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Session 39 "Free communications in pig production" 31 August 2011

Impact of initial weight heterogeneity and pen density on evolution of weight heterogeneity within groups of growing pigs

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Weight heterogeneity in pig groups

- **Topic of high interest for management of fattening pig groups to optimize/ameliorate**
  - feeding strategies
  - slaughtering decision
  - animal welfare
- **Limited data on evolution of heterogeneity depending on group size, initial heterogeneity …**
- **Few data on relationships between evolution of heterogeneity and behaviour/hierarchy**

Objective

- **Within groups of growing pigs, study the evolution during the fattening period of**
  - **Coefficient of variation (CV) of BW**
  - **Weight rank**
  - **Hierarchy rank**
  - **Behavioural activity**
- **Depending on**
  - **Initial BW CV in the pen**
  - **Number of pigs per pen**

Experimental design

- **Fattening pigs (29.4 – 105.3 kg BW, 77-154 d of age)**
- **Factorial design in two replicates**
  - **Two animal density - group size**
    - **. 10 pigs / pen *versus* 20 pigs / pen,**
    - **. pens of 32 m² *(concrete floor with straw)***
    - **. 1 feeder for 10 pigs *(standard diet, ad libitum)***
  - **Two initial levels of BW variability (normal distribution of weight)**
    - **. Low → CV = 7.4%**
    - **. High → CV = 20.8%**
  - **120 pigs on total (50% ♂, 50% ♀), 8 pens**

Measurements

- **Daily feed intake per pen**
- **Individual BW once per week**
- **Hierarchy rank**
  - **2, 5 and 10 weeks after the entrance in the fattening room**
  - **Feeding competition test after a fasting period (Place et al, 1995)**
  - **For each animal within each group, index between 0 (lower social rank) and 1 (higher social rank)**

Measurements

- **Daily feed intake per pen**
- **Individual BW once per week**
- **Hierarchy rank**
- **Behavioural activity**
  - **2, 4, 6, 8 and 10 weeks after the entrance in the fattening room**
  - **During 3h**

    Every 10-min scan interval, observation on all animals (individual identification)

    - 3-min continuous recording focused on feeding area

    - simple focal observation
  - **Activities: investigation, agonistic behaviour, resting, feeding**

Measurements

- **Daily feed intake per pen**
- **Individual BW once per week**
- **Hierarchy rank**
- **Behavioural activity**

- **Analysis with CORR and MIXED procedures of SAS**

  fixed effects of group size, initial BW CV level, their interaction and age for repeated measures

Results

Performance

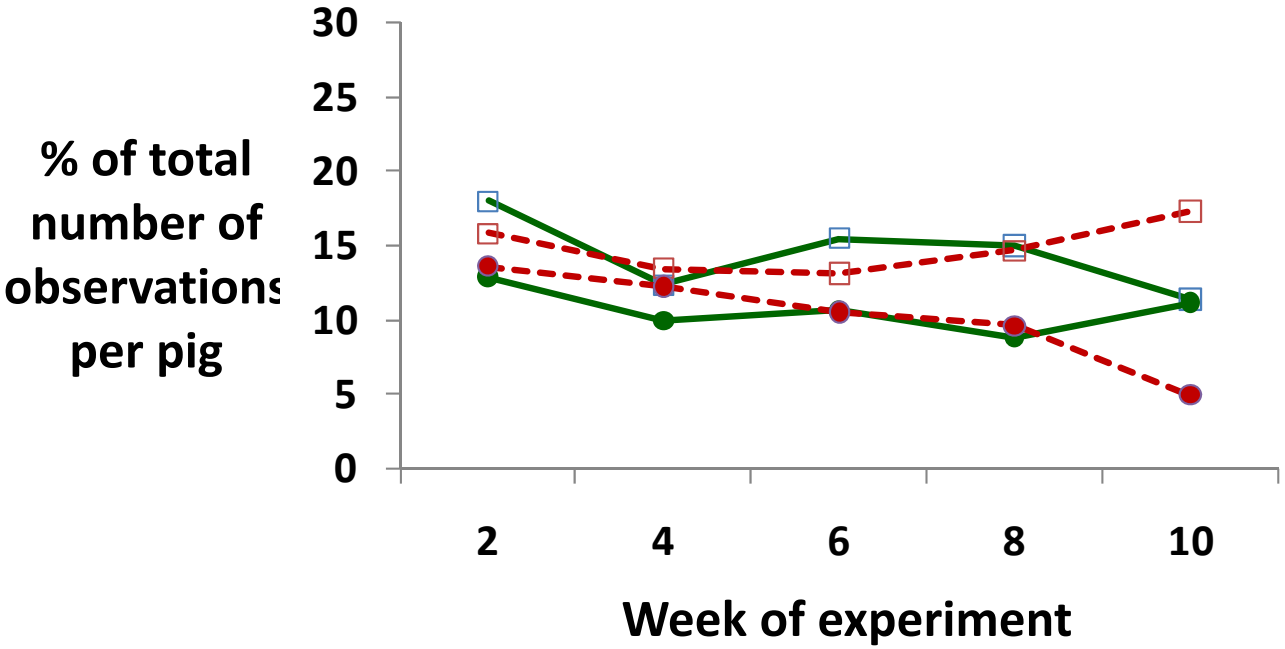
	10 pigs/pen		20 pigs/pen	
	low CV	high CV	low CV	high CV
ADG (g/d)	998	1003	983	993
Feed intake (kg/d)	2.60	2.46	2.52	2.55

