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Responses to weaning depending on diet in two pig lines divergently selected on residual feed intake

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Feed efficiency and stressors

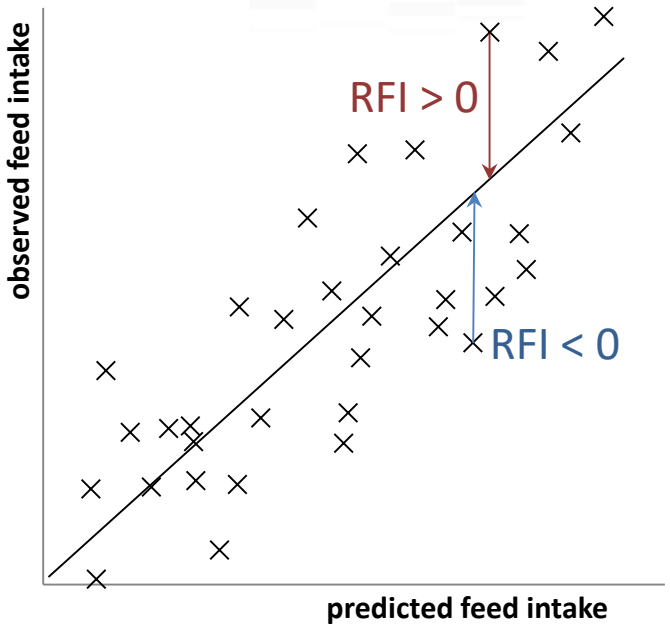
- **Improving feed efficiency** (rate of conversion of the feed into body weight) is **necessary** to reduce feed costs and the environmental impact of pig production

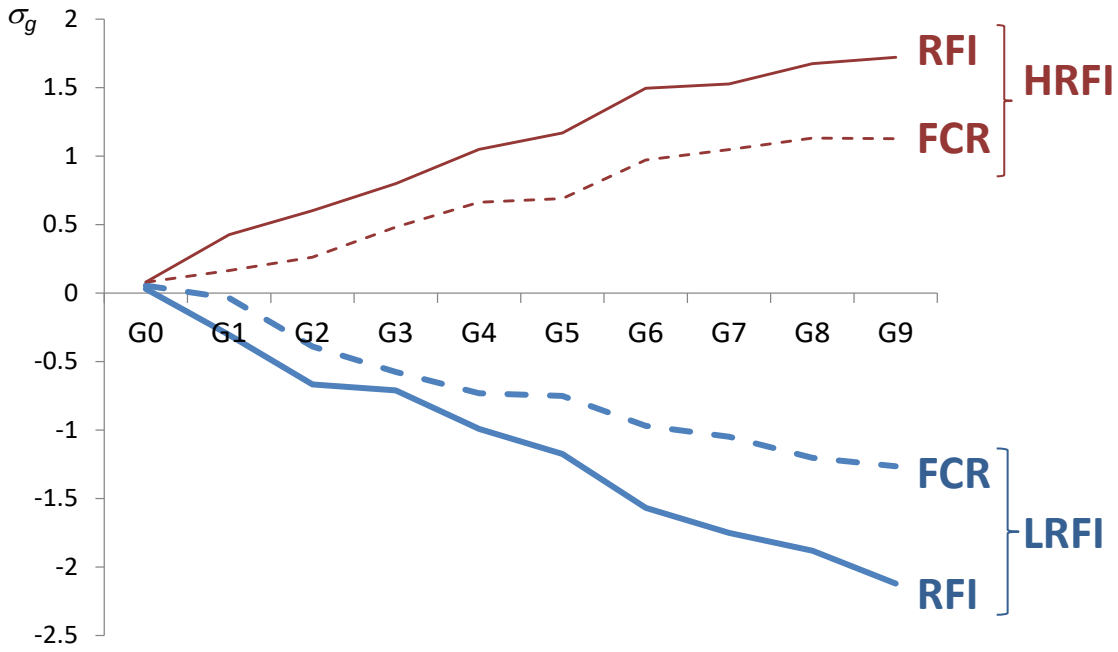
- **Improving** the **animal robustness** is **necessary** to reinforce the animal ability to maintain high production levels when facing stressors

- But **selecting for improved feed efficiency might impair the animal's ability to respond to stressors**
- **Weaning** is the main natural stress in pig production, responsible for about 50% of the use of antibiotics

→ Hypothesis: more efficient pigs might be more sensitive to weaning

Divergent pig lines for residual feed intake (RFI)





Low RFI (LRFI) → better feed efficiency **-163 g/d RFI** **-317 kg feed / kg BW FCR**

→ eat less than predicted from growth and body composition

Objectives

1. Compare weaning in the RFI lines (Montagne et al)

2. Test a protective dietary regime after weaning on growth and health in the RFI lines

Design - Animals

n=264 pigs in two successive batches

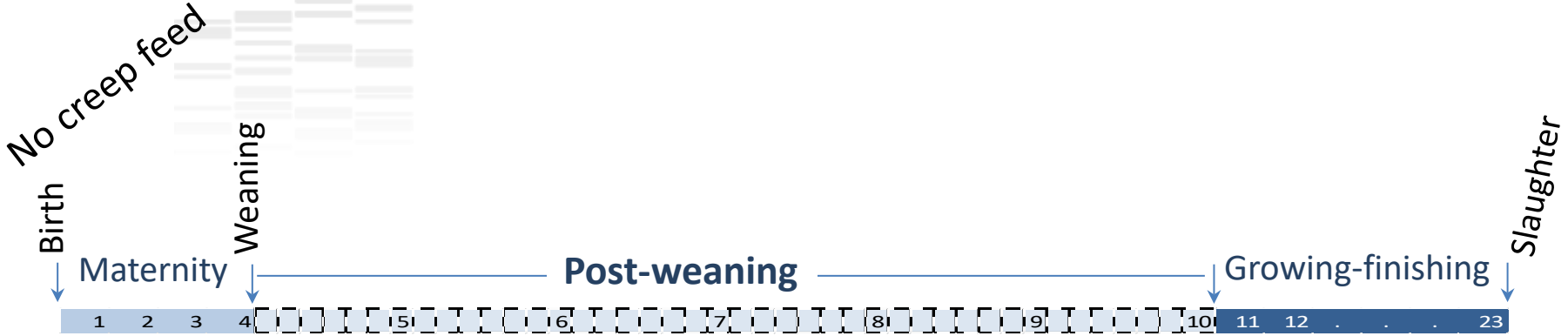
Post-weaning test

66 females and 66 castrated males tested per line
from weaning (4 weeks of age) to 10 weeks of age
conventional post-weaning units
22 pigs per pen, penned by line and diet

