Livestock Science 167 (2014) 362–369

Contents lists available at ScienceDirect

Livestock Science

journal homepage: www.elsevier.com/locate/livsci

Slaughterhouse examination of culled sows in commercial pig herds

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ARTICLE INFO

Article history:
Received 9 February 2014
Received in revised form
30 June 2014
Accepted 1 July 2014

Keywords:
Sows
Culling
Reproduction
Post-mortem examination
Endometritis

ABSTRACT

A proper culling policy in sow herds is a prerequisite to maintain a stable parity profile of the breeding animals and to maintain consistent production. This study investigated reasons for culling of 502 sows from 7 commercial pig herds and examined the reproductive tract of these sows by macroscopical, bacteriological and histopathological examination. Associations between all three examinations were statistically analysed. More than 50% of the sows was culled because of reproduction failure, while old age was the second most common reason (23%). Approximately 75% of the examined uteri were visually normal. Purulent exudate was detected in 18% of the animals. No abnormalities were found in 54% of the ovaries, whereas 28% showed inactivity. Sixty-two percent of the uteri were bacteriologically positive, with *Escherichia coli* (18%) being the most frequently isolated. Histologically, 52% of the uteri showed mild to severe inflammation. From the uteri with endometritis based on visual inspection and histology, 26% and 30% was bacteriologically negative, respectively. The presence of bacteria showed a slight agreement with macroscopical ($\kappa=0.14$, $p=0.04$) and histopathological endometritis ($\kappa=0.18$, $p=0.04$). No agreement was found between macroscopical and histopathological lesions ($\kappa=-0.06$, $p>0.05$). Major differences were found between herds for all parameters. In conclusion, sows are mostly culled because of insufficient reproductive performance, and many of the culled sows show endometritis lesions. Histopathology appears to be more sensitive than visual inspection.

1. Introduction

A proper culling policy in sow herds is a prerequisite to maintain a stable parity profile of the breeding animals. This is necessary to maintain consistent production and to avoid huge swings in the number of replacement gilts. Culling rates of sows vary considerably between herds, ranging from 15% to 85% (D'Allaire et al., 1987) or from 26% to 70% (Boyle et al., 1998). D'Allaire and Drolet (2006)

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http://dx.doi.org/10.1016/j.livsci.2014.07.001
1871-1413/

proposed 40% as recommended culling rate, with 35% being true culling and 3–5% deaths. The decision to cull sows is not that straightforward, and inappropriate culling can cause major financial losses to the pig producer. Krabbenborg et al. (1989) reported that sows not showing estrus are often culled too early post-weaning whereas sows failing to conceive too late. The price for culling sows has also become a significant factor in determining culling decision over the past years. As a result, old sows may be retained too long in the herd and young sows may be removed too early from the herd, with decreasing productivity as a consequence (D'Allaire et al., 1987; Ciaran, 1999).

Reproduction failure is one of the major causes for culling sows. D'Allaire and Drolet (2006) stated that 13–49% of all sows are culled because of impaired fertility, such as anestrus in sows post-weaning, regular and irregular returns, no pregnancy, abortion and peripartal difficulties. Other important reasons for culling include old age, locomotion problems, disease, and poor performance. Culling reasons may vary over time, among countries, herds and parities. Some findings in literature are based on old studies, performed decades ago (Dagorn and Aumaitre, 1979; Dalin et al., 1997; Boyle et al., 1998), when sows were far less productive than nowadays. Other studies in different countries investigated reasons for culling in sows and/or assessed post-mortem lesions. However, reasons for culling are influenced by many factors such as sow genotype, housing conditions, and management policies (Svendsen et al., 1975), thus studies in the United States, Canada or Asia (Friendship et al., 1986; D'Allaire et al., 1987; Tummaruk et al., 2009; Kwiecien et al., 2010; Sasaki and Koketsu, 2011) are not always comparable with the European situation, because of the major differences in management, feeding, genetics, climate and housing conditions. In addition, monitoring culling rate and reasons for culling, and investigating whether reasons for culling correspond with the results of diagnostic examinations, can identify diseases or management deficiencies. Examination of culled sows in the slaughterhouse can therefore be very helpful to verify culling decisions. As insufficient reproductive performance is the main reason for culling, most emphasis is placed on the examination of the reproductive tract. A representative number of culled breeding animals can be investigated in a simple way, and the visual inspection can be complemented with further histopathological and/or bacteriological examinations. De Winter et al. (1995) reported that endometritis was diagnosed in 67% of the sows culled because of vaginal discharge and in 56% of the sows culled for other reasons. Affected sows are often infected with bacteria such as *Escherichia coli* (*E. coli*), *Staphylococcus* spp. and *Streptococcus* spp. (Meredith, 1986; De Winter et al., 1995). However, performing both histopathological and bacteriological examinations is time consuming and expensive, making it interesting to know which method is most sensitive to detect endometritis.

