UNIVERSITEIT GENT

FACULTY OF BIOSCIENCE ENGINEERING

Effect of the IGF-II and stress genotype on carcass quality in pigs

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- IGF-II = Insulin-like growth factor-II
- IGF system → Large influence on muscle growth and development
- Mutation prevents the binding of an inhibitor → IGF-II mRNA expression ↑
- IGF-II = paternally expressed gene

Apat animals inherited the IGF-II mutation

⇕

Gpat animals carrying the wild type allele

- IFG-II mutation affects muscle growth (↑), fat deposition (↓) and size of the heart (↑) in pigs
  - Increase of carcass lean content at the expense of fat
- No effect on birth weight
- No evidence for an effect on growth performance

- Effect of IGF-II genotype on carcass parameters ?
  - Lean carcass content
  - Carcass conformation
- Presence of correlated responses with STRESS genotype ?

- Animals were slaughtered according to live weight (± 110 kg)
  - Fed ad libitum
  - Overnight fasting before slaughtering
  - Killed in a commercial slaughterhouse after CO_2 stunning
- Cross bred pigs
  - Rattlerow Seghers Sow line
- Number of animals:
  - Total: 117

Number of animals			
		A	G
Nn	B	18	19
	G	17	20
NN	B	10	10
	G	16	7

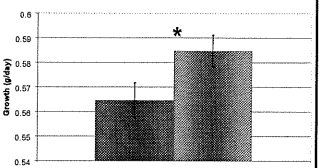
- Carcass parameters
  - % lean meat (→ cgm apparatus)
  - Carcass proportions
    - Fat thickness
    - % *Longissimus* in the carcass
    - Ham width and ham angle
    - Length of the carcass
  - Commercial carcass cuts
  - pH_{40}, pH_{24} and PQM_{24} in carré and ham

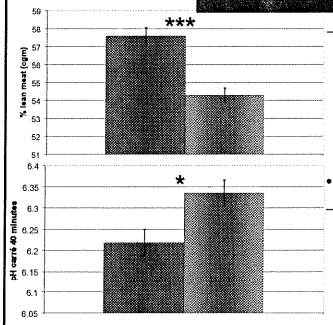
- Animals were slaughtered according to live weight:
  - Mean weight: 109.2 ± 7.3 kg
  - Min / Max: 91 kg / 132 kg
- Carcass weight
  - Mean weight: 87.3 ± 6.6 kg
  - Min / Max: 73 kg / 104 kg
  - Mean age: 192.4 ± 15.0 days
  - Mean yield: 80.0 ± 2.8 %

- Univariate general linear model
- Fixed factors + two-way interactions
  - IGF-II genotype
  - STRESS genotype
  - GENDER
  - SIRE
- Covariate factor used
  - Carcass weight (W)
- SPSS 12.0 for windows

- Animals were the progeny of 2 sires indicated as
  - Sire 1 (n = 61) and Sire 2 (n = 56)
  - Large White X Landrace breed

→ Significant sire effect on growth



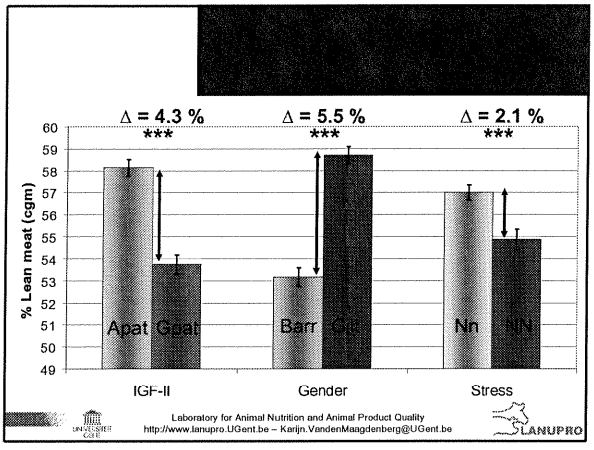


→ Significant sire effects on:
- Carcass parameters (e.g. % lean meat)
- Carcass conformation
- pH_{40} (carré)

• Conclusion:

→ Sire effect has to be included in the model

→ No interaction of sire with IGF-II or STRESS

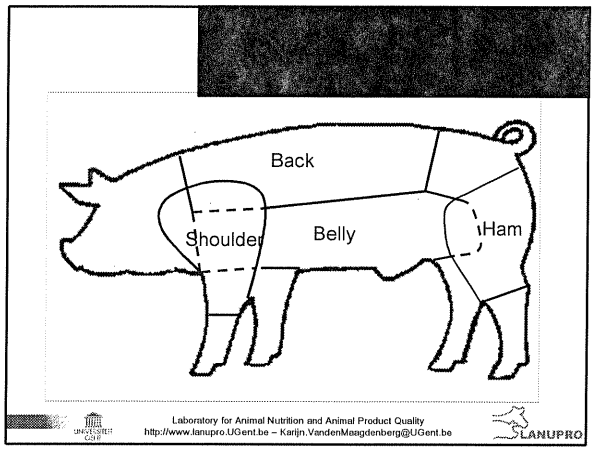


- Significant effects of IGF-II on other lean meat characteristics
  - Fat thickness: Apat < Gpat
  - % *Longissimus* in the carcass: Apat > Gpat
  - Area loin: Apat > Gpat

