Effects of Handling Stress of Gilts During Gestation on Embryonic Survival

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ABSTRACT

In the study of the effects of handling stress on reproductive performance of gilts, 18 gilts were allocated to either stress (blood collection) or control (no blood collection) treatments. They were housed in the same building. On day 20-22 after insemination all the gilts were slaughtered and it had been found that the number of corpora lutea, corpora lutea size and embryonic mortality were not significantly difference but the rectal temperature was found to be significantly difference. There was a marked drop of rectal temperature over number of days after they had been inseminated. It was concluded that in more severe environmental conditions, handling of early pregnant gilts should be treated with great care.

Key words :   swine, stress, embryo

INTRODUCTION

It is quite well known that handling will always cause a shift of hormone balance within animal's body. In order to determine levels of various hormones in embryonic survival studies, blood samples have to be collected from pregnant animals at various stages of gestation. The alteration in hormone balance during early period of gestation play a critical role in transport of ova, early blastocyst development and uterine preparation for implantation processes. Animals at this stage have the potential of being more susceptible to stress (Anderson, 1978). Therefore, the present study is designed to determine the effects of stress of blood collecting from the jugular vein during early gestation on embryonic survival of gilts.

MATERIALS AND METHODS

A completely randomized design using eighteen Landrace gilts which had exhibited at least one oestrus cycle and were between 8 to 9 months of age at the time of breeding. The gilts were allocated randomly to either stress (blood collection; 9 gilts) or control (no blood collection; 9 gilts) treatments.

All the gilts were inseminated artificially (7.5 x 109 sperms/dose) on 4 consecutive days at the first sign of oestrus. In the stress group, blood samples (8 ml) were collected from the jugular vein, using a syringes with 8.75 cm long No.18 needle, while the animal was restrainted by a piece of nylon rope (0.5 cm. diameter) at the snout. The blood samples were collected between 11:00 to 12:00 noon on day 0, 5, 10, 15 and 20 after insemination.

Rectal temperature was recorded, using a copper-constantan digital thermister, for all gilts between 2:00 to 2:30 pm everyday until slaughtered. They

Table 1   Means meteorological data during the experimental period.

Parameter	Control[1]	Stress
Daily temperature (°C)	25.2ᵃ	25.6ᵃ
Daily maximum temperature (°C)	31.7ᵇ	32.4ᵃ
Daily minimum temperature (°C)	19.2ᵃ	19.1ᵃ
Daily different temperature (°C)	12.4ᵇ	13.4ᵃ
Daily relative humidity (%)	66.0ᵃ	61.7ᵇ

a,b Means within row with different superscripts are significantly difference (P<0.05).

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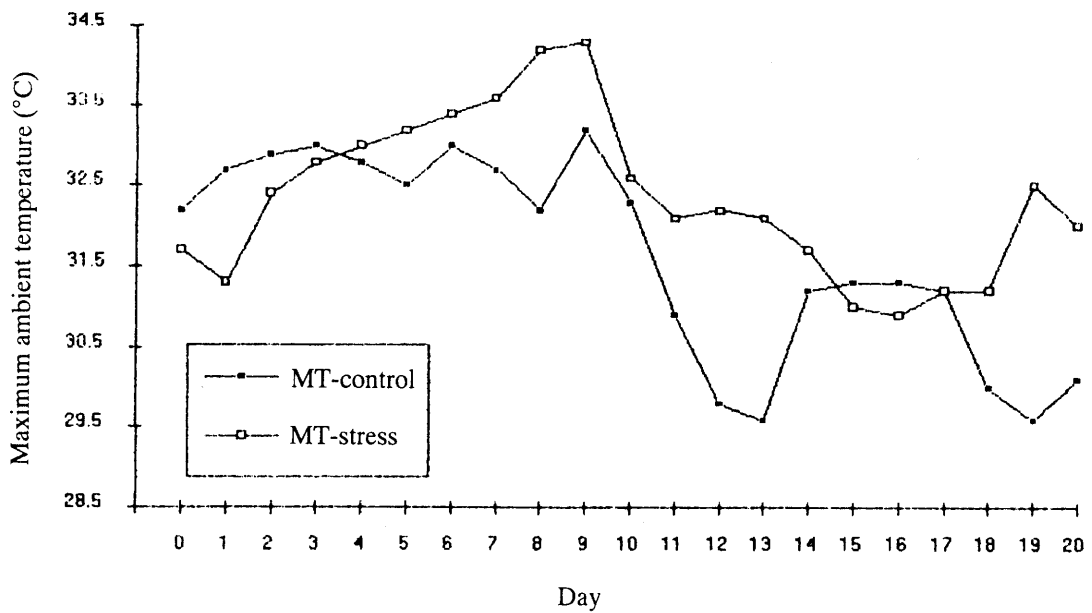2   Chareon Phokapand Groups of companies, Bangkok.
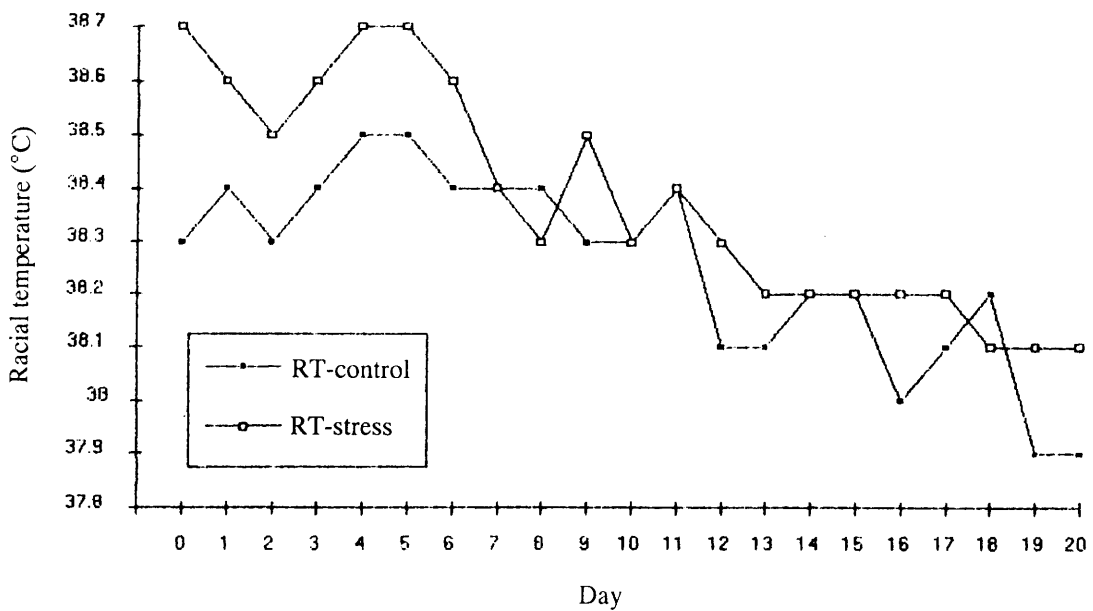
Figure 1 Daily maximum ambient temperature (MT).

