Proc. Aust. Soc. Anim. Prod. (1974) **10**; 375

A COMPARISON OF RAPESEED MEAL AND MEAT MEAL IN RATIONS FOR GILTS AND SOWS

M.R. TAVERNER* and D.M. CURIC*

Summary

Rapeseed meal replaced meat meal in the diets of female pigs from before mating until two reproductive cycles were completed. The source of supplementary protein had no effect on any aspect of sow reproduction or on the growth of progeny.

Sows farrowed more piglets, ate more during gestation and lactation, and had heavier piglets at weaning in their second parity than in their first. It was concluded that rapeseed meal could contribute 15.1 to 16.6% of the total ration for breeding females and completely replace meat meal as the protein supplement in their diets.

I. INTRODUCTION

Meat meal and meat and bone meal are the most common sources of supplementary protein in pig rations in Australia. They are, however, variable in quality and becoming increasingly expensive. Vegetable proteins, such as rapeseed meal (RM) have the potential to provide supplies of uniform ingredients at relatively low cost and are replacing meat meal in pig rations to an increasing extent.

Rapeseed meal produced locally by the expeller-extraction process has been shown to be able to replace half of the protein from meat meal in rations for grower finisher pigs fed under regimes of limited feed intake (Taverner and Mullaney 1973). The use of Australian RM in diets for breeding females however, has not been reported.

The aim of our experiment was to determine the effects of replacing meat meal with RM in diets based on wheat on the reproductive performance of gilts and sows during periods corresponding with pre-gestation, gestation and lactation.

II. METHODS AND MATERIALS

(a) Experimental

Two groups each of five paired crossbred gilts (Large White x Berkshire) with a mean liveweight of 63±1.4 kg were fed two diets (Table 1) during growth until two' reproductive cycles were completed. During this period the pigs were housed in pairs but were fed the experimental diets individually. The gilts were fed 1.3 kg of feed per day until mating. In parities one and two respectively the pregnant pigs were fed 1.5 and 2.0 kg of feed daily from 0 to 12 weeks, and 2.0 and 2.3 kg of feed daily from 13 weeks to farrowing. During lactation in both parities pigs were offered daily, a maximum feed allowance of 2.5 kg plus 0.3 kg per piglet in the litter; the feed offered was increased by 0.5 kg per day from the level fed before farrowing until the full allowance was offered. Each day, pens were provided with 1 kg of crushed hay for bedding; each pig ate approximately 0.2 kg per day of the hay throughout the experimental period. A creep diet was offered ad libitum to piglets from three days after birth.

All gilts were mated over a 17 day period at an average age of 245 days and average liveweight of 96±1.8 kg. The second mating commenced in the first oestrus period after the first litter was weaned at eight weeks of age. Two boars were used equally for sows mated in each group at each parity.

* Department of Agriculture, S.S. Cameron Laboratory, State Research Farm, Werribee, Victoria. 3030.

TABLE 1

Composition of experimental diets*

Diet No	Rapeseed** meal %	Meat meal %	Crushed wheat %	Wheat starch %	Crude protein %
1	17.4	-	79.7	-	16.2
2	-	11.0	80.7	5.6	15.1

* In addition to these ingredients tabulated each diet also contained 2.0% steamed boneflour, 0.25% iodized salt and 0.5% of a comprehensive vitamin and trace mineral supplement.

** Rapeseed meal contained 7.2 mg goitrin, 1.92 mg butenyl isothiocyanate and 0.57 mg pentenyl isothiocyanate per gm of meal.

In both gestation periods the sows were confined to farrowing stalls several days before farrowing and, with their litters, for one week after farrowing. Each sow and litter was then allowed free movement between the crate and an open pen to which one other sow and litter from the same experimental treatment was also allowed free access.

(b) Measurements and analyses

Food intake of sows and of the creep diet offered to their progeny was measured. All pigs were weighed weekly and within 24 hours after farrowing.

