# Are PigWatch's Insemination Requests in Time with Ovulation in Sows?

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## Introduction

PigWatch is a fully automated system that predicts the best timing for insemination based on real-time sow behaviour monitoring during the first days post weaning. A study has been designed to assess the correlation between PigWatch insemination requests and timing of ovulation as defined by hormonal variations in time (progesterone and estradiol).
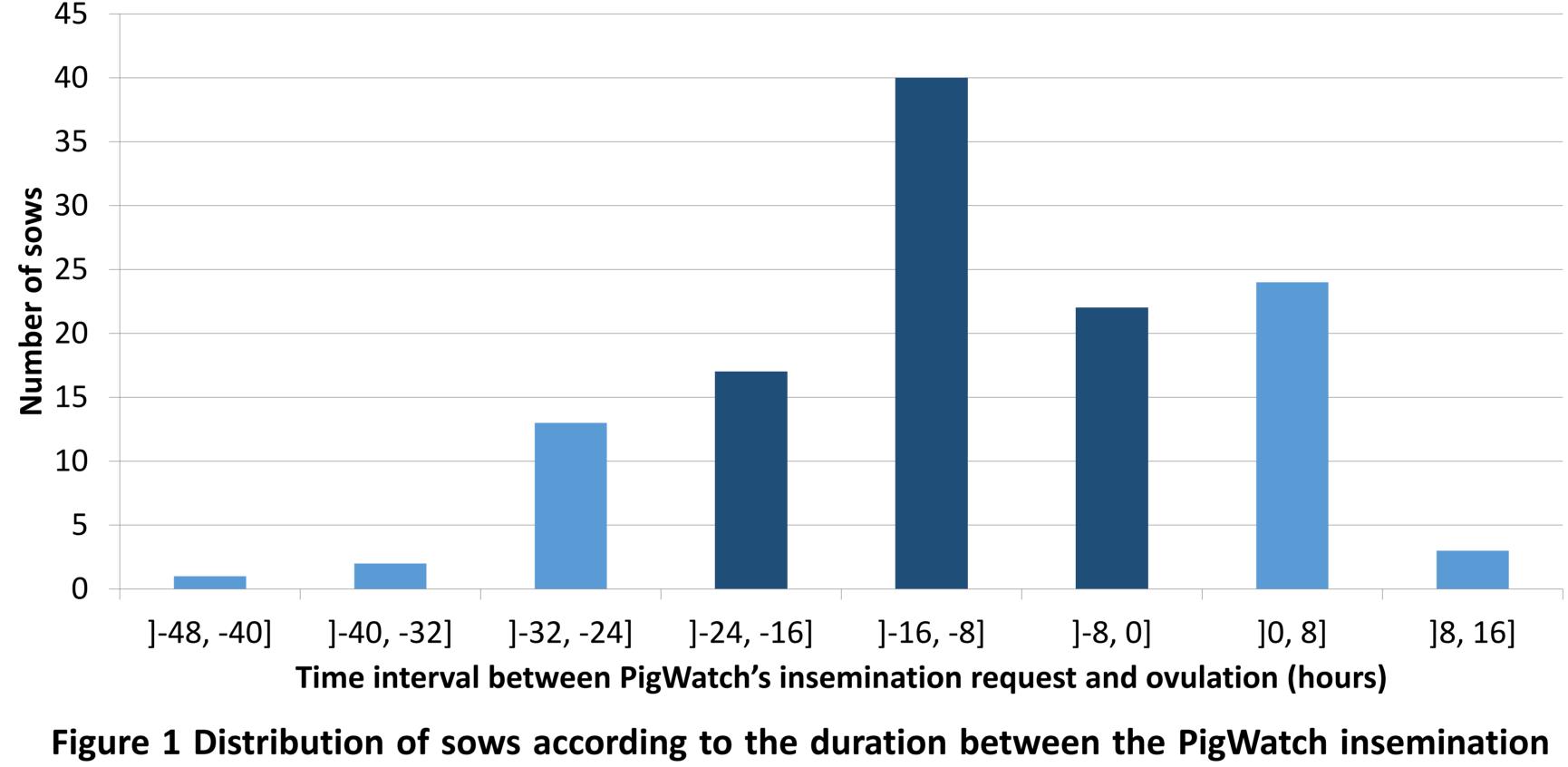


## Materials and Methods

In this 6-month study, a total of 122 sows were inseminated according to PigWatch's insemination requests.

A blood sampling method for estimating ovulation time with adequate precision had to be developed to accurately compare the PigWatch insemination request to the ovulation time while inducing minimal noise into the sow's behavioural data. Noise in the data - disturbances to the sow's natural behaviour - arises mainly due to workers' activity around the sows, feeding, and the presence of the boar. In order to reduce the impact of blood sampling on the behavioural data, samples were collected twice a day starting from the PigWatch insemination request and until a minimum of five samples was achieved.

The statistical analysis of hormonal temporal variation - partly based on the work of Soede et al. (1994) - provided an estimated timing of ovulation with an average 95%-confidence interval of 12.65 hours.

## Results

It was shown that PigWatch (*SiS5 Beta algorithm*) requested 95% of the inseminations requests within 32 hours before and 8 hours after ovulation. The 122 tested sows had 95.1% fertility rate, 15.26 total born piglets and 1.16 inseminations (semen doses).



**Figure 1** Distribution of sows according to the duration between the PigWatch insemination request (*PIR*) and the time of ovulation (*TO*) as estimated by the developed statistical method (An interval of 0 hour means that the *PIR* was exactly at the estimated *TO* and a negative time interval means that the *PIR* was before the estimated *TO*)

Results from this study suggest that there is a good correlation between PigWatch's insemination requests and optimal timing for insemination as shown by hormonal temporal variation, high fertility rates and excellent farrowing performances. Although there was no significant difference in performances between pairs of classes shown in Table 1, sows that were inseminated within 24 hours prior to ovulation (65%) had 1.92 piglets more than sows inseminated outside this time interval (p = 0.0187). This is consistent with the results of another article from Soede et al. (1995) who concluded that this was the best period to inseminate without experiencing a significant drop in farrowing performances.

**Table 1** Distribution of sows and the average technical performances of each class according to the duration between the PigWatch insemination request (*PIR*) and the time of ovulation (*TO*) as estimated by the developed statistical method (An interval of 0 hour means that the *PIR* was exactly at the estimated *TO* and a negative time interval means that the *PIR* was before the estimated *TO*)

| Time Interval (Classes) | # Sows | Average # Total Born Piglets | Average Conception Rate |
|---|---|---|---|
| ]-48, -40] | 1 | 13.00 | 100.0% |
| ]-40, -32] | 2 | 10.50 | 100.0% |
| ]-32, -24] | 13 | 15.10 | 84.6% |
| **]-24, -16]** | **17** | **15.18** | **100.0%** |
| **]-16, -8]** | **40** | **16.09** | **95.0%** |
| **]-8, 0]** | **22** | **16.24** | **100.0%** |
| ]0, 8] | 24 | 13.74 | 95.8% |
| ]8, 16] | 3 | 15.50 | 66.7% |
| **Total** | **122** | **15.26** | **95.1%** |

## Conclusion

- A method for estimating ovulation time from a limited number of blood samples was developed such that minimal noise was induced in the behavioural data of the sows.
- PigWatch can reduce the number of semen doses while maintaining good breeding performances.
- Inseminating once at the right moment has the potential to improve conception rate and the number of piglets per litter, to reduce labor and semen costs, and to maximize the use of the boars with highest genetic potential.

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pigwatch Sow Insemination System 5