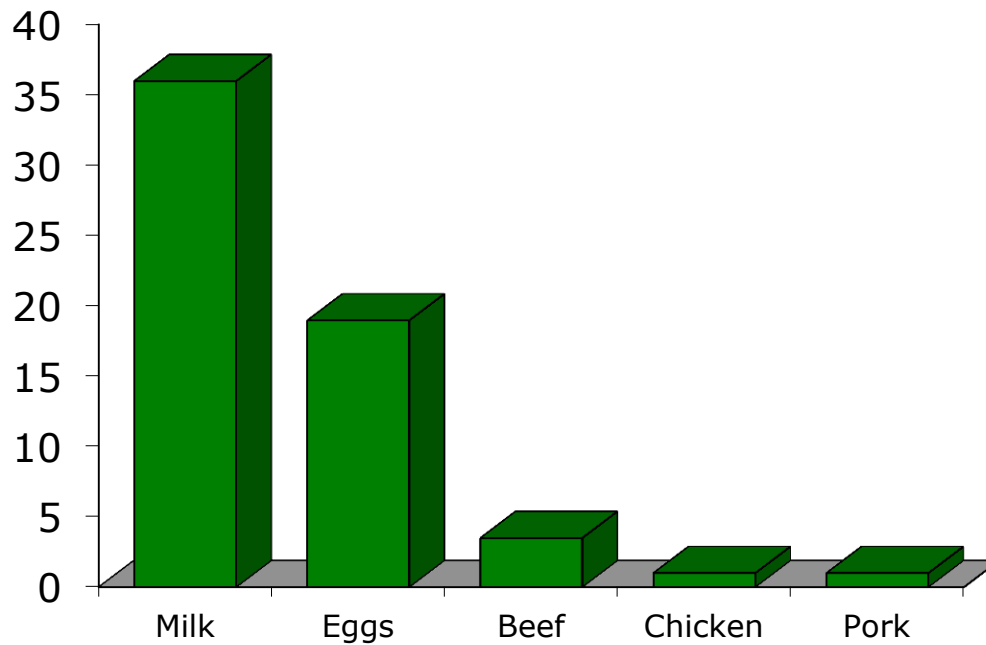

FREE-RANGE GROWING PIGS - EFFECT OF FEEDING STRATEGY AND GENOTYPE ON ANIMAL BEHAVIOUR, PERFORMANCE AND MEAT QUALITY

ANNE GRETE KONGSTED, MARGRETHE THERKILDSEN AND JOHN E HERMANSEN



LOW MARKET SHARE OF ORGANIC PORK, %



NEED TO IMPROVE THE QUALITY IN A BROAD SENSE

- › Eating quality
- › Animal health and welfare
- › Integrity of the animal
- › Environmental and climatic footprints



WAYS TO IMPROVE THE IMMATERIAL QUALITY

- › Growing-finishing pigs free-range
- › Use of alternative breeds
- › Low use of concentrate



HYPOTHESES

- › Restricted feeding with concentrate
 - › will motivate the pigs to forage in the range and this
 - › will improve feed conversion ratio (of the concentrate)
 - › will eliminate the need for adding vitamin- and mineral mixture
- › Alternative/traditional genotypes
 - › are more motivated to forage in the range
 - › have improved/different eating qualities



'SUMMER' PROJECT

Genotype x feeding strategy



Meat quality



Behaviour



Performance



MODERN VS. TRADITIONAL CROSS-BREED

DYL: Duroc x [Yorkshire x Landrace]

TYL: Tamworth x [Yorkshire x Landrace]



FEEDING STRATEGY

HIGH Concentrate according to Danish indoor recommendations + 10-15 %

LOW+ Restricted feeding with concentrate (80 % -> 60 % of recommendations) and *with* supplementing vitamins and minerals

LOW÷ Restricted feeding with concentrate (80 % -> 60 % of recommendations) and *without* supplementing vitamins and minerals



EXPERIMENTAL PADDOCKS



Eighteen paddocks (2 x 3 x 3) of 1.600 m²

CROPS: GRASS CLOVER W HERBS AND LATER CHICORY



TIME TABLE

Week:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Crop:	Grass clover with herbs										Chicory						
Behaviour:								x	x	x	x	x	x				
Weight:	x			x			x			x			x				
Blood:			x			x				x			x				
Slaughter:														x			x