Growing-finishing test

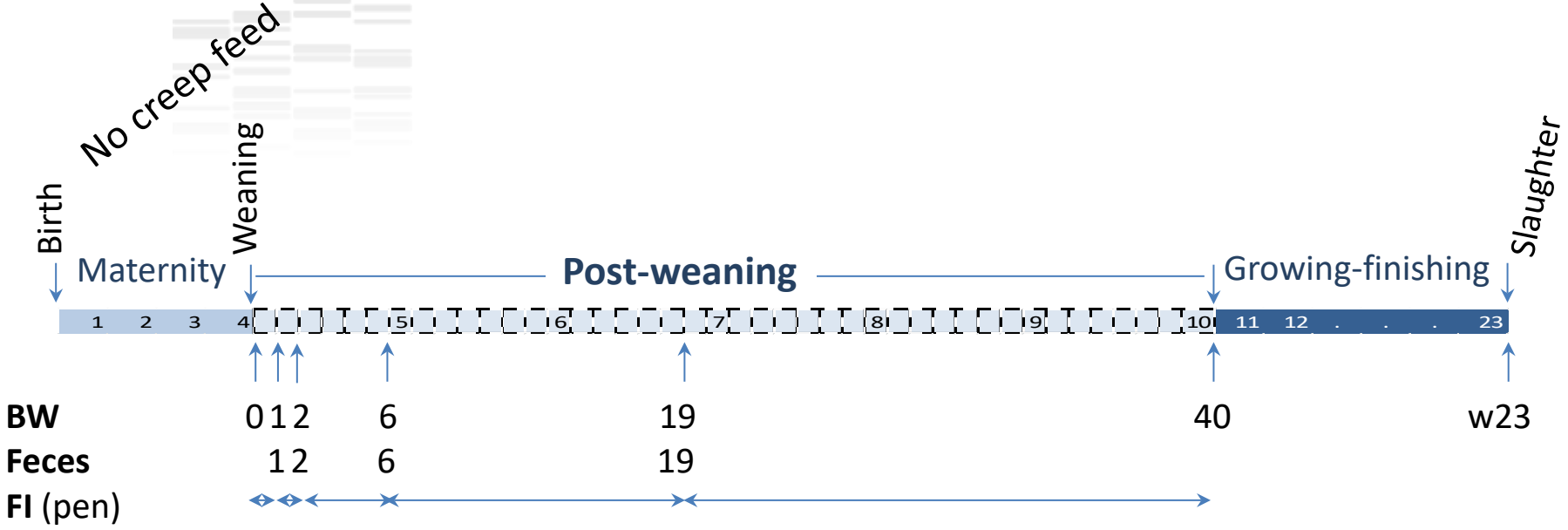
44 females and 44 castrated males tested per line (2/3)
from 10 weeks of age to 23 weeks of age
conventional growing-finishing units, automatic feeders
11 pigs per pen , penned by line and sex

