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Research Article

Disease Control Management Strategy in Bali Cattle

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Abstract. Livestock health is a very important factor in beef cattle farming. Huge losses are often caused by the onset of an attacking disease. Therefore, it is necessary to prevent and control the disease. This study aims to evaluate disease control management strategies in cattle in Indonesia. The method used is a qualitative descriptive research with a literature review method. The results showed that cattle breeders who implemented good disease control management strategies tended to have better livestock health and higher productivity. This study also identified several important factors in the success of Peyang disease control management strategies including disease prevention, treatment, surveillance, quarantine, access restrictions and education. The implication of this study is that cattle farmers must improve their knowledge and skills in disease control management to improve the health and productivity of their livestock.

Keywords: *Strategy, Disease Control Management, Cattle, Bali Cattle.*

A. INTRODUCTION

Bali cattle (Bos sondaicus) is one of the germplasm in Indonesia which has been cultivated for a long time and has spread to various parts of the archipelago. Bali cattle are also a local potential that has a high selling value in the livestock agribusiness sector. Bali cattle breeding is a livestock business that has very good prospects because the need for and demand for meat tends to increase from year to year (Kusnadi, 2008).

Bali cattle are an important resource for the Indonesian economy, especially in Java and Bali. According to data from the Central Statistics Agency (BPS) in 2019, Bali is the province with the largest cattle population in Indonesia, which is around 724 thousand head of cattle. This Bali cattle has a unique physical shape with a blackish color, a slightly convex head, and a smaller body posture compared to other cows. In addition, Balinese beef is also considered to have a distinctive taste and high quality (Hartatik, 2019).

The majority of livestock in Bali are community farms managed by farmers and ranchers. The maintenance system implemented there is in a pen, there are also cows that are released in the pasture, but in the afternoon they are put back in the pen. Apart from being given forage, the cows will be fattened with additional feed in the form of concentrates (Novarista et al, 2020).

Increasing production of Bali cattle must be accompanied by a good maintenance system. The success of the Bali cattle farming business is highly dependent on the maintenance procedures applied. Incorrect maintenance management will affect production results and can even result in large losses. In general, the development of Bali cattle breeding in Indonesia still really needs improvement from directed and sustainable livestock breeding management so as to be able to produce standard-standard seeds (Agustiyana, 2022).

Despite having many advantages, Bali cattle farms still face various problems, including livestock health problems. Livestock health is a very important factor in beef cattle farming. Huge losses are often caused by the onset of an attacking disease. Therefore, it is necessary to prevent and control the disease. Disease control on a farm is an important part of

a livestock business, because disease control is directly related to livestock health which is part of the supporting factors for livestock productivity. Livestock health can be determined by looking at their physiological status, from behavior to daily feed consumption (Irawati et al, 2021).

Diseases in Bali cattle can cause livestock death, reduce productivity, and damage the quality of meat. Some diseases that often attack Bali cattle include anthrax, brucellosis, Q fever, mastitis, and intestinal worms. Therefore, a management strategy for disease control in Bali cattle needs to be developed and properly implemented to maintain livestock health and productivity (Hubeis, 2020).

Disease control strategies in Bali cattle involve selecting the right vaccine, good sanitation management, planning disease prevention and management measures, and closely monitoring livestock health conditions. However, in practice, many Balinese cattle farmers still do not understand the proper disease control strategies, so they often experience economic losses due to disease in their livestock. In addition, changes in increasingly complex environmental conditions and other factors such as climate change also affect the health of Bali cattle (Siregar, 2015)

Therefore, research on disease control management strategies in Bali cattle is very important to do. With good research results, it is hoped that Balinese cattle breeders will be able to increase their knowledge and skills in disease control management and be able to implement appropriate strategies to maintain the health and productivity of their livestock. In addition, the results of this study can also provide useful information for animal husbandry experts to develop new technologies for disease control in Bali cattle (Yusdja & Ilham, 2006).

