Factors affecting weaning-to-first service interval in a Landrace-Large White swine population in Northern Thailand

C. Chansomboon*, S. Koonawoottritrinon*, M. A. Elzo†, T. Suwanasopoe*

*Department of Animal Science, Kasetsart University, Bangkok 10900, Thailand
†Department of Animal Sciences, University of Florida, Gainesville, FL 32611-0910, USA

INTRODUCTION

Improvement of sow efficiency in current commercial swine production systems has focused mostly on increasing number of piglets born. However, non-productive service intervals, measured either as weaning-to-first-service interval (WSI) or as interval from weaning to first service of first estrus, has been frequently ignored. Weaning-to-first-service interval is an economically important trait in commercial swine production because longer WSI periods increase maintenance costs and decrease sow efficiency. Researchers have found numerous factors (seasonal, environmental, genetic, age, parity, litter size, photoperiod, lactation length, parity, breed, management) to have an effect on WSI. In particular, high temperatures and humidity in tropical conditions may extend the WSI periods. Few studies have investigated the effect of genetic and environmental factors on WSI in Thailand. A study of F1 Landrace x Large White crossbred was reported to increase sow efficiency and lower production costs for Thai swine producers. Thus, the objective of the current study was to characterize genetic and environmental factors that affect WSI and its components in a large swine population raised under tropical environmental conditions in Northern Thailand.

MATERIALS AND METHODS

Data, Animals, and Management. The dataset contained 12,914 litter records from 2,596 sows collected between 1989 and 2008 in a commercial swine population located in the province of Chachoengsao, Thailand. The average percentage of the first estrus was 93.7% (range 88 to 99%). The average herd stall has 5% of the herd on farrow and 15% on farrowing, and 25% on pregnancy. The average herd has 28 days of gestation and 28 days of lactation. The average daily weight gain was 716 g (range 400 to 1200 g). Sows were classified as primiparous (November to February), summer (March to June), and rainy seasons (July to October).

WSIs were kept in an open-house system. Cooling systems were foggers for lowerers and feeders, and they were ventilated automatically when the ambient temperature was higher than 30°C. Breeder sows were fed 2.5 kilograms of feed per day (19% crude protein and 3,300 to 3,500 kcal/kg gross energy) divided into 2 feeding times (7:00 and 19:00). Farrowing-farrowing sows were fed 5 to 6 kilograms of feed per day (17% to 19% crude protein and 3,000 kcal/kg gross energy) separated into 4 feeding times (7:00, 10:00, 13:00, and 15:00). Piglets were weaned at around 28 days after parturition. Euthanasia of pigs and sow was detected by ear exposure, and artificially instilled twice with laceration from the same toe. The first insemination occurred 12 hours after estrus was detected, and the second one 12 hours later.

RESULTS AND DISCUSSION

The overall mean for WSI of sows in this population was 2.6 ± 0.45 days. Factors affecting WSI were parity, YL and LL (P < 0.05).

Factors affecting WSI were parity, YL and LL (P < 0.05).

Parity. The WSI was longer (P < 0.01) for first-parity sows (7.69 ± 0.12 days) than for sows of other parities (5.72 ± 0.15 to 6.10 ± 0.12). Longer WSI in primiparous sows may have been related to higher nutritional requirements for their own litters of high birth weight. Higher nutritional demands for growth in addition to milk production for their first litter may have prevented them from returning to estrus or returning to estrus more slowly than multiparous sows. Thus, assistance could be more easily detected in multiparous than in primiparous sows. More difficult estrus detection in primiparous sows may have affected service dates, potentially making their WSI longer.

Lactation Length. The estimate of the regression coefficient for WSI on LL was -0.04 ± 0.02 days per LL interval (P < 0.01). This value indicated that WSI decreased by 0.14 days for each day of increase in LL. This negative relationship suggested that a combined period of LL and WSI may be sufficient to allow a normal reproductive cycle to continue with a successful pregnancy because the uterine environment appears to be ready to maintain pregnancy 21 to 28 days postpartum (Palmer et al., 1985; Mabry et al., 1996).

Breeder Groups. Primiparous sows had similar WSI (5.89 ± 0.09 days) to YL sows (6.00 ± 0.12 days) under the environmental conditions of northern Thailand. On the other hand, crossbred LY sows (6.23 ± 0.14 days) and YL sows (6.76 ± 0.15 days) had longer WSI than purebreds sows (P < 0.01), and LY crossbreds had longer WSI (9.40 ± 0.12 days) than YL crossbreds (8.28 ± 0.09 days). Crossbreds had longer WSI than purebreds, perhaps due to lower adaptability to tropical conditions and lower higher nutritional requirements.

Heterosis. Heterosis estimates for WSI were 0.20 days (4.85) for LY sows, and 0.75 days (12.22) for YL sows. Differences in heterotic effects for WSI between reciprocal crossbred groups may be related to differences in allocation of nutrients for reproduction (number of piglets born alive: 9.40 ± 0.09 piglets for LY and 9.76 ± 0.10 piglets for YL; P < 0.01) and milk production (number of piglets weaned: 0.10 ± 0.03 piglets for LY and 0.28 ± 0.06 piglets for YL). Crossbred YL sows may have depleted their energy reserves to a greater extent than LY sows, thus they needed more time (longer WSI) to cope with their energy balance and return to their reproductive cycle. Reciprocal differences also suggested that LY sows had lower production costs due to shorter WSI than YL sows.

REFERENCES