Design – records



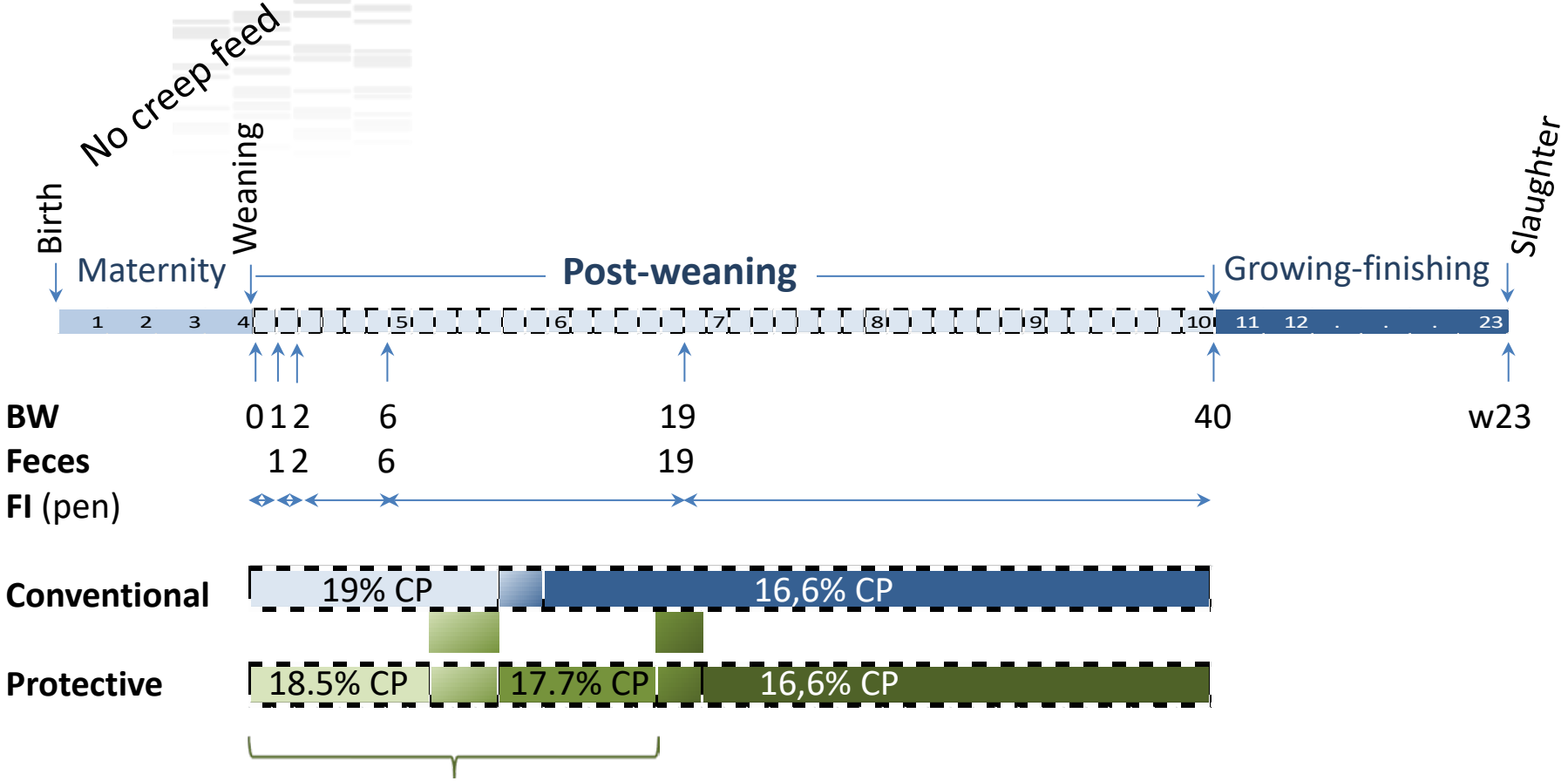
No antibiotics

Design – records



No antibiotics

Design – records



higher diversity of ingredients:

less crude protein, more AA

high digestibility diet : extruded cereals (rice), potatoes protein concentrate

No antibiotics

No vaccination

Statistics

Linear models

on gaussian traits

sex

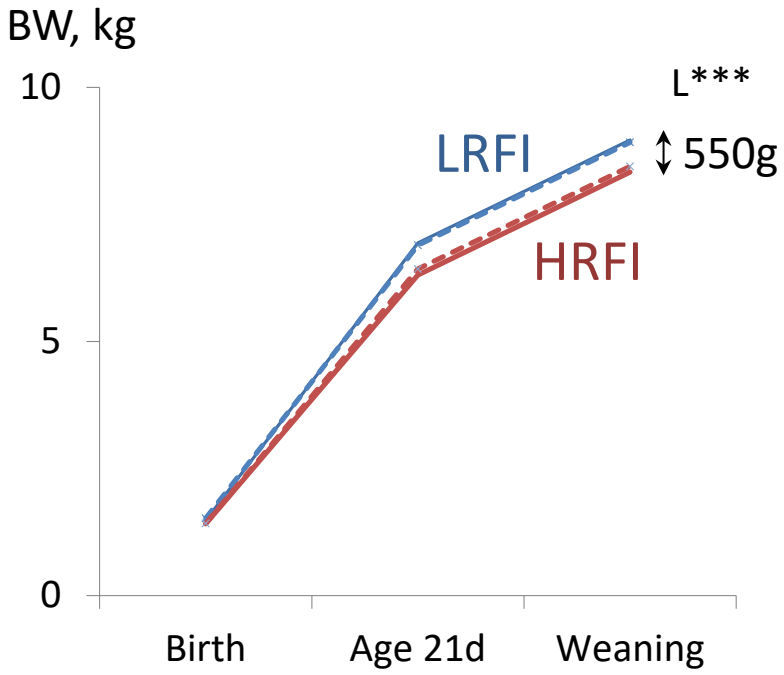
batch

line (L)

diet (D)

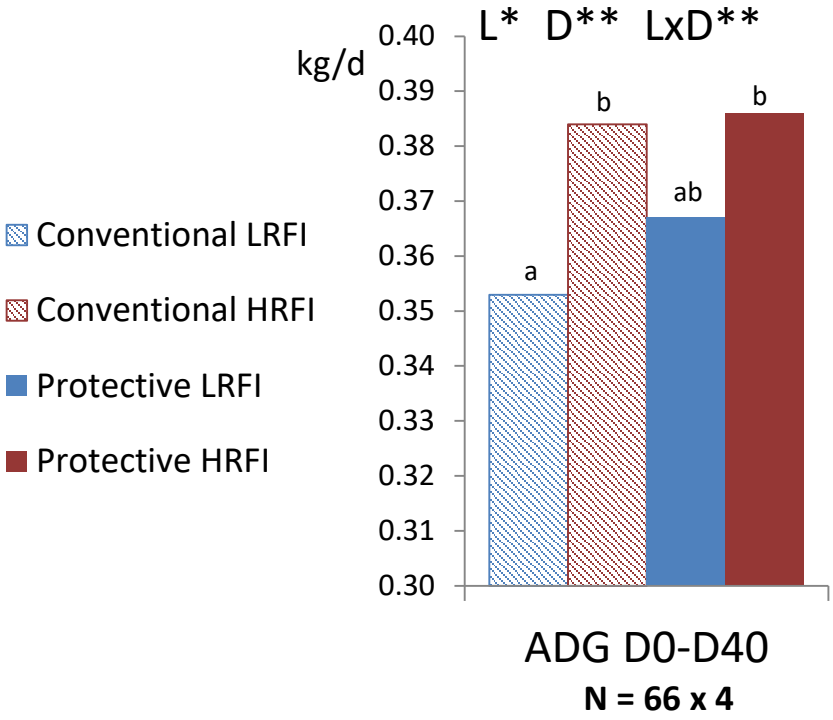
line x diet (LxD)

At each time independently



Chi2 on the number of animals with normal, soft and liquid feces to test separately the effects of the line and diet