Previously, several studies have been conducted to evaluate disease control management strategies in cattle. However, not much research has been done specifically for Bali cattle. Therefore, this study will discuss disease control management strategies in Bali cattle, including important factors in the success of this strategy and research implications for the development of better Bali cattle farms in the future (Surtina et al, 2022).

Disease control management strategies in Bali cattle are very important to maintain livestock health and productivity. However, many Balinese cattle farmers still do not understand the right strategy for disease control. Therefore, research on disease control management strategies in Bali cattle needs to be carried out to increase the knowledge and skills of Balinese cattle breeders in disease control management and help develop better Bali cattle farms in the future.

This research is expected to provide a clearer picture of the disease control strategy in Bali cattle and the factors that need to be considered to increase its success. The results of this study are expected to provide useful recommendations for Bali cattle breeders and animal husbandry experts to develop new technologies for disease control in Bali cattle.

In addition, the results of this study can also assist the government and related institutions in formulating policies and programs that are more effective in supporting disease control in Bali cattle. These policies and programs may include increasing access for Bali cattle breeders to disease control information and technology, providing quality vaccines, and developing a system for monitoring and evaluating the health of Balinese cattle on a regular basis.

B. LITERATURE REVIEW

1. Cattle Livestock Business

The livestock business scale is one of the small-scale business scopes because it is categorized as a business managed by farmer households with limited labor, capital and management (Kurniyawan, 2012). According to Darmawi (2011), the business of raising cattle

is a business that can be used as a source of livelihood for rural communities. In livestock there is a form of maintenance management to support livestock performance.

Based on the regulation of the Ministry of Agriculture (2020), Number: 5594/kpts/T1.040/F/04/2020 discussed technical guidelines for evaluating the application of good livestock farming (Good Farming Practice) and included guidelines for beef cattle according to GFP from Pemmentan No. 46 of 2015 with the following criteria: 1) Infrastructure and facilities include: separate from other livestock farming locations, have access to transportation (private transport car), available feed sources, cage locations not close to settlements, adequate water sources available, have normal organs and good genetics, availability of a variety of feed types, has livestock equipment, has availability of medicines for various diseases, has a variety of cages (male, female, and calf cages), broodstock cage size (1.5×2 m), calves (1.5 m2)), solid and liquid waste storage facilities are available, there is solid and liquid waste sewage treatment, there is a health care facility. 2) Maintenance pattern: special handling of newborn calves up to 7 days old, standard feeding and drinking, intensive maintenance of cattle care, installation of calf identification numbers, provision of forage from 3 months of age, avoidance of inbreeding, keeping records marriage, male identity, carry out routine checks, start mating at the age of 18 months and are mated in a special place, carry out natural mating. 3) Animal health and animal welfare: optimizing animal fitness, supervising so that not just anyone goes in and out of the cage, disinfects the cage, makes a special quarantine cage, makes the location of the cage so that no wild animal just comes in to carry disease, does not hurt, injure and cause stress animals, use clean facilities and infrastructure, make and protect cows from rain and sunlight, provide food and drink according to the physiological needs of cows. 4) Environmental preservation: prevent environmental pollution and erosion, prevent livestock from making noise. 5) Human Resources: HR Healthy physically and spiritually, have skills according to their field and understand risks, have knowledge of cattle farming, apply safety and security at work. The GFP criteria need to be applied with good management to support the growth of cattle.

Judging from the theory put forward by Gorge R Terry (2021), management is a form of process of an action, namely planning, organizing, actuating and supervising. While in the livestock concept, maintenance management is a form of determining the success of livestock business as seen from the increase in body weight and physical appearance of the cows. According to Tantri et al (2013), the cattle rearing system can be carried out both intensively and extensively. Intensive rearing systems, where livestock are kept in pens forever, while extensive rearing systems graze full livestock both day and night.

In maintenance management there are several aspects that need to be considered including stables, provision of cattle breeds, feed, health, mating and manure management. Cages in a broad sense are forms of livestock control in protecting livestock from wild nature, protecting livestock from factors (weather such as wind, rain and sunlight), and facilitating livestock handling. While forage for livestock is theoretically a plant other than grain that livestock can consume safely and sustainably which includes grass and leaves (Hartutik, 2017).

