



The effect of protein and salt level on performance and faecal consistency in weanling piglets

Sam Millet, Bart Ampe, Mike Tokach

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ILVO

Why?

TABLE 16-5A Dietary Mineral, Vitamin, and Fatty Acid Requirements of Growing Pigs Allowed Feed Ad Libitum (90% dry matter)

Item	Body Weight Range (kg)						
	5-7	7-11	11-25	25-50	50-75	75-100	100-135
NE content of the diet (kcal/kg) ^a	2,448	2,448	2,412	2,475	2,475	2,475	2,475
Effective DE content of diet (kcal/kg) ^a	3,542	3,542	3,490	3,402	3,402	3,402	3,402
Effective ME content of diet (kcal/kg) ^a	3,400	3,400	3,350	3,300	3,300	3,300	3,300
Estimated effective ME intake (kcal/day)	904	1,592	3,033	4,959	6,989	8,265	9,196
Estimated feed intake + wastage (g/day) ^b	280	493	953	1,582	2,229	2,636	2,933
Body weight gain (g/day)	210	335	585	758	900	917	867
Body protein deposition (g/day)	—	—	—	128	147	141	122

Mineral elements	Requirements (% or amount per kilogram of diet)						
Sodium (%)	0.40	0.35	0.28	0.10	0.10	0.10	0.10
Chloride (%)	0.50	0.45	0.32	0.08	0.08	0.08	0.08

NRC, 2012

	5 - 11 kg LG	11 - 25 kg LG
Mineralen (g/kg)		
Mg	1,1	1,1
Na	2,4	1,1
Cl	3,2	3,2
K	3,3	2,9
Spoorelementen (mg/kg)		
Fe	110	110
I	0,15	0,15
Mn	22	22
Se	0,28	0,24

*: Een voedernorm is de behoefte plus een veiligheidsmarge.

CVB, 2016

Why?

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NE content of the diet (kcal/kg) ^a			
Effective DE content of diet (kcal/kg)			
Efficiency of gain			
Estimate of body weight gain (kg)			
Estimate of feed intake (kg)			
Mineral			
Sodium	0.08	0.10	0.10
Chlorine	0.08	0.08	0.08

quadratic polynomial model suggested the maximum at 0.38% Cl. In conclusion, 7 to 12 kg pigs fed diets that contained at least 0.35% Na and 0.38% Cl had greater ADG and G:F compared to pigs fed diets with lower concentrations and minimal effects were observed among the sources of Na or Cl used in these studies.

Shawk et al., 2019

NRC, 2012









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CVB, 2016

Does the salt requirement depend on the protein level?

→ experiment with 2 protein levels x 4 salt levels

	189 g CP/kg	223 g CP/kg	
1,9 g Na/kg			1,9 g Na/kg
2,5 g Na/kg			2,6 g Na/kg
3,1 g Na/kg			3,2 g Na/kg
3,8 g Na/kg			3,9 g Na/kg

Experimental design

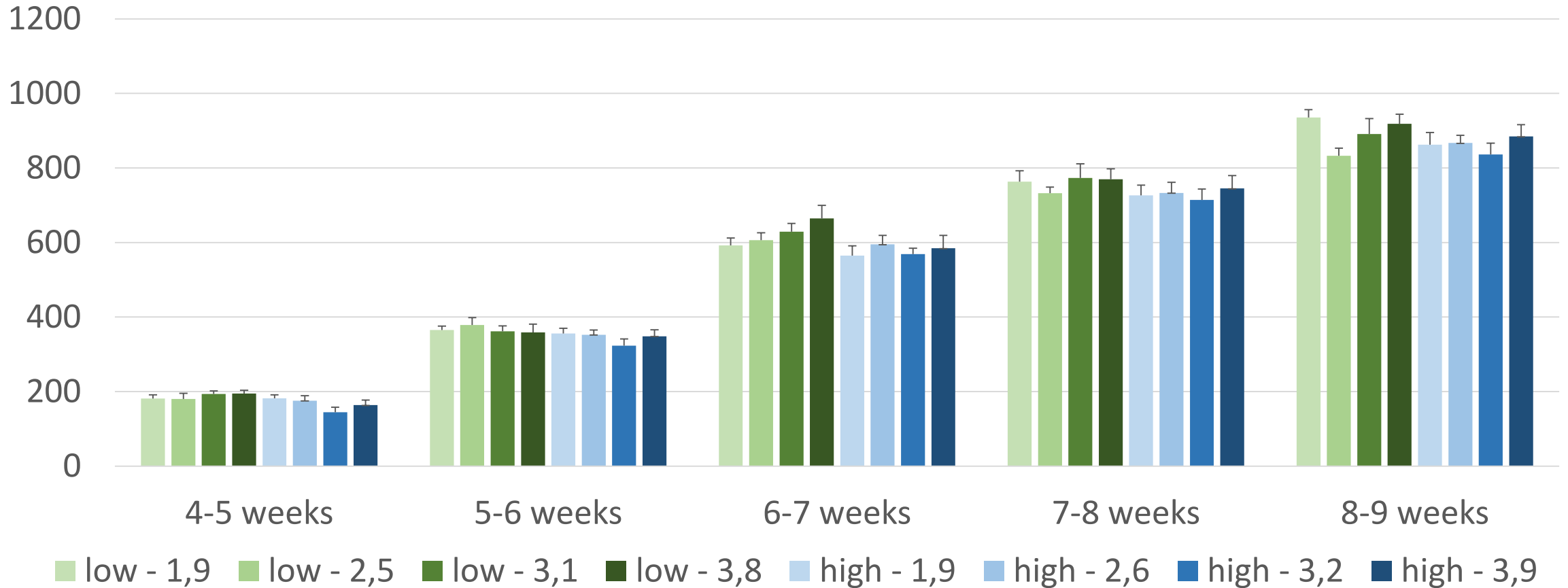
→ 12 pens per treatment

→ 4-9 weeks

Na, g/kg	1.9	2.5	3.1	3.8	1.9	2.6	3.2	3.9
Crude protein, g/kg	185	185	185	185	220	220	220	220
SID Lys, g/kg	11.80	11.80	11.80	11.80	12.50	12.50	12.50	12.50
Net Energy, MJ/kg	9.85	9.85	9.85	9.85	10.40	10.40	10.40	10.40
SID Lys:CP	0.064	0.064	0.064	0.064	0.057	0.057	0.057	0.057
SID Lys:NE	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20

