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# Damaged pen floors reduce pregnancy rates in Garut sheep: A comparative study across ram breeds

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**ABSTRACT:** Pen floor conditions are crucial for the success of natural mating in livestock. This study compared the effects of damaged floors, with holes and uneven surfaces, versus undamaged, stable floors on pregnancy rates of Garut ewes (n=89) mated with rams of various breeds, such as Dorper (n=4), Batur (n=1), Garut (n=4), and Garut×Batur crossbred (JxBat; n=2). Rams were housed with 3–16 ewes for 45–60 days, and pregnancy was assessed via ultrasonography. The results showed that ewes on undamaged flooring had significantly higher pregnancy rates (100.0%) than those on damaged flooring did (85.3%). In all ram breeds, damaged pen floors negatively affected mating and reduced reproduction. Regular inspection and maintenance of pen flooring during mating periods are essential for optimizing the fertility of Garut sheep.

**Keywords:**
pen floor, natural mating, pregnancy rate, Garut sheep

## ■ INTRODUCTION

Garut sheep are one of the leading livestock commodities in Indonesia and have a high economic value (Putrayana *et al*. 2024). One of the determining factors for the reproductive success of Garut sheep is the management of the pen, especially the condition of the pen floor. Damaged pen floors, such as holes or uneven floors, can affect the mating behavior of livestock and potentially reduce the pregnancy rate. Studies on pen floor conditions for the success of mating in local sheep in Indonesia are currently very limited, although in practice, farmers maintain the pen floor for the convenience of mating (Sirat *et al*. 2021).

Most publications have focused more on the sanitation and cleanliness of floors on sheep health (Sirat *et al*. 2021). The selection of materials for pen bases has been studied intensively and extensively for the comfort of sheep (Sablik *et al*. 2023) and the selection of materials for pens in countries with subtropical climates (Færevik *et al*. 2005). This study aimed to analyze the effect of pen floor conditions on the success of natural mating in Garut sheep under tropical climate conditions in Indonesia. By understanding these factors, breeders can take preventive steps to increase their reproductive efficiency.

## ■ MATERIALS AND METHODS

At the Cikarawang farm Bogor West Java of Indonesia, 89 Garut ewes were distributed across communal pens (4-17 animals per pen). The study included four ram breeds: Dorper (n=4), Batur (n=1), Garut (n=4), and Garut×Batur crossbred (JxBat; n=2), with pens having intact or damaged flooring. Natural mating occurred over 45-60 days, with buck-to-doe ratios of 1:3–1:16. The animals received fresh forage ad libitum, concentrated feed at 2.5-4% body weight, and water access. Pregnancy was diagnosed 60 days post-mating using brightness-mode ultrasonography with a 6.5 MHz linear rectal probe. Reproductive success rates were calculated as the percentage of pregnant ewes per pen, comparing the floor conditions and ram breeds. The results are descriptively presented.

## ■ RESULTS AND DISCUSSION

Figure 1 illustrates the breeding pen flooring conditions used during the 45-60 day natural mating period, comparing in-

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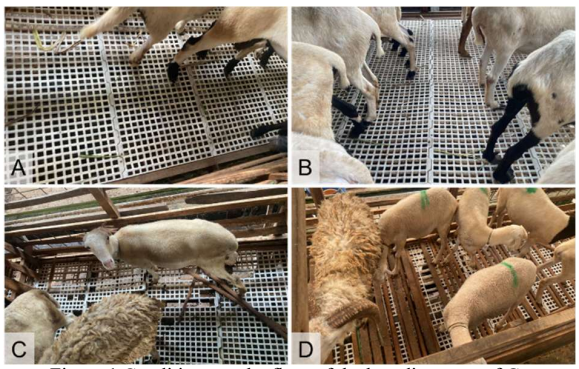


Figure 1 Conditions on the floor of the breeding cage of Garut sheep. (A-B) The slats of the cage floor were still intact (undamaged). (C-D) The slats of the cage floor had holes in several parts (damaged), and some parts were covered with wooden slats to cover the holes.

tact versus perforated flooring. Intact flooring provides stable footing and optimal weight distribution during mounting, whereas perforated flooring induces behavioral avoidance, as sheep actively prevent limb entrapment in surface irregularities. This compromised flooring significantly disrupts breeding efficiency impairing estrus ewe stance stability and interfering with ram foot placement during mounting.

The data revealed significant variations in pregnancy rates based on floor condition and ram breed (Table 1). Dorper rams achieved perfect fertility (100%) on undamaged floors (n=23) but dropped to 87.5% on damaged floors (n=16). Similarly, Garut rams showed 100% pregnancy rates on intact floors (n=23) versus 82.9% on damaged surfaces (n=12). The JxBat crossbreed demonstrated this pattern most dramatically, with 100% success on good floors versus 80% on damaged ones. Overall, undamaged flooring yielded 100% pregnancy rates across all breeds (n=34), whereas damaged floors averaged 85.3% (n=55). These findings strongly suggest that floor integrity critically affects mating success, with even high-quality genetics such as Dorper being compromised by poor pen conditions. An 8.76% standard deviation indicates relatively consistent results within each treatment group.

During natural mating, the ram mounts a receptive ewe in the standing position, which requires precise biomechanical coordination (Patel *et al*. 2007). The ram's forelimbs initially bear most of the weight, which transfers to the hindlimbs during thrusting (Balasubramaniam & Wing 2002). Successful copulation relies on coordinated musculoskeletal movement and weight redistribution to facilitate penile penetration and sperm deposition (Patel *et al*. 2005). However, poor flooring conditions can interfere with this by reducing mounting stability, limiting penetration depth, and impairing sperm transfer efficiency in the female reproductive tract. These disruptions significantly diminish the likelihood of successful fertilization.

The cage floor condition plays a critical role in the natural mating success of Garut sheep. Damaged or uneven flooring can reduce pregnancy rates by hindering mounting behavior and increasing the risk of injury. Such injuries may cause trauma to rams, making them reluctant to mate with females in estrus (Fisher & Roadknight 2024). To ensure effective breeding, sturdy, level, and non-slippery flooring are essential for minimizing mating accidents. Additionally, maintaining a clean environment positively affected the reproductive performance of the flock.

Table 1. Ultrasonographic diagnosis of pregnancy in Garut ewe resulting from natural mating with several ram breeds.

| Ram Name | Ram Breed | Garut Ewe (n) | Pregnancy (%) | Mating Floor Condition |
|---|---|---|---|---|
| Satria | Dorper | 16 | 87.50 | Damaged |
| Sura | Dorper | 6 | 100.00 | Undamaged |
| Simba | Dorper | 5 | 100.00 | Undamaged |
| Sadewa | Dorper | 12 | 100.00 | Undamaged |
| Rambo | JxBat | 5 | 80.00 | Damaged |
| Darma | JxBat | 5 | 100.00 | Undamaged |
| Sakura | Batur | 7 | 85.71 | Damaged |
| Borneo | Garut | 5 | 80.00 | Damaged |
| Arjuna | Garut | 7 | 85.71 | Damaged |
| Romeo | Garut | 12 | 100.00 | Undamaged |
| Brahma | Garut | 11 | 100.00 | Undamaged |
| | **Total** | **89** | **93.26** | **All floor** |
| | **Mean ± deviation** | | **92.63±8.76** | |

## ■ CONCLUSION

Damaged pen floors significantly reduced pregnancy rates in Garut ewes across all ram breeds, including superior breeds, such as Dorper. Maintaining intact flooring can achieve 100% mating success, regardless of the ram breed used.

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