The process of maintenance management, of course, there are many costs that must be incurred by breeders, namely fixed costs and variable costs. Fixed costs are costs whose value does not depend on the size of production but on long-term needs, while variable costs are costs related to the size of production costs. Darmawi (2011), states that the net income of a business is the difference between revenue (gross income) and total expenses of the business. Based on the theory, acceptance can be interpreted as the value of money obtained from the sale of output. The greater the sales results, the greater the revenue, but the amount of revenue does not guarantee high income (Suryanto et al., 2007).

2. Balinese cattle

Named Bali Cattle because the spread of the population of this cattle nation is found on the island of Bali. Bali cattle (Bos sondaicus) are one of the original and pure Indonesian cattle breeds, which are the original descendants of the banteng (Bibos banteng) and have undergone a domestication process that occurred before 3,500 BC, the original Balinese cattle have the same shape and characteristics as the banteng. Bali cattle are also known as Balinese cows which are sometimes also called Bibos javanicus, although Bali cattle are not a subgenus with the Bos taurus or Bos indicus cattle. Based on the genealogical relationship of the Bovidae family, the position of Bali cattle is classified into the Bibovine subgenus but still belongs to the bos genus. Payne & Rollinson (1973) states that this breed of cattle is thought to have originated from the island of Bali, because this island is now the center for the spread/distribution of cattle for Indonesia, hence the name Bali cattle and seems to have been domesticated since prehistoric times 3500 BC.

Judging from the carcass characteristics and compact and harmonious body shape, Bali cattle are classified as ideal beef cattle, even their meat quality values are superior to European beef cattle such as Hereford and Shortorn. Therefore, it is considered better as livestock in a humid tropical climate because it shows good body abilities by providing food with high nutritional value (Ako, 2019). Meanwhile, Saka et.al (2005) reported that the carcass of male Bali cattle (beef) is not ideal because the front carcass quarter (which has lower economic value) is larger (52%) than the rear carcass quarter (48%), unless it is castrated when it is still a calf.

Variation is a general characteristic found in a population. Diversity occurs not only between nations but also within the same nation, between populations and within populations, between individuals. Diversity in Bali cattle can be seen from the phenotypic characteristics that can be observed or seen directly, such as height, weight, texture and length of hair, body color and color patterns, development of horns, and so on.

Bali cattle have uniform physical characteristics, and only experience minor changes compared to their wild ancestors (Banteng). The color of cows and calves or young is usually light brown with a thin black line along the middle of the back. The color of bulls is brown when young but then this color turns slightly darker at the age of 12-18 months until it is close to black as an adult, except for castrated bulls which will remain brown. In both sexes there is white on the back of the thighs (buttocks), lower part (stomach), four lower legs (white stockings) up to the nails, inside the ears, and on the edges of the upper lip. (Hardjosubroto & Astuti, 1993)

In addition to the general and standard color patterns, several aberrant color patterns are also found in Bali cattle, as stated by Hardjosubroto and Astuti (1993), namely:

a. Injin cattle are Balinese cattle whose body hair color has been black since childhood, the color of the inner ear hair is also black, even if the male is castrated, the color does not change.
b. Mores cows are Balinese cattle which should have a white lower body but have black or red on the lower part.
c. Spotted cows are Balinese cows with white spots on their body.
d. Bang cows are Balinese cows with white shirts on red legs.
e. Panjut cows are Balinese cattle with white tail tips.
f. Cundang cows are Balinese cows with a white forehead.

Abidin (2008) states that the reproductive capacity of Bali cattle is the best among local cattle in Indonesia, because Bali cattle can give birth every year. With good management daily weight gain can reach 0.7 kg per day. Another advantage is that Bali cattle easily adapt to new environments, so they are often called pioneer livestock.