Results

Daily feed intake, g/day

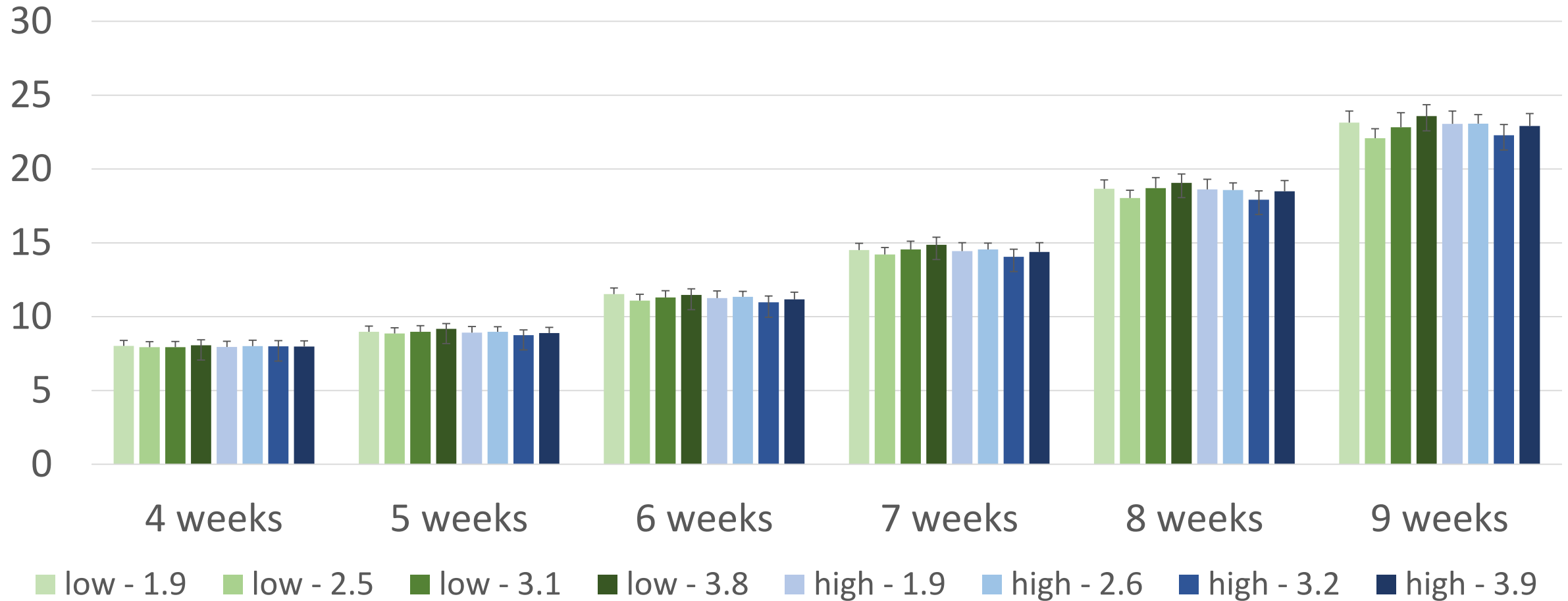


Crude protein level: $P < 0.001$

Salt level: NS

Results

Bodyweight, kg

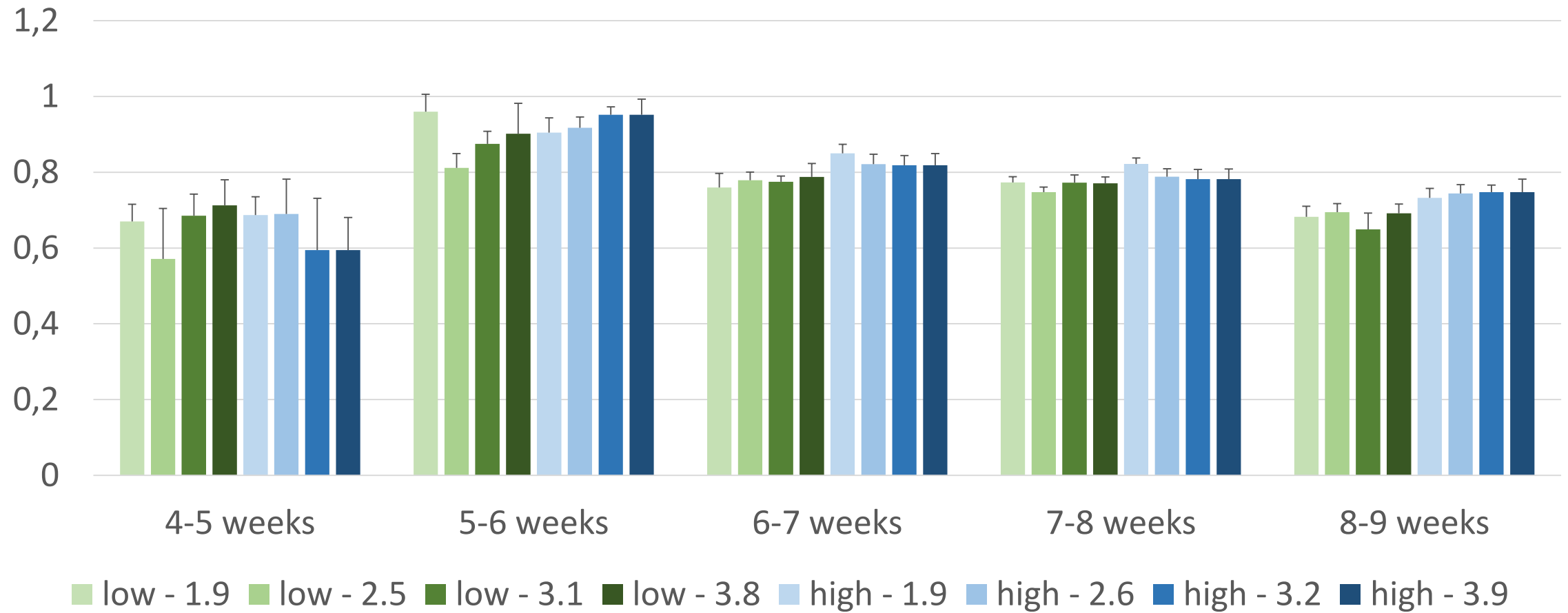


