

Reproductive Performance of Pig Based on Age of the Sows and Litter Size

Sri Gustina^{1*}, Nopriadi Sambo Pasau¹, Hendro Sukoco¹, Hasbi Hasbi²

¹Department of Animal Science, Faculty of Animal Science and Fisheries, Universitas Sulawesi Barat, Jl. Prof. Dr. Baharuddin Lopa, Tande Timur, Majene, 91412, Indonesia

²Faculty of Animal Science, Hasanuddin University, Jl. Perintis Kemerdekaan Km.10, Makassar 90245, South Sulawesi, Indonesia

*Corresponding Author

Sri Gustina

Department of Animal Science,
Faculty of Animal Science and
Fisheries, Universitas Sulawesi
Barat, Jl. Prof. Dr. Baharuddin
Lopa, Tande Timur, Majene,
91412, Indonesia

Article History

Received: 09.08.2023

Accepted: 12.09.2023

Published: 16.09.2023

Abstract: Pigs farming is one of the livestock commodities that have the potential to be developed, so it is necessary to observe age of the sows and litter size to determine the reproductive performance of pigs. This study was conducted in the Jambutua village of Polewali Mandar Regency with descriptive methods by observing directly. A total of 60 sows were surveyed using saturated sampling. The parameters observed were the age of the sows and the litter size. The results showed that the age study of sows in Jambutua Village had an average age of 3 years with 4 times of births. Litter size increases with each birth. The average of litter size was the highest at the fourth parity of 12 piglets, followed by the third parity of 10, the second birth of 8, and the lowest number of piglets per birth, the first birth of 7. The results of the analysis conducted that the parity has a correlation with the age of sows with the significance value (P) is 0.000, and the correlation value (R²) is 39.2%.

Keywords: Age of the sows, litter size, parity, reproductive performance.

Copyright © 2023 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

Pig farming is one of the livestock commodities that has potential to be developed in Indonesia. According to Lavery *et al.* [1], pig farming as a contributor to low-cost meat protein has been recognized throughout the world. Meanwhile, in several areas in Indonesia, pig farming is needed for traditional activities. However, to obtain optimal results in running a pig farming business, there are several things that need to be considered, such as the availability of adequate seeds both in terms of quality and quantity. Breeding management is the activity to select pigs based on production and/or reproductive characteristics [2, 3]. Selection of good breeds is the first step to the success of a livestock

business [4]. Selection of adult pigs to be used as breeding stock can be through in various ways, including individual selection, production results or based on pedigree [3, 5]. At present, efforts to breed pigs are carried out using two methods which are natural mating and artificial insemination [6]. The reproductive characteristics of pigs are unique when compared to cattle, sheep and horses, because pigs have a prolific nature with high number of births (10-14 piglets/birth) [5] with an average birth duration of 250 minutes [7]. According to Lavery *et al.* [1] that reproductive performance parameters in pigs include litter size, number of children weaned, child mortality, weaning age, dry period. Fertile sows generally have good calving intensity, at least two births in a year. Therefore, this research was

Citation: Sri Gustina, Nopriadi Sambo Pasau, Hendro Sukoco, Hasbi Hasbi (2023). Reproductive Performance of Pig Based on Age of the Sows and Litter Size, Glob Acad J Agri Biosci; Vol-5, Iss- 4 pp- 82-85.

conducted to analyze and determine the reproductive performance of pigs in terms of the age of sows and litter size.

MATERIALS AND METHODS

Samples and Population

This research was conducted in Jambutua Village, Polewali Mandar Regency, using quantitative research with a descriptive approach. The population in this study was all 60 sows in Jambutua Village, Polewali District, Polewali Mandar Regency, using a saturated sampling technique.

Collecting Data

The data collection method used in this study are (1) observation, data collection carried out based on direct observation to determine the age of the sows and the litter size. (2) interviews, data collection carried out through direct interviews with pig farmers using a questionnaire instrument.

Data Analysis

The data in this study were analyzed using quantitative descriptive analysis. The correlation between the age of the sows and parity was analyzed by means of multiple linear regression analysis using SPSS software version 16 for windows.

RESULTS AND DISCUSSION

Age of Sows

The study of livestock age is an important factor because it is closely related to reproductive efficiency. The reproductive performance of sows can be seen from their ability to produce offspring. Pigs are livestock that prolific, but the range of the number of litters per birth varies. Parity is often not directly proportional to the age of the sows, and can be caused by the management of breeders who are not managed properly, which affects the reproductive aspects [8]. The study of the age of sows with the parity in Jambutua Village, Polewali Mandar Regency can be seen in Table 1.