→ **Conclusion: IGF-II genotype improves carcass quality**

→ GENDER and STRESS effects as expected

→ No correlated responses STRESS ↔ IGF-II


Back
Shoulder
Belly
Ham
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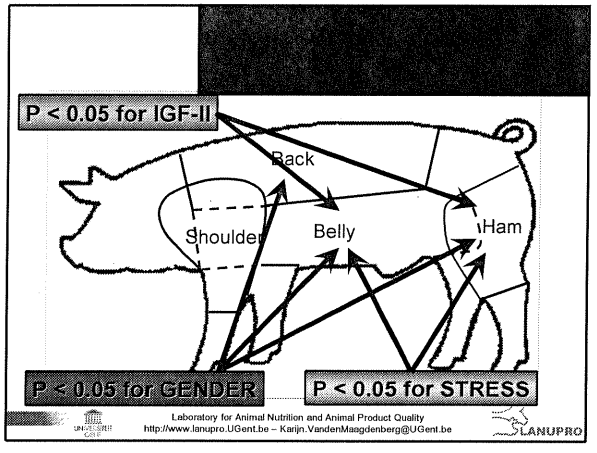
P < 0.05 for IGF-II
Back
Shoulder
Belly
Ham
P < 0.05 for GENDER
P < 0.05 for STRESS
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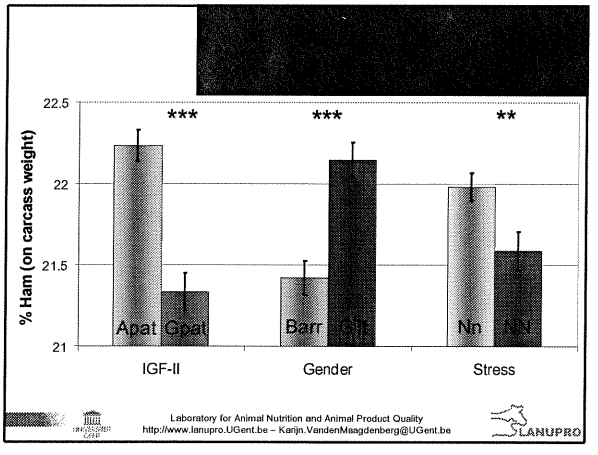
% Ham (on carcass weight)
22.5
22
21.5
21
***
***
**
Apat
Gpat
Barr
Gilt
Nn
NN
IGF-II
Gender
Stress
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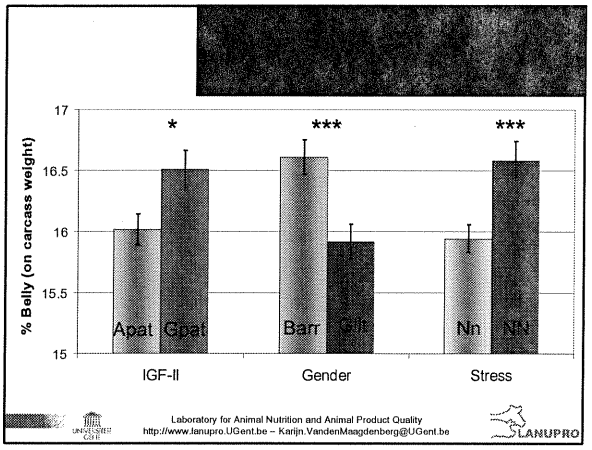

- Effect of IGF-II genotype on:
  - Ham width: Apat > Gpat (***)
  - Ham angle: Not significant
  - Length of the carcass: Not significant
- Effect of STRESS and GENDER on:
  - Ham width: Nn > NN (**) and B < G (***)
  - Ham angle: Not significant
  - Length of the carcass: Nn < NN (***) and B < G (**)
- No correlated responses STRESS ↔ IGF-II

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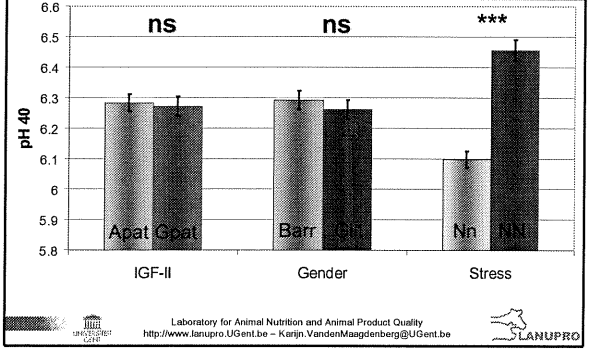

- No effect of IGF-II in carré and ham on pH_{40}, pH_{24} and PQM_{24}
- Effect of STRESS on pH_{40}, pH_{24} and PQM_{24} as expected
  - Nn < NN for pH_{40} (***)
  - Nn > NN for PQM_{24} (***)

→IGF-II genotype affects percentage lean meat → Δ > 4 %
- Effect GENDER > IGF-II > STRESS

→Effects of the IGF-II genotype on lean content is more explicit than the effect on carcass confirmation

→No effect of IGF-II on pH_{40}, pH_{24} and PQM_{24}

- STRESS and GENDER affects % lean meat
- STRESS and GENDER have effects on carcass cuts and conformation (except ham angle)
- Effects of STRESS on pH and PQM as expected

→**No correlated responses between IGF-II ↔ STRESS or IGF-II ↔ GENDER for the measured parameters**

→Additive effects of the IGF-II and the stress genotype

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