Growth rate, feed intake and FCR from weaning to D40

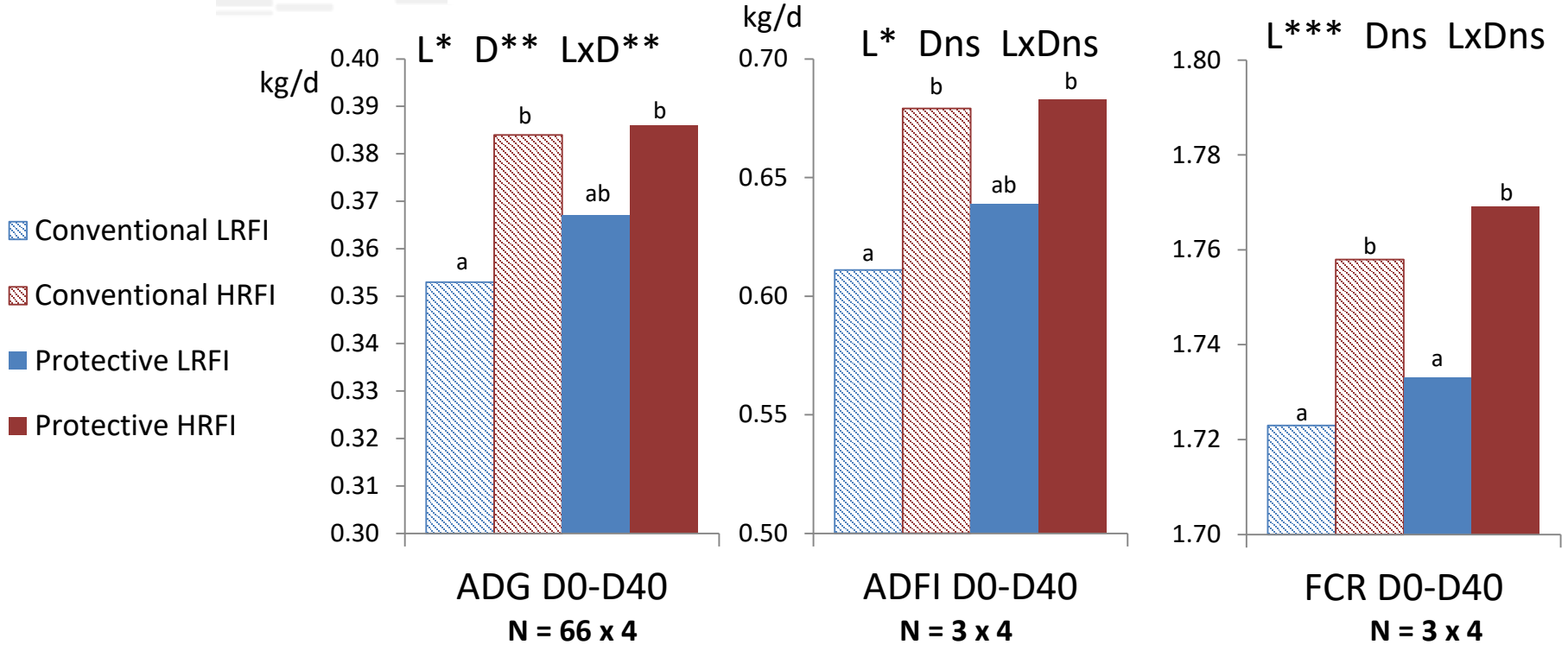


→ Major line effect : LRFI grow slower during post-weaning

➔ at weaning + 40 days, no line difference for BW

→ No diet effect on HRFI pigs; slight improvement of LRFI pigs performances

Growth rate, feed intake and FCR from weaning to D40

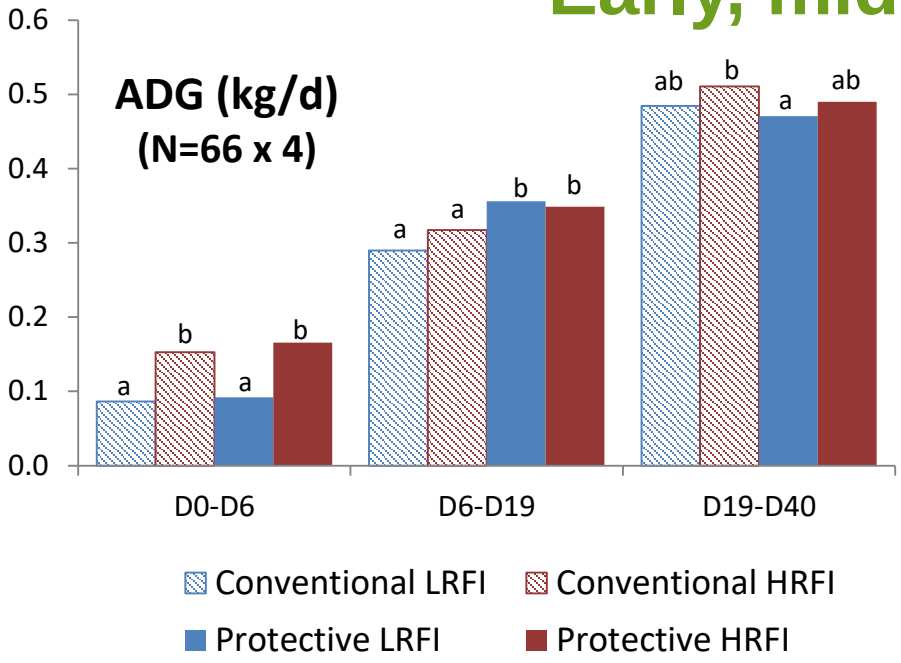


→ Major line effect : LRFI pigs eat less and grow slower during post-weaning