C. METHODS

In researching disease control management strategies in cattle, qualitative methods can be used to obtain more in-depth data regarding the experiences and views of farmers in dealing with diseases in cattle. Qualitative methods involve collecting more descriptive and narrative data, such as in-depth interviews with breeders, participatory observation, and analysis of documents related to government policies regarding disease control in cattle (Sugiyono, 2011). Qualitative methods can provide more in-depth and descriptive data regarding disease control practices in cattle, so as to provide a more holistic and contextual understanding of disease control management strategies in cattle. However, keep in mind that qualitative methods do not produce generalizable data, so that research results can only be generalized to the same context. Participatory observation is carried out by involving farmers in observation activities, so that researchers can understand the context and environment that influence disease control practices in cattle. In addition, analysis of documents related to government policies can provide an overview of the regulations that must be obeyed by breeders in controlling disease in Bali cattle.

D. RESULTS AND DISCUSSION

1. Types of diseases commonly found in

Disease is a problem that worries farmers in developing Bali cattle. Some diseases that often attack Bali cattle are Jembarana disease, Bali ziekte disease and Malignant Cow Disease (DGS) or Bovine Viral Diarrhea (BVD) which are typical diseases in Bali cattle.

a. Jembrana Disease

Jembrana disease is caused by a virus and only affects Bali cattle. Affected cows are more than 1 year old and most are 4–6 years old. Jembrana disease transmission from cow to cow is thought to be by blood-sucking insects such as flies (sieve flies), ticks and mosquitoes. These insects are blood-sucking insects. If the insect bites and sucks the blood of a sick cow.

Cattle that are attacked by Jembrana disease will experience a decrease in appetite, so that their general growth, including weight gain, is stunted. This disease can even cause the death of cows, especially if it is handled too late. In addition, Jembrana disease has prevented the sale of Bali cattle breeds from Bali outside the island, due to fears that Jembrana disease will spread to a wider area in Indonesia. This obstacle to the sale of breeding cattle certainly hindered the increase in the price of Bali cattle (Kamalasari et al, 2019).

And what is even more worrying, if Jembrana disease is not treated seriously, the extinction of the Bali cattle will occur. Whereas Bali cattle are native Indonesian cattle which have many advantages, including being able to live and grow well in less fertile/marginal areas because they have good digestibility of feed. If the Bali cattle become extinct, then Indonesia, especially Bali, will lose its proud livestock resources. That is the reason for the importance of the Jembrana disease control program.

b. Diseases of Bali / Bali ziekte

The cause of the disease is lantadine poison which is found in the lantana camara or kramasi plant. Bali cattle when they eat this plant will experience poisoning and suffer from Bali ziekte disease. Symptoms of the disease: fever, decreased appetite and even disappears completely, itching and restlessness, skin on the protruding parts of the body and the tips of the left and right or symmetrical ears dry up like crackers and then peel off and leave scars. This situation will be worse if the cow is sunburned or exposed to heat. Infection often occurs in the scar, so that the wound becomes a watery scab and even festers. In an acute event, Bali ziekte disease is difficult to cure, but in circumstances where the levels of Lantana camara eaten are still small, the chance of recovery can still be 70-90%.

c. Cow Malignant Diarrhea Disease (DGS) or Bovine Viral Diarrhea (BVD)

Bovine Viral Diarrhea (BVD) or Cow Malignant Diarrhea (DGS) is an acute and often fatal infectious animal disease, caused by a virus from the Pestivirus genus of the Togaviridae family (Muhammad et al, 2004). In general, postnatal infection is non-clinical, biphasic temperature increase (there are two times the increase in body temperature) and leukopenia followed by an increase in immune substances/antibodies which can be detected by neutralization serum tests. Infection can be seen through serological and virologic diagnosis and the appearance of clinical signs and the presence of pathological lesions. Disease control can be done with the use of live vaccines (modified live vaccines). The impact of economic losses due to BVD is relative, depending on the accuracy of the management system and timing of vaccination as well as several aspects of production.