Statistical effects of pen density, initial CV level and interaction: NS ($P > 0.1$)

⇨**No effect of pen density or initial CV level on performance**

Behavioural activities

example of social interactions (continuous recording)



Statistical effects:

Pen density	NS
Initial CV level	NS
Age	NS
Initial CV level x age	NS

⇨ No effect of initial BW heterogeneity or pen density on number of observations of the different behavioural activities

Social relationships

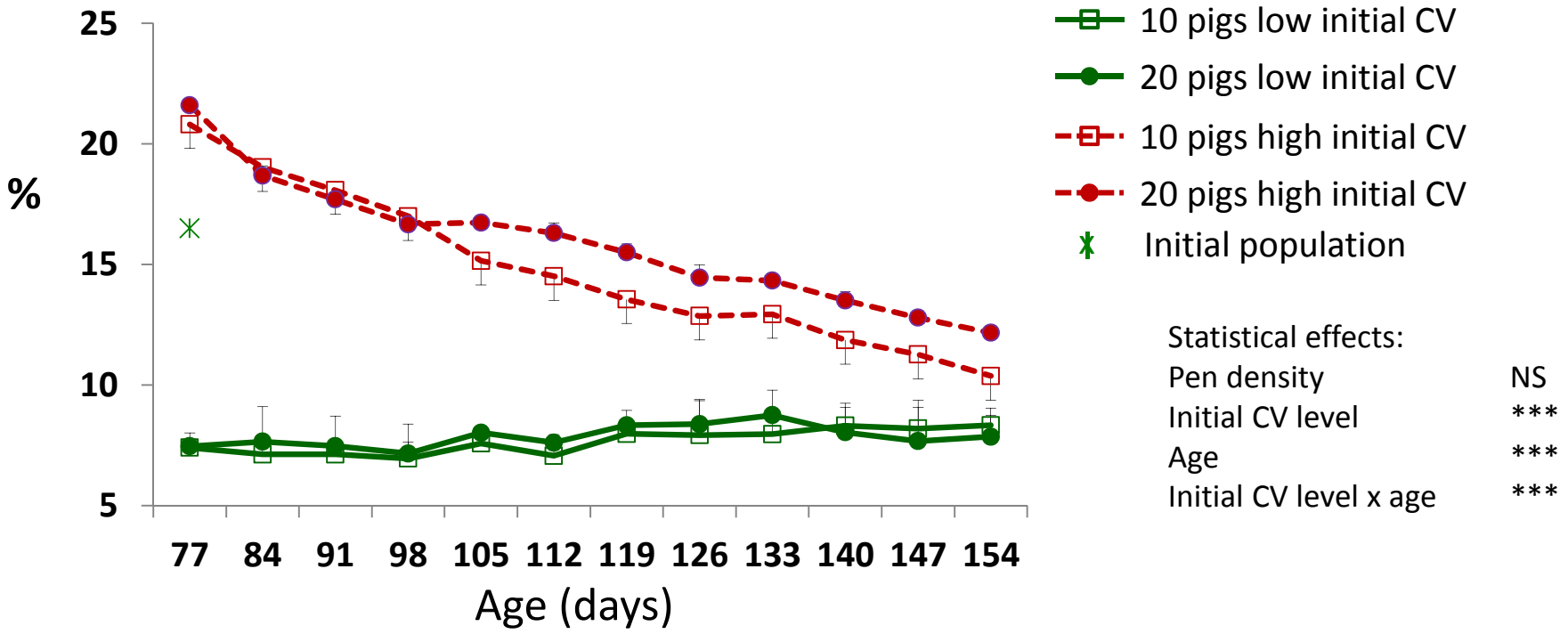
Spearman correlations between hierarchy index at different ages