Performance, robustness, mineral- and vitamin status

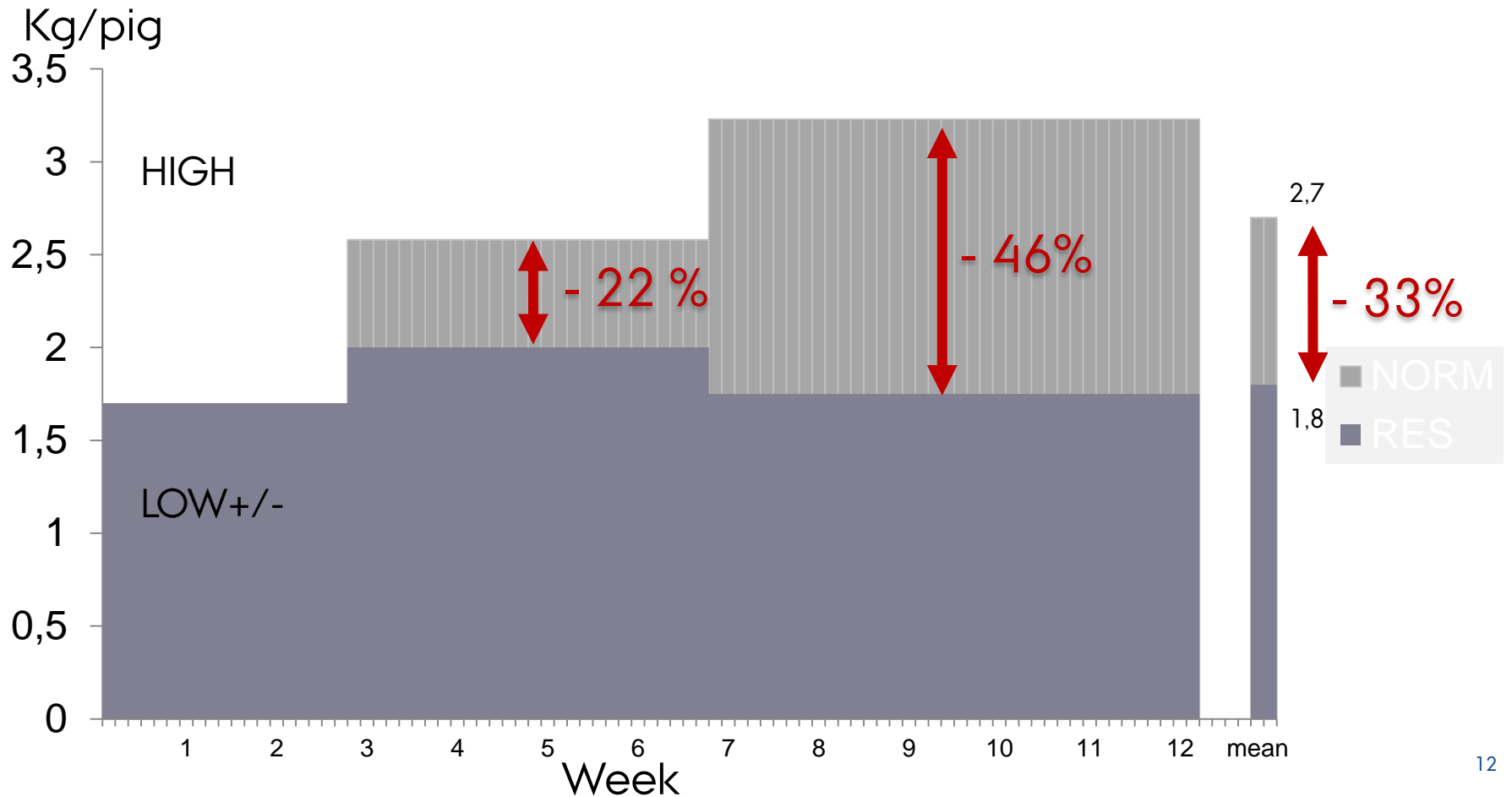
Behaviour

↑
HIGH
n=24

↑
LOW
n=48

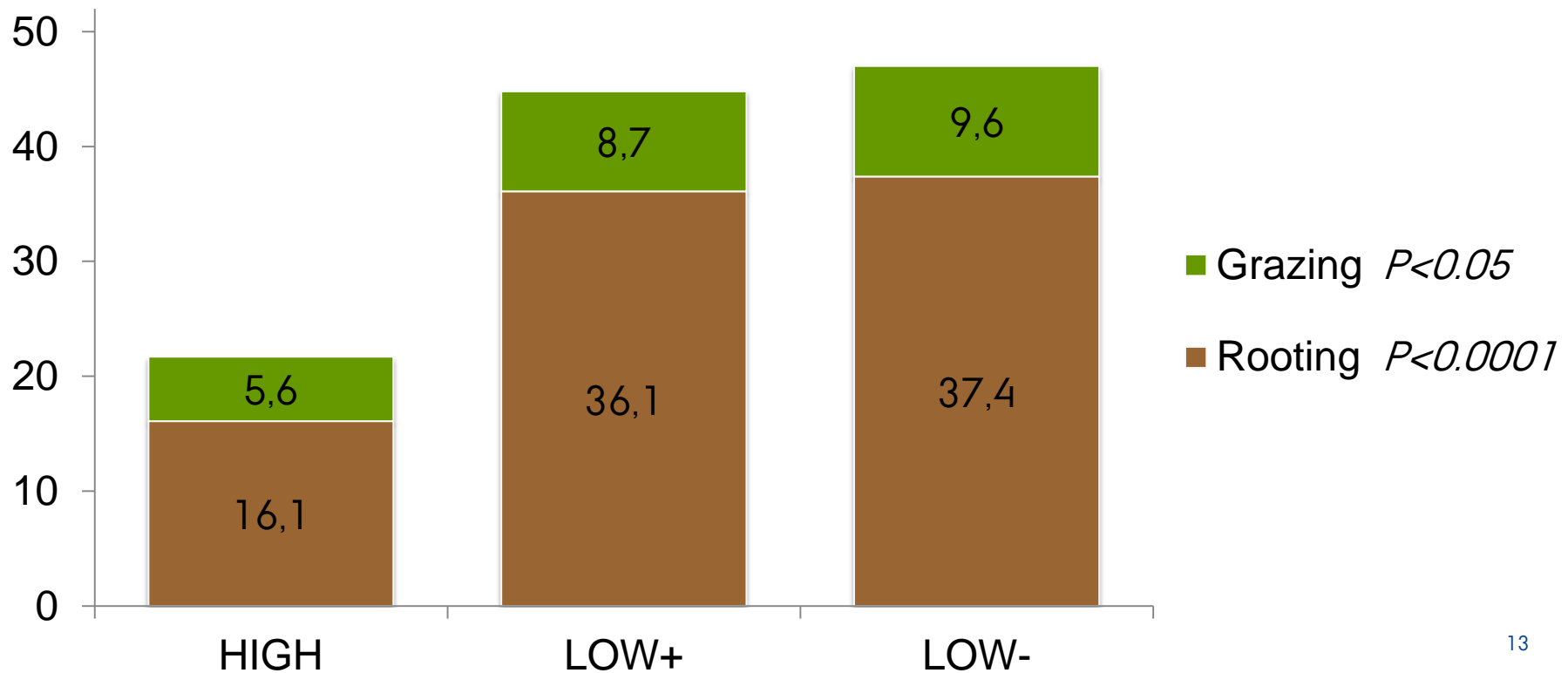
Meat quality

RESULTS - DAILY INTAKE OF CONCENTRATE



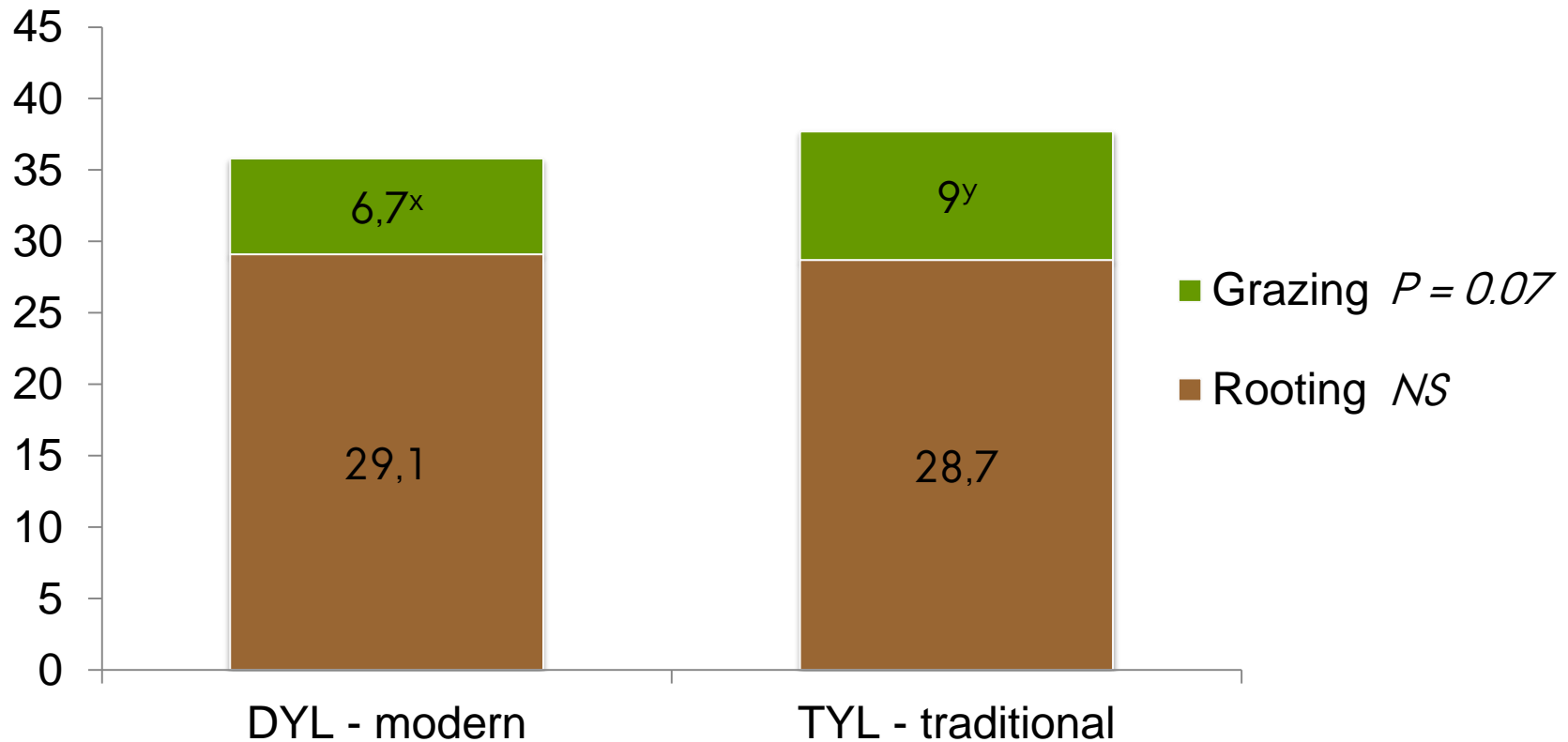
FORAGING BEHAVIOUR – EFFECT OF FEEDING STRATEGY

