Home grown rapeseed meal as soya bean meal alternative for grower and finisher pigs

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Background

- Rapeseed meal (RSM) is a protein source for fattening pig diets, with typical upper inclusion limit in the UK of ~15%.
- Recent Canadian studies indicate that greater levels of RSM may be used in weaned pigs without detrimental impact on performance.
- Could RSM prepared from modern varieties of UK oilseed rape be used at greater than 15% inclusion levels and as such replace soya bean meal (SBM) in fattening pig diets?

Objective

- To establish to what extent RSM of two oilseed rape varieties (DK Cabernet and PR46W21) can replace SBM in growing and finishing pig diets

Pigs, housing and diets

- Ninety-six finisher pigs
  - Initial BW: 33.8±0.4 kg (growers)
    56.2±0.8 kg (finishers)
- Two rounds of 16 pens in each phase
  - Single sex; 3 pigs per pen
- Diets
  - Control: SBM based diets
  - RSM max: 25% RSM at expense of SBM for each variety
  - Control and RSM-max were mixed for dose-response
  - Formulated to meet BSAS (2003) requirement for “lean and fast growing pigs”

Requirements

Item		
NE (MJ/kg)	**9.5**	**9.3**
DE (MJ/kg)	14.4	14.1
SID Lys (g/kg)	**9.8**	**8.9**
Total Lys (g/kg)	11.7	10.6
SID Met (g/kg)	**2.9**	**2.7**
SID Thr (g/kg)	**6.4**	**5.8**
SID Try (g/kg)	**1.9**	**1.7**
Ca (g/kg)	**7.2**	**6.8**
digP (g/kg)	**2.5**	**2.4**
NDF (max, g/kg)	130	180

Test diets (growers)

Ingredient	SBM control	Max DK	Max PR46
SBM	220	40	40
DK Cabernet	0	250	0
PR46W21	0	0	250
Wheat	340.12	237.70	237.89
Barley	300	300	300
Wheat feed	100	100	100
Soya oil	11	45	45
Lysine	2.46	4.6	4.53
Methionine	0.55	0.26	0.26
Threonine	0.69	0.93	0.91
Tryptophan	0	0.31	0.21
DCP	7.7	6.65	6.65
Limestone	10.98	8.05	8.05
Salt	4	4	4
Premix	2.5	2.5	2.5

Test diets (finishers)

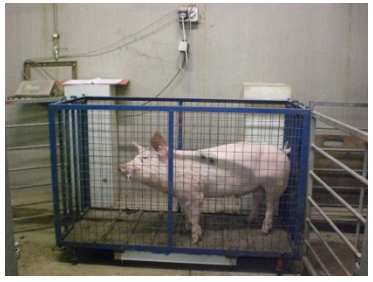
Ingredient	SBM control	Max DK	Max PR46
SBM	180	0	0
DK Cabernet	0	250	0
PR46W21	0	0	250
Wheat	265.02	164.97	165.16
Barley	315	315	315
Wheat feed	200	200	200
Soya oil	13.7	45.4	45.4
Lysine	2.24	4.37	4.3
Methionine	0.42	0.13	0.13
Threonine	0.53	0.76	0.74
Tryptophan	0	0.27	0.17
DCP	6.35	5.25	5.25
Limestone	10.94	8.05	8.05
Salt	3.3	3.3	3.3
Premix	2.5	2.5	2.5

Experimental design

- Appropriate volumes of SBM control and RSM max meals were mixed
- Seven pelleted test diets
  - SBM control
  - 5, 15 and 25% RSM for each variety
- Replicates
  - n=4 pens per RSM diet
  - n=8 pens for SBM control
  - Pen allocation balanced for sex
- Gradual and complete replace of SBM
- Gradual reduction in wheat by 30-40%