Crude protein level: NS

Salt level: NS

Results

Feed efficiency, g/g

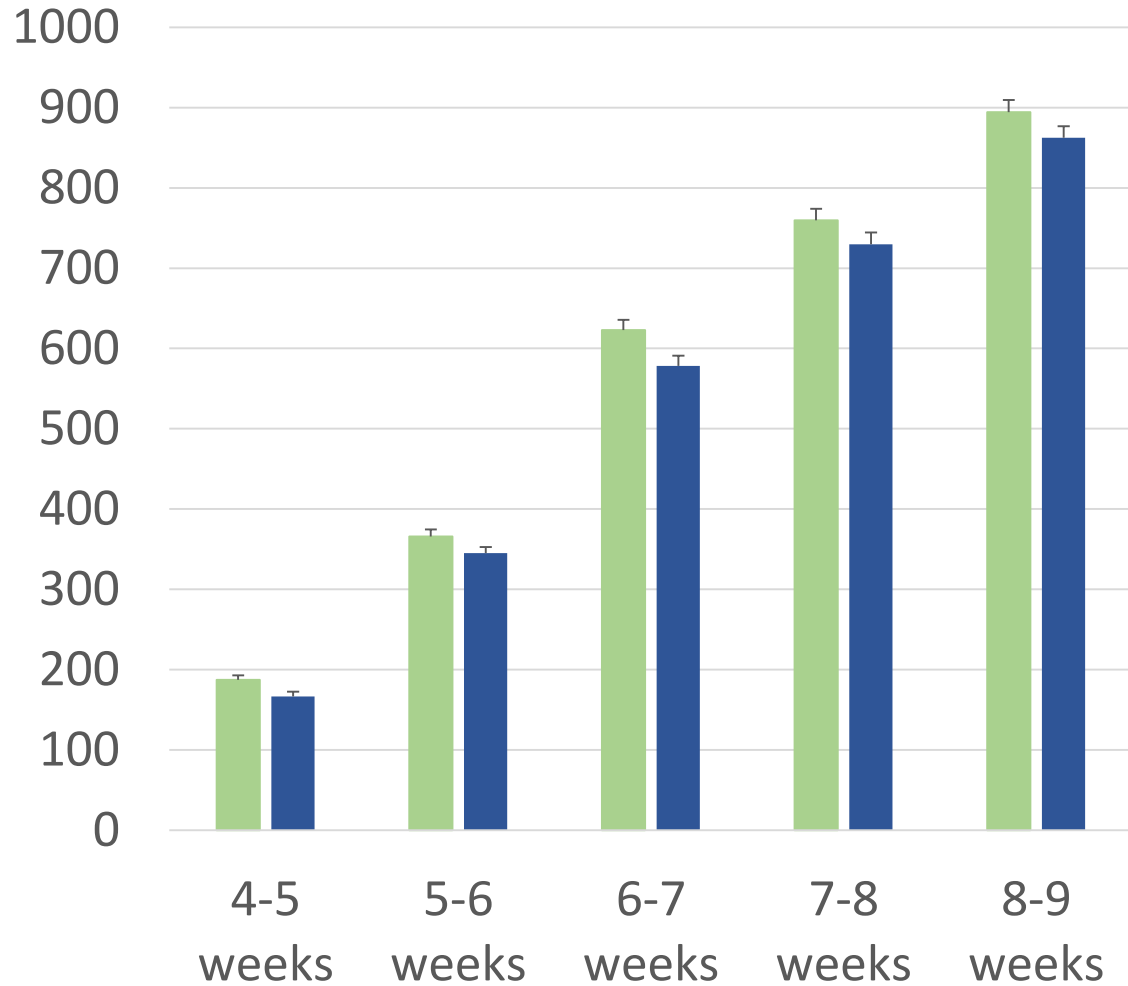


Crude protein level: 0.024

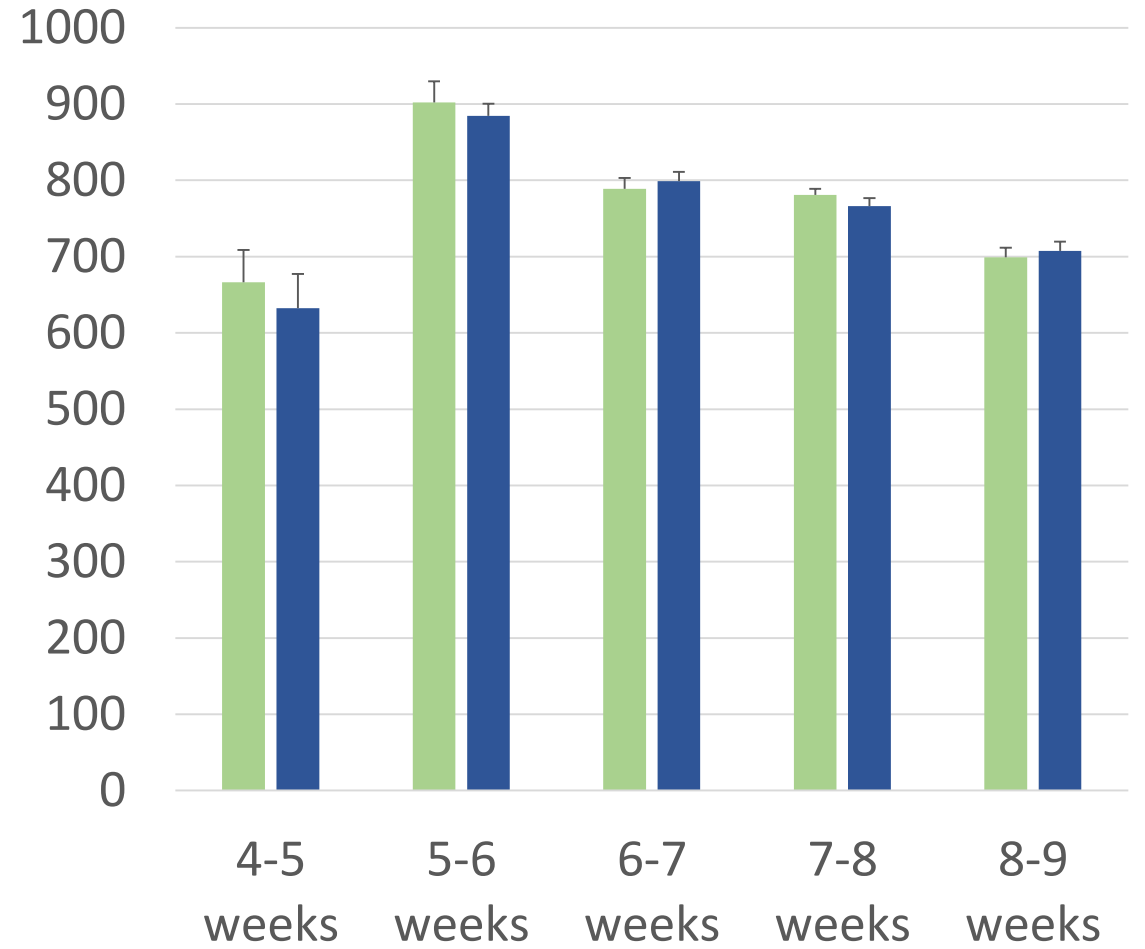
Salt level: NS

Results