Table 1: Study of the age of sows

Age of sows (Year, month)	Number	Percentage (%)	Parity (times)
2.5 - 2.9	13	21.7%	3
3.2 - 3.9	47	78.3%	4
Total	60	100%	

Based on the analysis result that sows in Jambutua Village, Polewali Regency had the highest frequency of giving birth at >3 years of age at 47 pigs (78.3%) with an average parity of 4 times, at >2 years of age with a frequency of 13 pigs (21, 7%) with an average parity of 3 times. This is because each livestock generally has a different number of births which can be characterized by differences in the age of the sows, and also the maintenance management carried out by the breeder [4]. Lotu *et al*. [9] stated that sows can give birth twice a year, but this is often not achieved because it is influenced by the age of the animal and the accuracy of the mating system. Sows who are 2 years old can give birth three times and aged 3 years can give birth four times and have 8-14 piglets each birth. This is

supported by Nangoy *et al*. [10], that the increasing age of livestock will be followed by an increase in the number of births and the litter size with the right mating time. More Hoving *et al*. [11] explained that generally the reproductive performance of sows increases with increasing parity number, with the highest level at parity 3 to 5.

Litter Size

Litter size is the number of piglets born per sow, and varies between sows and between parities. Litter size can be influenced by several factors including the age of the parent. The results of the average number of offspring born to pigs in Jambutua Village at different ages can be seen in Table 2.

Table 2: Litter Size of pigs

Age of sows (Year)	Litter Size (piglets)			
	1 st Parity	2 nd Parity	3 rd Parity	4 th Parity
2.7 ± 0.1	6.8 ± 1.1	8.6 ± 0.9	10.1 ± 0.6	-
3.5 ± 0.2	6.9 ± 0.8	8.3 ± 0.8	10.1 ± 0.7	11.8 ± 1.1
Average	6.9 ± 1.0	8.5 ± 0.9	10.1 ± 0.7	11.8 ± 1.1

Based on the results of the research in Table 3, it showed that the first birth resulted in an average number of piglets of 6.9 ± 1.0 and continued to increase in subsequent births: second birth (8.5 ± 0.9); third birth (10.1 ± 0.7); fourth birth (11.8 ±

1.1). This is in line with Wahyuningsih *et al*. [12], which stated that the first birth to sows will produce fewer piglets when compared to subsequent births. The number of piglets born will increase with the frequency of births with the highest reproductive

performance at birth 3 to 4 [13]. This is supported by Satriavi [14], that the high number of litter size can be influenced by factors such as the age of the mother where the number of piglets in the first birth is usually less than in subsequent births. The number of births to sows on average is 11 piglets and can even reach 20 in sows that have a very high productivity level [7]. The difference in the litter size based on the results of this study is thought to be related to the physiological condition of the sow's reproductive organs which develop in line with the pregnancy stage, increasing the sows age so causes an increase in the number of maturation and ovulation of oocytes, thus affecting litter size. This is in line with Kuslianto *et al*. [15], that the increase in the litter size in pigs is due to an increase in the number of maturation and ovulation of oocytes and can also be influenced by the breed of pig, the age of

the mother, and the type of feed given during pregnancy. Furthermore, Sumardani *et al*. [16] explained that the number of oocytes that are ovulated affects litter size, the more oocytes that are ovulated will increase the number of fertilized oocytes, and this means increasing the litter size per parent. This is supported by Djego *et al*. [17], the litter size is determined by fertilization and embryos, duration of pregnancy, maintenance and feeding procedures. Since the first birth, the number of children tends to increase and reaches a peak in the third and fourth births, then stabilizes until the sixth birth [18].

Correlation of Age of Sows with Parity

The correlation between the age of the sows and the number of births based on the analysis results can be seen in Table 3.

Table 3: Correlation of sows age and parity

Parities	Sig.	Anova	R- Square
First parity	0.045		
Second parity	0.047	0.000 ^b	0.392
Third parity	0.048		
Fourth parity	0.000		

Table 3 showed that the age of the sows has a significant correlation with the parity. A significance value obtained is 0.000^b which is less than 0.05 based on the result of ANOVA. The correlation between the sows age and the parity can be seen in the R square value, which is 0.392. It means 39.2% the parity can be explained by the age of the sows, while 60.8% is influenced by other factors not studied, such as brood weight, livestock genetics, and other reproductive aspects. This is in line with Nangoy *et al*. [10], that each parity is related to the age of the sows and the number of children born on pig farms. The litter size will increase if the sows have high parity. This is supported by Bunok *et al*. [19], that the number of piglets per birth is influenced by several factors including the age of the mother, breed, genetics, and breeding management. In addition, it is also influenced by semen quality, nutrition, and the environment [1].

CONCLUSION

The study of sow age and parity has a positive correlation. The litter size with an average age of 3 years is four times. The lowest liter size was in the first birth with 7 piglets and continued to increase until the fourth parity with a litter size of 12 piglets.