Observations

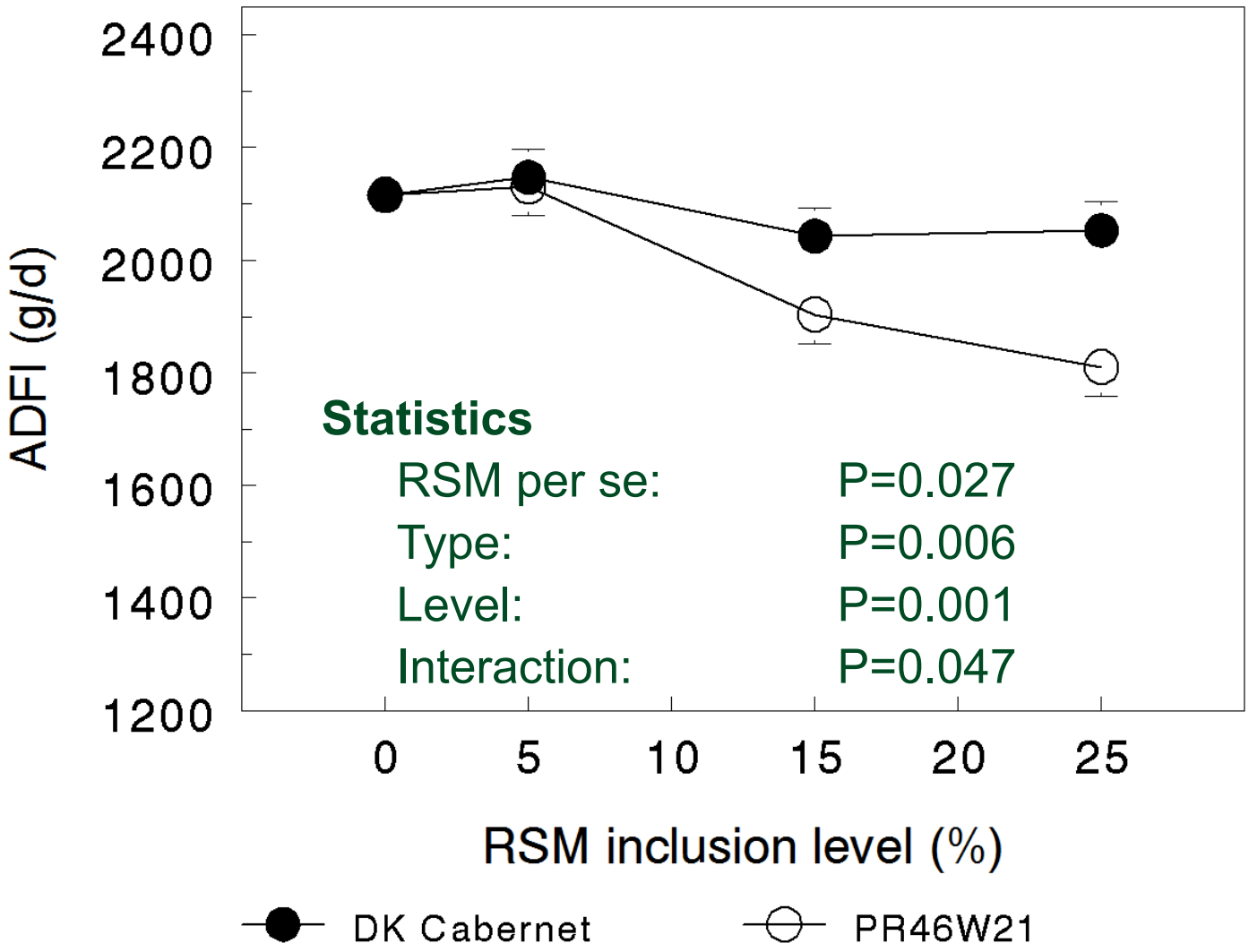
- Experimental schedule
  - Day-7 (entry in pens and standard feed)
  - Day-2 (1/3 test diet)
  - Day-1 (2/3 test diet)
  - Day0-21: full on test diets
- Daily weighing of feed offered
- Regular weighing of feed refusals
  - days 0, 7, 14 and 21
- Regular weighing of pigs
  - days -7, 0, 7, 14 and 21
- Feed samples during feeding



