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GxE interactions for growth and backfat thickness in organic and conventional pig production

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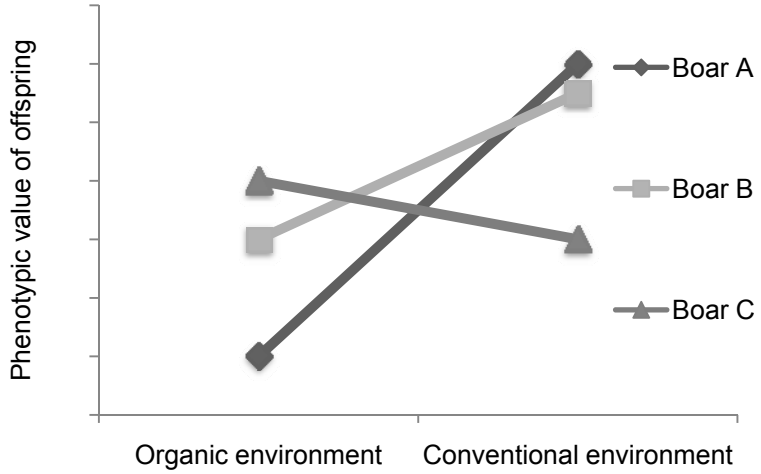
Background

- No organic pig breeding program
- Conventional animals used in organic production environments
- Main differences between organic and conventional production: Feedstuff, space allowance, outdoor access, infection load
- Are the best producing animals in conventional production also the best producing animals in organic production?

Background

- GxE interaction => same trait – partly different genes



- Economically important if genetic evaluation is done in only one of the environments
- Growth and backfat thickness are economically important

Aim: to answer the question

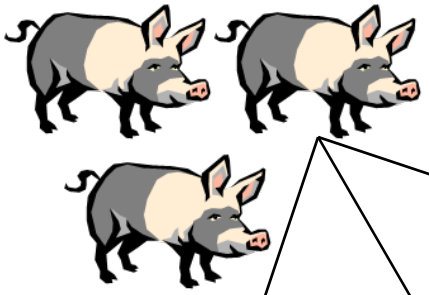
Are there GxE interactions for fattening traits in organic and conventional pig production environments?

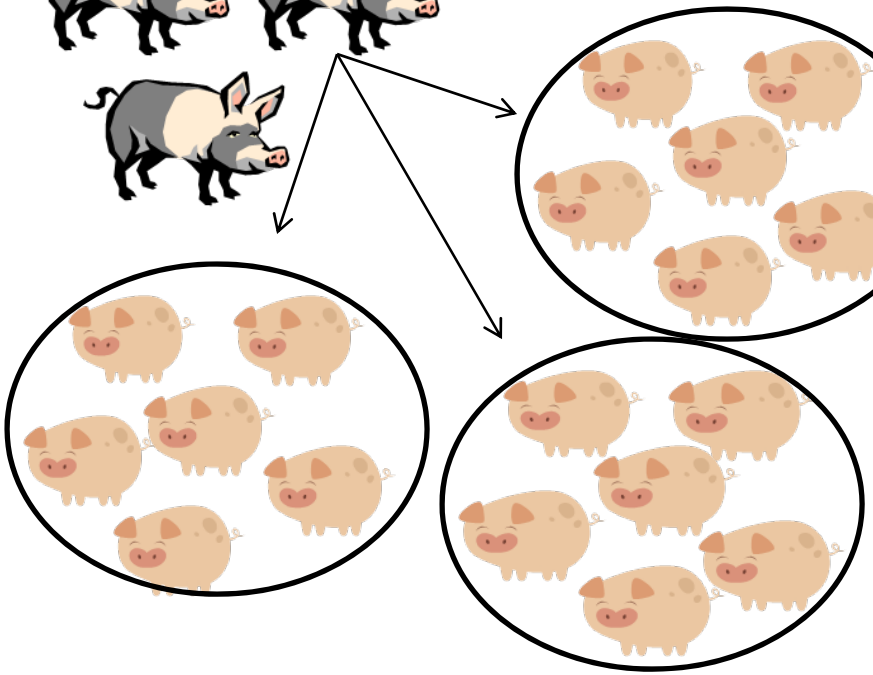
Method

Compare ranking of boars' organic and conventional breeding values.

What did we do?

37 AI-Hampshire boars





174 Swedish Landrace x Yorkshire sows
3 organic piglet producing herds

6 organic fattening herds

Slaughter records (slaughter weight and backfat thickness) from 1805 offspring collected at slaughter plant

What did we do?