% of all observations



FORAGING BEHAVIOUR – EFFECT OF GENOTYPE

% of all observations





05.09.2012

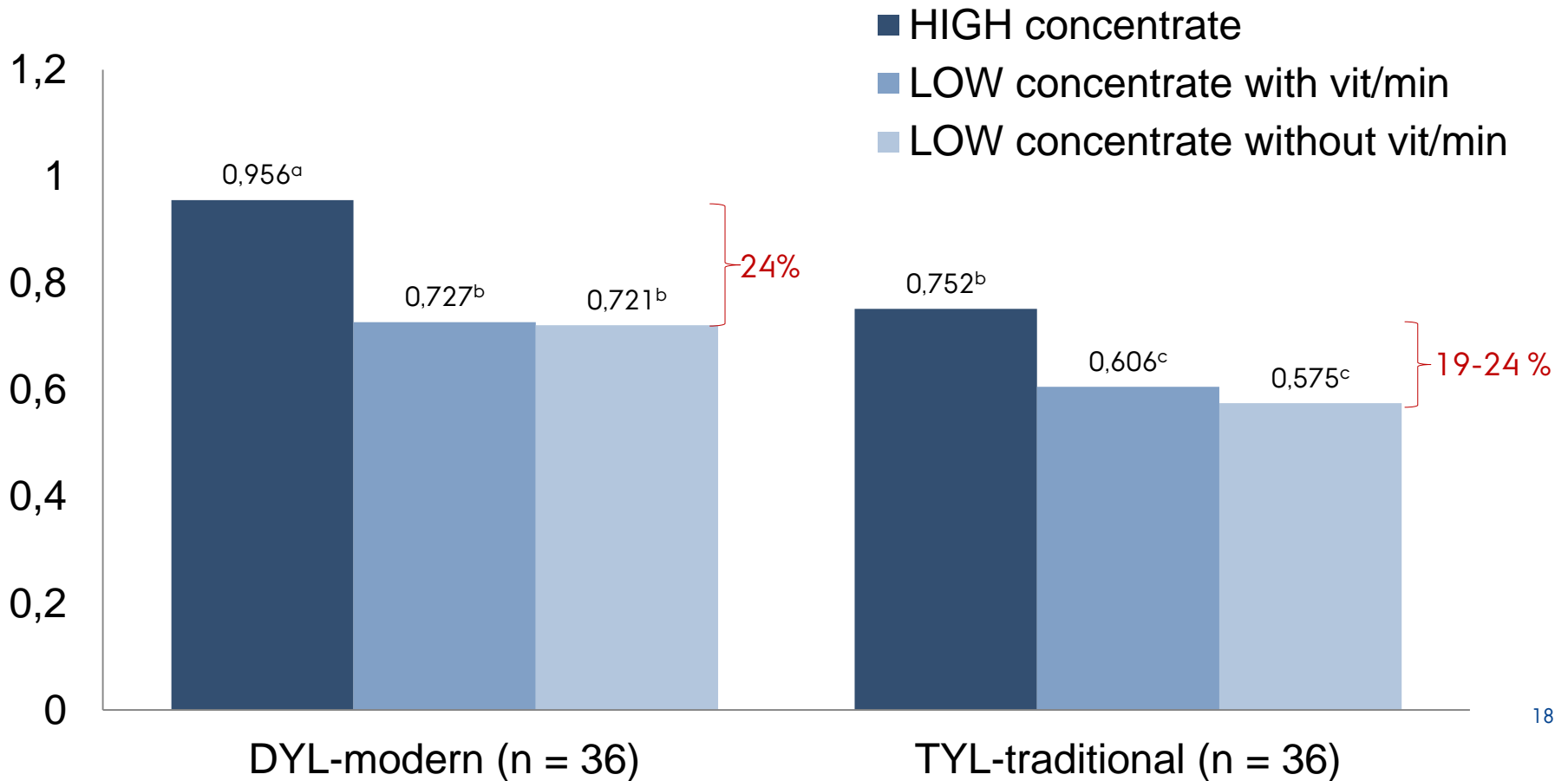


05.09.2012

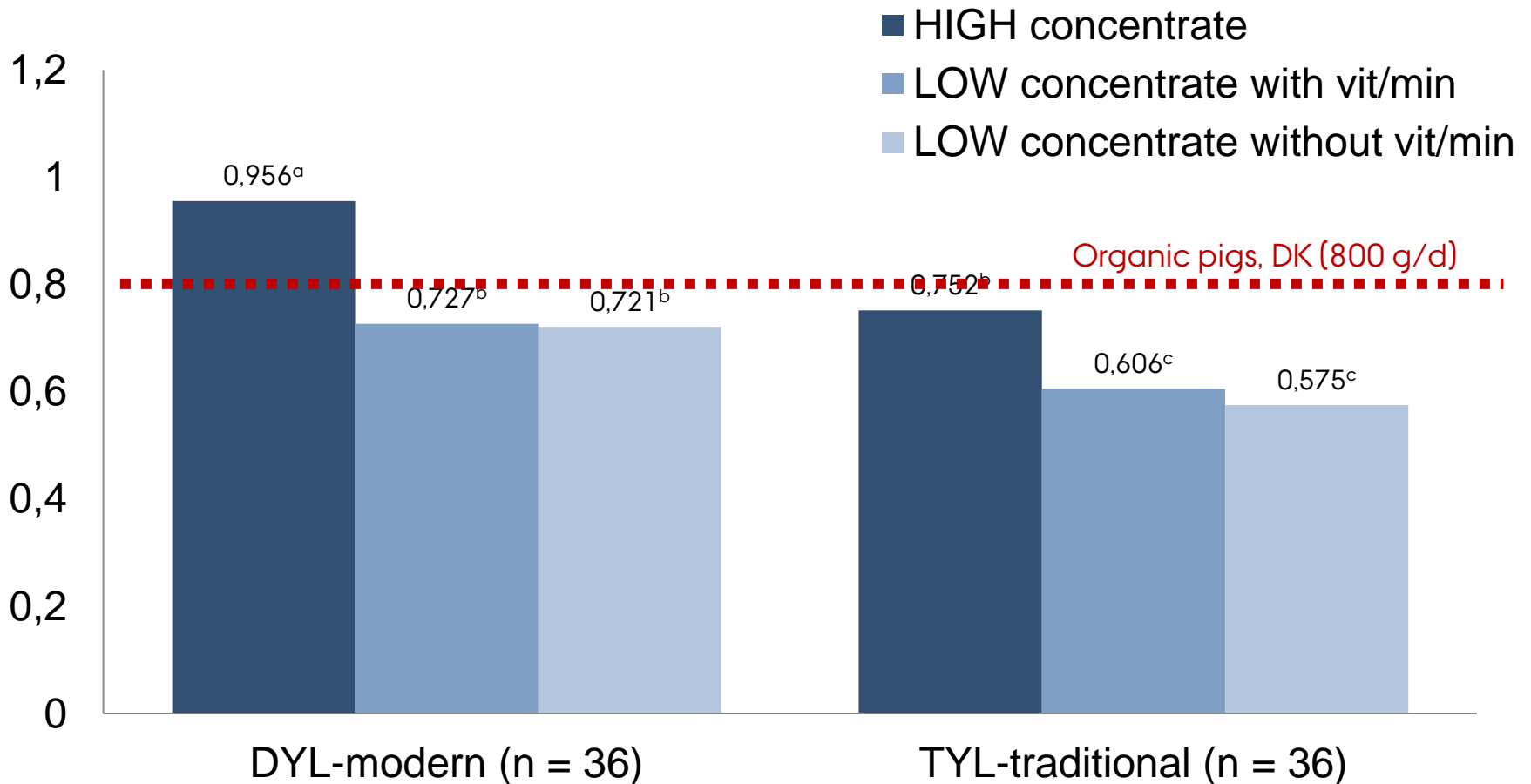


05.09.2012

DAILY GAIN, KG

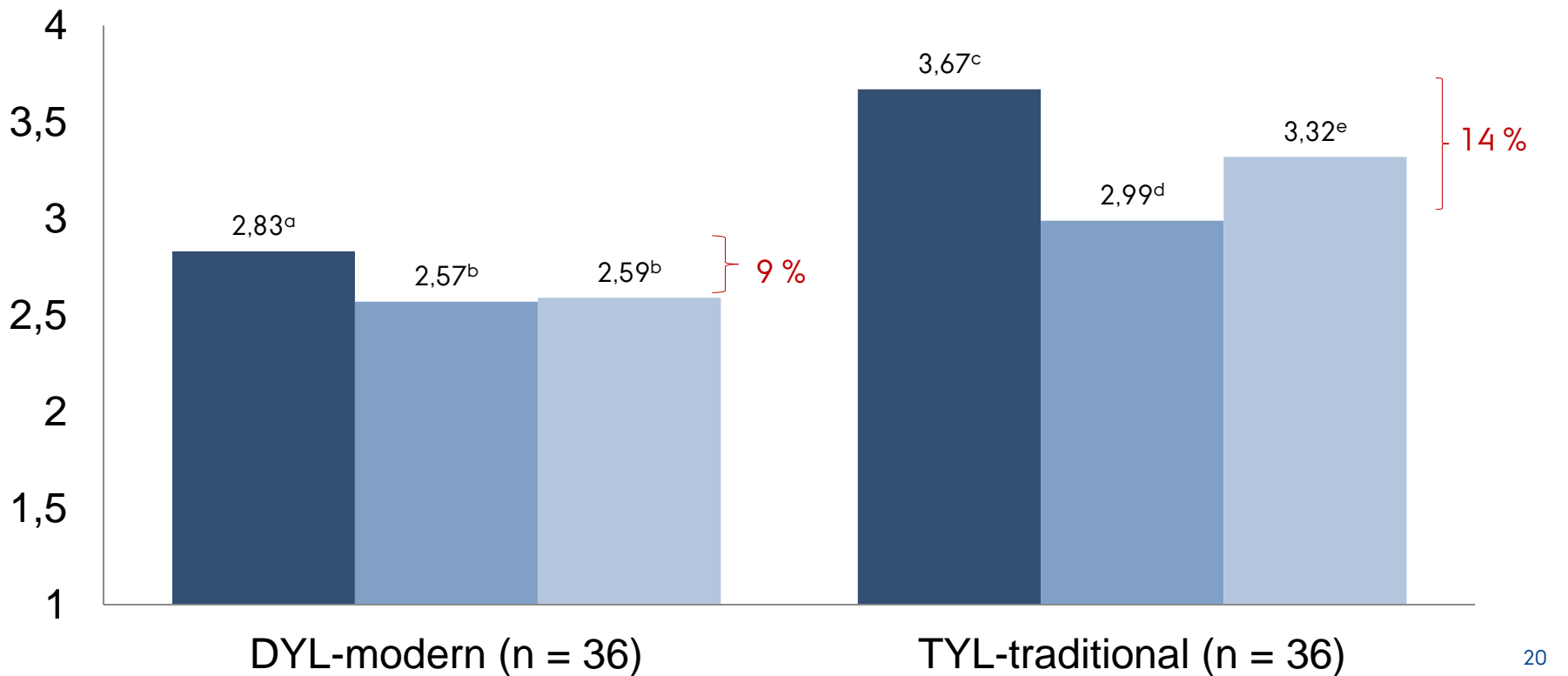


DAILY GAIN, KG



