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## Sows having high lifetime efficiency and high longevity associated with herd productivity

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### Introduction and Objectives

Lifetime average pigs born alive (PBA) was commonly used as measurement of lifetime performance, and was closely related to culled parity and sow longevity (Engblom et al., 2007). Average culled parity did not directly indicate sow fertility and lifetime efficiency, because culled parity ignored nonproductive days (Lucia et al., 1999). Lifetime efficiency measured as lifetime PBA per day may be more accurately related to nonproductive days, sow longevity, and herd productivity (pigs weaned per mated female per year) than lifetime PBA per parity. The objectives were to characterize sows having high lifetime efficiency and high longevity, and to determine an association between those sows and herd productivity.

### Material and Methods

This study was conducted by obtaining sow data with 66,262 parity records of 13,786 sows born during 1999 in 92 herds, and herd data with mean measurements of four-year records from 2000 to 2003 in the 92 herds using a recording software system (PigCHAMP<sup>®</sup>) in Japan. Lifetime efficiency was measured as annualized lifetime PBA, which was calculated as the sum of PBA in a lifetime divided by the sow life days, multiplied by 365 days. Sows were categorized into three groups based on upper 25 percentile of the lifetime efficiency and culled parity  $\geq 6$  in the following:

- (1) HE-HL sows: having high lifetime efficiency and high longevity
- (2) OE-HL sows: having ordinary lifetime efficiency and high longevity
- (3) LL sows: having low longevity regardless of lifetime efficiency.

Mixed-effects models were used in all analyses. Herd was used as a random effect.

### Results and Discussion

The proportions of HE-HL, OE-HL, and LL sows in

13,786 sows were 21.8%, 24.5%, and 53.7%, respectively, and mean values of annualized lifetime PBA were 24.5, 17.7, and 12.6 pigs, respectively.

Annualized lifetime PBA was highly correlated with sow life days and culled parity ( $r = 0.68$  and  $0.76$ ), and average nonproductive days ( $r = -0.46$ ;  $P < 0.01$ ). Meanwhile, lifetime average PBA was marginally correlated with sow life days and culled parity ( $r = 0.24$  and  $0.25$ ), and average nonproductive days ( $r = -0.07$ ;  $P < 0.01$ ).

HE-HL sows had the shortest average nonproductive days ( $P < 0.05$ ). LL sows had lifetime average PBA similar to OE-HL sows. HE-HL sows had the most PBA and the highest farrowing percentage from parity 1 to  $\geq 8$  ( $P < 0.05$ ). OE-HL sows had fewer PBA than LL sows at parity 1 to 3 ( $P < 0.05$ ), and PBA similar to LL sows at parity 4 and 5. LL sows had the longest weaning-to-first-mating interval, and had the lowest farrowing percentage from parity 1 to 5 ( $P < 0.05$ ). Sows being mated between 186–227 days of age were 1.09 to 1.11 times as likely to become a HE-HL sow as those being mated between 249–269 days of age ( $P < 0.05$ ).

Of the 92 herds, the mean proportions (Mean  $\pm$  SD) of HE-HL, OE-HL, and LL sows within a herd were  $23.5 \pm 12.3\%$ ,  $26.3 \pm 11.4\%$ , and  $50.2 \pm 12.8\%$ , respectively. Approximately 60% herds had 20.1 to 40% of HE-HL sows, and 5.4% had no HE-HL sows. All herds had OE-HL and LL sows. Higher proportions of HE-HL sows ( $r = 0.80$ ) and lower proportions of LL sows ( $r = -0.50$ ) were correlated with greater numbers of pigs weaned per mated female per year ( $P < 0.01$ ).

In conclusion, HE-HL sows had the greatest PBA and farrowing percentage from the first parity to the end. Annualized lifetime PBA may be a good measurement including lifetime fertility, lifetime prolificacy, and sow longevity.

### References

- Engblom et al. 2007. *Livest. Sci.* 106: 76–86.  
Lucia et al. 1999. *JAVMA.* 214: 1056–1059.