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MORPHOLOGICAL EXAMINATION OF OVARIES IN GILTS WITH NOT DETECTED STANDING OESTRUS UP TO 240 DAYS OF AGE AND LATER

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ABSTRACT

The main purpose of this study was to investigate the ovarian structures (*corpora lutea, corpora hemorragica, corpora albicans*) in the slaughtered gilts, with not detected standing oestrus up to 240 days of age and later. Post-mortem morphological examinations were done on ovaries from 233 gilts. The status of pubertal maturation was determined according to presence of functional ovarian structures: large follicles (6-11mm), corpora lutea, corpora hemorrhagica and corpora albicantia. Ovaries with large follicles, corpora lutea or corpora hemorrhagica, were considered as having one ovarian cycle. Ovaries with combination: large follicles + corpora albicantia, corpora hemorrhagica + corpora albicantia or corpora lutea + corpora albicantia were considered as having two ovarian cycles. Ovaries with only small folicles (≤ 5mm) were considered as prepubertal (acyclic) ones. According to functional ovarian structures, 57% of gilts were prepubertal (acyclic) and 43% had established pubertal cyclic ovarian activity. From total number of pubertal gilts, 65% had established one, and 35% - two pubertal ovarian cycles. Probably the lack of standing oestrus detection in 43% ovarian cyclic gilts were the consequence of (a) silent oestrus or (b) inadequate oestrus detection procedure. Post-mortem examination of reproductive organs was a valuable diagnostic tool for gilts with delayed prepubertal anoestrus.

Key words: gilt; puberty; oestrus; ovary; morphology

INTRODUCTION

Puberty maturation occurs when the gilt undergoes first ovulation followed by normal ovarian cycle. The external oestrus symptoms are manifested by redding and swelling of the vulva and standing reflex (Eliasson, 1989). Gilts usually acquire their first pubertal oestrus at 6 - 7 months of age and 100 – 110 kg body weight (Evans and O'Doherty, 2001). If they have not established their first oestrus prior to 8 months of age, they are considered as having delayed puberty. Interactions of several genetics and paragenetics factors, such as a season of the year, boar contact, transport and/or relocation, nutrition, back fat thicknes, housing system and hormonal treatment, affect the attainment of puberty in gilts (Dalin and Einarsson, 1986; Stančić et al., 2006, Strejček et al,. 2001, Budáčová et al., 2001, Omelka et al., 2005). Delayed puberty in gilts is a widespread problem in pig breeding, because of causing financial losses for pig producer. The main purpose of this study was to investigate ovarian structures (corpora lutea, corpora hemorragica, corpora albicans) in gilts with not detected oestrus symptoms (mainly standing reflex), up to 240 days of age and later.

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MATERIAL AND METHODS

From the total of 1.118 gilts, selected for reproduction on one large farm unit in Serbia, in 233 (20,8 %) gilts oestrus was not detected up to 240 days of age and later. These gilts were considered as having delayed puberty. The gilts were penned together at 20 animals per box. The oestrus detection was done once within 24h, by close contact with teaser boar. The gilt's age at slaughter ranged from 242 to 308 days (av. 264 d). After slaughter reproductive organs of gilts (n = 233) were examined in the laboratory. The status of pubertal maturation was determined according to the presence of functional ovarian structures: large follicles (6 – 11mm), *corpora lutea*, *corpora hemorrhagica* and *corpora albicantia*. Ovaries with large follicles, corpora lutea or corpora hemorrhagica, were considered as having one ovarian cycle. Ovaries with combination: large follicles + *corpora albicantia*, *corpora hemorrhagica* + *corpora albicantia* or *corpora lutea* + *corpora albicantia* were considered as having two ovarian cycles. Ovaries with only small follicles (≤ 5 mm) were considered as prepubertal (acyclic) ones.

RESULTS AND DISCUSSION

In 57 % of the gilts (133 / 233), except small follicles (≤ 5mm), no other functional structures were found in the ovaries. These gilts were considered as really prepubertal (acyclic). In 43 % of the remaining gilts (100 / 233), different cyclic ovarian structures, such as large follicles, *corpora hemorrhagica*, *corpora lutea*, *corpora albicantia* were found in the ovaries. These gilts were considered as pubertal (sexually mature, cyclic) ones (Fig. 1). In the group of pubertal gilts, according to functional structures present in ovaries, 65 % (65/100) of the gilts were considered as having one pubertal ovarian cycle and 35 % (35 / 100) considered as having two pubertal ovarian cycles (fig. 1 and tab. 1).