The present study investigated reasons for culling of sows in commercial pig herds in Belgium and examined the reproductive tract of these sows in the slaughterhouse by visual inspection, histopathology and bacteriological examination. Associations between macroscopical, histopathological and bacteriological findings indicating endometritis were assessed.

2. Materials and methods

2.1. Herd selection and study population

Seven Flemish pig herds with more than 500 sows were included in the study. They were randomly selected from the National Identification and Registration database (I&R, Sanitel-Pigs, 2005). From each herd, some reproduction parameters were recorded, using computer-based record systems for the period December 2009 till December 2010. The recorded reproduction parameters per herd included the number of piglets weaned per sow per year and the replacement rate. The replacement rate was calculated as the number of pigs mated for the first time multiplied by 100 and divided by the average sow inventory during the same time period. From each herd, two or three batches of culled gilts and sows were investigated. Gilts were female pigs which had been selected for breeding purposes but had not farrowed yet. For each individual animal, the parity and the reason for culling were recorded. If more than one reason was reported, the most decisive reason was taken into consideration. The reason "anestrus" was given to sows not showing clinical signs of estrus within ten days after weaning.

The examined sows were culled during two periods, first from December of 2010 until April 2011 and next from December 2011 until February 2012.

2.2. Macroscopical examination

The reproductive tracts of the animals were individually identified and collected in the slaughterhouse, and subsequently transported to the faculty of veterinary medicine, Ghent University, where they were examined within 2 h after collection. The ovaries, oviducts, bursae ovaricae and uteri were inspected macroscopically and palpated. The stage of the estrus cycle was determined based on the presence of small (≤ 4 mm), medium (5–8 mm) or large (>8 mm) follicles, ovulation points (OP) and *corpora rubra* (CR), *lutea* (CL) and *albicantia* (CA). Follicles were defined as transparent, fluid-containing structures, OP were seen as little red points on a follicle, CR were characterized as ovulated follicles with blood clots, CL were structures of pink, tan or yellow colour and finally CA were defined as regressed and shrunken white CL. Ovaries were considered as inactive if only follicles less than 3 mm in diameter or no *corpora* were present. Cyst-like formations larger than 15 mm in diameter were recorded as ovarian cysts (COF, Dalin et al., 1997; Heinonen et al., 1998; Knauer et al., 2007). No differentiation was made between follicular or luteal cysts, as the difference is not always clear using visual assessment alone. A further distinction was made between para-ovarian, para-oviductal and oviductal cysts. Para-ovarian cysts were located in the bursa ovarica or near the ovaries in the mesovarium, para-oviductal cysts were located in the mesosalpinx and oviductal cysts on the oviduct. The patency of the oviducts was tested using a needle and syringe with physiological solution. The cervix and the uterus were incised longitudinally and inspected for presence of e.g., foetuses, mummies or macerated foetuses or congenital malformations. The endometrium was examined for edema and signs of inflammation. Endometritis was defined as severe edema and congestion, dark red colour of the endometrium