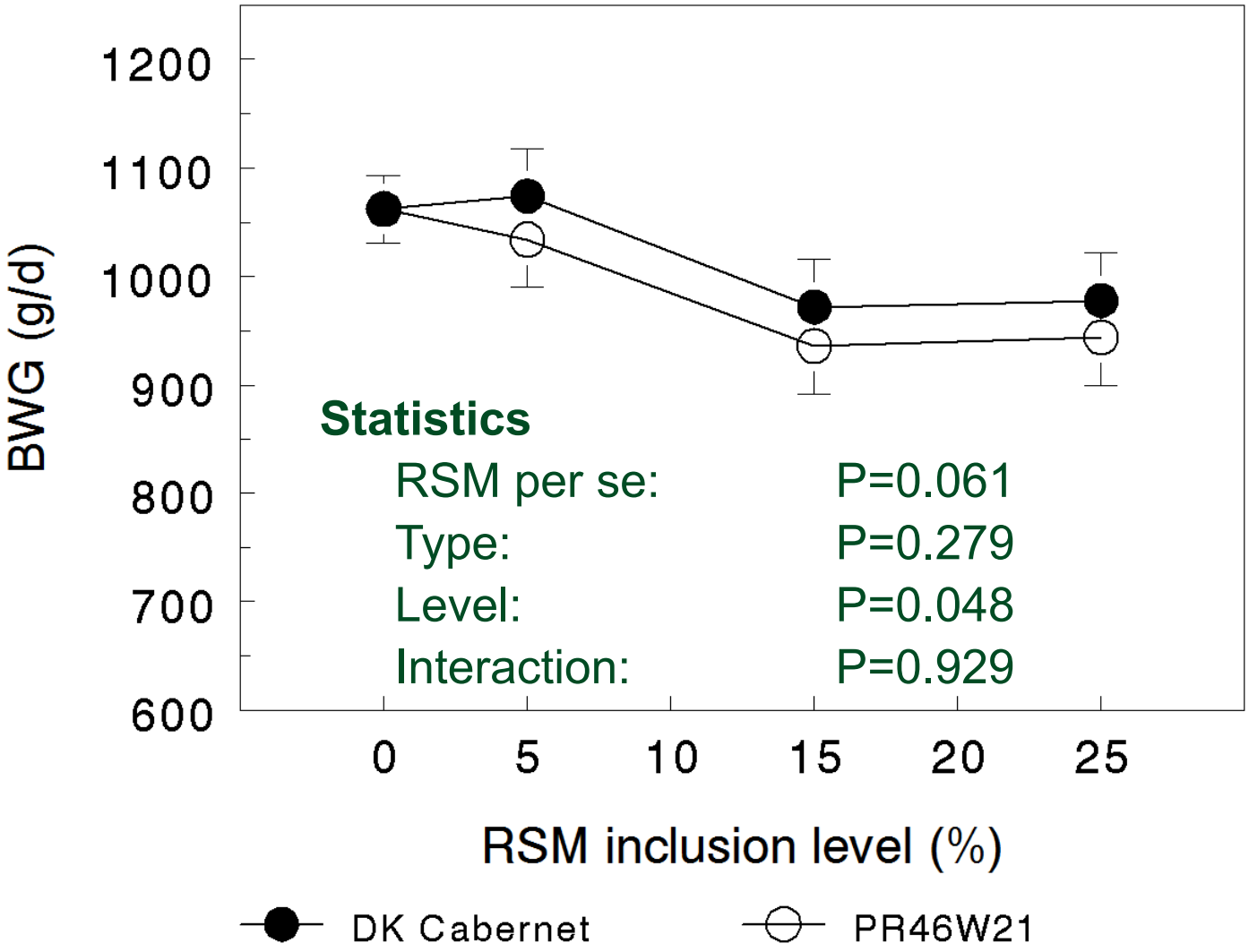
Calculations and statistics

- Performance parameters
  - Average daily feed intake (ADFI)
  - Average daily gain (ADG)
  - Feed conversion ratio (ADFI/ADG)
- Statistical analysis
  - 7 × 2 factorial (diet × sex) with covariates
    - No interactions with sex, so focus on diet effect here
  - Contrast statements to assess:
    - Effect of RSM per se
    - DK Cabernet vs PR46W21
    - Effect of RSM level
    - Interaction between type and level

