The productivity of pigs at PT. Adhi Farm, Solo

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Abstract. Pig is a potential animal because it has the ability to produce a high litter size. Increasing the productivity of pigs to produce high litter sizes until weaning requires good management because the born litter sizes that live up to weaning determine the success of the pig farming business. The purpose of this research was to determine the productivity of pigs at PT. Adhi Farm, Solo. Forty-one farrowing and weaned sows were used in this research, and secondary data collected from 147 pigs. The data collected included the management of feeding and housing, mating management, farrowing management, and management of litter size born alive and weaning. Data were analyzed descriptively to know about reproduction and production management applied by the company. The results showed that the average productivity of pigs at PT. Adhi Farm respectively litter size born alive: 9.43±2.34 tails, litter size at weaning: 8.26±1.88 tails, mortality rate during the suckling period: 12.13±13.66%, the age of the weaning: 32.91±5.14 days, and litter size at weaning percentage: 87.85±13.65%.

1. Introduction
Pigs are prolific livestock that produces litter sizes with shorter generation intervals than other large livestock so that pigs have the potential to become meat-producing. Pig has many advantages over other livestock that the growth rate is fast, easy to breed, easy to find the source of feed and carcass value is high enough as a provider of animal protein for humans [1]. Increasing the productivity of pigs to produce high litter sizes until weaning requires good management in maintenance such as mating management, handling sows, and litter size, and weaning management. The born litter size that lives until weaning determines the success of the pig farming business because the more litter size is born and weaned, the profits gained by the company will increase, and therefore this study is important to know how the productivity of pig farms with the management pattern applied by PT. Adhi Farm, Solo. The result of this study can be useful for pig farmer or the pig farming industry which needs information about the maintenance management of pigs to get the optimal litter size.

2. Materials and Methods
The material used in the study was 41 farrowing sows and besides that, it also uses previous data from 147 pigs. The field data were from commercial pigs farm at PT. Adhi Farm which is located in Karanganyar Regency, Solo, Central Java between on July to August 2005. The data taken in this study are the management of pig production and productivity data namely litter size born alive (tail), weaning age (days), litter size at weaning (tail), mortality of piglets during the suckling period (%), litter size at weaning percentage (%).
2.1. Management of Pig Production at PT. Adhi Farm

Temperature and humidity can affect the appearance of pigs, where piglets need warm air and vice versa the sows require lower temperatures. The average daily temperature and humidity are 28.13°C and 72.06%, respectively. The ideal temperature for pigs is between 19-21°C, with humidity around 70-75%. This shows that the temperature is quite high for the sows, so the effort carried out by the farm to reduce heat stress for the sows are watering the entire body, especially in the noon.

The feeding of the sow pregnant was carried out twice per day, morning and afternoon (2.3-2.5 kg/day), while for the sow in the farrowing crates was carried out three times a day, in the morning, afternoon and evening (3.5-4 kg/day). The provision of less feed in pregnant pigs aims to overcome difficulties when breeding due to overweight sows, while increased feeding at the end of the pregnancy period until weaning is done to ensure rapid fetal growth, increase milk production and improve the condition of the mother's body. An adequate water and feed intake are important for sow health, performance and reproduction. An increased feed intake decreases body weight loss, increases litter performance and backfat depth [2].

The housing system for males is an individual cage with a size of 2.20 x 2.26 x 1.46 m³ and the pregnant pig in individual cages with a size of 2.14 x 0.71 x 0.92 m³. The sow uses farrowing crates have size 1.90 x 0.66 x 0.92 m³ and a warm box is placed in this area with measures 1.8 x 0.56 x 0.64 m³. According to the previous research, farrowing pen during lactation provides sows with more space so they can turn around freely. They are an alternative to the physically and behaviourally more restrictive farrowing crates but using farrowing crates in the sows during lactation period can reduce pre-weaning piglet mortality (10.23%) than using pen [3].

The pig farms of PT. Adhi Farm, applying a natural services system and artificial insemination (AI), is usually carried out in the morning at around 10:00 a.m. with a frequency of marriage twice in each lust period. This is done so that the sperm can fertilize a failed fertilized egg during the first mating. The right time to mate also affects the number of fertilized eggs. The best time for mating is at the end of the first day of lust and 24 hours later [4]. Natural services in pigs are recommended to produce live birth litter size compared to AI because there are constraint factors for AI success such as the environment and humans error [5].

Pregnant pigs are moved to the farrowing crates for 1-2 weeks before giving birth to reduce stress due to changes in the cage environment. The sows who shows signs of anxiety, decreased appetite, red and swollen vulva and secretes mucus, and milk can come out if the nipple is squeezed from the base to the end is a symptom that the sows will soon give birth. Intramuscularly injecting oxytocin with 3 cc dose at the back of the ear when after one of litter size is born and reaching the genitals of the sow to take the fetus is done to accelerate the birth process and help the mother who has difficulty giving birth.