	10 pigs/pen		20 pigs/pen	
	low CV	high CV	low CV	high CV
Week2 – Week5	0.65*	0.69*	0.49*	0.45*
Week2 – Week10	0.40^{t}	0.17	0.36*	0.27

Statistical significance of correlation: ^{t} P < 0.1, * P < 0.05

⇨**No effect of pen density or initial BW CV on hierarchy rank evolution**

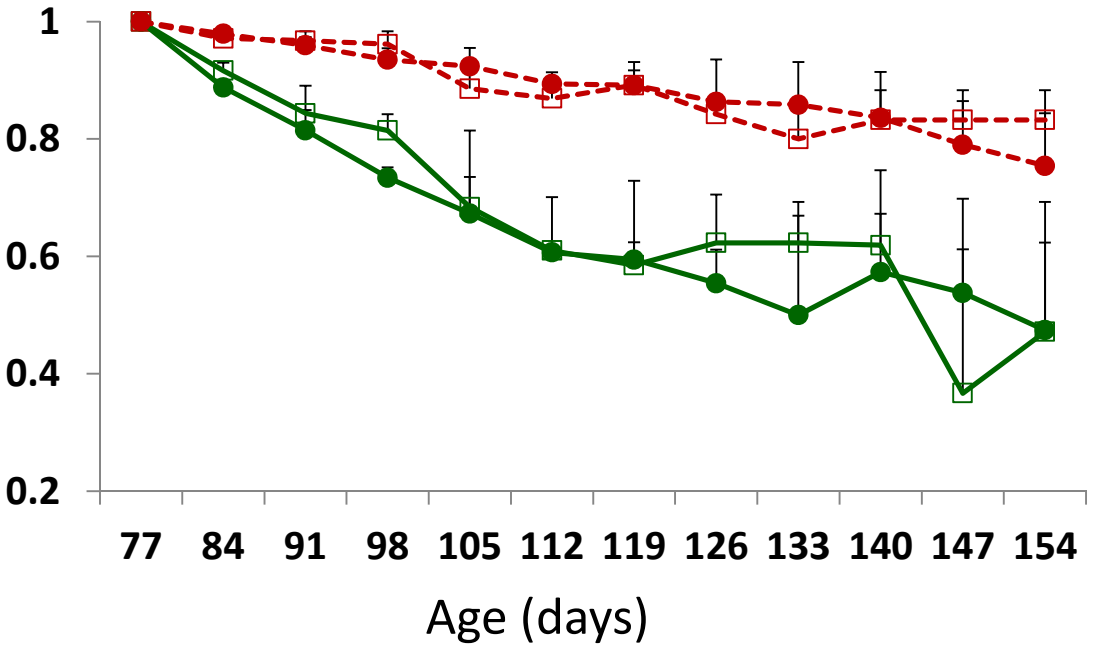
Coefficient of variation of BW



Statistical effects:	
Pen density	NS
Initial CV level	***
Age	***
Initial CV level x age	***

⇨Decrease of BW CV with age in groups with high initial CV

Spearman correlation between initial BW and BW at different ages



Statistical effects:	
Pen density	NS
Initial CV level	*
Age	***
Initial CV level x age	***

⇨Decrease in Spearman correlation with age

⇨ Gradual reorganisation of BW ranking more marked for groups with low initial CV

Conclusion

- **Lack of effect of pen density on growth or behaviour**
- **Quite stable hierarchy within groups**

  ⇨**due to available area / pig (1.6 – 3.2 m²) and *ad libitum* feeding?**
- **Homogenisation of BW within groups with high initial CV, no changes in low initial CV groups**

  ⇨**Convergence towards low CV levels**

  ⇨**CV to take into account in group constitution at the beginning of growing period for optimizing feeding strategies and slaughtering decision**

Thank you
for your attention

EAAP 2011, Brossard et al, session 39 – paper n°5