REFERENCES

1. Lavery, A., Lawlor, P.G., Magowan, E., Miller, H.M., O'Driscoll, K., & Berry, D.P. (2019). An

association analysis of sow parity, live-weight and back-fat depth as indicators of sow productivity. *Animal*, 13(3), 622-630.

- Tummaruk, P., Lundeheim, N., Einarsson, S., & Dalin, A. M. (2001). Effect of birth litter size, birth parity number, growth rate, backfat thickness and age at first mating of gilts on their reproductive performance as sows. *Animal Reproduction Science*, 66(3-4), 225-237.
- Gruhot, T.R., Calderon Diaz, J.A., Baas, T.J., & Stalder, K.J. (2017). Using first and second parity number born alive information to estimate later reproductive performance in sows. *Livestock Science*, 196, 22-27.
- Klimas, A., Klimiene, A., Sobotka, W., Kozera, W., & Matusевичius, P. (2020). Effect of parity on reproductive performance sows of different breeds. *S. Afr. J. Anim. Sci*, 50(3), 434 – 441.
- Andersson, E., Frossling, J., Engblom, L., Algers, B., & Gunnarsson, S. (2016). Impact of litter size on sow stayability in Swedish commercial piglet producing herds. *Acta Veterinaria Scandinavica*, 58(1), 31.
- Djawapatty, D. J., Belli, H. L. L., & Hine, T. M. (2018). In vitro and in vivo fertility of spermatozoa of Landrace pig with Citrat-Yellow egg diluter supplemented on various levels of fructose stored in 18°C temperature. *Jurnal Sain Peternakan*, 13(1), 43-54.
- Ju, M., Wang, X., Li, X., Zhang, M., Shi, L., Hu, P., Zhang B., Han X., Wang, K., Li, X., Zhou, L., D. A. & Qiao, R. (2022). Effects of litter size and parity on farrowing duration of Landrace x Yorkshire

- sows. *Animals (Basel)*, 12(1), 94.
8. Gobay, B., Yaku, A., & Iyai, D. A. (2015). Understanding the Objectives of Pigs Farming Development in Arfak Tribe Farmers, West Papua. *International Journal of Agriculture System*, 3(2), 179-191.
 9. Lotu, P., Belli, H. L. L., & Marawali, A. (2017). Reproductive performance of Landrace crossbreed sows with different parity. *Jurnal Nukleus Peternakan*, 4(2), 173-177.
 10. Nangoy, M. M., Lapian, M. T., Najoan, M., & Sopotan, J. E. M. (2015). The effect of birth weight with the appearance of the piglets until weaning. *Zootec*, 35(1), 138-150.
 11. Hoving, L.L., Soede, N.M., Graat, E.A.M., Feitsma, H., & Kemp, B. (2011). Reproductive performance of second parity sows: Relations with subsequent reproduction. *Livestock Science*, 140(1-3), 124-130.
 12. Wahyuningsih, N., Subagyo, Y. P., Sunarto, S., Prastowo, S., & Widyan, N. (2012). Performance of hybrid piglets based on sow parity. *Sains Peternakan: Jurnal Penelitian Ilmu Peternakan*, 10(2), 56-63.
 13. Knecht, D., Srodon, S., & Duzinski, K. (2015). The impact of season, parity and breed on selected reproductive performance parameters of sows. *Arch. Anim. Breed*, 58, 49-56.
 14. Satriavi, K. (2013). Estimation of genetic parameters in landrace sow based on litter size of the offsprings. Skripsi. Universitas Sebelas Maret.
 15. Kuslianto, M. P., Gaina, C. D., & Simarmata, Y. T. (2015). Effects of pregnant Mare's serum gonadotropin (Pmsg) injections on the improvement of sows productivity. *Jurnal Kajian Veteriner*, 3(2), 191-201.
 16. Sumardani, N. L. G., Warmadewi, D. A., Ariana, I. T., & Indrawati, R. R. (2010). The combination of steaming-up and flushing method to increase litter size on landrace. *Majalah Ilmiah Peternakan*, 13(3), 164174.
 17. Djego, Y., Kune, P., & Kihe, J. N. (2021). Influences of sex on production performace at birth age of pigs from landrace crossbred sows. *Jurnal Nukleus Peternakan*, 8(1), 46-50.
 18. Skorjanc, D., Brus, M., & Candek Potokar, M. (2007). Effect of birth weight and sex on pre-weaning growth rate of piglets. *Arch. Tierz*, 50, 476-486.
 19. Bunok, D. K. I., Lapian, M. T. R., Rawung, V. R. W., & Rembet, G. D. G. (2020). Relationship of weight birth piglet with addition of agency wight, weaning weight, mortality, and litter size weaning in livestock PT. Karya Prospek Satwa. *Zootec*, 40(1), 260-270.