Litter size born alive birth need a warm temperature of around 35°C. The efforts made by farmers to prevent cold and reduce the mortality by cleansing the body of them from mucus and blood and providing warm boxes. Cutting the umbilical cord is done as soon as the piglets born, the cutting of the tails and the teeth of piglets is done at the age of one day. Cutting teeth in piglets is done to keep from injuring the sow nipples and prevent injuries from fights among piglets. Male pigs that are not used as prospective seed are castrated when they are approximately two weeks old. Piglets should be castrated before 10 weeks of age to facilitate handling, reduce stress and castration injury in piglets to recover faster [4]. Castration done for avoids ‘boar taint’, caused by compounds such as androstenone and skatole, which give the meat an offensive odor or taste that can be evident during the cooking of pork products [6].

The maintenance of pigs is facing a number of obstacles, one of which is the problem of diseases caused by bacteria, parasites, and viruses [7]. The effort made to prevent disease is by vaccinating. Vaccination programs are carried out for disease prevention so that livestock morbidity and mortality can be minimized [8]. Vaccination conducted at PT. Adhi Farm, namely mycoplasma vaccination and hog cholera. The administration of mycoplasma vaccine (2 ccs) was carried out at one week, and 10 days later a vaccination of hog cholera (1 cc) was carried out. Mycoplasma vaccination is repeated one to five weeks later.
2.2. Data analysis
The data obtained were analyzed descriptively includes:
1. The average of litter size born alive (tail), which is the number of piglets born alive per sow per birth.
2. The average of litter size at weaning (tail), the number of piglets weaned per sow per birth.
3. The average of weaning age (days), piglets are born and suckle on the sow until the piglets no longer receive milk from the sows.
4. The average of mortality of piglets during the suckling period (%) is calculated by reducing the litter size born alive by being weaned divided by the litter size born alive then multiplied by 100%.
5. The average of litter size at weaning percentage (%) is calculated from the number of litter size born alive minus the number of litter size at weaning from each sow then multiplied by 100%.

The average formula and standard deviation mathematically are [9]:

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\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n} \\
S = \sqrt{\frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{n-1}}
\]

\(\bar{x}\) = mean
\(\Sigma x\) = the sum of all the x value
n = the number of data
S = standard deviation
\(x_i\) = each of the values of data

3. Result and Discussion
Productivity in pigs observed in this study are the number of litter size born alive, litter size at weaning, mortality of piglets during the suckling period, weaning age, and litter size at weaning percentage can be seen in Table 1.

| Variable                                | Value          |
|-----------------------------------------|----------------|
| Litter size born alive (tail)           | 9.43±2.34      |
| Litter size at weaning (tail)           | 8.26±1.88      |
| Mortality of piglets during the suckling period (%) | 12.13±13.66  |
| Weaning age (days)                      | 32.91±5.14     |
| Litter size at weaning percentage (%)   | 87.85±13.65    |

Table 1 shows that the average of litter size born alive was 9.43±2.34 tails. Pigs are prolific livestock that has an average litter size of 6-12 tails [10]. The number of litter size is influenced by several factors such as management for example by minimizing maternal stress, especially one week before farrowing process [11]. Reported that oxytocin given to sows at the onset of fetal expulsion significantly increases the rate of fetal distress, anoxia, and intrapartum death in piglets, therefore, administration of oxytocin to parturient sows is not recommended [12] but recommended given prior to artificial insemination so that the amount of litter size is more [13].

Litter size at weaning is influenced by the number of litter size born alive and maintenance management. The survival of pre-weaning pigs is very important because it has economic benefits in the livestock business. Pre-weaning survival is influenced by several factors like birth weight (BW), litter size, farrowing length, dystocia, birth order (BO), environmental temperature, nutritional status, health, gender, and maternal and piglet behavior [14] and management intervention include: tooth reduction; split suckling; cross-fostering; use of nurse sow systems and early weaning, including split weaning; and use of artificial rearing systems [15]. Pre-weaning mortality is still relatively high in
almost all pig farms, but their incidence has declined from 35% in 1924 to around 15-20% at the beginning of the new millennium [14]. Based on the research, litter size at weaning was 8.26±1.88 tails or 87.85±13.65% with the mortality rate of piglets during the suckling period was 12.13±13.65%. This shows that the number of litter size born alive and the ability of piglets to endure during the suckling period was affected the amount of litter size at weaning. PT. Adhi Farm has carried out a good management to prevent deaths in piglets during the suckling period including by giving mycoplasma vaccine and hog cholera.

Weaning is the age at which the piglets can be separated from the sows. Piglets can be separated from their mothers after 8 weeks. This weaning is in accordance with the situation in which the normal sow lactation period will end until the piglet is 8 weeks old [16]. The farmer usually weaned their piglets at the age of 4-6 weeks and based on the research, weaning age at PT. Adhi Farm Solo was 32.91±5.14 days. This shows that the age of piglets has sufficient weaning age to be separated from the sows.

4. Conclusion
In general, the management of pig production at PT. Adhi Farm is good. All production activities starting from the management of livestock-environment conditions, feed management and housing, management of the mating system, farrowing and litter size management are run well by the company so that the productivity of the resulting litter size up to weaning is quite high at 8.26 ± 1.88 tails.

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