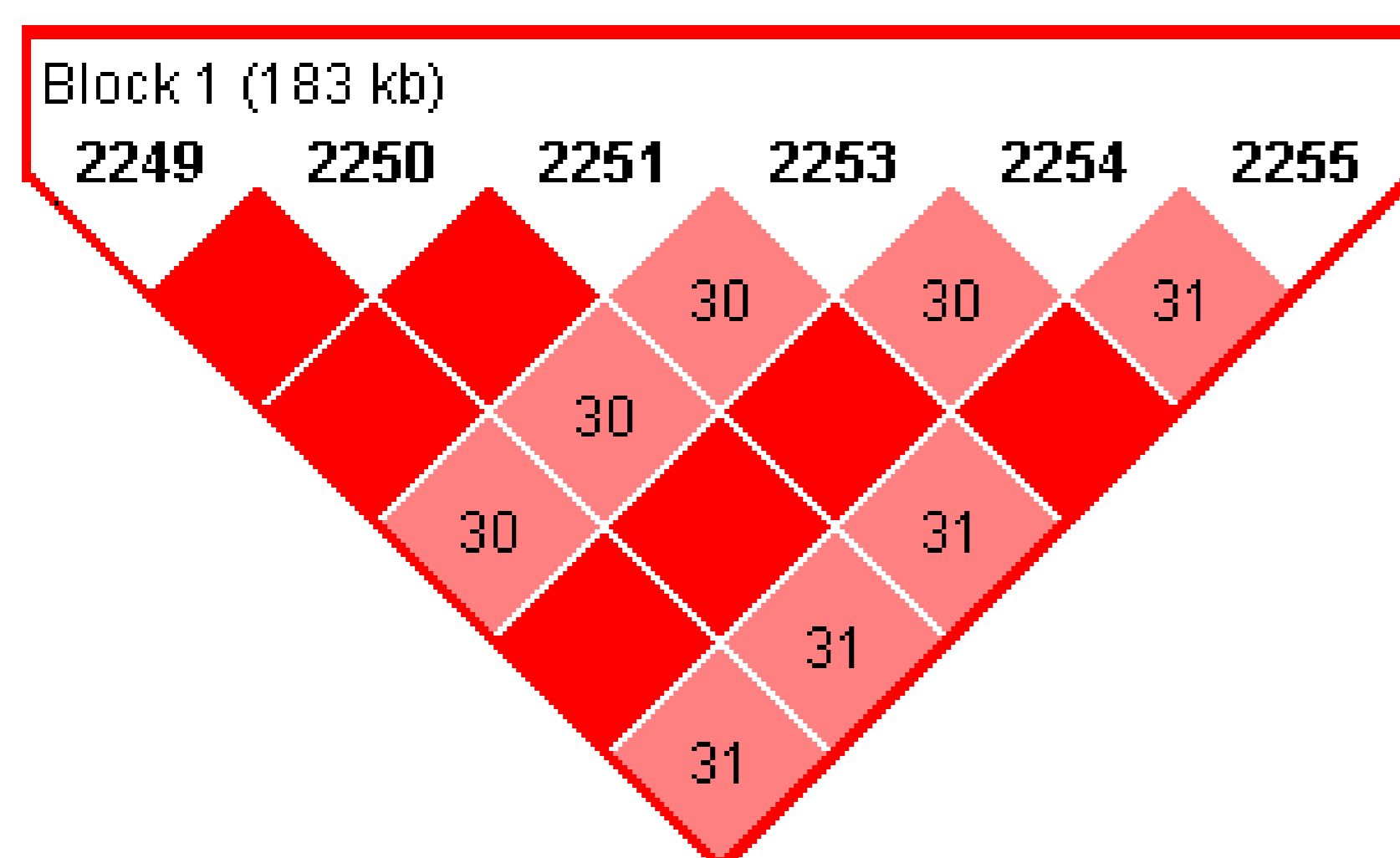
## One region of special interest found on chromosome 1 for meat quality traits

H  
A  
P  
L  
O  
T  
Y  
P  
E  
R  
E  
S  
U  
L  
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### Chromosome 1

6 SNP haplotypic block of 183 kb



**Effects on meat quality**  
& no effect on growth rate, feed intake, feed efficiency and carcass composition

Trait <sup>§</sup>	Standard deviation (SD)	p-value	Haplotypic effects in proportion of SD		
			ACTCTA	ACTTTC	GTCTCC
pH24 SM	0.15	<b>0.0007</b>	0.16 <sup>a</sup>	0.03 <sup>a</sup>	-0.19 <sup>b</sup>
L*GS	3.5	<b>&lt; 0.0001</b>	-0.16 <sup>a</sup>	-0.14 <sup>a</sup>	0.30 <sup>b</sup>
a*GS	1.5	0.03	-0.13 <sup>a</sup>	0.042 <sup>ab</sup>	0.091 <sup>b</sup>
b*GS	1.4	<b>&lt; 0.0001</b>	-0.18 <sup>a</sup>	-0.13 <sup>a</sup>	0.31 <sup>b</sup>
WHC (s)	59.6	0.01	0.14 <sup>a</sup>	-0.13 <sup>b</sup>	-0.016 <sup>ab</sup>
MQI (%)	2.5	<b>&lt; 0.0001</b>	0.20 <sup>a</sup>	0.034 <sup>a</sup>	-0.23 <sup>b</sup>

<sup>§</sup> Semi Membranosus (SM) and Gluteus Superficialis (GS) muscles; Water Holding Capacity (WHC) of GS; Meat Quality Index (MQI); for a given trait, effects with different superscripts (<sup>a</sup> or <sup>b</sup>) differed significantly

2249  
2250  
2251  
2253  
2254  
2255

**ACTCTA** freq 57%, favourable  
**ACTTTC** freq 24%, intermediate  
**GTCTCC** freq 19%, unfavourable

C  
O  
N  
C  
L  
U  
S  
I  
O  
N

Numerous SNP associated with production traits despite the limited number of tested pigs:

- ➔ **Confirm regions** detected in crossbred populations
- ➔ **Evidence new** regions for production and meat quality traits



**6 SNP haplotype affecting meat quality traits only** to be further explored for use in selective breeding

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