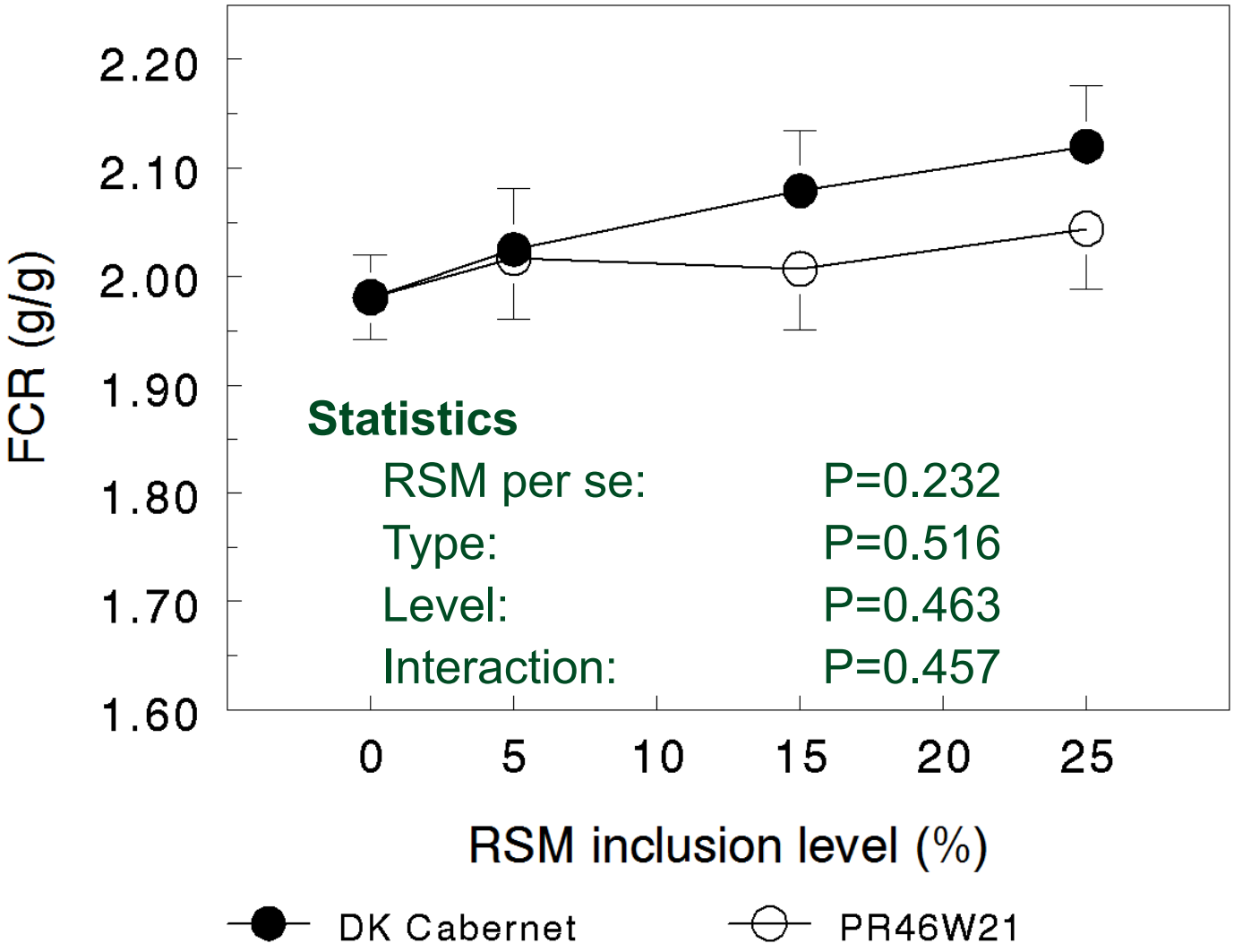
Feed intake (growers)



