



## **Pregnancy diagnosis by ultrasound echography: an aid to control pig reproduction**

F. Martinat-Botte, F. Bariteau, O. Teffene, M. Terqui

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Surge of LH occurred during oestrus while  $E_2$  17  $\beta$  concentrations were still high. It lasted 13 to 20 hours and was accompanied by an increase in FSH and PRL secretion. While LH and PRL mean levels decreased, FSH concentrations were still increasing. Pulses of LH occurred again about 30 hours after the start of the LH surge.

During the period of oestrus, each exposure to the boar was immediately followed by a peak of PRL which could play a role in the behaviour of the gilt.

### **Use of ultrasound echography to study embryonic development in the sow**

Martine LEPERCQ <sup>(1)</sup>, Françoise MARTINAT-BOTTE <sup>(2)</sup>, Y. FORGERIT <sup>(3)</sup>,  
M. TERQUI <sup>(1)</sup>

*(1) INRA, Station de Physiologie de la Reproduction, Nouzilly, 37380 Monnaie.*

*(2) I.T.P., 149, rue de Bercy, 75595 Paris Cedex 12.*

*(3) INRA-S.E.I.A., 86480 Rouillé.*

Ultrasound echography (scanning) allows to visualize embryonic vesicles as early as 18 days after ovulation in the sow. Before, the allantoic and amniotic fluid volumes are too small and undetectable. The purpose of this study was to evaluate with accuracy the conceptus development (embryonic vesicles, embryos) in the first third of pregnancy in order to define the conditions of optimum utilization of this pregnancy diagnosis on the farm.

A total of 233 pregnant sows from 4 herds were scanned 6 times at intervals of 7 days from  $21 \pm 2$  d post-insemination. All examinations were carried out by the same operator. The ultrasound scanner used was a TOSHIBA SAL 32 B. For each sow, images of the first three scannings were recorded with a video tape recorder. For each scanning, images were drawn after frame-freeze. This allowed measurement of the size of individual structures within an image : vertical diameter of surface ( $n = 6622$ ) of vesicles, length ( $n = 253$ ) or diameter ( $n = 585$ ) of embryos.

A very rapid growth of vesicles was observed between 20 and 30 d. Their size (diameter of surface) was less variable. After 30 d growth was slower.

Embryos were visible from 21 d post-insemination. Between 21 and 37 d ( $r = 0.97$ ) their growth was linear. Nevertheless between 21 and 30 d, images were easy to interpret due to the small size of embryos relative to the volume of fluid. It is therefore recommended to perform pregnancy diagnosis during this period. Prediction of the litter size by enumeration of vesicles at 3, 4 or 5 weeks is not possible, the calculated coefficients of correlation being too small ( $r$  : ranging between 0.16 and 0.27).

### **Pregnancy diagnosis by ultrasound echography : an aid to control pig reproduction**

F. MARTINAT-BOTTE <sup>(1)</sup>, F. BARITEAU <sup>(2)</sup>, O. TEFFENE <sup>(1)</sup>, M. TERQUI <sup>(3)</sup>

*(1) I.T.P., 149, rue de Bercy, 75595 Paris Cedex 12.*

*(2) INRA-S.E.I.A., 86480 Rouillé.*

*(3) INRA, Station de Physiologie de la Reproduction, Nouzilly, 37380 Monnaie.*

In the sow, we have previously shown that ultrasound echography (scanning) can be an aid to the early diagnosis of pregnancy. This technique has been used since 1984 in about fifty herds.

The results obtained are reported here with an emphasis laid on factors liable to interfere with the accuracy of the diagnosis. Moreover, the effect of echotomography on the main parameters of reproduction and culling is analysed in some herds.

Pregnancy was diagnosed with an overall accuracy of 96.7 % in 1605 scans performed in 48 herds. Between 18 and 21 d, the percentage of errors in positive diagnoses (DG+) reached 7 %, but it was higher in negative diagnoses (30 %). Beyond 22 d post-insemination, the error was small : 3 % or less.

The accuracy of diagnoses performed by experienced operators (more than 200 scans) was always higher : 97.5 versus 94.9 % in inexperienced operators (less than 200 scans). Most errors were made by the latter between 18 and 25 days. A period of training and of adaptation to the scanner is therefore very important. It is more or less long depending on the skill of the operator. Likewise, litter order and genotype have a significant effect on the accuracy of diagnosis. In order to determine the effect of this technique on herd management, we have analysed matings and their results (return to oestrus, farrowing, culling and its cause) in 4 herds during the 12 months preceding the application of ultrasound scanning (period I) and during one year of regular application of this technique to presumably pregnant sows (period II). It was concluded that ultrasound scanning offers a practical means of controlling returns to oestrus in barren sows and of reducing the unproductive periods. The mating-culling interval was reduced from 96 to 46 days on an average for period II.

### **Use of ultrasound echography on-the-farm to detect abnormalities of the urogenital tract of sows**

F. MADEC <sup>(1)</sup>, Françoise MARTINAT-BOTTE <sup>(2)</sup>, Y. FORGERIT <sup>(3)</sup>,  
M. LE DENMAT <sup>(4)</sup>, J.C. VAUDELET <sup>(4)</sup>

- (1) *Ministère de l'Agriculture, Direction de la Qualité,  
Station de Pathologie Porcine, B.P. 9, 22400 Ploufragan.*  
(2) *I.T.P.-M.N.E., 149, rue de Bercy, 75595 Paris Cedex 12.*  
(3) *INRA-S.E.I.A., 86480 Rouillé.*  
(4) *I.T.P.-La Motte au Vicomte, 35650 Le Rheu.*

Sterile or subfertile sows may stay on the farm for several weeks leading to economic losses. As previous data from the inspection of urogenital tracts of sows at the slaughterhouse had shown a noticeable prevalence of lesions, it was decided to use ultrasound scanning as mean of diagnosing earlier some physiopathological lesions of the urogenital tract of sows.

A first study was conducted at the slaughterhouse. A total of 106 sows were scanned with a B-Mode scanner (TOSHIBA, SAL 32 B) just before slaughter. Images were recorded with a video tape recorder. After slaughter, the urogenital tract was removed and observed at the laboratory. Thereafter, the recorded images were compared to macroscopic observations. A second study involving 162 sows was made in two herds severely affected with reproductive disorders (farrowing rate of 50 or 60 %).

Ultrasound echography allowed to detect ovaries exhibiting cystic follicles (attached black spots, 15-70 mm diameter separated by a thin wall) or hemorrhagic corpora lutea (blood clots appearing as attached or not black spots of 12-20 mm diameter surrounded by a thicker wall). The ovaries could be easily located especially during the follicular phase (70 % of such ovaries were detected). During the luteal phase, the percentage was lower (51 %). Bladder abnormalities (stones, purulent cystitis) or abscesses were also detected. Uterus abnormalities such as pyometritis were seldom observed during post-mortem examinations and scans were difficult to interpret.