THE EFFECT OF A 'SINGLE-FEED FLUSH' ON OVULATION RATE IN GILTS*

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Studies by Robertson, Casida, Grummer & Chapman (1951) demonstrated that ovulation rate in swine could be influenced by the level of feed intake. Most studies showing this 'flushing effect' utilized 6- to 21-day intervals of high energy feeding. Recently, however, attempts have been made to obtain a flushing effect by feeding a single high energy feed during oestrus in the pig. Feeding the increased energy levels on the 1st day of oestrus has been reported to result in a significant flushing response (Lodge & Hardy, 1968; Brooks, Cooper, Lammings & Cole, 1972) while other reports have not shown this effect (Naber & Zimmerman, 1971; Moore, Dutt, Hays & Cromwell, 1971; Cooper, Brooks, Cole & Haynes, 1973). Flushing on the 2nd day of oestrus was reported as not leading to an increase in ovulation rate (Brooks *et al.*, 1972).

The study reported here was conducted to determine if an increase in ovulation rate could be obtained by increasing feed intake in gilts for a single feeding early in oestrus when the level of preflushing feed intake was based on body weight of the gilt rather than on a specific caloric intake for all animals.

Forty Yorkshire-Poland China crossbred gilts were used in this study. Starting at 5 to 6 months of age, they were fed a basal ration at the rate of 2.2% of their body weight/day, based on weekly weighings. This was a balanced ration meeting all nutrient requirements for breeding gilts as defined by NCR and providing 3242 cal/kg of feed. Gilts were individually fed once daily at 08.00 to 09.00 hours. Vasectomized boars were used to check for oestrus twice daily, in the morning before feeding and in the evening. Treatment consisted of feeding one of two energy levels at the first feeding after detection of the oestrus of the second oestrous cycle. One group was fed the basal ration at the rate of 2.2% of body weight (control group). The other group received 7.3 kg of the basal ration, the uneaten portion being weighed 6 hr later to determine the actual feed consumed (flushed group). After this single-treatment feeding, all gilts were fed 2.2% of their body weight/day until they were slaughtered at Day 3 (day of heat = Day 0). Tests for significant differences between treatment means were performed with the *t* test (Steel & Torrie, 1960).

Flushed gilts consumed twice as much feed during the 1st day of oestrus as the gilts receiving the basal ration but the ovulation rates of the two groups were not significantly ($P > 0.05$) different (Table 1). If ovulation is not complete, the number of large follicles remaining shortly after ovulation can also be used, along with a number of CL, as an indication of follicular development during

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the cycle before ovulation. The number of total ovarian structures (CL plus follicles >4 mm in diameter) did not differ between basally fed and flushed gilts, indicating that neither ovulation nor development of large follicles was different in the two treatment groups.

This study joins the increasing number of reports that a significant increase in ovulation rate does not result from a single-feed flush early in oestrus. The feeding regimen used in the present study differs, however, from that used in other single-feed flushing experiments. The feed intake was determined by body weight rather than utilizing a predetermined caloric level for all gilts. The average feed intake at the time the gilts were started on the experiment was 1.7 kg/day and rose to an average of 2.63 kg/day for all gilts by the time of the treatment feeding. As a result, the preflushing feed intake was somewhat higher than the 1.8 kg feed level fed in studies demonstrating a significant effect of the 1-day flush (Lodge & Hardy, 1968; Brooks *et al.*, 1972). Feed consumption by the flushed group was also higher, however, and the difference

Table 1. Effect of a single high energy feeding* on the ovulation rate in gilts

Characteristic studied	Feed level	
	Control	Flush
No. of gilts	20	20
Feed intake (kg) †	2.61 ± 0.34 ‡	5.14 ± 1.10
Ovulation rate	11.95 ± 1.80	11.25 ± 2.24
Total ovarian structures §	12.80 ± 2.73	11.90 ± 2.56

* The single high energy feeding was the first feeding following detection of oestrus at the second oestrous period.

† Feed intake values refer only to the first feed after standing oestrus.

‡ Mean ± standard deviation.

§ Total ovarian structures include corpora lutea from ovulation at the second oestrus plus follicles greater than 4 mm in diameter.

in feed intake between flushed and non-flushed gilts was greater in this study than in all but one trial (Lodge & Hardy, 1968) of those showing a flushing response. The feeding regimen of Moore *et al.* (1971) utilizing a preflush level of 2.27 kg/day with free access to feed at oestrus is similar to the study reported here, but they also did not show an increased ovulation rate in the flushed group ($P > 0.05$). The results reported here and those of Moore, in which the preflush level of feed intake was not greatly restricted, favour the suggestion made by Lodge & Hardy (1968) that the 1-day flushing effect may simply be the restoration of an ovulation rate suppressed by a low level of caloric intake during the preflush period.

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