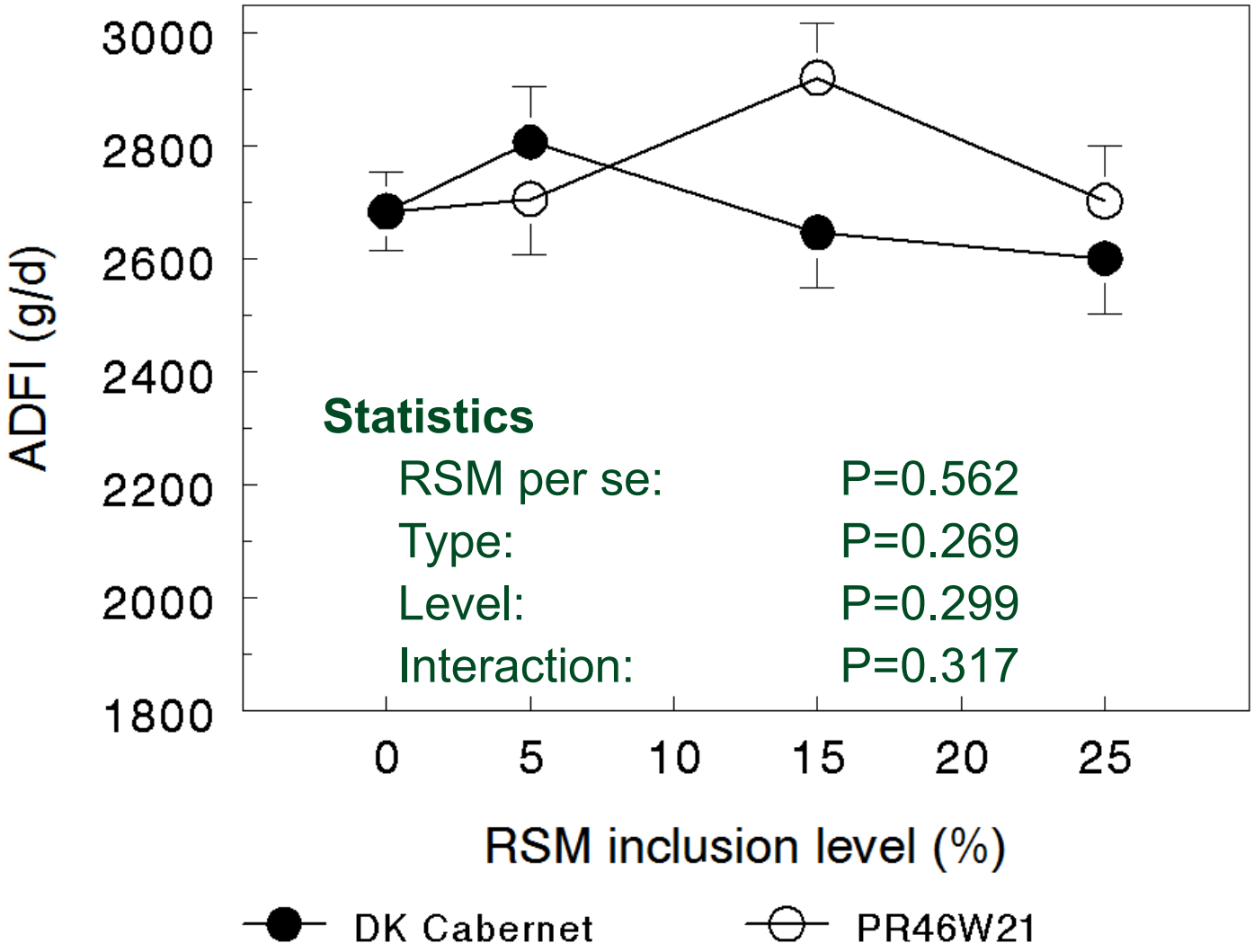
Weight gain (growers)