**Figure 2 Mean daily rectal temperatures (RT) of the gilts over
the experimental period.**

Table 2   **Reproductive performance parameters and mean rectal temperatures of the control and handling stress treated gilts.**

Parameter	Control	Stress
Number of gilts allotted	10	9
Number of gilts found pregnanted at day 20-22 after insemination	9	9
Mean number of corpora lutea	14.80 ± 0.68^a	15.60 ± 0.47^a
Mean corpora lutea size (mm)	9.30 ± 0.27^a	9.90 ± 0.26^a
Mean number of normal embryo	12.30 ± 0.67^a	13.80 ± 0.86^a
Percent embryonic mortality (%)	83.35 ± 2.38^a	87.97 ± 3.33^a
Mean rectal temperature (°C)	$38.30 \pm 0.04b$	$38.40 \pm 0.03a$

a,b Means within row with different superscripts are significantly difference (P<0.05).

were slaughtered on day 20 to 22 after insemination and intact reproductive tracts were recovered. The uterine horns were dissected and the number of viable embryos were accounted for. Ovaries were examined visually for the number and size of corpus lutea were measured using vernier calliper. The data obtained were analysed using analysis of variance (Steel and Torrie, 1980).

RESULTS

Means daily meteorological data that the gilts from both groups were exposed to during the experimental period are shown in Table 1 while Table 2 shows mean values of the measured reproductive performance parameters and mean rectal temperature of the gilts from both control and handling stress treated groups.

It can be seen from Table 1 that all meteorological parameters measured of the stress treated group, except mean minimum and mean different ambient temperatures, were significantly higher than that of the control group (Figure 1). The results also revealed that there were no significantly differences in the reproductive performance between the control and the stress treated groups. Although the rectal temperature of the stress treated group was significantly higher than that of the control group.

Furthermore, it has been observed that there was a marked drop of rectal temperature of the gilts from both groups (Figure 2) over number of days after they had been inseminated.

DISCUSSION

From the results obtained it has clearly revealed that it is quite safe to take blood sample via the jugular vein of the early pregnant gilts. If the animals were tethered at the snout by a piece of small diameter rope. Although there was a significant (P<0.05) increases of rectal temperature of the stress treated group.

The increase in the rectal temperature may be the results of the significant (P<0.05) increases in environmental temperatures as it has been well documented that animals subjected to elevated ambient temperature would have their deep body temperature elevated also (Johnson, 1987). However, it is generally known that a large amount of heat is generated in working animal (Pearson, 1985) and this would lead to the increase in the rectal temperature of the animals (Vajrabukka and Thwaites, 1984). Therefore, the increase in rectal temperature of the handling stress treated gilts would possibly be contributed by the results of handling stress as the animals were invarily struggled to some degree while being handled.

The environmental temperature during the experimental period had mean daily maximum of approximately of 32 °C which it should being considered as quite normal for the tropical conditions. Therefore, gentle handling the early pregnant gilts would also be of no harm to both of the gilts and their embryos. However, with higher environmental temperature such as that found during summer season in the tropics, the animal should be handled with great care.

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