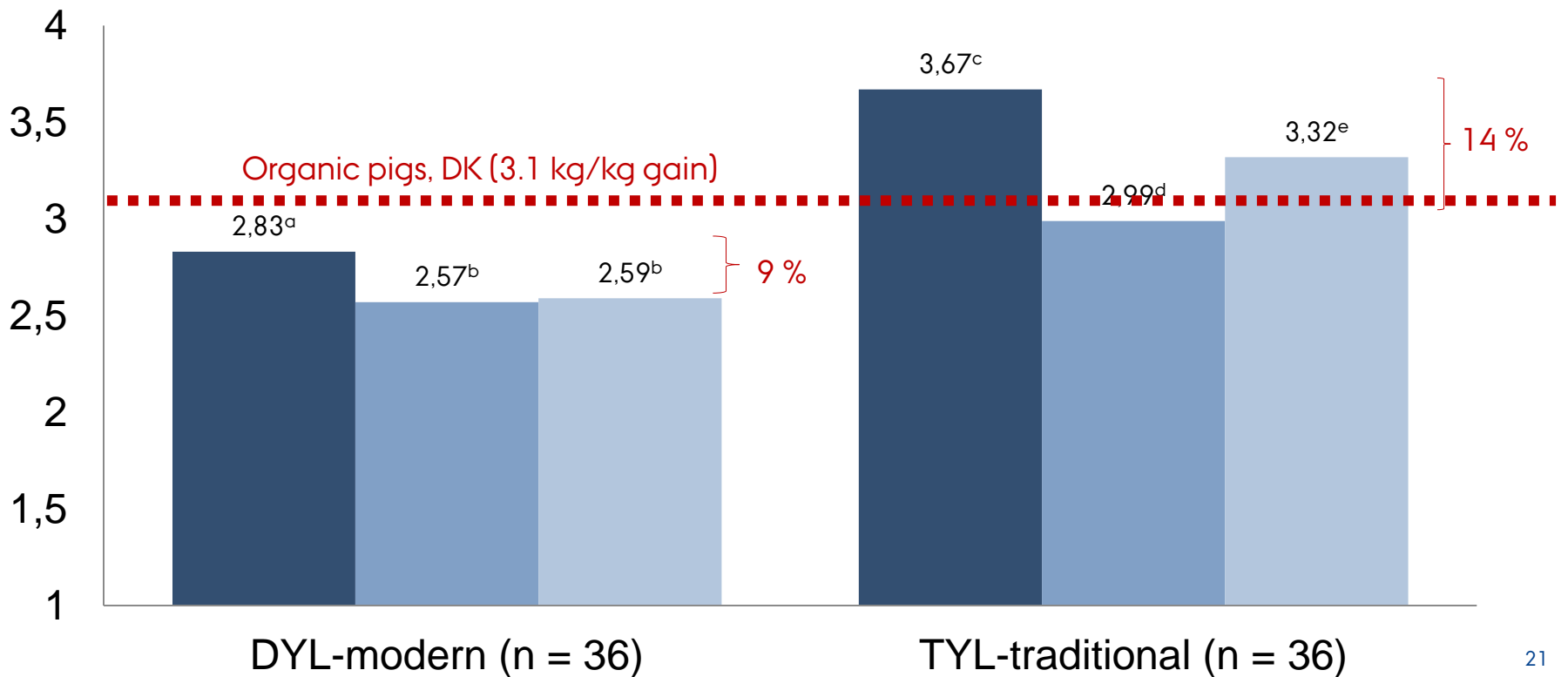
FEED CONVERSION

Kg concentrate per kg gain



FEED CONVERSION

Kg concentrate per kg gain



MEAT QUALITY – DONE ON HIGH AND LOW+ PIGS

Pigs were slaughtered at Danish Crown in Herning – HIGH pigs first and LOW+ pigs three weeks later