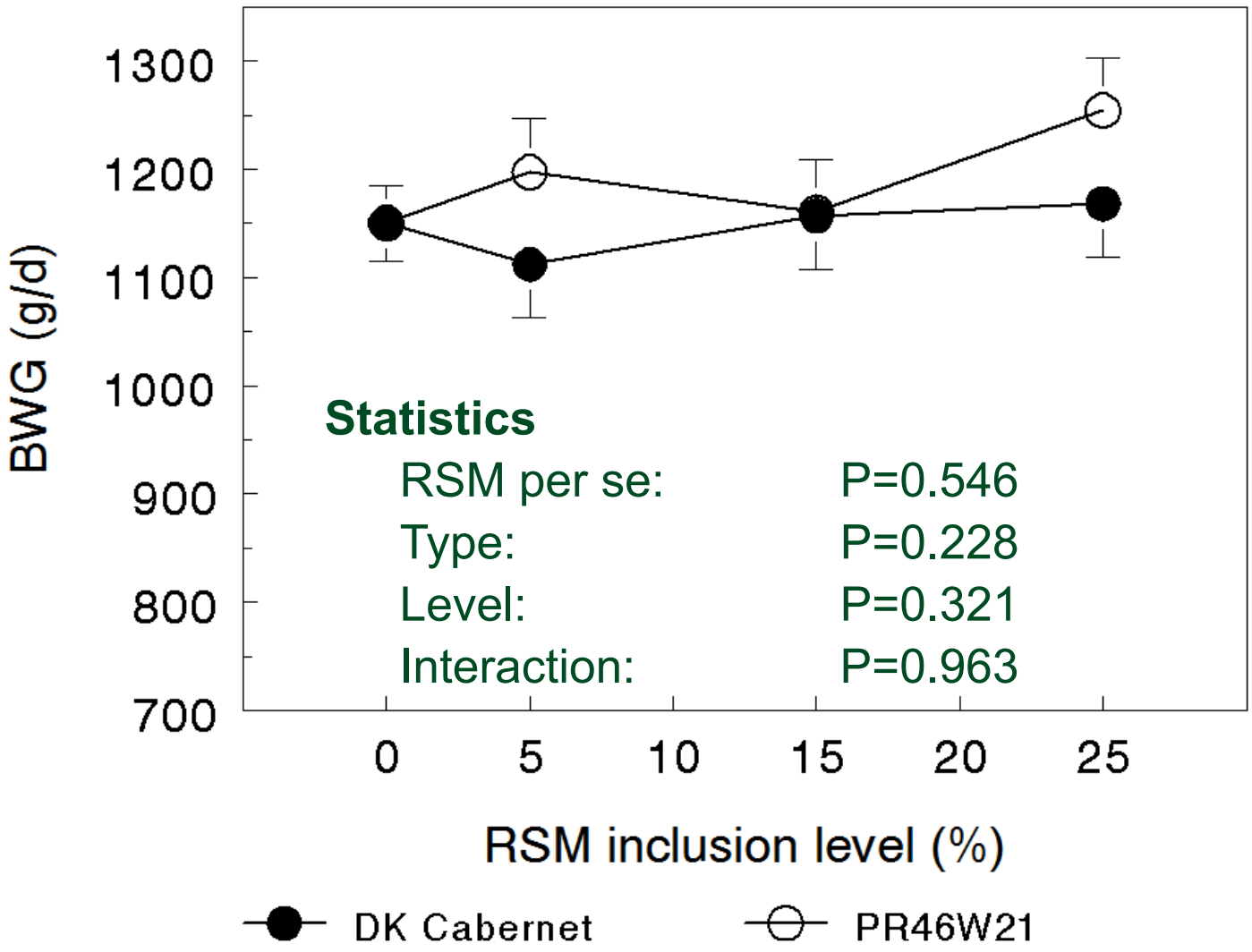
Feed conversion ratio (growers)