Daily feed intake, g/day



Feed efficiency, g/10 MJ



■ Low crude protein level ■ High crude protein level

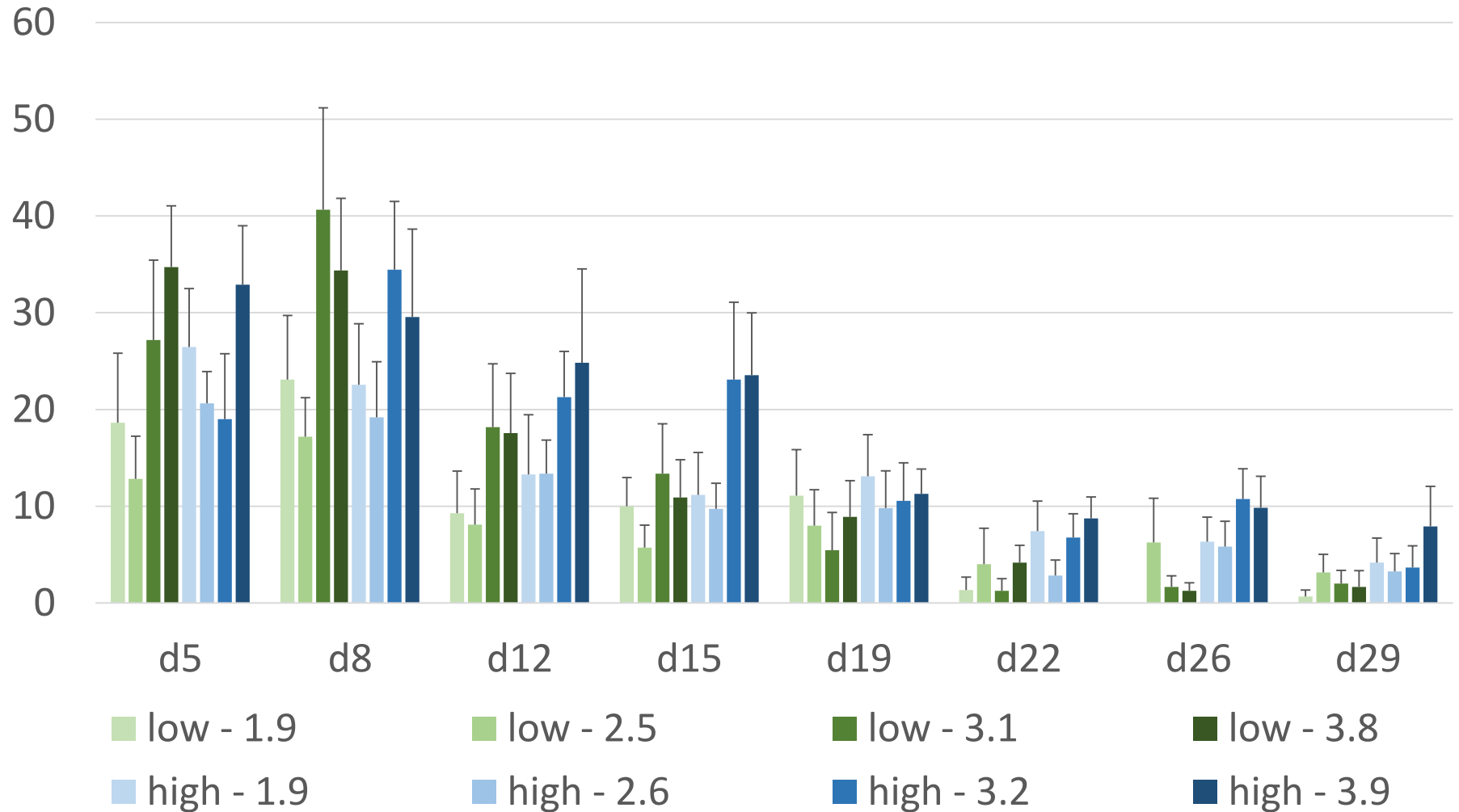
■ low crude protein level ■ high crude protein level