Measurements at the day of slaughter

- > Weight
- > Meat percentage
- > pH and temp 45 min and 3 h post mortem in ham (*M. biceps femoris*) and loin (*M. longissimus*)



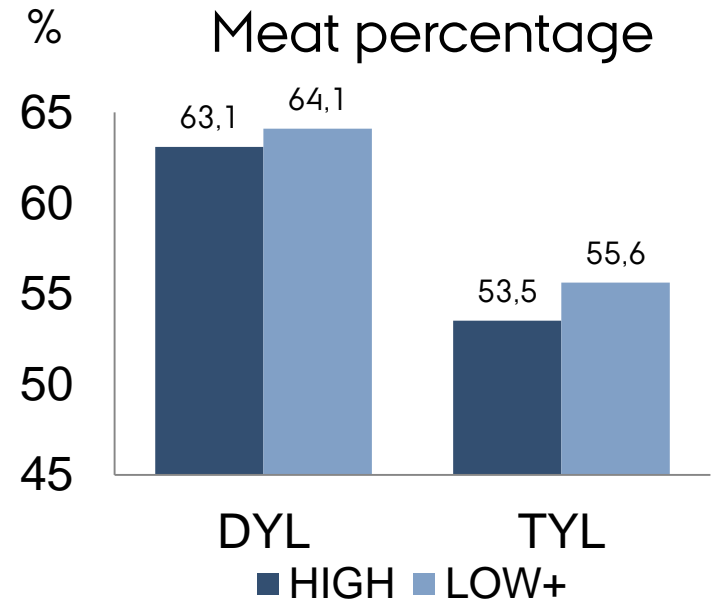
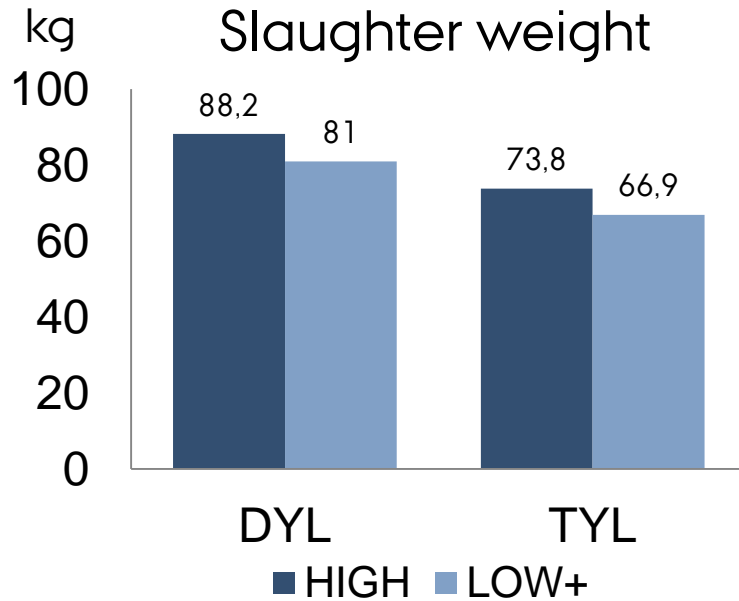
MEAT QUALITY – ON LOIN AND HAM