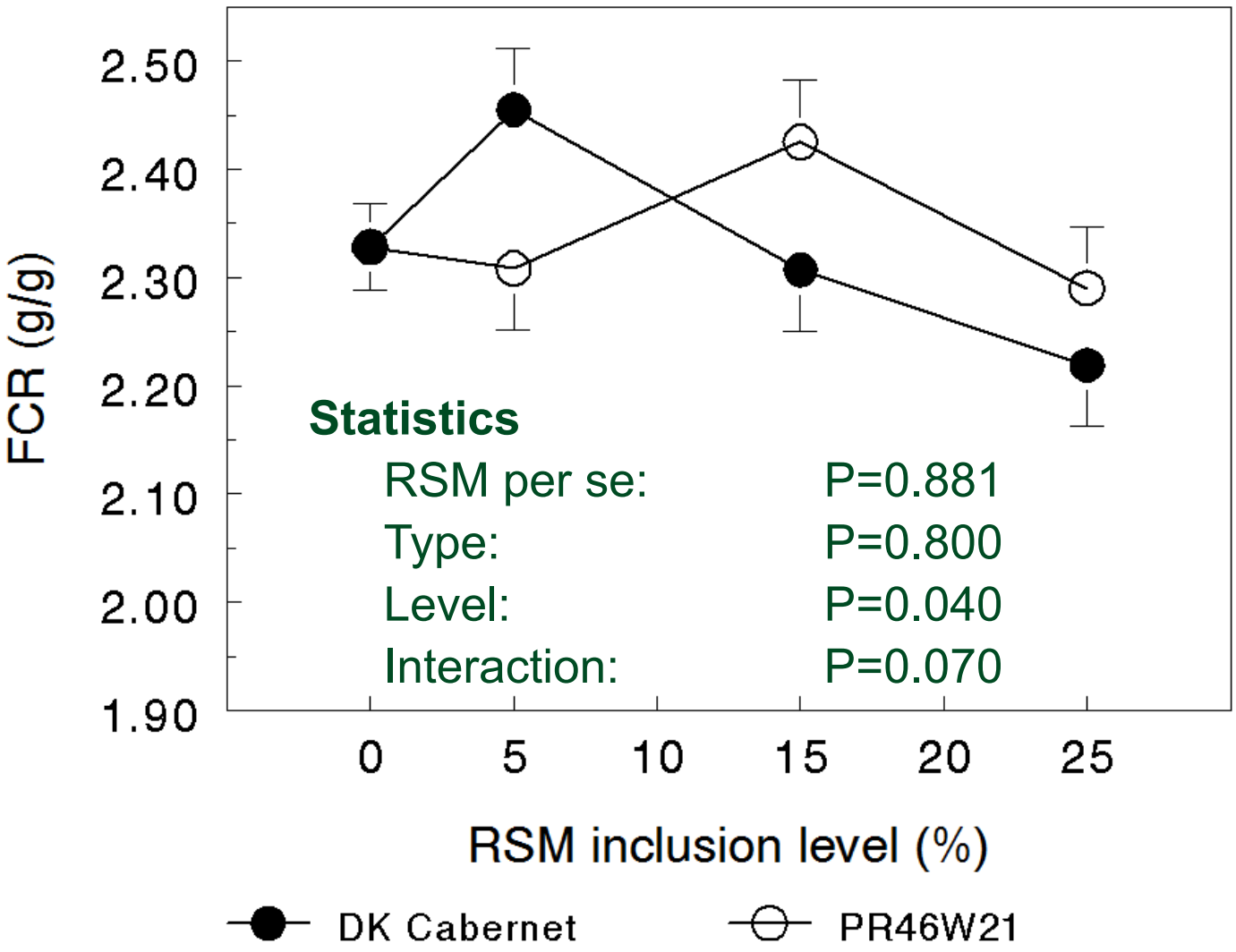
Feed intake (finishers)



Weight gain (finishers)



Feed conversion ratio (finishers)



Conclusion

- Gradual exchange of SBM/wheat for RSM resulted in reduced performance of grower pigs at 15% inclusion but similar performance in finisher pigs
- Impact on growers seems stronger for PR46 than for DK CAB but no variety effect for finishers
- Greater than classically thought levels of RSM (~15%) may be used in nutritionally complete finisher diets BSC to completely replace SBM and reduce reliance on wheat
- This benefit is not demonstrated for the more sensitive growers

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AHDB
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The Scottish Government
Riaghaltas na h-Alba