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ANALYSIS OF REPRODUCTIVITY OF MADRASIN CATTLE BEFORE AND AFTER FOOT AND MOUTH DISEASE ON GILI IYANG ISLAND, SUMENEP, MADURA

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Abstract

This research aims to analyze reproductivity (S/C and Pregnancy) and supply and demand for Madrasin cattle before and after FMD disease on Gili Iyang Island, Sumenep, Madura. This research used data from 450 madrasin cattle on Gili Iyang Island, Sumenep. The research was carried out by comparing data obtained before the FMD outbreak in January 2022 – May 2022 and after the FMD outbreak in June 2022 – November 2022. The results of the research showed that the reproductivity of Madrasin cattle before and after the FMD disease on Gili Iyang Island, Sumenep, Madura in S/C increased, while during pregnancy there is a decrease. The supply and demand for the Madrasin cattle business before and after the FMD on Gili Iyang Island, Sumenep, Madura, decreased.

Keywords*:* Madrasin cattle, FMD, reproductivity, supply and demand, Gili Iyang

1. INTRODUCTION

Madrasin cows are cross-produced cows of Madura cows and Limosin that are capable of becoming superior cows is also not denied to have disease-threatening as well. One of the diseases is a Foot and Mouth Disease or FMD that attacks cows. The disease is caused by the Foot and Mouth Disease Virus (FMDV) in which the FMD virus particles are 25-30 nm in size, not amplopic, have the icosahedral capsid composed of proteins, with the ganoma being single-stranded RNA with sense-positive. The FMD virus is classified into the genus *aphthovirus* and the family *picornaviridase.*

Based on research from Rahma (2022) stated the impact of FMD has a negative effect signally on the productivity and reproductivity of cattle ranging from decreased body weight, anesthesia, miscarriage to death. Testing for virus detection can be done using RT-PCR, ELISA. As of the end of June 2022, there were 19 provinces and 221 districts/cities affected by Foot and Mouth Disease with a total of 291.538 cases, 96,060 recovered, 2,944 conditional cuts and 1,733 deaths. The research proves that this disease is very dangerous. If prolonged, it could hurt farmers and reduce beef production.

Based on the problems and findings above, studies were conducted on the disease in Madrasin cows known as the ancestors of resistant or well-adapted Madura cows. This research is also a study to find out how disturbed the reproductivity of cows madrasin before and after the presence of this disease. Research on Madrasin's cows was carried out in Gili Iyang, Sumenep, East Java.

Geographically, Sumenep district lies between the coordinate position 11°332°5°-116°16°45° East and between 455°-7°24° South latitude. Giliyang has an area of about 9.15 km^2 with a population of 7,832 in two villages, namely Bancamara and Banra'as. (Wirawan, 2019). Air in Gili Iyang Island is the second cleanest air in the world. According to the latest study conducted by the Technical Chamber of Environmental Health and the Court of Diseases (BBTKLPP), the oxygen (O_2) condition reaches 20.9-21,5% or is above the normal threshold of

20%. The carbon dioxide (CO_2) condition on this island ranges between 302-313 ppm, is below the permissible normal limit in the air of 387 sppm. (Aida *et al.*, 2017).

Besides having the 2nd best air level in the world, Gili Iyang Island also has a population of cattle and goats that are scattered in two villages namely Bancamara and Banra'as. The population in Bancamera Village is 2,346 and the population of Goats is 425 while the population in Banra'as village is 2,235 and the number of goats is 670. Based on the above description, a study was conducted on the reproductivity analysis of madrasin cows before and after the Foot and Mouth Disease on the island of Gili Iyang Sumenep Madura.

The study aims to analyze the reproductivity (S/C and pregnancy rate) and supply and demand of Madrasin cows before and after FMD on the island of Gili Iyang Sumenep Madura

2. RESEARCH METHOD

This study uses this type of longitudinal observational research, a design of the same subject because it was done on on Gili Iyang Island, Dungkek District, Sumenep Regency, East Java.This research uses secondary data such as S/C recapitulation data, such as IB data, GDP data, wealth, vaccination, maintenance costs, number of cows sold and Madrasin cows sales price.Reproductivity data of S/C and fertility with successful artificial insemination, supply and demand data based on sales and maintenance before the FMD outbreak in January 2022 – May 2022 and data after the FMD in June 2022 – November 2022 are analyzed with descriptive.

3. RESULTS AND DISCUSSION

Table 1. Reproductive Results Based on S/C Before and After Foot and Mouth Disease show that the S/C before FMD was 1.1, which means one marriage resulted in one pregnancy, while after FMD it showed 2.25, which means two marriages resulted in one pregnancy. Based on this table, FMD increases the S/C number so that FMD causes repeated mating. This is in accordance with Nurul et al. (2022), who stated that reproductive disorders due to FMD are one of the causes of repeated mating in cattle.

Table 1. Reproductivity Results Based on S/C Before and After Foot and Mouth Disease.