Results

Faecal consistency score

Crude protein
level: 0.719

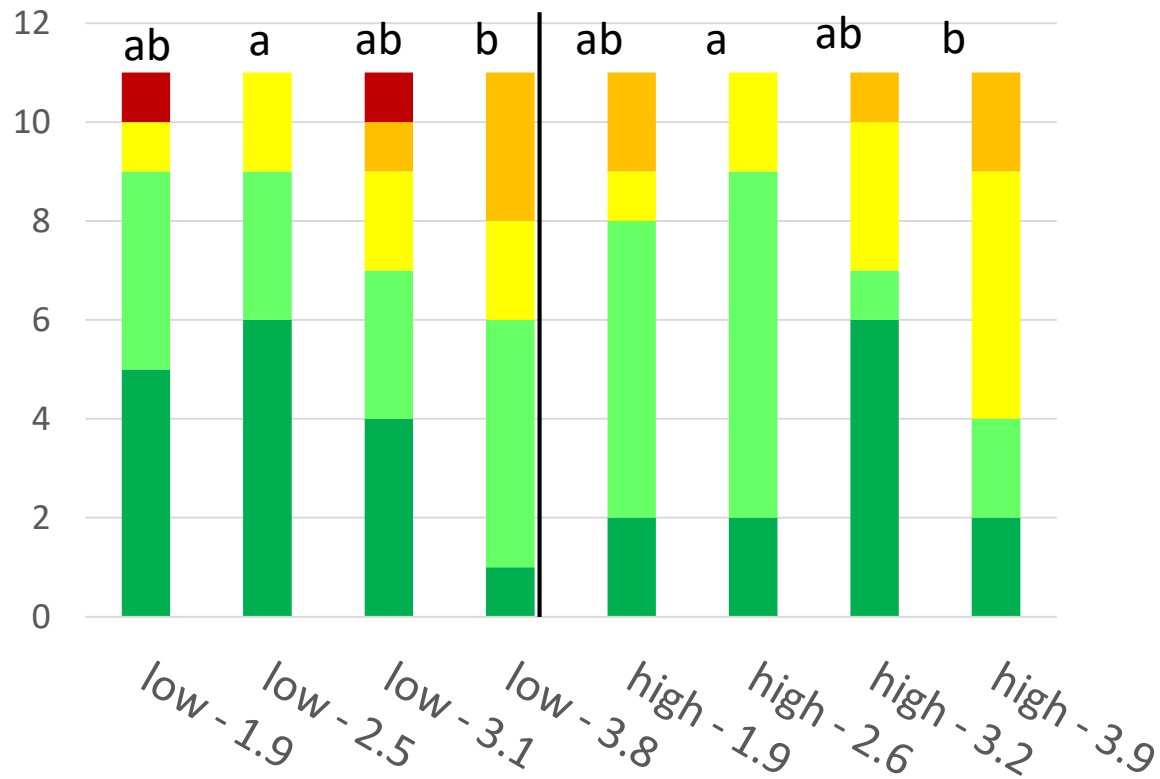
Salt level:
0.021



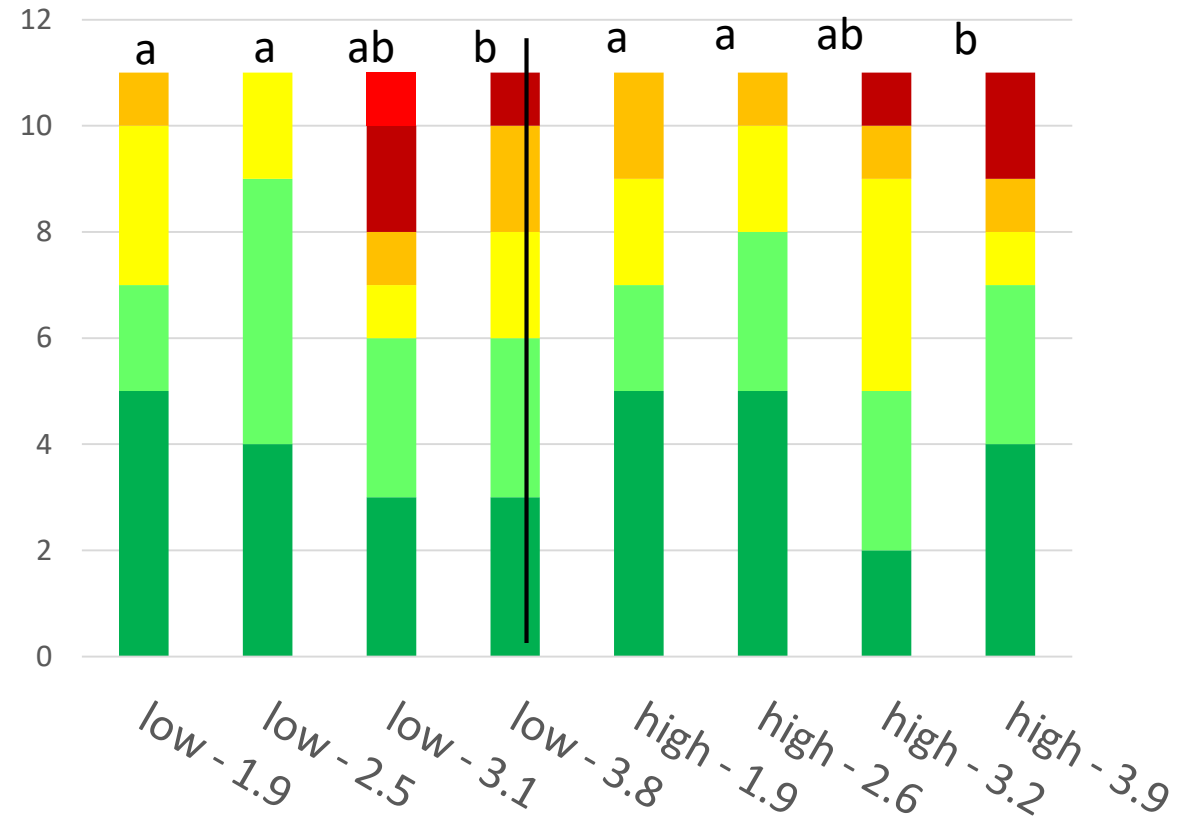
(0= perfect → 100= watery diarrhea)

