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Opinion

Sow Litter Size and Piglet Development

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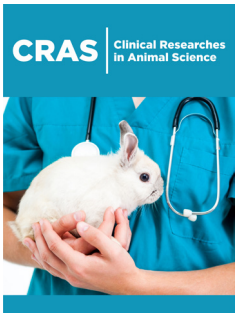
ISSN: 2770-6729



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Submission: August 29, 2024

Published: September 06, 2024

Volume 3 - Issue 3

How to cite this article: Roberto G Martínez Gamba* and Gerardo Ramírez Hernández. Sow Litter Size and Piglet Development. Clin Res AnimSci. 3(3). CRAS. 000565. 2024
DOI: 10.31031/CRAS.2024.03.000565

Opinion

As knowledge about the principles of inheritance has increased, the selection process in pigs has been carried out in a more systematic way. Selection initially focused on physical appearance, but, from the 1950s onwards, production traits were increasingly used [1]. Initially, progress was observed in carcass and growth traits, while reproductive traits showed little improvement and as a consequence, litter size changed relatively little [2]. However, as pig production increased in intensity, improvements in litter size were achieved through improved reproductive management, targeted nutrition, and more recently, through the effective implementation of genomic selection for litter size [1].

Knowledge of some piglet production variables remains limited, especially in aspects such as litter size, individual birth weight and overall litter weight [2,3]. The use of hyper-prolific sows in commercial production has caused an increase in the Percentage of Lactation Mortality (PML). PML greater than 12% and repercussions in weaning and fattening pigs are reported with 3.3 mortality due to low birth and weaning weight [4]. Therefore, the mortality of lactating piglets is an animal welfare and economic problem in the pig industry that needs to be deepened.

However, the genetic improvement achieved has allowed pig farmers to increase the number of piglets born per litter, both as total number of births (NT) and number of live births (NV) [5,6]. This gradual and continuous increase in litter size has caused, on the one hand, that producers have difficulty taking sufficient care with larger litters in which the birth weight of the piglets decreases and there is a greater risk of stillborn piglets due to the longer duration of farrowing. On the other hand, aspects such as the sow's lactation capacity, in terms of number of teats and feed intake to maintain higher milk production have not had the same improvement as litter size [7].

The selection of maximum value traits used in sows has produced a faster response of ovulation rate and therefore litter size. However, the response in other traits requires attention; for example, a negative effect is the high stillbirth rate. The objective of this work is to know the various effects of a larger litter size on pig production, its relationship with mortality on farms and the impact it produces on pig fattening and therefore on their productivity, and on the other hand to know what measures can be taken to alleviate this situation.

A piglet is low birth weight when, at birth, its measurement is less than the average litter weight or when it is below 1.0kg [8,9]. A negative relationship between litter size and birth weight has been demonstrated, [3] which has an impact on piglets' welfare and increases the risk of mortality during lactation. Since piglets of lower weight tend to be weak and less reactive, predisposing them to die by crushing or starvation [10]. Approximately 15 to 20% of piglets die during the farrowing and lactation process, but when this percentage is described in piglets born with low birth weight it raises to 40%. The variability of individual piglet weight at birth is directly related to survival and has a multifactorial origin [11]. Increased mortality from birth to slaughter has been demonstrated in piglets born with 0.950kg weight or less [12].

As a result of a marked increase in the ovulation rate associated with a modest increase in embryonic survival, it has resulted in a greater number of embryos in the post-implantation period, especially between 25 and 30 days [13]. This generates a condition of embryonic overcrowding that has consequences on the placental area available per fetus, which affects the development of the products [14]. Intrauterine Growth Restriction (IUGR), embryonic survival and fetal weight have been related to uterine capacity, uterine capacity being understood as the number of fully developed fetuses that the uterus can maintain until the time of delivery [15]. It has been observed that uterine capacity affects fetal growth from day 30 of gestation, at this time competition becomes critical as fetuses compete for uterine space and nutrients [16]. The detriment to placental function in early stages of gestation with an overcrowding of embryos in large litters will affect the development of fetal organs, as well as the type and number of muscle fibers, giving rise to IUGR; Preliminary data indicated that even when the number of embryos in the uterus does not significantly affect average birth weight, overcrowding results in measurable IUGR in fetuses [15].

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