FMD	S/C
Before	1.1
After	2.25

Table 2 shows that the pregnancy rate before FMD was 450 birds, while after FMD the pregnancy rate was 7 birds. Based on this table, FMD causes a decrease in pregnancy rates. Foot and Mouth Disease (FMD) causes almost all of the affected Madrasin cows to experience anestrus. According to Anwar et al. (2023), productive livestock infected with Foot and Mouth Disease (FMD) will lose the ability to give birth a year after being attacked by Foot and Mouth Disease (FMD), or what could be called fertilization disorders. The estrous cycle experienced by heifers ranges from 18 to 20 days with an average of 20 days, and for mother cows, it ranges from 18 to 20 days with an average of 21 days (Tiro et al., 2020). Factors that influence the estrus cycle include reproductive hormones (Prastyaningrum et al., 2023).

In madrasin cattle, after being infected with Foot and Mouth Disease (FMD), the physical condition of madrasin cattle declines, which affects the hormone function of madrasin cattle. Anwar et al. (2023) reported that livestock infected with FMD have difficulty swallowing and chewing; in severe cases, livestock cannot swallow feed at all, causing weight loss and lameness. Difficulty swallowing and chewing conditions affect the decline in hormone function.

Hormonal abnormalities, namely the slowing down of the pituitary's work in producing reproductive hormones so that ovarian activity slows down (Randel, 1990), Deviant hormones trigger reproductive disorders such as repeated mating. Fertilization failure triggers a decrease in reproductive performance due to decreased ovarian function, resulting in low ovum quality (Gebrekidan et al., 2009). An imbalance in the nutrients absorbed will result in low ovarian activity (Pradhan and Nakagoshi, 2009).

Table 2. Reproductive Test Results Before and After Foot and Mouth Disease.

FMD	Pregnancy
Before	450
After	7

In Table 3. the results of supply and demand analysis based on expenses and costs for maintaining Madrasin cattle on Giliyang Island before and after the Foot and Mouth Disease Case show that the production of Madrasin cattle before FMD was 539 heads, while after FMD it was 0 heads. Maintenance costs before FMD Rp. 25,000/head/day and after FMD Rp. 30,000/head/day.

The anestrus experienced by Madrasin cattle after Foot and Mouth Disease (FMD) resulted in a decrease in the reproductivity of Madrasin cattle, resulting in decreased market demand. This decrease in market demand is in accordance with supply and demand theory, which explains the relationship between supply and demand. It is possible that changes in demand and supply simultaneously result in supply and demand both experiencing an increase or decrease (Kennedy, 2017). Supply (offer) can occur if the seller can provide the goods the buyer needs. Factors that influence supply (offer) include the price of the goods themselves, the prices of other goods that are closely related to the goods, production costs, the provider's operational goals, and the level of technology used. Other factors that cause changes in supply (offer) are the price of other goods, the cost of obtaining the provider's target production factor, and the level of technology (Kennedy, 2017).

Demand is influenced by several important factors, such as the price of the item itself, the price of other goods that are closely related to the price of the item, household income and the average income of the community, people's tastes, and predictions about future conditions. If there is a decrease in demand, it will cause a decrease in the equilibrium price and equilibrium quantity. The amount of demand and the price level are related to the influence of income (income effect), substitution (substitution effect), and subjective appreciation (marginal effect) (Kennedy, 2017). Madrasin cows that are still in estrus require high maintenance costs, causing losses to farmers. Madrasin cows that are still in estrus are influenced by livestock fertility (Maemunah, 2024). The high level of fertility in livestock is supported by good maintenance management and appropriate detection of estrus (Fauziah et al., 2016).

Madrasin cows that are still in estrus tend to be less likely than Madrasin cows to have anestrus after contracting Foot and Mouth Disease (FMD). The cost of maintaining Madrasin cattle after Foot and Mouth Disease (FMD) is higher compared to low market demand. Low market demand is balanced with low birth rates, resulting in an imbalance in maintenance costs and market demand. This imbalance results in losses for farmers in accordance with the law of supply. The law of supply states that if the price of an item increases, the quantity of goods sold increases; if the price decreases, the number of goods sold decreases (Kennedy, 2017).

Table 3. Results of Supply and Demand Analysis based on Expenditure and Cost of Maintenance of Madrasin Cows in Giliyang Island Before and After Foot and Mouth Disease.

FMD	Pengeluaran (ekor)	Biaya Pemeliharaan (Rp/Hari)
Before	539	25.000
After	0	30.000

4. CONCLUSIONS

Based on the research that has been carried out, the following results can be concluded,the reproductivity of Madrasin cattle before and after FMD disease on Gili Iyang Island, Sumenep, Madura in S/C increased while during pregnancy there was a decrease and supply and demand for the Madrasin cattle business before and after the PMK on Gili Iyang Island, Sumenep, Madura decreased.

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