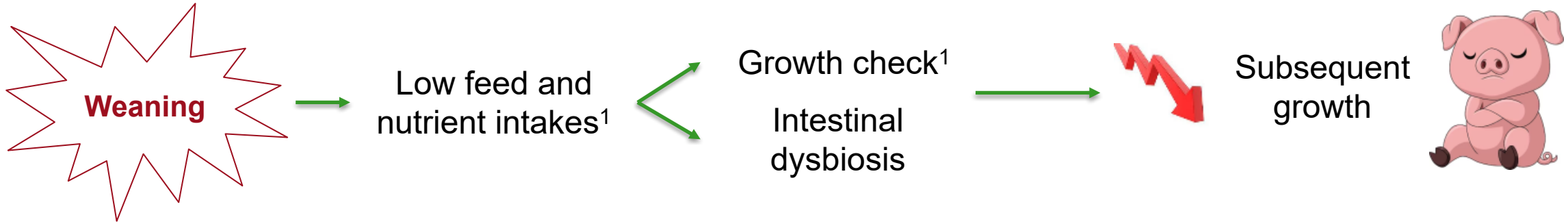
Effect of glutamine and/or milk supplementation post-weaning on pig growth and intestinal structure

E.A. Arnaud, G.E. Gardiner, S. Vasa, J.V. O'Doherty, T. Sweeney, P.G. Lawlor

28.08.2023
EAAP, France

Context



- **Strategies to address this:**
  - → Supplementation with milk replacer post-weaning:
    - to alleviate nutritional stress at weaning[2]
  - → Supplementation with L-glutamine post-weaning:
    - to maintain epithelial barrier function[3]

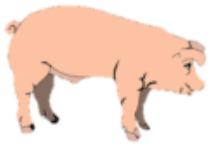
- **Hypothesis:** Milk supplementation and/or L-glutamine will ↑ growth and improve intestinal structure in pigs post-weaning

[1]Lawlor et al., 2020; [2]Zijlstra et al., 1996; [3]Coëffier et al., 2003

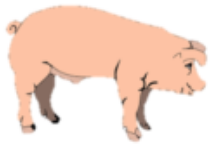
Source pig image: https://www.freepik.com/premium-vector/cute-sad-pig-cartoon-white-background_42753522.htm

Materials and methods

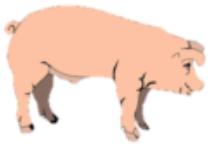
No supplementary milk / no L-glutamine



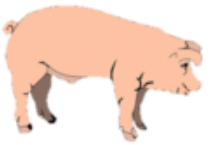
No supplementary milk / L-glutamine



Supplementary milk / No L-glutamine



Supplementary milk / L-glutamine



480 pigs (10/pen)