Measurements 24 h post mortem

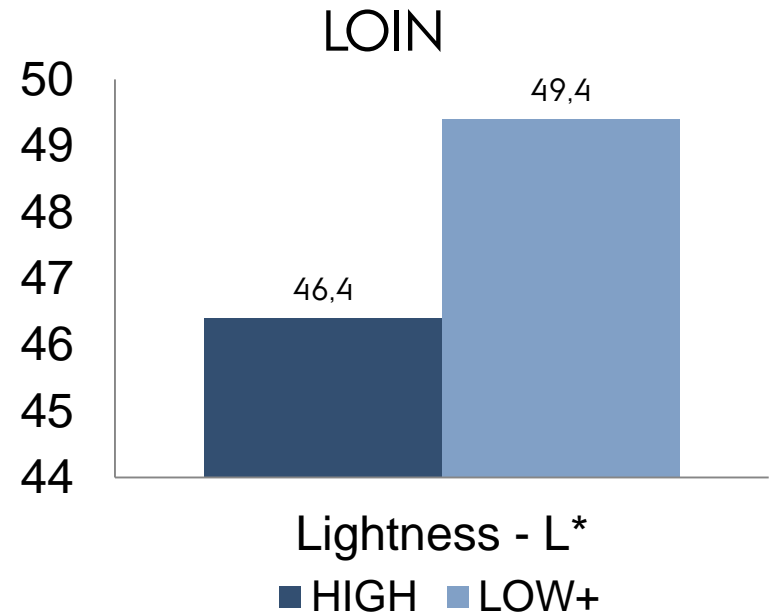
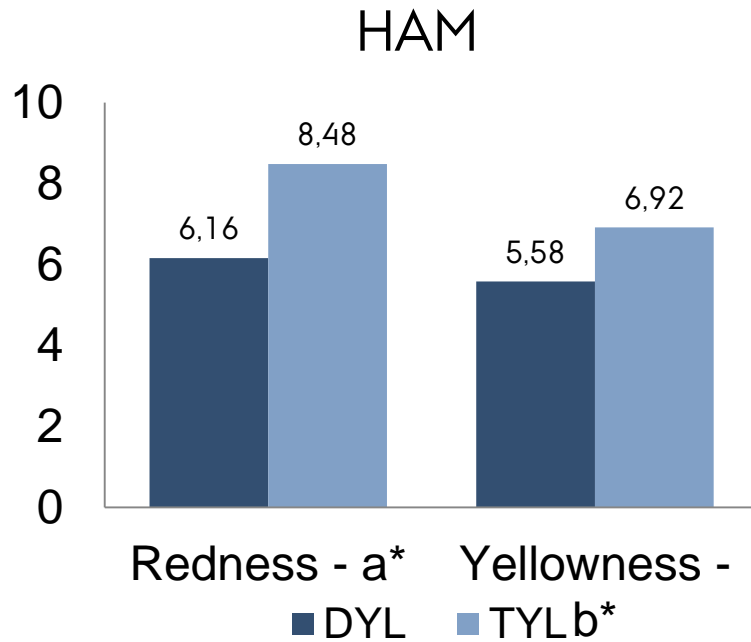
- > pH and temperature
- > Colour
- > Driploss
- > Muscle weight and size
- > Sampling for fatty acid composition, oxidation, shear force (1, 4 and 7 days PM) and sensory evaluation (4 days PM)



