Acta vet. scand. 1978, *19*, 156—158.

Brief Communication

PUBERTY STUDIES OF SWEDISH CROSSBREEDING GILTS*

A number of factors such as breed, feeding and management are considered to influence the attainment of puberty in gilts. The season of birth also has been indicated as a source of the variation in age at puberty (e. g. *Bane et al.* 1976). The chronological age is considered to be of greater importance than live weight (*Anderson & Melampy* 1972), but severely restricted feeding delays puberty. The recommendation in Sweden is to breed the gilts during their second or third estrus. No information is, however, available concerning the age at puberty of Swedish crossbred gilts of today. The object of the present investigation was to investigate the age at puberty of Swedish crossbred gilts by the use of careful heat checking and analyses of peripheral blood plasma levels of progesterone.

The study included 44 crossbred gilts (Swedish Landrace × Swedish Yorkshire) bought from 9 producing herds at approx. 25 kg live weight. The gilts, born during the period 12/6—23/7 1975, were transferred to an experimental farm on September 30. The gilts were on restricted feed, the amount being calculated by group weight of each pen. Daily ration was 1 kg at arrival, was gradually increased to 2.5 kg at 80 kg live weight, and thereafter kept constant. Commercial feed was used containing 15 % protein and approx. 11.3 megajoule (2.7 Mcal) per kg. The gilts were weighed once a month. From 5 months of age the gilts were grouped in pens with 4—6 gilts per pen, and the animals were checked daily for heat in the presence of a vasectomized boar housed in an adjacent pen.

Blood samples were drawn from an ear vein every 10th day from 5 months of age, until the second recorded heat. Gilts not showing external heat symptoms 280 days of age were considered anestrous and slaughtered. The genital organs of these gilts were collected at slaughter and were examined as soon as possible. The blood samples were centrifuged and plasma was removed and stored at —20°C until assay. Peripheral blood plasma levels

* This investigation was supported by a grant from the Swedish Council for Forestry and Agricultural Research.

Table 1. The age at first recorded heat in the 44 gilts and the mean live weight within age groups.

Age (days)	Number of gilts	%	Mean live weight (kg)
180—200	4	9.1	92
201—220	9	20.4	94
221—240	9	20.4	102
241—260	12	27.3	110
261—280	5	11.4	124
233 (180—278)	39	88.6	104 (77—145)

of progesterone were determined by a competitive protein binding technique (*Edqvist et al.* 1970). Progesterone levels below 1 ng/ml were determined by radioimmunoassay (*Kindahl et al.* 1976).

Thirty-nine out of 44 gilts (88.6 %) showed heat during the observation period. The average age at their first heat was 233 days (Table 1). Only 50 % had exhibited external heat signs at 8 months of age. One explanation for this might be the comparatively slow growth rate of the gilts. The average live weight for the 233 day old gilts was thus only 104 kg (Table 1). The reason for the slow growth rate is unknown. Health status was good and the feed was of high quality. In 3 of the 39 gilts (7.7 %) heat was not followed by a rise in the plasma level of progesterone. These gilts had apparently not ovulated. One of the gilts did not show a second estrus, and at slaughter the genital organs appeared to be juvenile. The other 2 gilts had elevated progesterone levels 3 weeks later, indicating occurrence of ovulation and formation of corpora lutea. However, 1 of the 2 gilts did not show heat signs until 3 weeks following the rise of plasma progesterone. The progesterone content furthermore indicated that 7/39 gilts (17.9 %) had ovulated and formed corpora lutea before clinical heat was recorded. Six gilts had 1 peak value and 2 gilts had 2 and 3 peaks respectively, alternating with low levels of progesterone at 20 days intervals. The absence of recorded heats in the phase of apparent cyclic activity of the ovaries as shown by the progesterone patterns, may be explained by occurrence of silent heats in these peripubertal gilts. The possibility of insufficient monitoring for occurrence of heat can not be excluded, in spite of the fact that heat checks were performed

in presence of a vasectomized boar and recorded by an experienced herdsman.

Five gilts (11.4 %) showed no heat during the observation period. Two of these gilts had peak values of progesterone indicating luteal tissue in the ovaries (*Larsson et al.* 1975). Findings at post-mortem examination of the genital organs from the other 3 gilts were compatible with delayed puberty.

A relationship appears to exist between age and body weight at first estrus in gilts. Present findings, however, do not indicate which factor is more significant. A more careful investigation including heat checking and daily bleeding for hormone determinations (estradiol, progesterone, LH) is necessary to clarify the occurrence of silent and unovulatory heats in peripubertal gilts.

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(Received February 11, 1978).

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