N= 12 pens

N= 12 pens

N= 12 pens

N= 12 pens

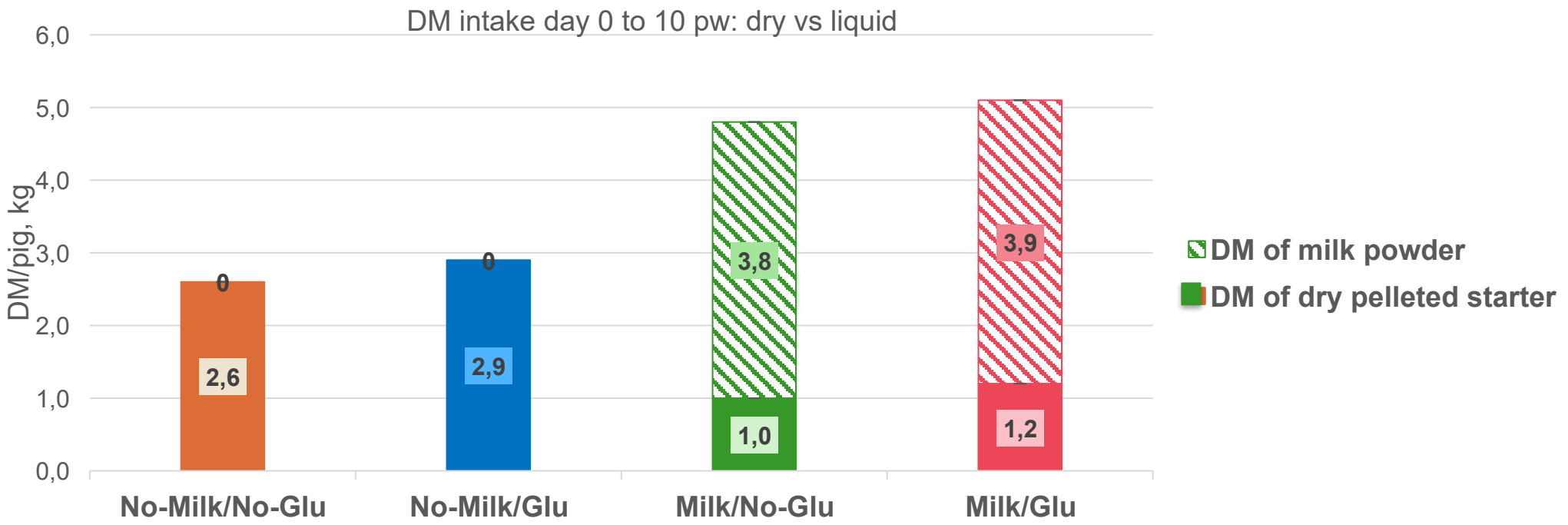
- **Supplementary milk replacer:** until day 10 post-weaning (Swinco) → 14.3% DM
- **L-glutamine:** added at 1% in the starter and milk powder

Parameters: pig feed intake per pen, individual pig weight, intestinal morphology at day 7 post-weaning

Statistics: mixed model procedure in SAS with means separation by Tukey's test

Results – Pig feed intake

Effect of treatments on solid *vs* liquid intake at day 10 pw



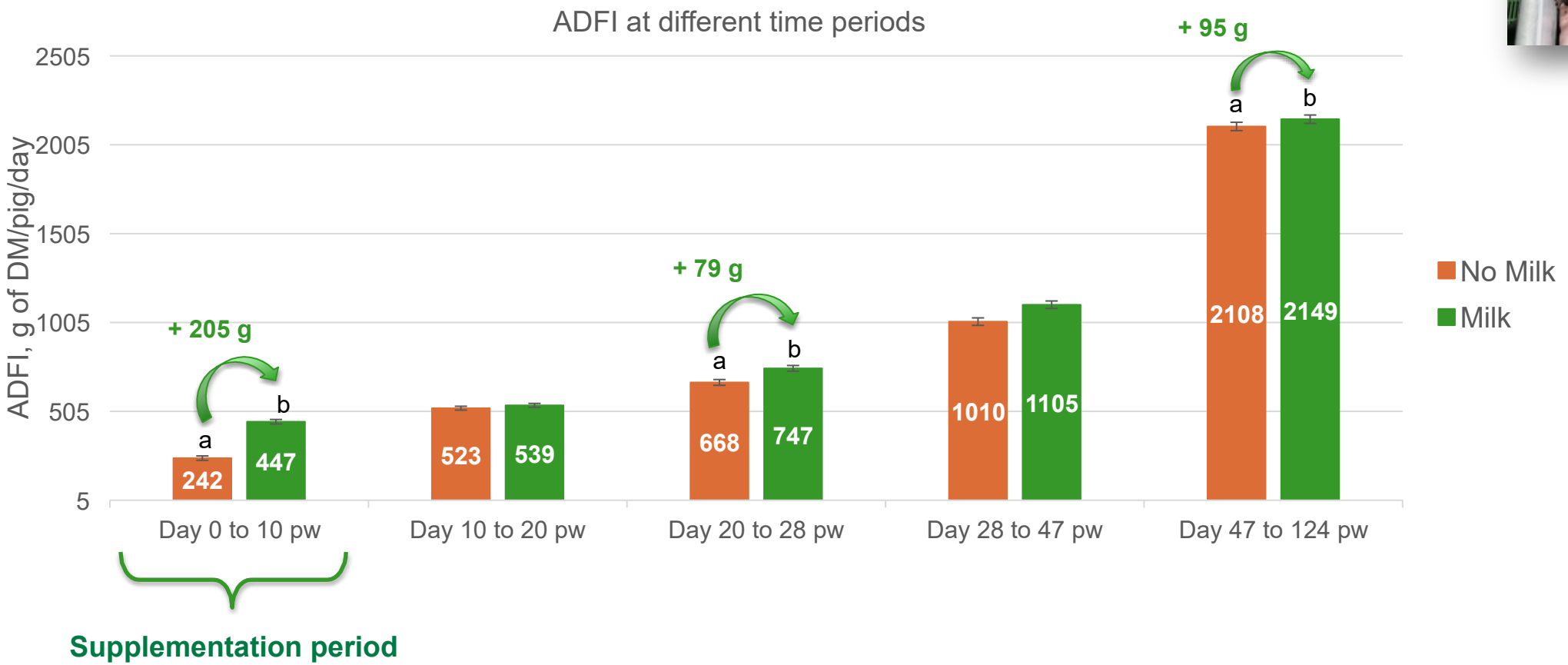
- No interaction between milk and glutamine
- No effect of glutamine on growth parameters