Results

Faecal consistency - day 5 after weaning



Faecal consistency - day 8 after weaning



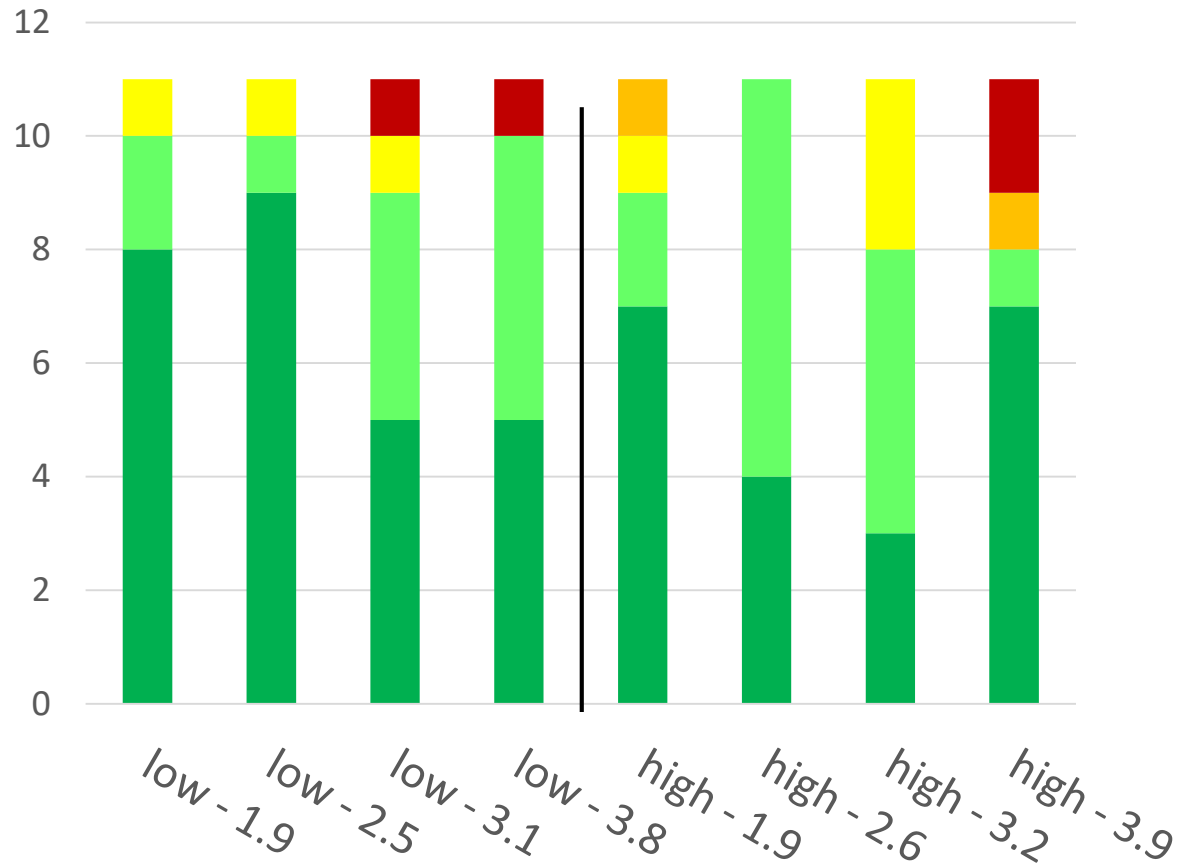
Score 0 Score 1 Score 2 Score 3 Score 4 Score 5