➔ improved FCR

→ No diet effect on HRFI pigs; slight improvement of LRFI pigs performances

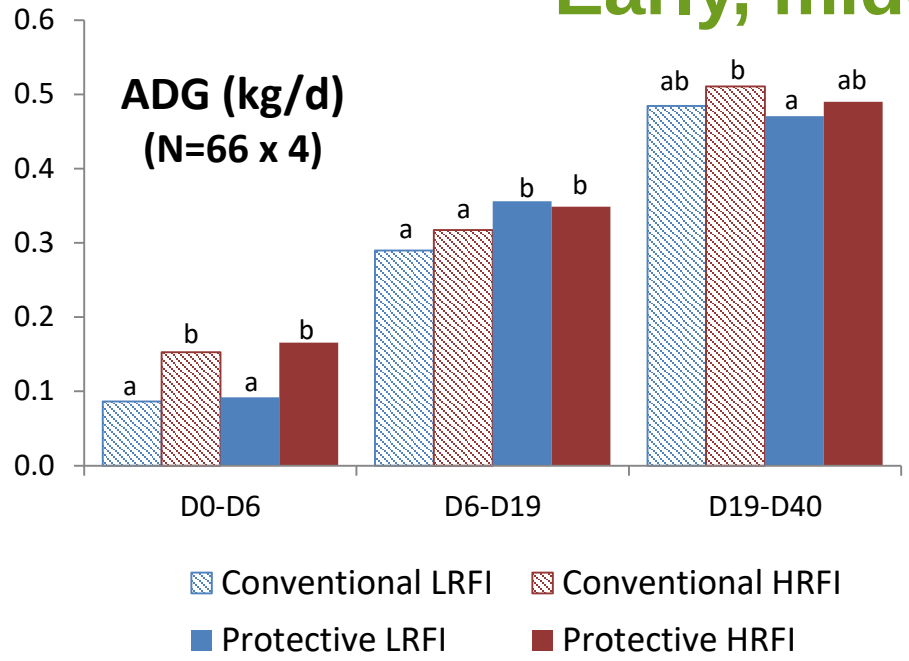
Early, middle and late post-weaning



→ LRFI pigs growth less, especially during week 1 after weaning

→ Diet favors better growth in weeks 2 and 3 after weaning

Early, middle and late post-weaning



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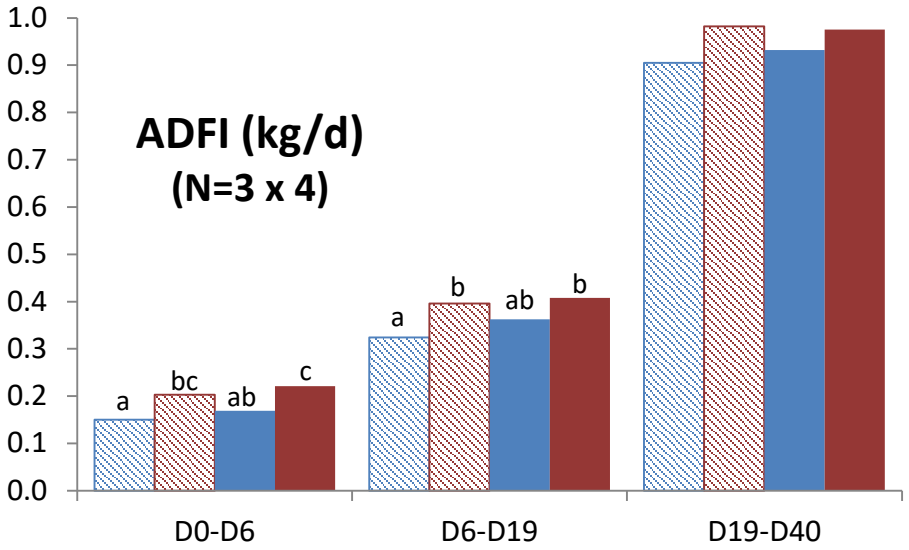
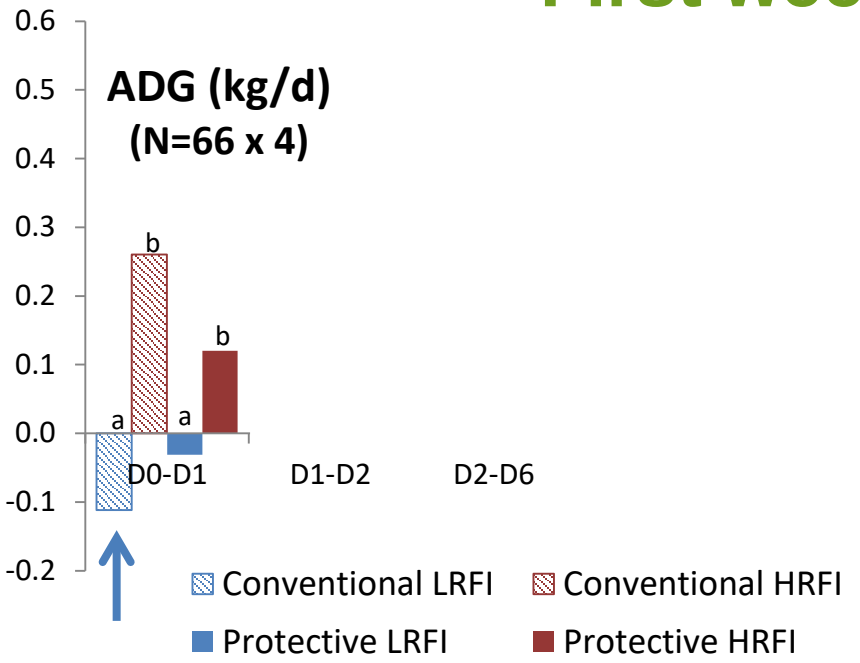