Effect of milk presented on the following slides

a,b at P < 0.05, A,B at P > 0.05 but less than P < 0.10

Results – Pig average daily feed intake

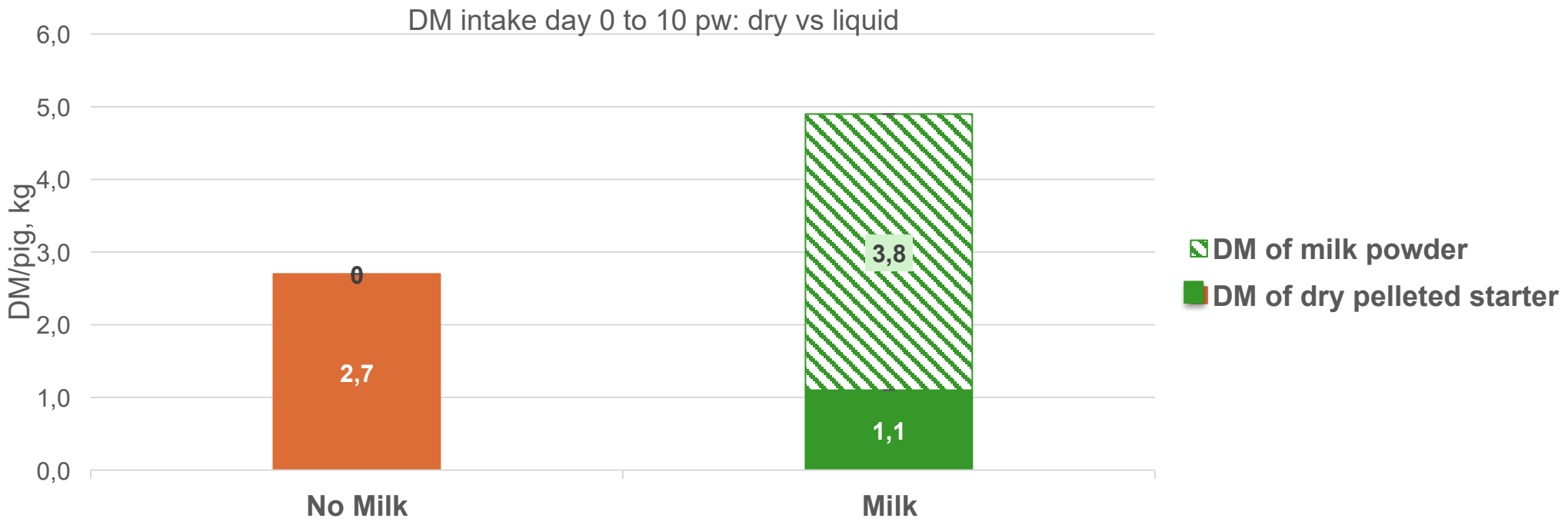
Effect of milk on ADFI:



a,b at P < 0.05, A,B at P > 0.05 but less than P < 0.10

Results – Pig feed intake

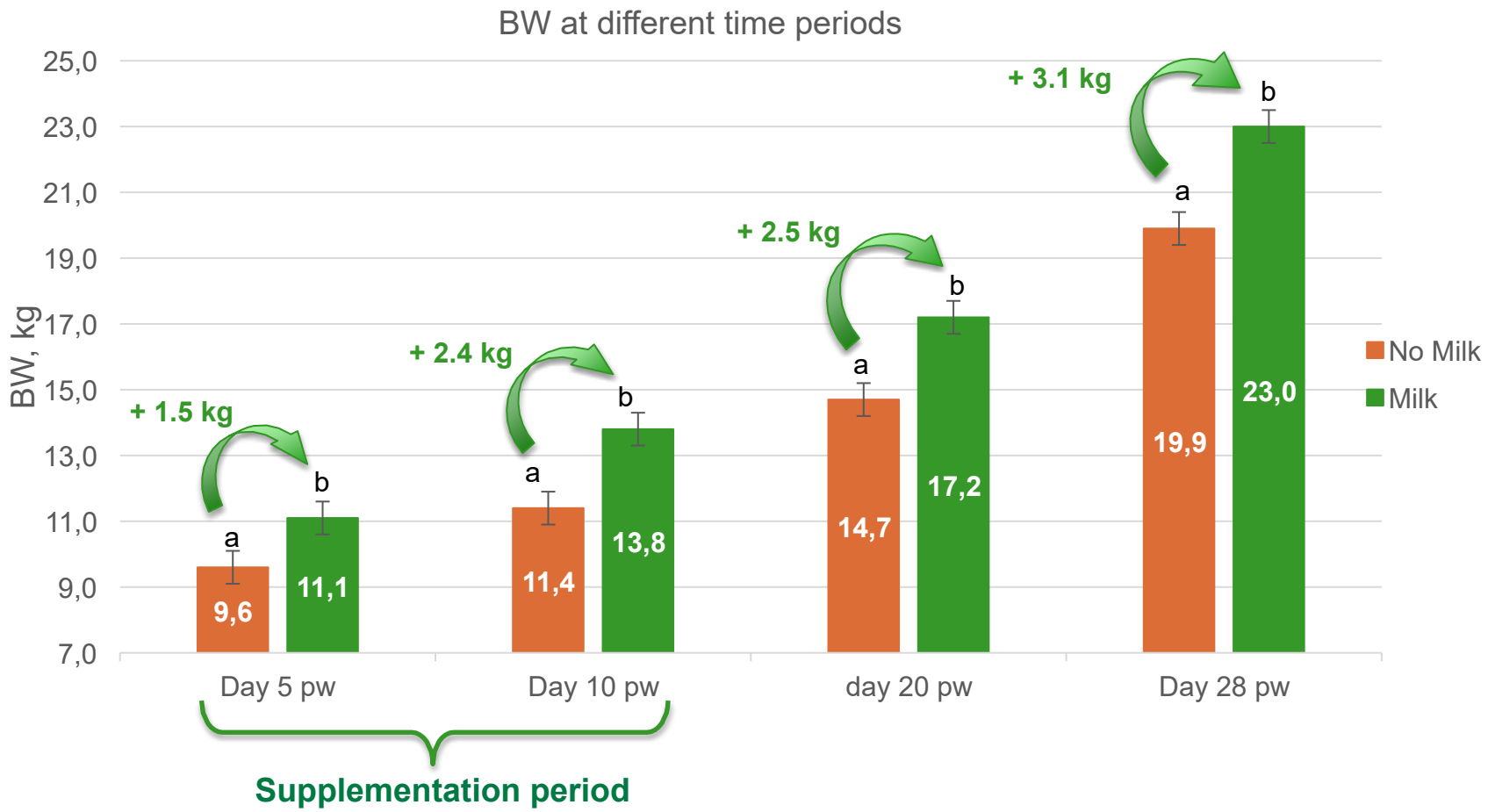
Effect of treatments on solid vs liquid intake at day 10 pw



