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A multi-level analysis using a herd management survey and sow reproductive data indicates that standard operating procedures should take account of day postweaning and parity

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Introduction and Objectives

It is critical for small or mid-sized producers to develop or refine their standard operating procedures to survive and compete with large herds equipped with well-designed facilities and production systems. The objective of the present study was to help producers develop or improve standard operating procedures. We also used multi-level analysis to determine associations between mating procedures and reproductive performance of sows by weaning-to-first-mating interval (WMI) and parity groups.

Materials and Methods

In March 2009, questionnaire forms regarding mating procedures for sows were sent to 115 commercial breeding herds in Japan that use a recording system (PigCHAMP®, Ames, IA, U.S.A.). Returned questionnaires from 96 herds (83.5%) were merged with the relevant reproductive data for each herd including farrowing rate (FR) and number of pigs born alive (PBA). Two-level mixed-effects models were applied to the 71,743 service records by using a herd at the two-level and an individual record at the one-level. The WMI was categorized into five groups: WMI 1-3, 4, 5, 6 and ≥ 7 days.

Results and Discussion

Means (± SEM) of average female inventory, FR and PBA for the 96 herds were 413 ± 60 pigs, 81.9 ± 0.78% and 10.8 ± 0.07 pigs, respectively.

Higher FR and PBA in sows were associated with the herds using direct boar contact, decreasing quantity diet after insemination and the time of first and second insemination ($P < 0.05$). An association between the timing of insemination and FR or PBA differed depending on the WMI (Table) and parity groups. On WMI 1-3 days, FR was higher in parity 1 and 2-5 sows in the herds that performed second insemination at up to "36 h" than those in the herds that performed second insemination at "48 h" ($P < 0.05$). However, there was no association of timing of second insemination with FR in parity ≥ 6 sows ($P > 0.05$).

On WMI 1-3, 4 or 6 d, FR and PBA were higher in sows in the herds using direct boar contact than those in the herds using indirect boar contact ($P < 0.05$). On WMI 6 or ≥ 7 days, FR in parity 1 sows in the herds using direct boar contact was higher than those in the herds using indirect boar contact ($P < 0.05$). However, no difference was found between the two types of boar contact for FR in parity 2 to 5 and ≥ 6 sows ($P > 0.05$). Furthermore, sows with WMI 6 days in the herds that decreased diet quantity after insemination had higher FR than those in the herds that did not decrease diet quantity ($P < 0.05$). In conclusion, it is essential for producers to improve their mating procedures by taking account of differences in WMI and parity groups.

Table. Number of pigs born alive between different times of first or second insemination after first estrus detection by weaning-to-first-mating interval (WMI)

Time of insemination	n	Mean ± SEM
First time of insemination		
WMI 4 days		
Immediately	1,679	11.5 ± 0.08x
6-12 h	7,108	11.6 ± 0.04x
18-24 h	594	10.6 ± 0.14y
Second time of insemination		
WMI 5 days		
6-12 h	3,527	11.5 ± 0.05x
18-24 h	11,924	11.1 ± 0.03x
36 h	10,205	11.2 ± 0.03x
48 h	2,184	10.4 ± 0.07y
WMI 6 days		
6-12 h	1,135	11.0 ± 0.10x
18-24 h	5,617	10.6 ± 0.04x
36 h	371	11.3 ± 0.16x
48 h	798	10.0 ± 0.10y

Means with different letters within a column (x-y) differ ($P < 0.05$).