The Voluntary Food Intake of Pigs
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DIET SELECTION IN GROWING PIGS

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INTRODUCTION

On a single food a pig can increase its intake of a nutrient (e.g. protein) as the concentration in the food is reduced below its requirement, only by increasing its rate of energy intake. When given two foods of different protein, but equal energy contents, as a choice, it can vary its protein intake independently of its energy intake by varying the proportions of each food in its diet. There are three kinds of food pairs to be considered:

(i) both foods are below the requirement;
(ii) both foods are above the requirement;
(iii) one food is above and one is below the requirement.

The problem is to predict the diet that will be selected in each case.

PREDICTIONS

(i) When both foods are below the requirement only the less limiting food is consumed.
(ii) When both foods are above the requirement the less abundant is preferred.
(iii) When one food is above and the other below the requirement, the pigs select a mixture of the two foods, which exactly meets their requirement.

In this third case, the diet selected will vary with sex, pig state and previous feeding.

TESTS OF THE THEORY

(a) The experimental evidence derives from an experiment (Kyriazakis, Emmans and Whittemore, 1988) where pigs were given access to the two foods as a choice. There were four foods used (L, A, B and H), with similar energy content but different levels of crude protein (CP): 125, 174, 213 and 267 g CP per kg fresh food.
(b) In another experiment pigs were made excessively fat (F pigs) by being given access to a low protein food (125 g CP per kg) from weaning to 16 kg live weight. Then they were given a choice between two foods, L and H (125 and 267 g CP per kg respectively). The diets selected were compared with the diets selected by 'normal' (T) pigs, which were given access to a high CP diet (267 g CP per kg) from weaning to 16 kg live weight, and then given the same choice of foods.

The fat pigs selected a diet much higher in protein than T pigs (Table 2) and had a reduced lipid gain (Table 3).

CONCLUSIONS

(i) When pigs are given a choice between two foods, which are below their requirements, the less limiting food is preferred, but some of the more limiting will still be eaten. The consumption of

TABLE 1
Diets selected by pigs on different food pairs (15 to 30 kg live weight)

Feed pair		Type of choice	Proportion chosen as food 1	Crude protein selected (g/kg)	Gain (g/day)
Food 1	Food 2				
L	A	limiting — less limiting	0·29	160	666
B	H	less abundant — abundant	0·94	214	770‡
L	H	limiting — abundant	0·45	204†	777‡
A	H	limiting — abundant	0·31	201†	762‡

† No differences in the crude protein selected by the animals on the two pairs.
‡ No differences in the growth rates of these animals.

TABLE 2
Diets selected by fat and 'normal' pigs (19 to 33 kg live weight)

Food pair		Type of pig	Proportion chosen as food 1	Crude protein selected (g/kg)
Food 1	Food 2			
L	H	F	0·32	233
L	H	T	0·72	177
Difference		0·40***	56***	

TABLE 3
The lipid gains of fat and 'normal' pigs (19 to 33 kg live weight)

	Lipid weight (kg)	
Type of pigs	at 19 kg live weight	at 33 kg live weight
F	2·98	4·79
T	1·92	4·39
Difference	1·06***	0·40
s.e.d.	0·01	0·54

the more limiting food may reflect the continuing exploratory behaviour of the animals, since neither of the two foods satisfies their requirements.

(ii) When both foods are above their requirements, the less abundant is very strongly preferred. It is suggested that excess nutrient intake has a disadvantage and it is therefore avoided.

(iii) When one food is above and the other below the requirement, the pigs select a diet which meets their requirements.

Since a pig, in a suitable environment can express its potential growth and desired lipid gain when it is offered a choice between two appropriate foods, it is reasonable to suggest that such a feeding system should be used when:

(a) growth and fattening characteristics need to be observed, as in selection stock, and
(b) the fatness desired by the animal is no greater than that desired by the pig producer, as in young pigs and, particularly, in boars.

REFERENCE

KYRIAZAKIS, I., EMMANS, G. C. and WHITTEMORE, C. T. 1988. The ability of growing pigs to control their protein intake when fed in different ways. *Animal Production* **46:** 485 (Abstr.).

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