→ LRFI pigs eat less, especially in weeks 1, 2 and 3

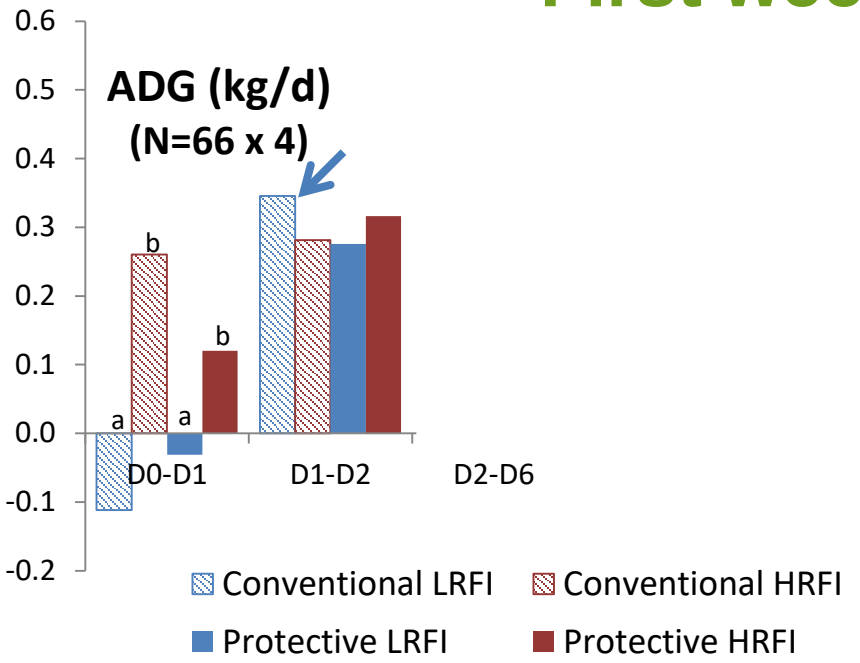
→ Protective diet tends to increase feed intake in LRFI pigs during this period

First week after weaning



→ LRFI pigs lose weight at D0
LRFI pigs tend to lose less weight with the protective diet – drinking effect?

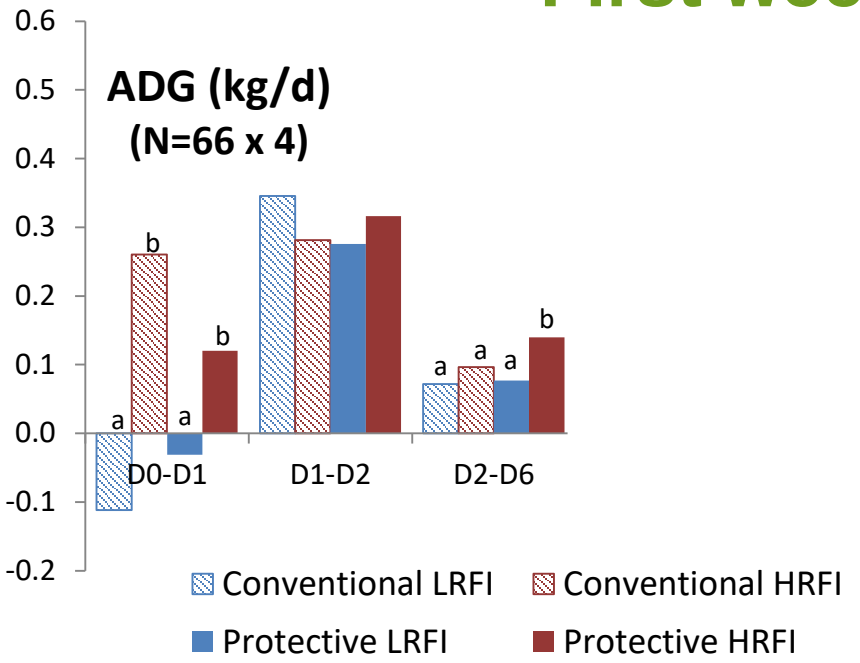
First week after weaning

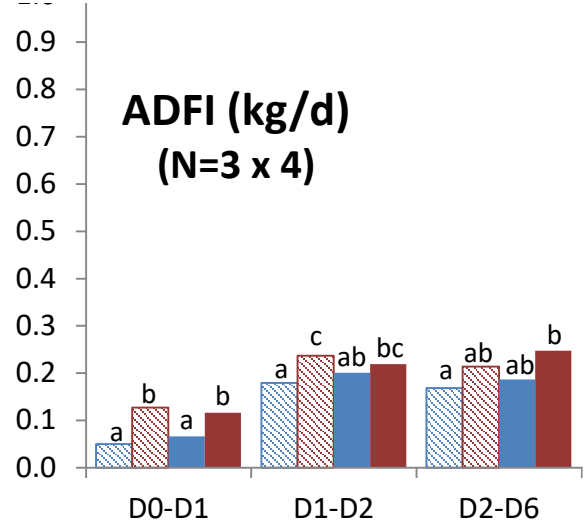


→ LRFI pigs lose weight at D0
LRFI pigs tend to lose less weight with the protective diet

→ LRFI pigs regain numerically more weight at D1 when fed the conventional diet

First week after weaning





→ LRFI pigs lose weight at D0
LRFI pigs lose less weight with securing diet
→ LRFI pigs gain numerically more weight at D1 when fed the securing diet

→ LRFI pigs eat less at D0, at all times

→ LRFI with securing diet tend to eat more than LRFI pig with conventional diet
→ No diet effect on HRFI pigs

Diarrhea

- Line effect :
  - At D1 and D2: higher proportion of **normal** feces in LRFI pigs ($P<0.0125$)
  - At D6: higher proportion of **diarrhea** in LRFI pigs ($P=0.0017$)
  - Line differences disappear after a week post weaning

- Diet effect :
  - At D6 and D12: higher proportion of **normal** feces in pigs fed the protective diet ($P<0.09$)
  - Diet differences disappear after two weeks post weaning

Conclusions

- The RFI lines have different strategies to deal with weaning

  see Montagne et al for more details

- The protective diet after weaning has positive effects just after weaning mainly on pigs which have difficulties to maintain feed intake immediately after weaning, ie LRFI pigs

- The protective diet show no effect during the growing-finishing period

Acknowledgements

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Staff from the farm is acknowledged for rearing, testing and sampling the pigs