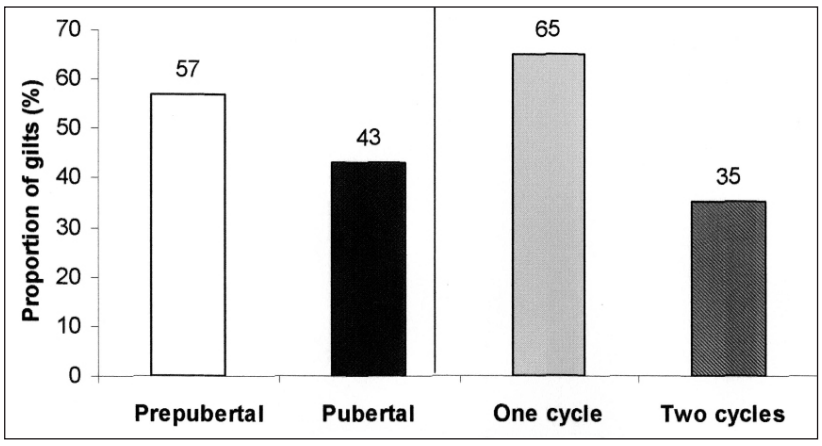

Fig. 1: Distribution of gilts with different status of pubertal maturation

Similar proportion of ovaries at follicular and luteal phase of the cycle were found in one and two cycle's gilts (tab. 1).

From 1118 gilts, selected for breeding purpose, in the year 2005, at one large farm unit in Serbia, 41,2 % gilts were culled before farrowing. The delayed anoestrus (20,8 %), return to oestrus after first insemination (6,8 %) and pseudopregnancy (13,6 %) were the main reasons for culling gilts. Of all 2041 gilts (Swedish Landrace x Swedish Yorkshire), 54,5 % were culled without farrowing any litter. In the same observation 66,9 % of gilts over 9 months of age were culled because of reproductive disturbances and anoestrus being the dominant reason. Among expected pregnant gilts 6,6 % culling were caused by failure to farrow (Ehnvall et al., 1981). A large proportion (42 %) of the culled gilts were slaughtered because of no heat (anoetrus) or no pregnancy (Henionen et al., 1998). In our previous investigation (Stančić et al., 1999), among 48 gilts with not detected oestrus up to 234 – 368 days of age at slaughtering, cyclic ovarian activity was found in 50 % of animals. These gilts had established one ovarian cycle (45,8%), two ovarian cycles (50 %) or three ovarian cycles (4,2 %).

An investigation which comprised clinical, endocrine and morphological studies indicates that ovulation without any external oestrus symptoms (''silent oestrus'') or anovulatory oestrus does not occur in pubertal gilts. Only 4,4% of the gilts faild to show standing reflex (Andersson et al., 1982). In 30 to 50% of the gilts having delayed puberty, no morphological changes on their reproductive organs were found (Stančić and Vidović, 1977; Dalin et al., 1997; Henionen et al., 1998; Gagrčin et al., 1998).

According to findings that ovulation without external oestrus symptoms does not occur in pubertal gilts, the question is: why, in farm condition, oestrus is not detected in significant number of gilts with established cyclic ovarian activity? We postulated that it is the result of inadequate oestrus detection procedure (in our case, oestrus detection once per day). These results demonstrate the importance of more frequent oestrus detections (minimal two detections per day, in the 12h intervals) and of more knowledge about external morphological and behavioural changes of gilts oestrus period. In addition, post-mortem examination of gilt reproductive organs, anamnestic data (Dalin et al., 1997) and plasma progesterone profiles (Chun et al., 2002) can be useful diagnostic tool for solving reproductive problems in peripubertal gilts.

Table 1: Distribution of functional ovarian structures in prepubertal and pubertal gilts

	Status of gilts pubertal maturation (n = 233)		
	Prepubertal (n=133)	**Pubertal matured** (n = 100)	
		with 1 E – cycle (n = 65)	with 2 E –cycle (n = 35)
Only small follicles (≤ 5mm)	133/100 %	–	–
Only large follicles (6 – 11mm)	–	18 / 27.7 %	–
Only *corpora hemorrhagica*	–	12 / 18.5 %	–
Only *corpora lutea*	–	35 / 53.8 %	–
Large follicles + *corpora albicantia*	–	–	8 / 22.9 %
Corpora hemorrhagica + *corpora albicantia*	–	–	5 / 17.1 %
Corpora lutea + *corpora albicantia*	–	–	22 / 60.0 %

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