a,b at P < 0.05, A,B at P > 0.05 but less than P < 0.10

Results – Pig body weight

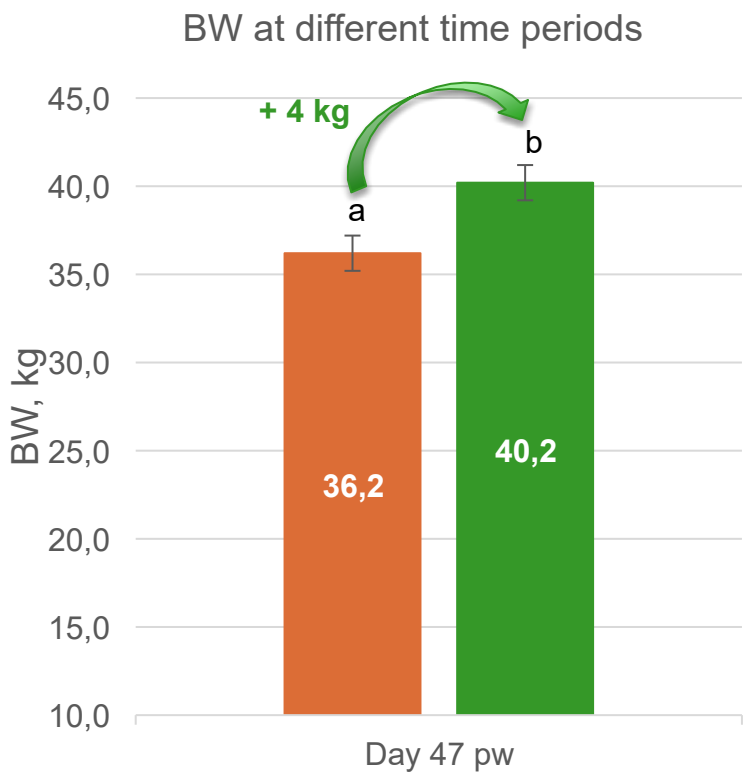
Effect of milk on BW at day 5, 10, 20 and 28 pw:

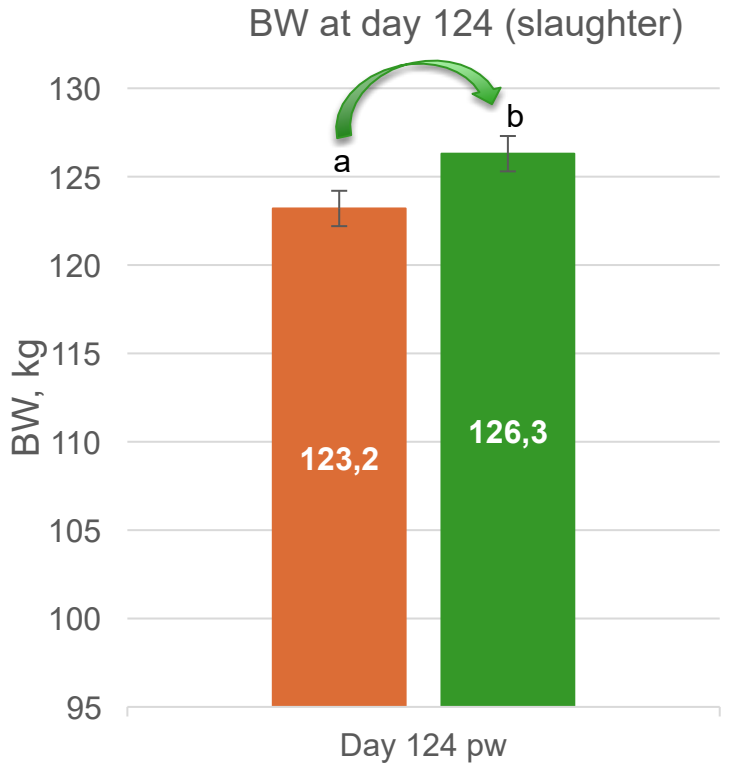


a,b at P < 0.05, A,B at P > 0.05 but less than P < 0.10

Results – Pig body weight

Effect of milk on BW at day 47 and 124 pw :





