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Reproductive performance of "nurse sows" in Danish piggeries

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ABSTRACT

The use of nurse sows in Danish piggeries is common practice because of large litter sizes; however, the effect of being selected as a nurse sow on subsequent reproductive performance is unknown. Therefore, the aim of this study was to quantify a nurse sow's reproductive performance in the subsequent litter. Nurse sows were defined as sows weaning their own litter at least 18 days postpartum and thereafter nursing another litter (nurse litter) before service. Data (2012–2013) from 20 piggeries with more than 14.5 live born piglets per litter and a stable distribution of sows among parities over time were selected. Records from 79,864 litters were obtained and analyzed using mixed linear and logistic regression models. The average lactation lengths were 40.3 days for nurse sows and 27.8 days for non-nurse (normal) sows. Nurse sows weaned on average 12.4 piglets and subsequently 11.5 nurse piglets, whereas non-nurse weaned 11.7 piglets in their single weaning. There was no difference in re-service rate between nurse and non-nurse sows in the subsequent reproductive cycle. Subsequent litter size in the next reproductive cycle was higher for nurse sows than that for non-nurse sows (18.69 vs. 18.11 total born piglets; $P < 0.001$). Nurse sows were of a slightly lower parity than non-nurse sows (3.12 vs. 3.27, $P < 0.001$), and nurse sows had an increased weaning to estrus interval compared to non-nurse sows (4.23 vs. 4.19 days, $P < 0.001$). The results indicate that nurse sows were selected among sows nursing large litters and could therefore suggest that these sows represent the best percentile of sows in a given piggery. In conclusion, this survey indicated no negative effects of being selected as a nurse sow on the subsequent reproductive performance. On the contrary, nurse sows gave birth to more piglets compared to non-nurse sows in their subsequent litter.

1. Introduction

Increasing reproductive performance of sows has been one of the drivers of genetic improvement in most pig-breeding schemes [1] and in the management of commercial piggeries [2]. As an example, the average litter size in Danish sows has increased from 12.4 to 15.4 live born piglets per litter over the last decade [3,4]. This increased number of live born piglets has led to new challenges at the udder of the sow, namely the excess of piglets compared to the number of functional teats, which is in general around 14 to 16 teats [5,6]. When the amount of viable live born piglets in a batch of sows exceeds the number of functional teats, interventions are required to successfully rear the maximum amount of piglets [7]. One of these interventions is the application of a nurse-sow system. Nurse sows are sows that wean an additional litter after weaning their own litter. The advantage of this system is the opportunity to

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wean two litters per sow, and subsequently more piglets, in one lactation period. On the other hand, sows weaning an additional litter in the same lactation will be submitted to a prolonged lactation period and increased time in the confinement of a farrowing crate. Welfare implications of nurse sows has been reviewed by Baxter, et al. [5] regarding the prolonged confinement in the farrowing crate, separation from the sow's own litter and transfer to a nurse litter, divergence between lactational output of the sow and input in the nurse piglets, and possible loss in body condition. Thaker and Bilkei [8] observed that increased body weight loss during lactation negatively influenced weaning to estrus interval (WEI) of the sow and total born piglets per litter in the subsequent farrowing, although a longer lactation period has also been found to increase subsequent litter sizes [9]. Therefore, the aim of this study was to investigate the effect of being a nurse sow on the reproductive performance in the subsequent reproductive cycle. It was hypothesized that nurse sows would have an increased WEI and decreased litter size in the subsequent farrowing compared to non-nurse sows. To investigate this hypothesis a large survey analysis was executed.

2. Material and methods

2.1. Definition of nurse sows

In current management systems, two methods can be applied for creating nurse sows, a one-step method and a two-step method [5]. The not commonly practiced one-step method is to wean a sow from her own litter at a minimum of 21 days of lactation (according to the EU legislation, EU council directive 2008/120/EC) and provide her with a second (i.e., nurse) litter composed by surplus piglets of at least 12 hours of age to ensure colostrum intake of those piglets from their own dam (see Fig. 1). The two-step method consists of using multiple sows at different stages in lactation, where the first sow (first stage) has her own litter (between Day 2 and 10 of lactation) transferred to a second sow (nurse sow second stage) of which her own litter was weaned at a minimum of 21 days of lactation in accordance to the EU legislation (EU council directive 2008/120/EC). In this survey, sows were classified as nurse sows when data showed a second weaning in the same lactation period. However, as the litter of the first stage nurse sow in the two-step method is not weaned but transferred to another sow (second stage), no registration of this action is made, and therefore, no differentiation could be made regarding the first stage nurse sow in the two-stage method and non-nurse sows. Hence, in this study, nurse sows are defined as sows that weaned their own litter at a minimum of 21 days of lactation and weaned one additional litter in the same lactation (nurse sows), whereas non-nurse sows are sows that weaned a single litter per lactation period.

2.2. Selection of piggeries

Twenty-nine Danish piggeries were contacted for their willingness to provide farm data collected in the commercial software (AgroSoft WinSvin version 4.54, AgroSoft A/S, Denmark) to be analyzed regarding nurse sow reproductive performance. These piggeries were selected because of the assumption that they met the following prerequisites: (1) high and reliable data standards (e.g., litters/sow/year in consensus with weaning-to-weaning interval); (2) productivity greater than 14.5 live born piglets per litter; (3) registration of nurse sows; and (4) a stable number of sows including constant distribution of sows among parities approximately 1 year before and during the data collection period. The collection period of data was 2012 and 2013. All piggeries sent in back-ups of their data after which records

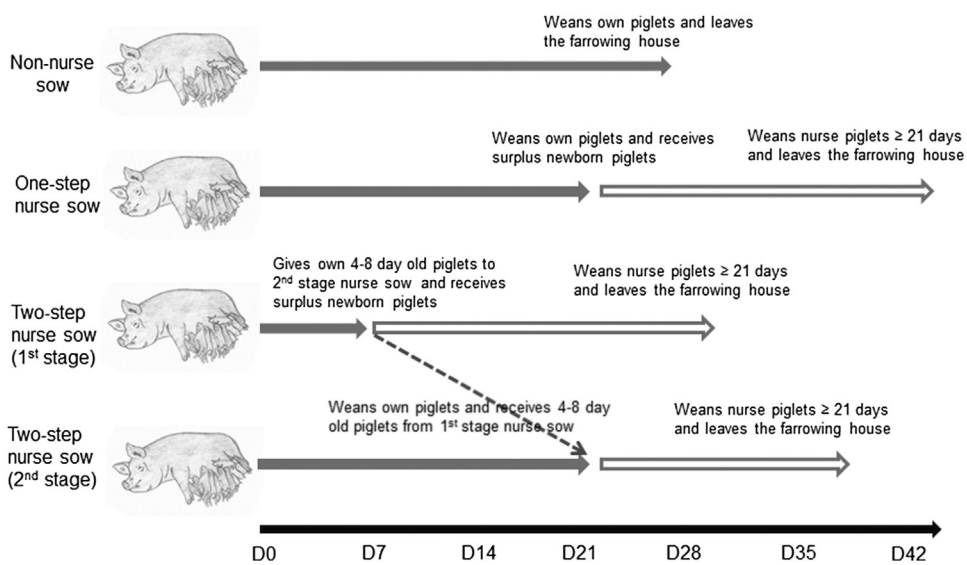

Fig. 1. A schematical illustration of the use of non-nurse (normal) sows, one-step nurse sows, and the two stages of a two-step nurse sow. According to EU legislation, the age of the piglets weaned must be at least 21 days. Gray arrows indicate the sows own piglets and white open arrows indicate nurse piglets.