Crude protein content of the diets was determined by an A.O.A.C. (1960) method and the major goitrogens in the RM determined by the method of Youngs and Wetter (1967).

The results were examined by analysis of variance. A missing value was calculated for a sow which failed to conceive at the second mating.

III. RESULTS

One sow fed diet 2 was culled following a third return to service in the second mating period. All other sows were successfully mated within an average of 6 ± 0.5 days following the weaning of the first litter.

The mean values for growth rate in the pre-mating period, liveweight loss during the first lactation and liveweight at the second mating were 342 ± 9.0 g/day, 12 ± 2.5 kg and 127 ± 3.5 kg respectively. These values did not differ significantly for either diet. Diet also had no affect on any aspect of the reproductive performance of sows and did not influence the growth of their progeny (Table 2).

Sows producing second litters had larger litters at birth ($P < 0.05$), ate more feed during gestation ($P < 0.01$) and lactation ($P < 0.01$) and their progeny were heavier at three weeks of age ($P < 0.01$) than sows producing first litters (Table 2).

IV. DISCUSSION

We found that RM can replace meat meal as the protein supplement to diets for gilts and second litter sows with no effect on reproductive performance or on the survival or growth rate of the progeny up to three weeks of age.

Schuld and Bowland (1968) however, found that the feeding of RM to gilts during the period prior to mating resulted in a reduced number of piglets weaned at three weeks of age.

TABLE 2

Influence of source of supplementary protein and of sow parity on the intake and reproductive performance of sows and on the intake of a creep ration and the growth of their progeny

Variable	Source of variation: Diet		Parity		LSD**	
	1	2	1	2	(P=0.05)	(P=0.01)
Average feed intake during gestation (kg/d)*	1.93	1.90	1.64	2.19	0.07	0.09
Gestation length (days)	115.7	115.4	115.2	115.9	2.9	4.1
Litter size :						
total born	10.3	9.5	8.5	11.3	2.1	3.0
alive after 24 hr	7.9	8.4	7.6	8.7	1.6	2.3
21 days	7.8	8.1	7.5	8.4	1.8	2.5
Survival to 21 days (%)**	79.8	87.1	88.6	78.2	16.1	22.7
Average piglet weight (kg)						
birth	1.21	1.30	1.26	1.25	0.19	0.26
21 days	5.46	5.56	5.00	6.02	0.52	0.74
Average creep intake* (kg/pig)	0.87	0.98	0.99	0.86	0.25	0.35
Average food intake during lactation (kg/d)*	4.1	4.0	3.4	4.6	0.4	0.6

** Least significant difference between means, within diet or parity.
** Percentage of total born.
* Air dry feed intake.

There was no indication of this effect in either our experiment or that of Saben and Bowland (1971).

The feeding of RM to gilts and sows had no effect on the number of oestrus cycles required for successful mating. This agrees with the results of Schuld and Bowland (1968) and Saben and Bowland (1971) but is contrary to those of Manns and Bowland (1963).

Many breeding sows in Australia are provided with straw or hay for bedding and it would be usual that, as in our experiment, a small amount is eaten. The reproductive performance of our sows and the growth performance of their progeny was comparable to those of Saben and Bowland (1971) and to Australian performance figures (Henry 1969, Bureau of Agricultural Economics 1972).

In Canada, an upper level of 3% RM in the total ration was recommended by Bowland and Bell (1972) for gestating and lactating sows. The results of our experiment would suggest, however, that this restriction need not be applied with Australian RM which can contribute 15.1 to 16.6% of the total ration of breeding females with no adverse effects.

V. ACKNOWLEDGEMENTS

Acknowledgement is made of Mr. Fox, Chemist, Department of Agriculture, Victoria, for the goitrogen analyses, Mr. R. Jardine, Biometrician, Department of Agriculture, Victoria, for assistance with the statistical analyses and to Dr. J. McLaughlin, Research Officer, Department of Agriculture, Victoria, for his help in preparing the paper.

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