+ 3.1 kg at slaughter

+ 2.5 kg carcass weight

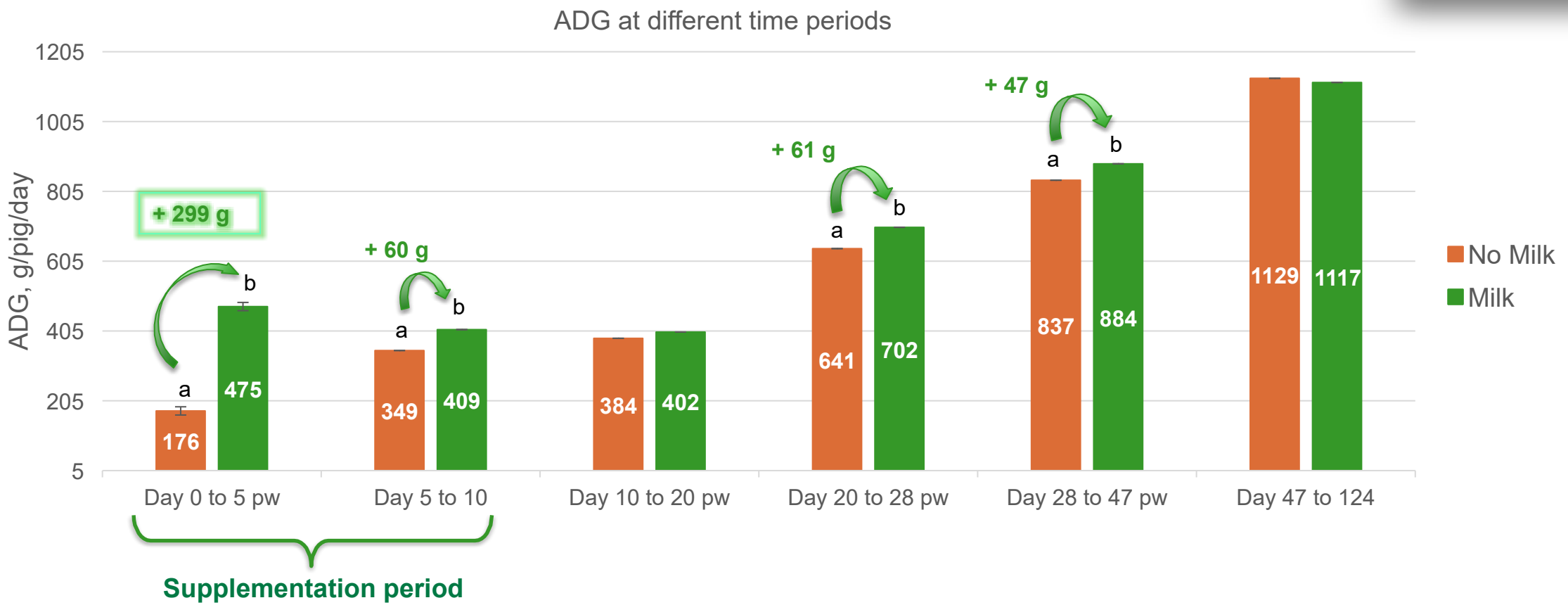
No Milk

Milk

a,b at P < 0.05, A,B at P > 0.05 but less than P < 0.10

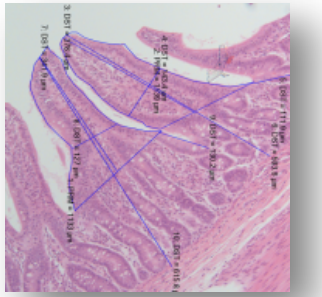
Results – Pig average daily gain

Effect of milk on ADG:

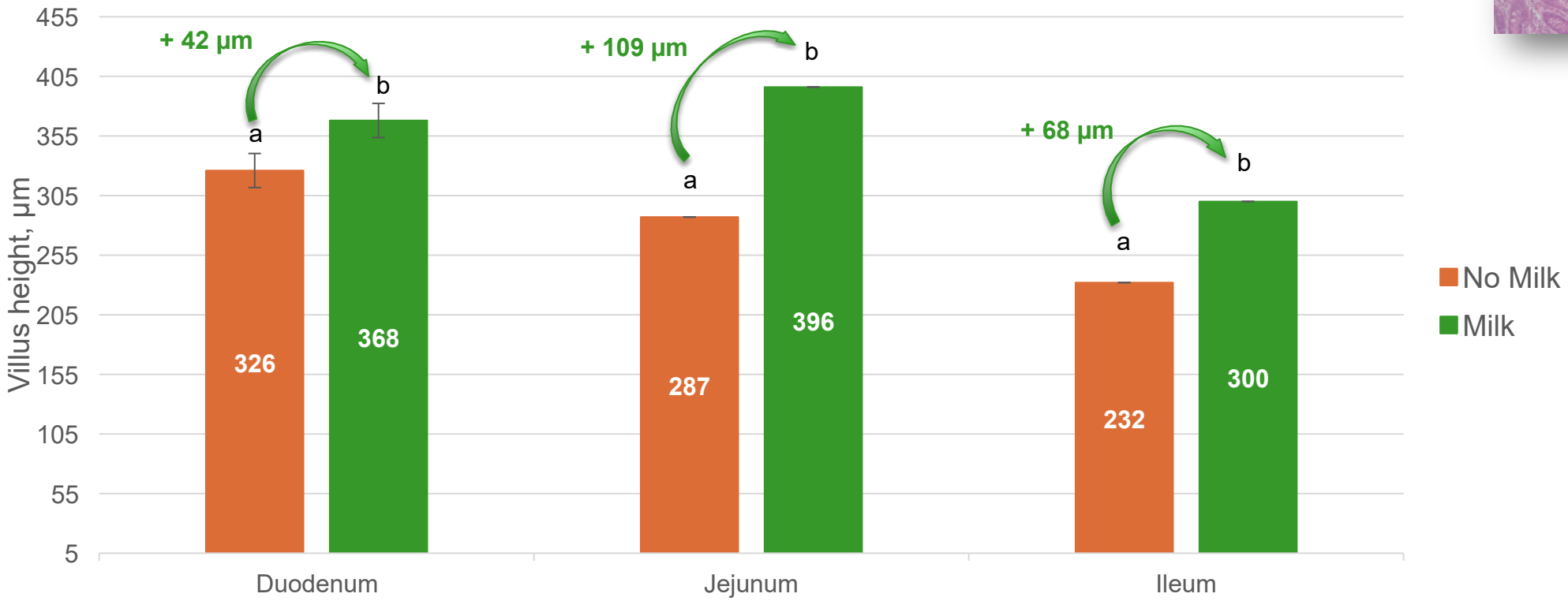


a,b at P < 0.05, A,B at P > 0.05 but less than P < 0.10

Results – Pig intestinal morphology



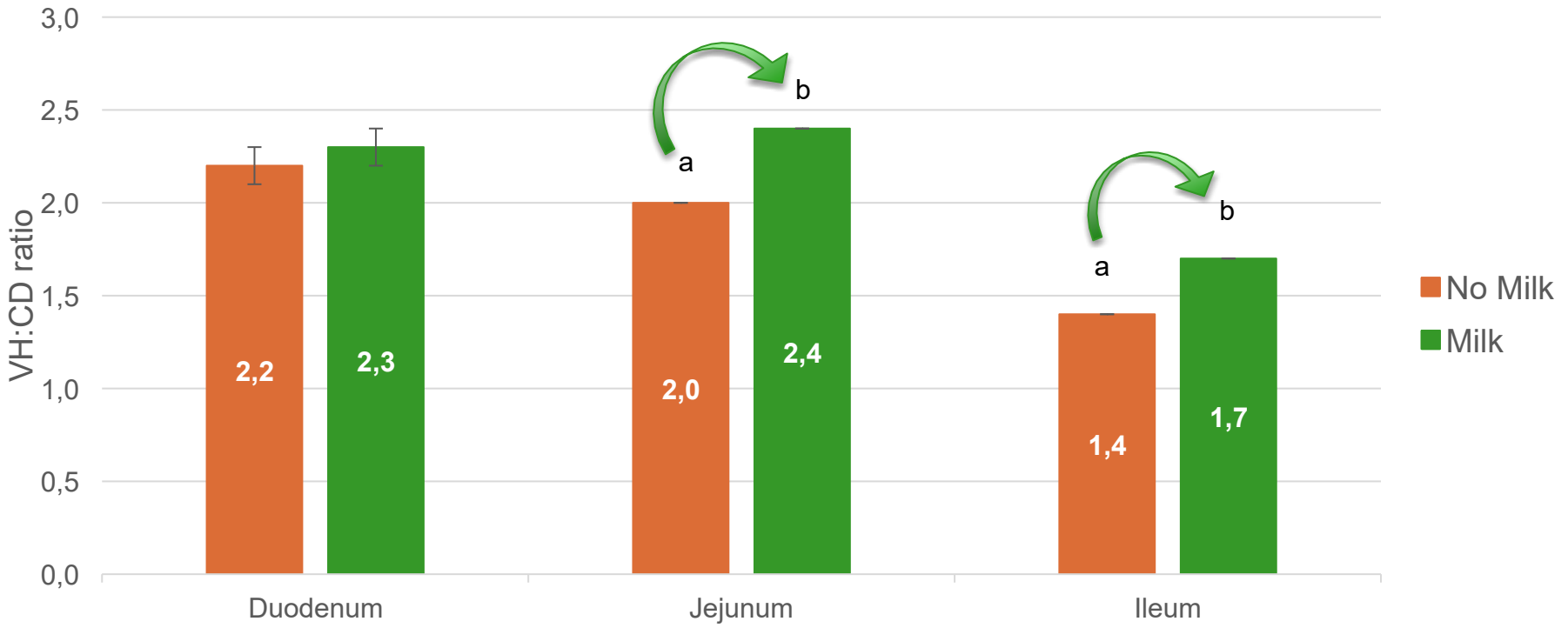
Effect of milk on villus height at day 7 post-weaning:



a,b at P < 0.05, A,B at P > 0.05 but less than P < 0.10

Results – Pig intestinal morphology

Effect of milk on villus height:crypt depth ratio at day 7 post-weaning:



a,b at P < 0.05, A,B at P > 0.05 but less than P < 0.10

Conclusion

Effect on BW

→ No effect of 1% glutamine supplementation

→ **+ 3.1 kg at slaughter** in pigs supplemented with milk 10 days post-weaning

- Supplementary milk **increased villous height** in the duodenum, jejunum and ileum and **VH:CD ratio** in the jejunum and ileum of pigs at day 7 post-weaning.

Recommendation:

Provide milk replacer in pigs up to 10 day post-weaning.

Milk powder: future trials should investigate how to optimize the supplementation period to fine-tune the economical cost.

SETU Ollscoil Teicneolaíochta an Oirdheiscirt South East Technological University
UCD DUBLIN
Department of Agriculture, Food and the Marine An Roinn Talmhaíochta, Bia agus Mara
teagasc Agriculture and Food Development Authority

Thank you for your attention !

Acknowledgements

- Pig department staff
- DAFM
- Intern students

Fundings

The PigNutriStrat project is funded by the Irish Department of Agriculture, Food and the Marine's Competitive Research Funding Programmes (Grant no: 2019R518).