Conclusions

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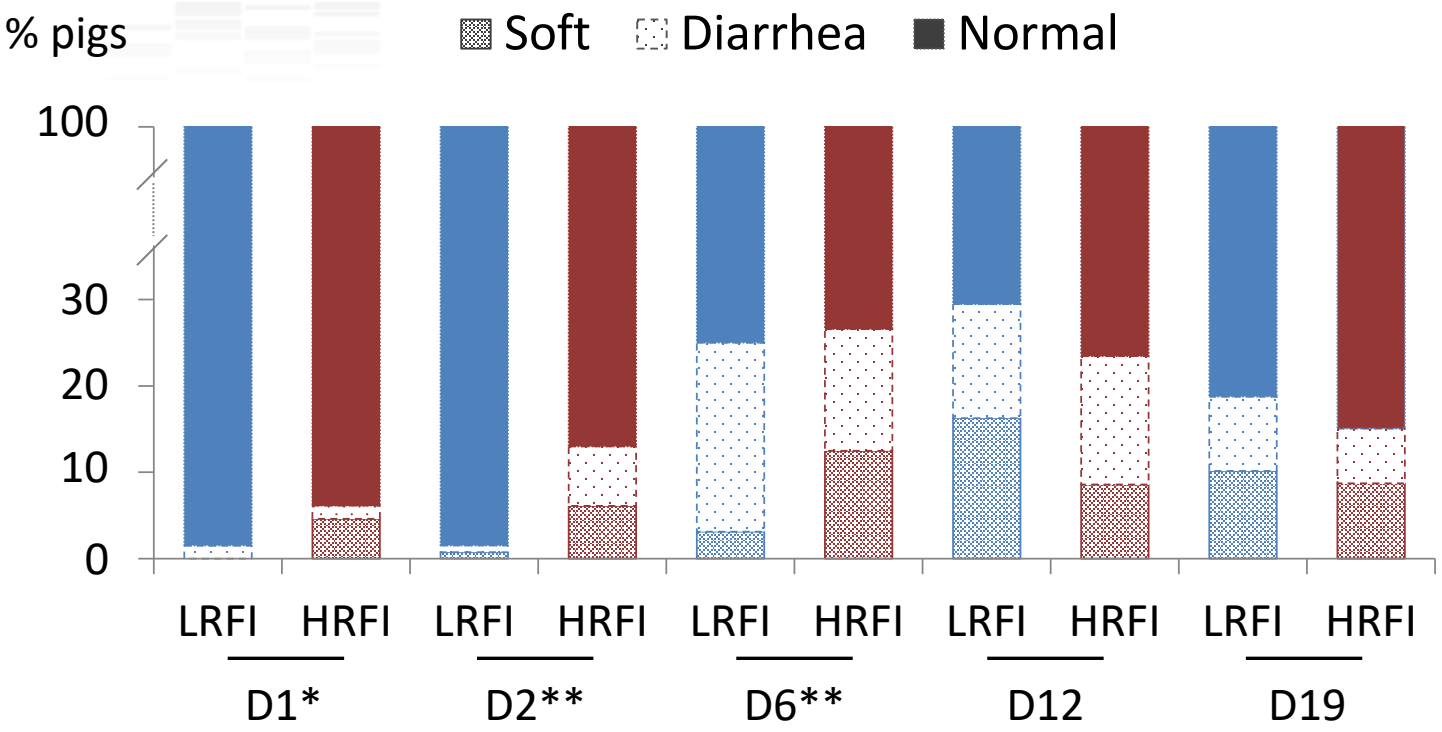
Diarrhea – line effect