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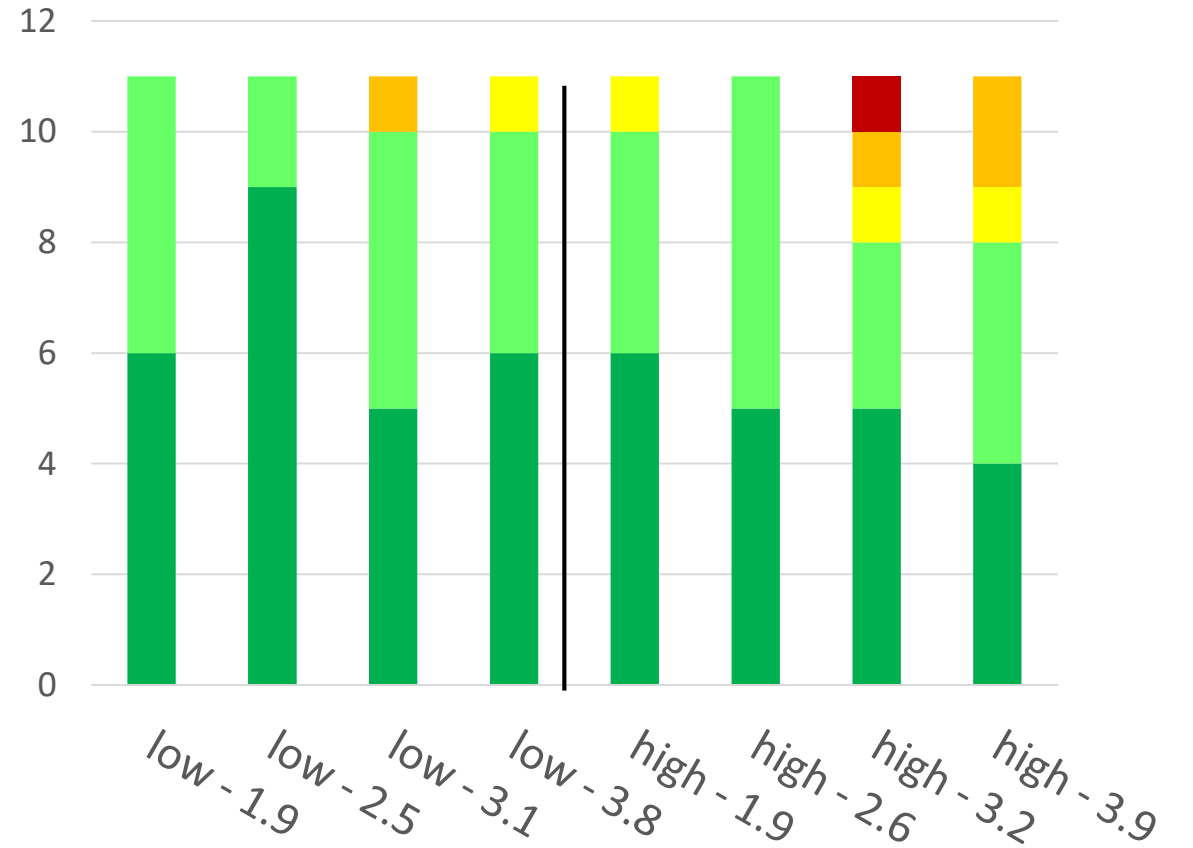
0= normal → 5= watery diarrhea

