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An Approach to Relationships Between Vagina Length and Prolificity of Sows

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Abstract: A possible relationship between vagina size and reproductive activity of sows with different parity number, was evaluated in 491 Landrace × Duroc × Yorkshire of none, first, second and third parity from a commercial farm. There were significant differences ($p<0.001$) between sows of first parity and the other two, being lesser the length of vagina from nulipare sows (25.17 cm) with no relevant differences between females from 1-3 parities (28.34 cm). Average growth of vagina-cervix length between none and one parity was 3.22 cm. These results suggest that vagina growth is stabilized after first farrowing. When vagina-cervix length was related to total and alive born piglets, these interdependences were not significant ($p>0.05$) among them for any parity. It is suggested that vagina-cervix length is not a relevant factor for selection of sows and therefore this trait is not indicative of a good or bad reproductive activity of sows in the future either. In this connection, other factors of a greater fiability should be taken into account from the point of view of the animal productive development.

Key words: Vagina length, prolificity, parity, sow, reproductive, activity

INTRODUCTION

It is known that there exist different factors determining ovulation rate and/or litter size from a sow. One of these factors is the degree of development of the genital apparatus of the sow during puberty, which is important for attain an optimum in ovulation capacity and embryo viability (Rueda *et al*., 2004). Uterine capacity of sows affects litter size and then this trait could be utilized as selection trait for reproductive function (Vianna *et al*., 2004). The size of uterus increases progressively with age, weight and sexual cycles of sows. Therefore, the development of the genital apparatus is a factor of great influence during puberty onset and for its fitness to a proper ovulation capacity and embryo viability (Edwards, 1997; Tarocco and Kirkwood, 2002).

A key for a high productivity during the life span of sow is to achieve an adequate development of the genital apparatus (Martin *et al*., 2001). In this connection it has been suggested by Wu and Dziuk (1995) that uterine length during puberty of sows is an indicator of its post-puberty size and therefore its litter size. In fact, the sow uterine capacity influences litter size. Some results show that length of penetration of the catheter is positively correlated to litter size and then could be utilized as a tool to predict methods of selection of the animals (Vianna *et al*., 2004). On the other hand, litter sizes depends upon ovulation rate, fertility and intrauterine mortality, factors in turn directly related to genotype, nutrition, age and sire effect (Barrios *et al*., 1984).

The heritability of litter size is very low, lesser than 0.01 and therefore it is not so advantageous to use this trait for selection (Fuentes, 2006). In practice, selection of young gilts is carried out considering age, weight and body condition. In fact, these factors does influence the productive performance of the sow. However, these characteristics can not predict prolificity with a fiability margin. In this connection the use of one trait easy to be measured and of a higher heritability could predict prolificity (Anderson and Melapin, 1994; Martin, 2001). The objective of the current investigation was to evaluate the possible relationship between vagina length and prolificity of sows from different parities.

MATERIALS AND METHODS

A total of 491 Landrace × Duroc × Yorkshire sows of none, 1, 2 and 3 parities, from a commercial farm were

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employed. The sows were grouped according to its parities. After every insemination, three per female on average, the length between the vagina and the cervix was determined, by measuring the length of the pipette between the bottom of vulva up its limit to cervix (Martin *et al*., 2001). After farrowing, the number of total and alive born piglets from that sows was recorded.

A one-way analysis of variance was conducted (Herrera and Barreras, 2005; Lemus and Ramírez, 2005) for establishing differences amongst groups, considering parity as treatment. An analysis of correlation was carried out for parities 1-3 (Herrera and Barreras, 2005) to set up the interdependence amongst the length of vagina and total born piglets and piglets born alive.

RESULTS AND DISCUSSION

It was found that there were significant differences ($p<0.001$) between treatments, since this measurement had lowest values for parity 0 as compared to the others (Table 1). However, there were not significant differences among multiparous sows, where on average, vagina-cervix length was 28.34 cm. As a consequence, average growth of vagina-cervix length between none and one parity was 3.22 cm According to data reported by others (Edwards, 1997; Tarocco and Kirkwood, 2002), uterus size increase progressively as sows aged. Some researchers (Martín *et al*., 2001) that sacrificed sows 5 days post-oestrus, that as long as the length of the vagina increased, the same measurement for uterus increased too.

In the current research it was observed that average growth of the length of vagina-cervix between farrowing 0 and 1 was 3.22 cm. However, between farrowing 1 and 3, this value did not increased considerably. These results suggest that length growth between the vagina and cervix of sows reachs a plateau after first parity.

Table 2 shows correlations obtained in every parity amongt length of vagina and the 2 variables concerning sow prolificity. Mean values for total born piglets and piglets born alive were 10.68 and 9.43 for parity 1, 11.15 and 9.9 for parity 2 and 11.91 and 10.53 for parity 3. These measurements did not have significant differences ($p>0.05$) among them and besides, they were in the normal range for these parameters in pig commercial farms. In fact, there were not relevant relationships between these indicators of sow prolificity and vagina-cervix length.

Results reported by up to date are controversial. Vianna *et al*. (2004) found that there was no interdependence between the length of vagina and foetal survival 70 days after conception. Similarly, in other studies (Tarocco and Kirkwood, 2002; Rueda *et al*., 2004) litter size was not associated to the length of the vagina.

Table 1: Effect of parity on vagina-cervix length and litter characteristics in sows

	Parity				
	0	1	2	3	EE ±
n	75	80	230	106	-
Vagina-cervix length, cm	25.17^{b}	28.39^{a}	28.32^{a}	28.44^{a}	0.388***
Litter characteristics					
Total born piglets	-	10.67	11.14	11.91	0.052
Piglets born alive	-	9.43	9.99	10.52	0.045

*** $p<0.001$, ^{ab} Means without letters in common in the same row differ significantly ($p<0.05$) among them

Table 2: Correlations among vagina-cervix length and litter traits in sows[1]

	Parity		
	1	2	3
n	80	230	106
Total born piglets	0.03	0.04	0.06
Piglets born alive	0.05	-0.01	0.03

[1]In all cases, $p>0.45$

However, some researchers (Wu and Dziuk, 1995; Martin Rillo *et al*., 1999, 2001) reported the contrary to these findings. In this connection, another factors such as age, physiological status, nutrition, environment and exercise, could be involved (Puentes, 1983; Quiles and Hevia, 2005; Jeanette and Roderick, 2005).

In the present investigation it was not possible to encounter any interdependence between the length of sow vagina-cervix and certain parameters of prolificity, therefore indicating that this organ value is neither a factor to be taken into account for selecting pig females in the market nor to predict a good or bad productive activity of the animal in the future.

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