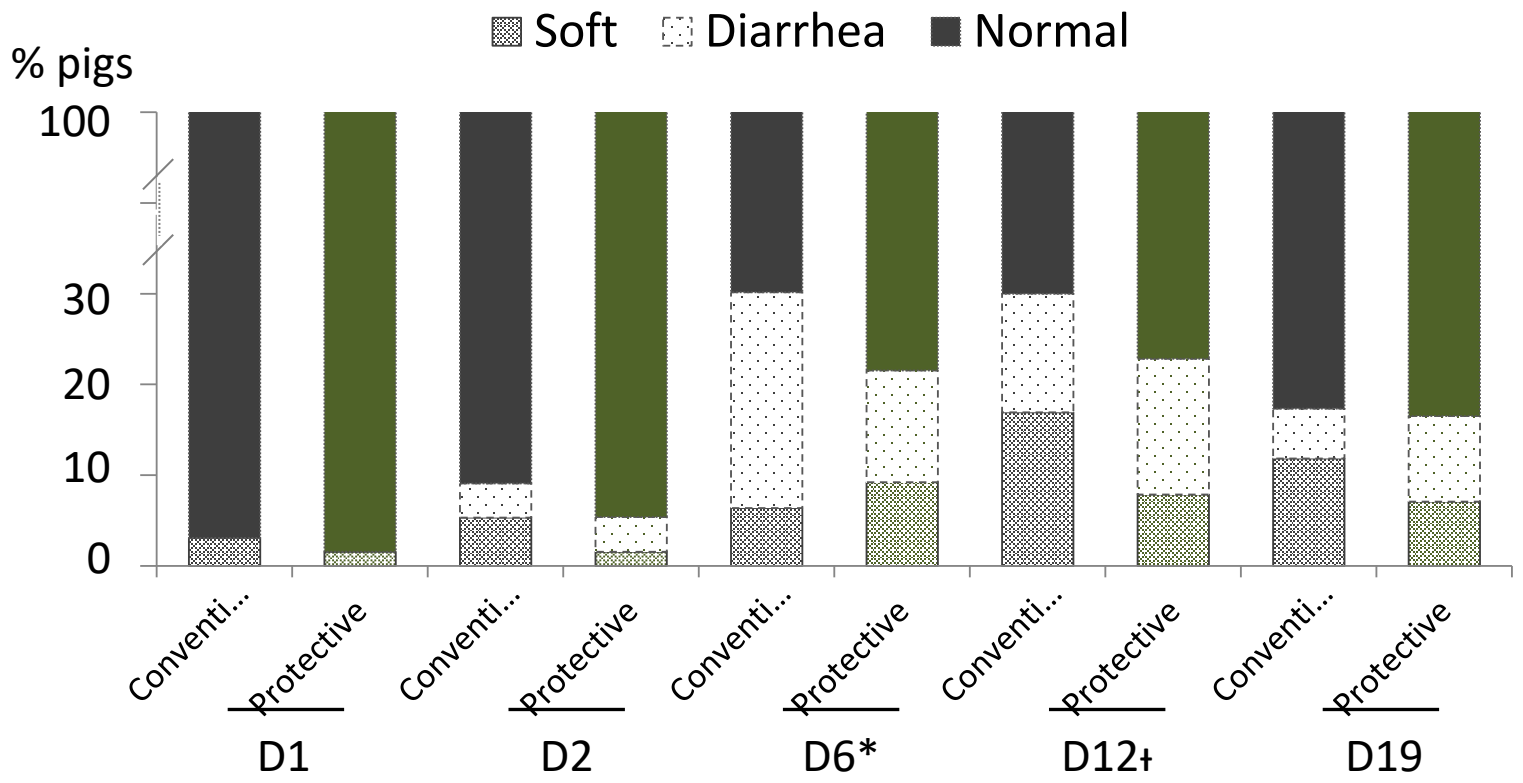


At D1 and D2: higher proportion of normal feces in LRFI pigs

At D6: higher proportion of **diarrhea** in LRFI pigs

Line differences disappear after a week post weaning

Diarrhea – diet effect

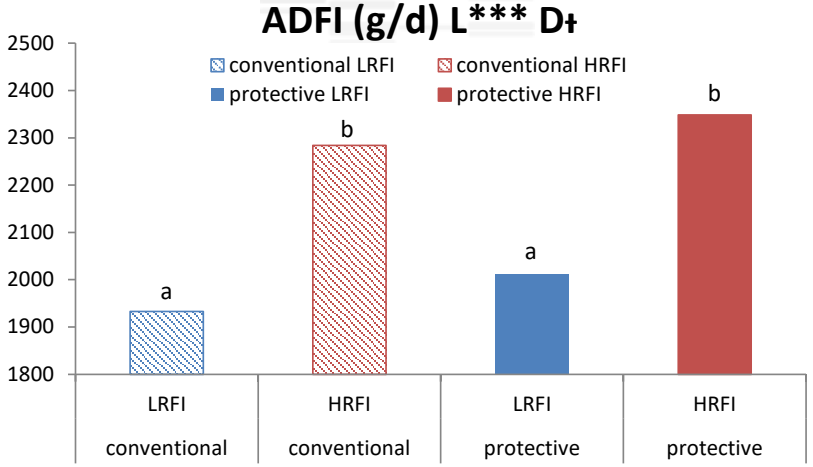


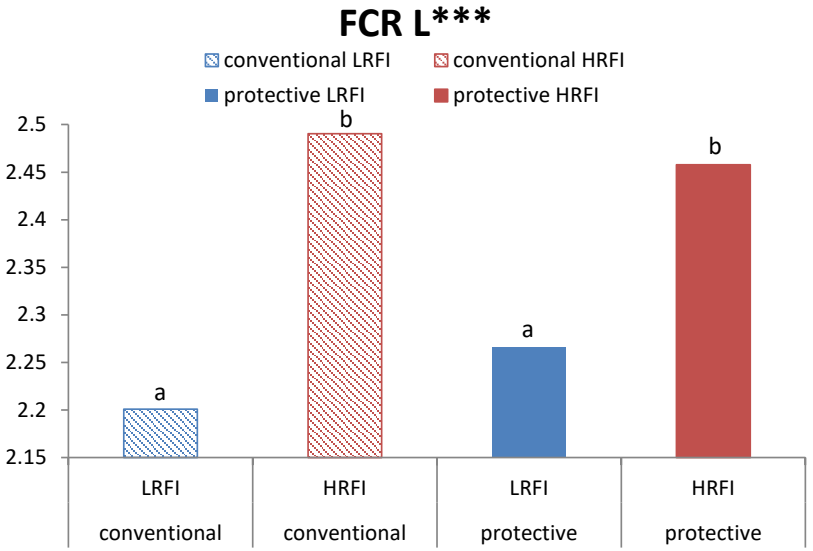
Before D12: higher proportion of normal feces in pigs fed the protective diet

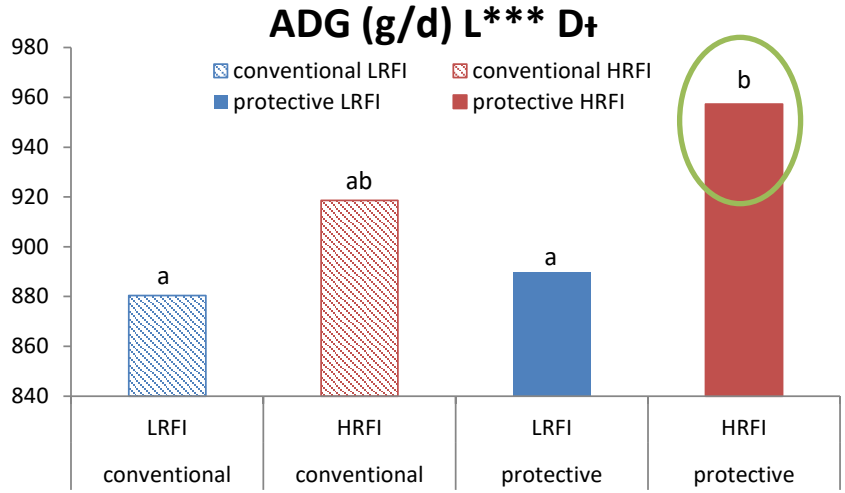
Diet differences disappear after two weeks post weaning

Production traits to slaughter

N= 44 x 4







→ Line differences as previously reported

→ No clear effect of the diet during post-weaning on growing-finishing traits