- Estimation of “organic” breeding values for the AI-boars
  - Bivariate genetic analysis for growth rate from birth until 100 kg and backfat thickness at 100 kg
  - Fixed effects: sex, litter size and fattening herd
  - Random effects: herd-year-season, birth litter and animal
- Conventional breeding values for the same boars, from the breeding organisation Quality Genetics

What did we find?

- Heritability
  - Growth rate until 100 kg: 0.30
  - Backfat thickness at 100 kg: 0.36
- Genetic correlation
  - -0.11

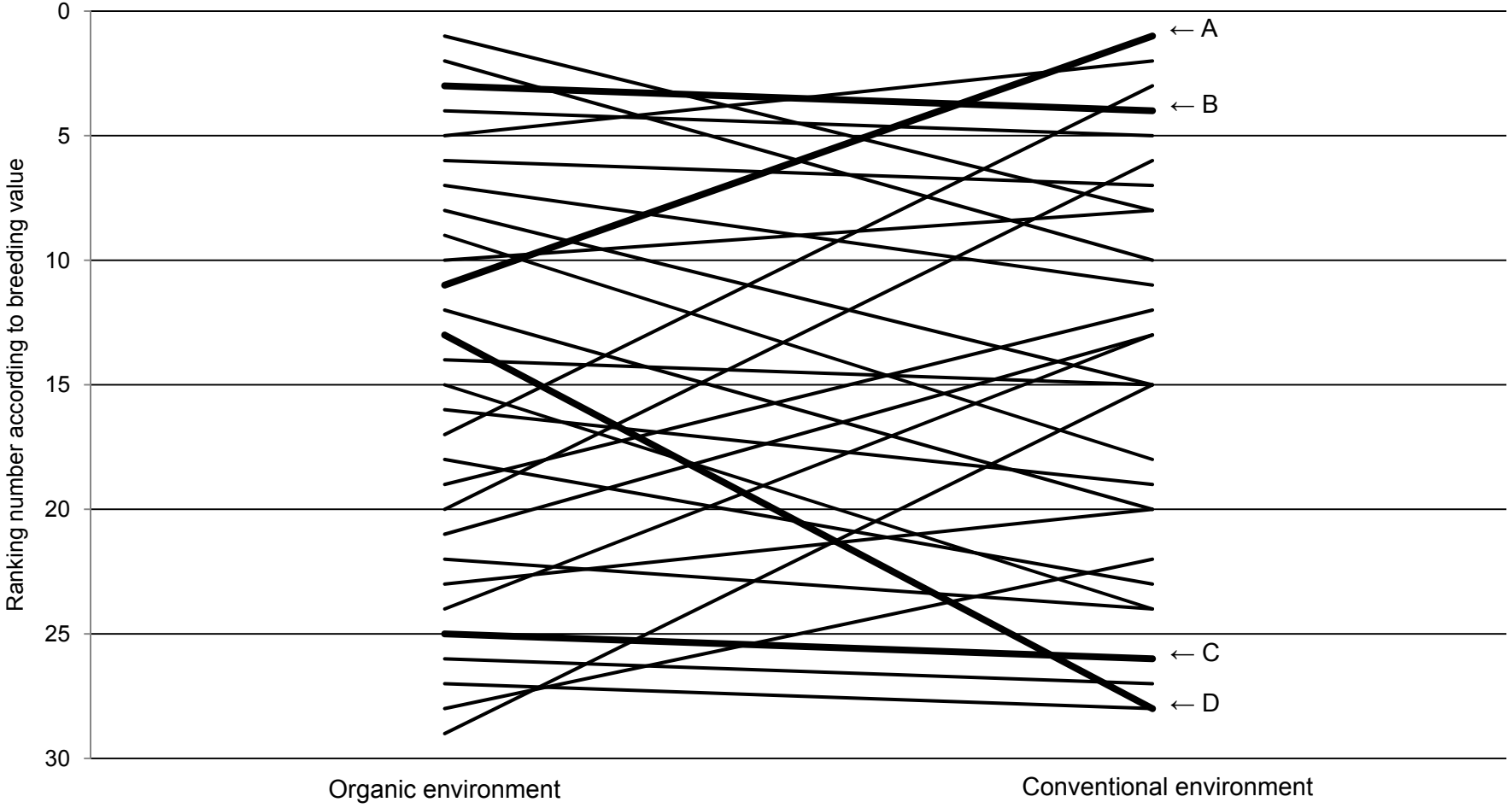
What did we find?