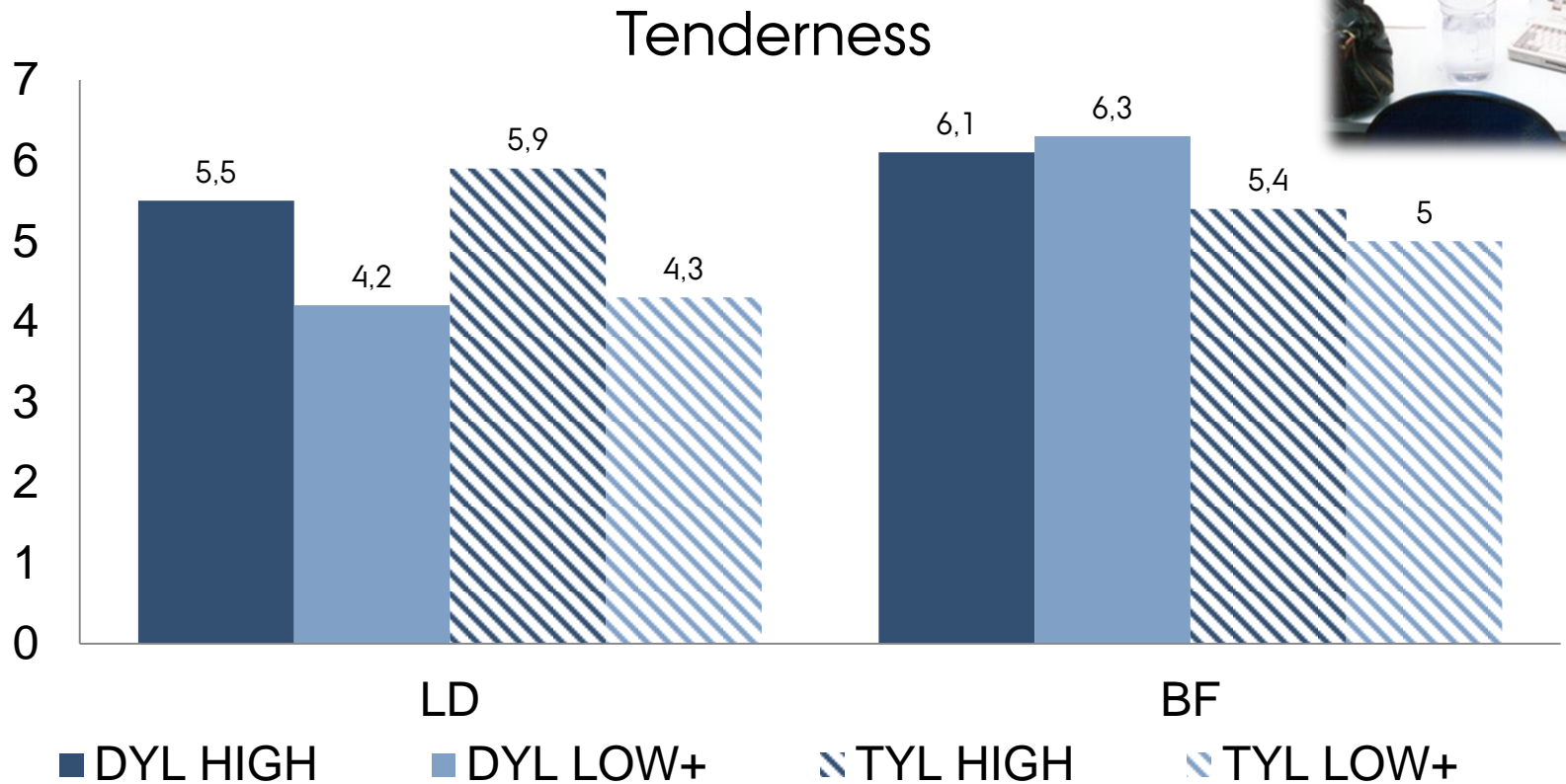
SLAUGHTER WEIGHT AND MEAT PERCENTAGE



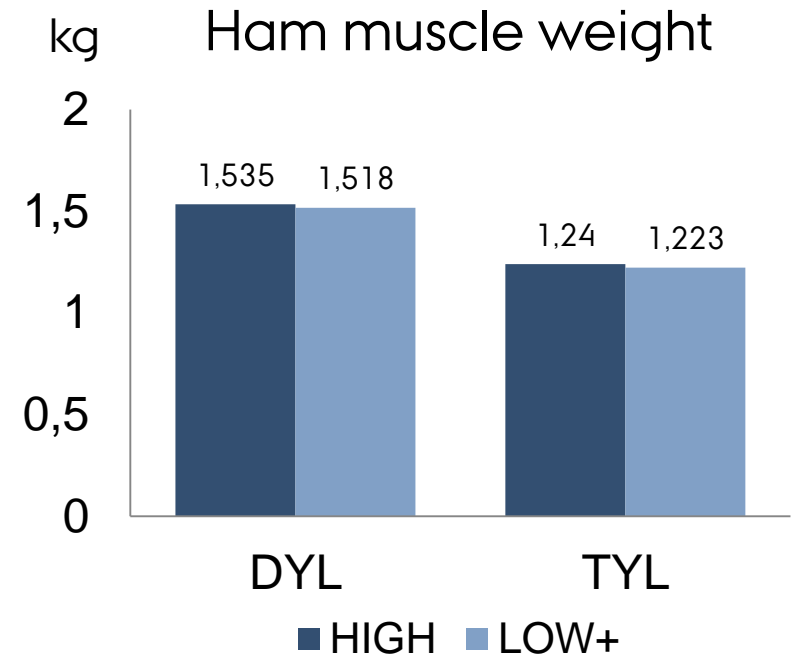
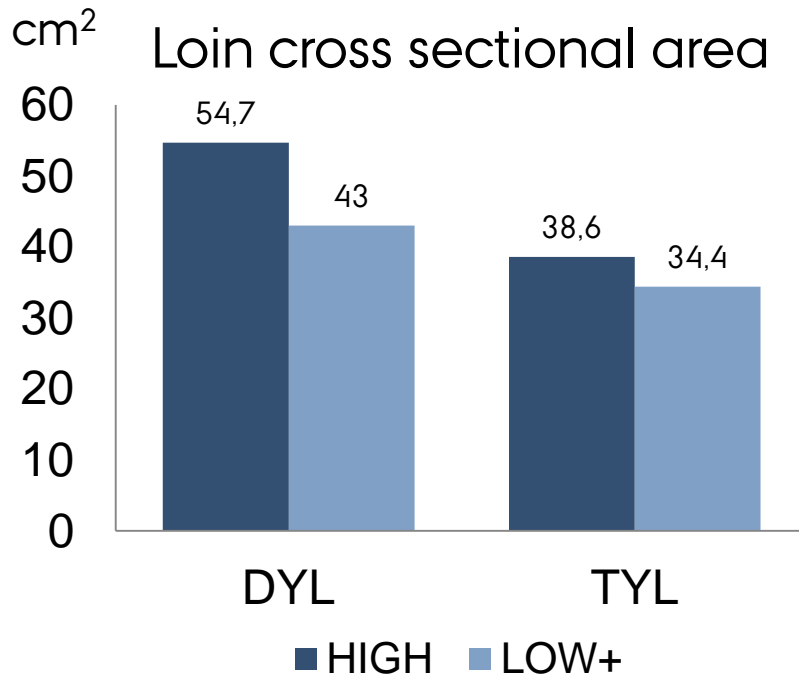
COLOUR TRAITS



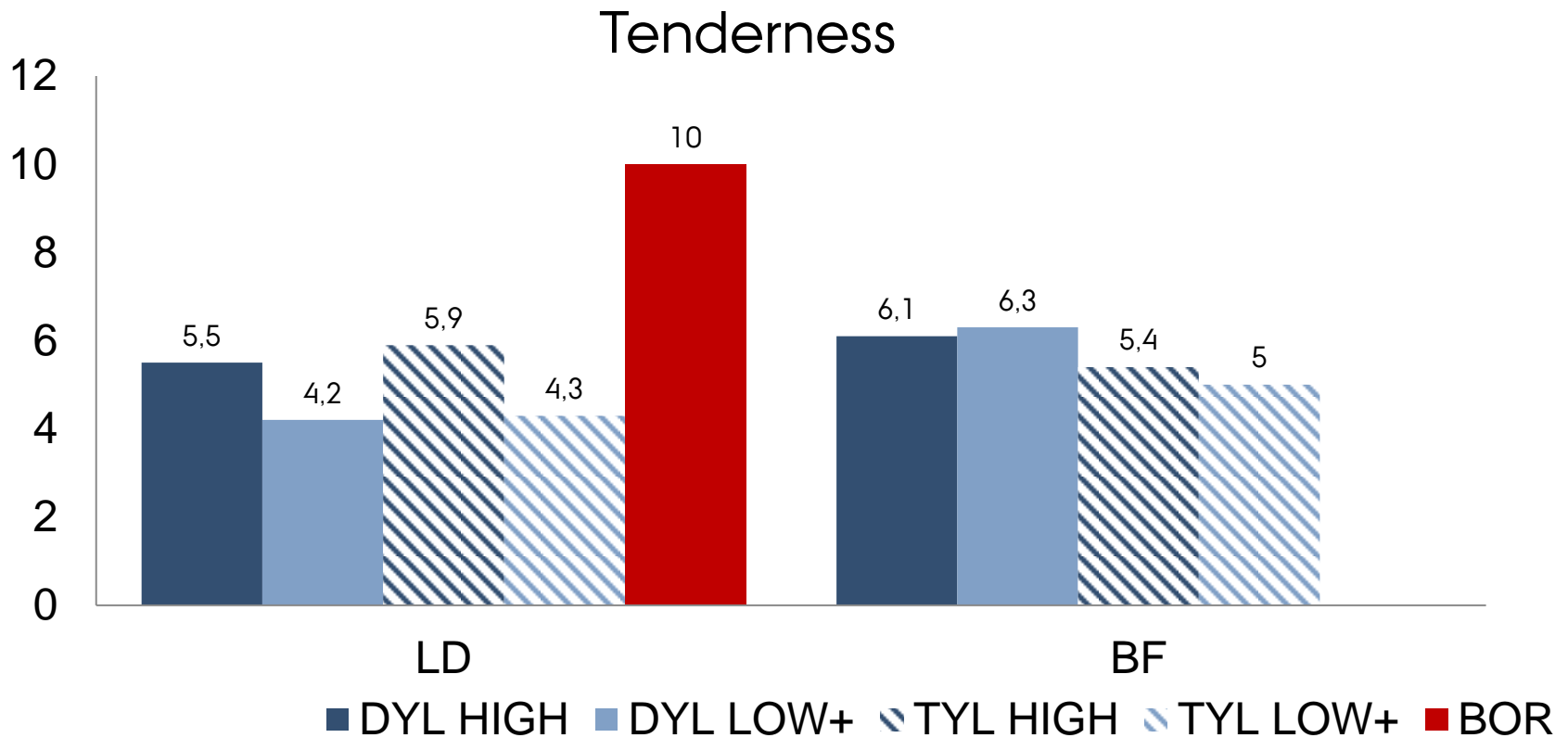
SENSORY EVALUATION - AROMA, FLAVOUR AND TEXTURE