Results

Faecal consistency - day 12 after weaning



Faecal consistency - day 15 after weaning

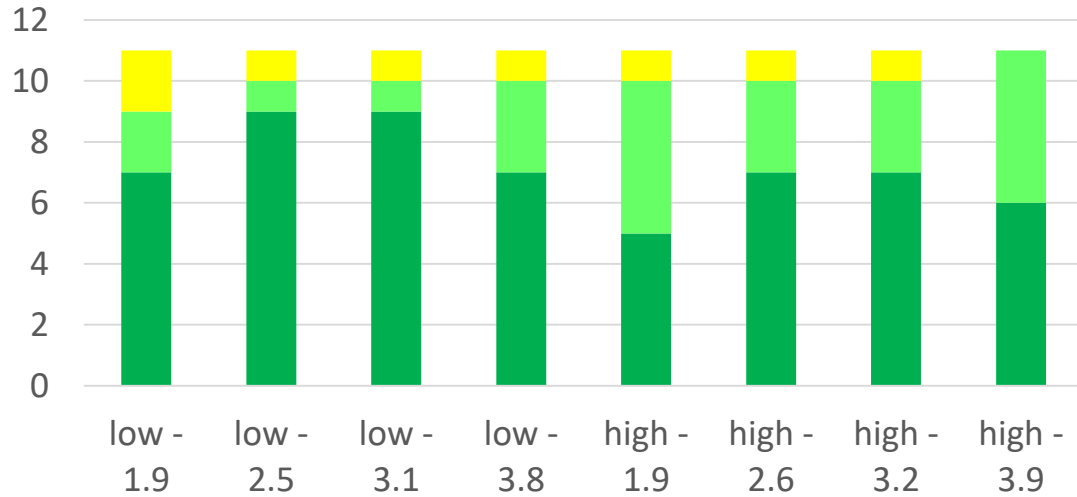


Score 0 Score 1 Score 2 Score 3 Score 4 Score 5

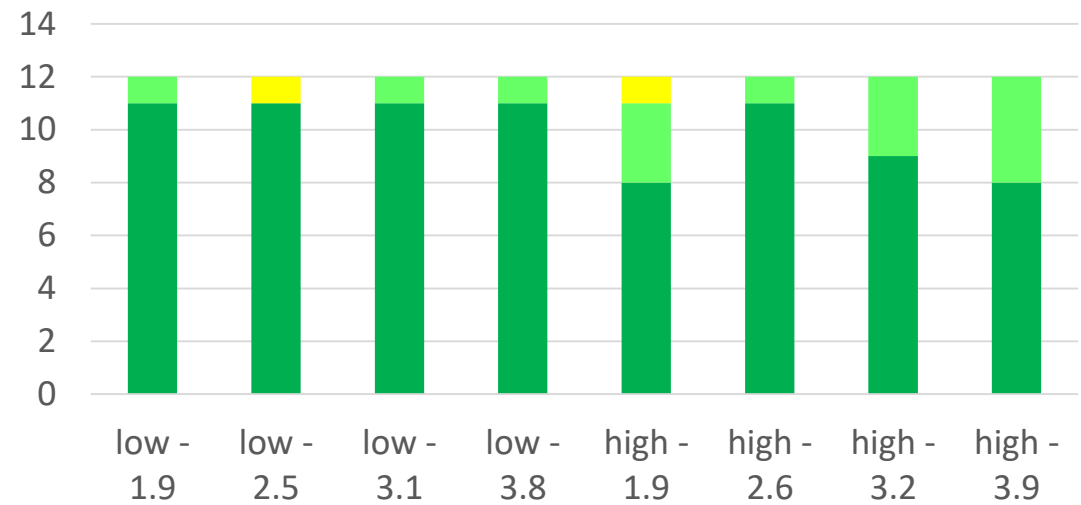
Score 0 Score 1 Score 2 Score 3 Score 4 Score 5

Results

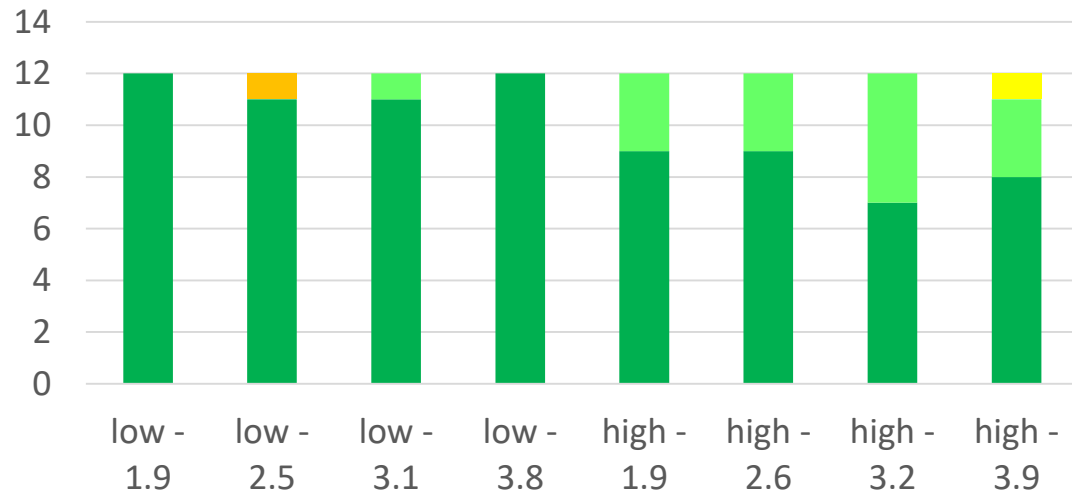
Faecal consistency - day 19 after weaning



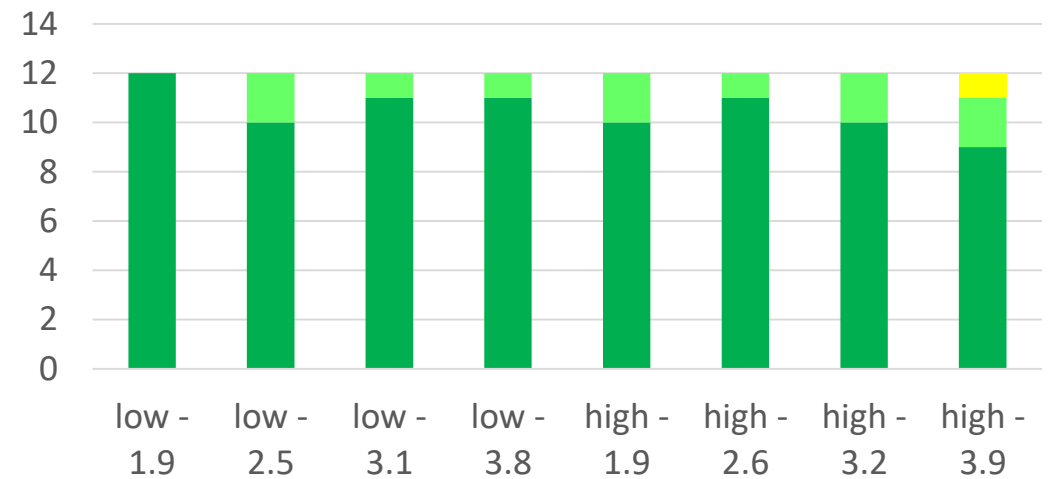
Faecal consistency - day 22 after weaning



Faecal consistency - day 26 after weaning



Faecal consistency - day 29 after weaning



Discussion

- No significant effect of salt level on performance
 ↔ US studies: Weaning age/ use of ZnO ?
- Negative effect on fecal consistency scoring
 - Lower absorption? → osmotic pressure?



Questions?