Spearman rank correlations between organic and conventional breeding values (N=29)

		p-values	
	r	H0: r=0	H0: r=1
Growth rate	**0.48**	0.009	0.001
Backfat thickness	**0.42**	0.022	0.001

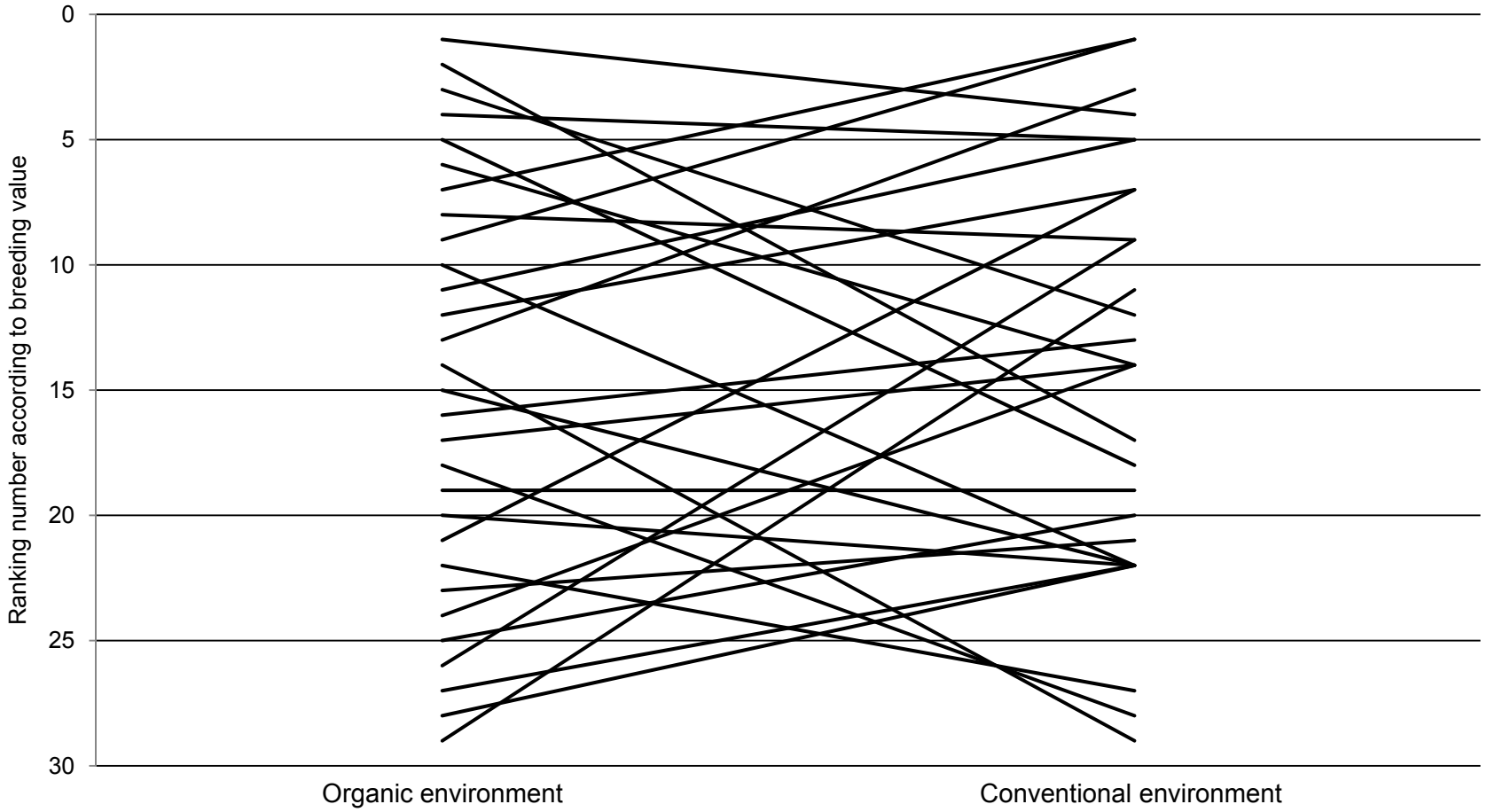
What did we find?

Differences in ranking of breeding values: Growth rate



What did we find?

Differences in ranking of breeding values: Backfat thickness



Conclusion

There are weak GxE interactions for growth rate and backfat thickness in organic and conventional production environments

Implications

- No strong GxE interactions => no separate organic breeding program needed
- Further research of the relative importance of different traits in organic production is needed. Different economic weights?
- Organic breeding index within conventional breeding program

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