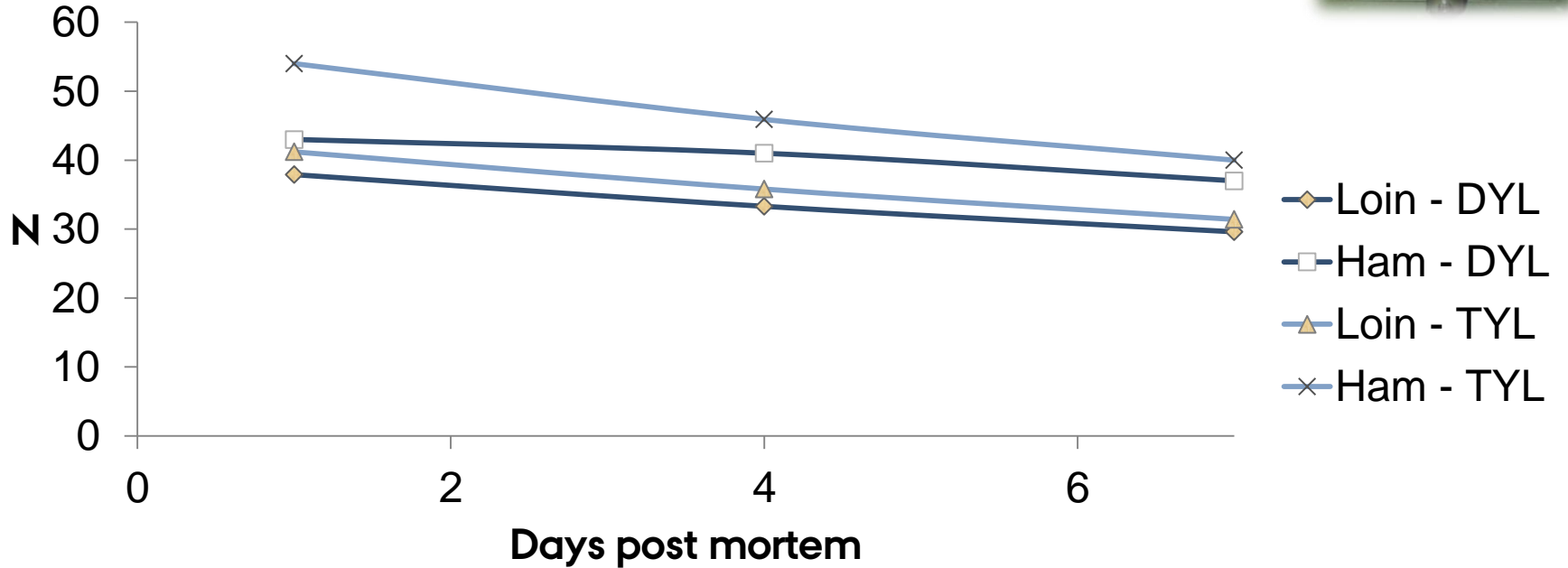
LINK BETWEEN TEXTURE AND GROWTH OF MUSCLES



SENSORY EVALUATION - AROMA, FLAVOUR AND TEXTURE



SHEAR FORCE



CONCLUSIONS – LOW CONCENTRATE

- › Significant more foraging activity
- › A 33 % reduction in concentrate -> daily gain was reduced 20-24 % and feed conversion ratio improved with 9-14 %
- › No effects of supplementing vitamins and minerals on growth
- › Meat percentage was higher in pigs feed low concentrate, but muscle area of loin reduced
- › Tenderness was reduced in loin, but no effect on aroma and flavour
- › Lower tenderness than the 'Bornholmer' pig



CONCLUSIONS – TRADITIONAL CROSS-BREED

- > Tended to graze more
- > 20 % lower daily gain
- > 25 % poorer feed conversion ratio
- > 9 % units lower meat percentage and smaller muscles
- > Lower tenderness in ham, and less juiciness, acid and metal flavour, but more sweetness in loin



WE ALSO LOOK AT

- > Plasma concentrations of minerals and vitamins [Jan V Nørgaard, Søren K Jensen](#)
- > Robustness, e.g. resistance to salmonella, gastrointestinal numbers of different microorganisms [Helle R Juul-Madsen, Ricarda G Engbjerg, Liselotte R Norup, Charlotte Lauridsen](#)
- > Fatty acid composition [Søren K Jensen](#)
- > Overall economy, resource use, environment/climate [Klaus Horsted, John Hermansen](#)



PART OF 'SUMMER' PROJECT

- SUPERB AND MARKETABLE MEAT FROM EFFICIENT AND ROBUST ANIMALS (SUMMER)
- OVERALL AIM IS TO INCREASE THE MARKET SHARE OF ORGANIC MEAT (PORK, POULTRY AND YOUNG BEEF)
- JOHN E. HERMANSEN PROJECT LEADER
- UNDER THE RDD PROGRAMME COORDINATED BY ICROFS
- FUNDED BY THE DANISH AGRIFISH AGENCY, MINISTRY OF FOOD, AGRICULTURE AND FISHERIES
- READ AND SEE MORE: [HTTP://AGRO.AU.DK/SUMMER/](http://agro.au.dk/summer/)