2. Management of Disease Control in Bali Cattle

In an effort to prevent the occurrence of various kinds of diseases in Bali cattle, a series of management can be carried out in disease control in Bali cattle which includes disease prevention, treatment, supervision, quarantine, access restrictions and education. Here's the explanation;

a. Disease prevention

The most effective form of disease control management in Bali cattle is disease prevention. Prevention is carried out by giving vaccinations, maintaining sanitation in the livestock environment, paying attention to feed quality, and maintaining the cleanliness of cattle. With prevention, farmers can minimize the possibility of spreading disease to cattle and prevent disease outbreaks that can cause large economic losses.

Vaccinating Bali cattle can help protect them from diseases that commonly occur in cattle. This can be done by checking the cow regularly to the vet and making sure all the necessary vaccines have been given according to schedule. In addition, maintaining the sanitation of the livestock environment is also important to prevent the spread of disease. The farmer must ensure that the cow pens are clean and dry, livestock waste is properly disposed of, and the cattle have adequate access to clean water.

Paying attention to feed quality is also important in preventing disease in cattle. Breeders must ensure that the feed given to cattle meets the required nutritional standards. Bali cattle that are malnourished are more susceptible to disease and can be infected more easily. Finally, maintaining the cleanliness of cattle is also important in disease prevention. Breeders must pay attention to the cleanliness of cows, including cleaning and caring for cow skin so that they are not easily infected with disease.

By taking appropriate precautions, farmers can minimize the risk of disease occurring in cattle and avoid large economic losses due to disease outbreaks. Therefore, disease prevention is the most important form of disease control management and needs to be applied continuously by cattle breeders.

b. Disease Treatment

Treatment is a form of disease control management in cattle which is carried out when the cattle are already infected with the disease. This treatment can be done by giving appropriate drugs or antibiotics and in the right dosage to help heal sick cattle.

In general, treatment of cattle is carried out by veterinarians who are experienced in treating livestock. The veterinarian will first carry out a diagnosis to determine the type of disease that affects cattle and provide medicines according to the disease. Treatment also needs to be done with the right dose and in sufficient time so that the cattle can recover properly.

However, treatment in cattle also has risks, such as excessive use of antibiotics can cause antibiotic resistance in cattle and humans. Therefore, the use of antibiotics must be done wisely and only when necessary.

In addition, treatment is also not always successful in curing sick cattle. This depends on the type of disease and the severity of the disease. Therefore, it is important to carry out good disease prevention early on so that cattle can avoid the risk of being infected with disease.

Treatment is a form of disease control management in cattle which is important in curing sick cattle. However, treatment also carries risks and may not always be successful in curing the disease. Therefore, it is important to carry out good disease prevention early on so that cattle can avoid the risk of being infected with disease.

c. Supervision

Supervision is a form of disease control management in cattle which aims to monitor and control the health condition of cattle on a regular basis. Under supervision, intensive observation of cattle is carried out by paying attention to the physical condition and symptoms of diseases that appear in cattle. This supervision is carried out routinely by breeders or veterinarians to prevent the spread of disease in cattle. If there are cattle showing symptoms of disease, then these cattle need to be isolated and given proper care so that they do not infect other cattle.

In addition, supervision can also be carried out by regulating the sanitation and hygiene of the cattle environment. The stables and environment for cattle need to be kept clean so that they do not become breeding grounds for bacteria, viruses or parasites that cause disease. In addition, the provision of food and water that is clean and healthy also needs attention.

Good supervision can help prevent and reduce the risk of disease spreading in cattle. By carrying out routine surveillance, breeders or veterinarians can find out the health condition of cattle early and can take quick and appropriate action in controlling disease in cattle.

Supervision is a form of disease control management in cattle which is important to prevent and reduce the risk of spreading disease in cattle. Supervision is carried out by monitoring and controlling the health condition of cattle on a regular basis as well as regulating the sanitation and hygiene of the cattle environment. By carrying out good supervision, breeders or veterinarians can find out the health condition of cattle early and can take prompt and appropriate action in controlling disease in cattle.

d. Quarantine

Quarantine is a form of disease control management in Bali cattle which aims to prevent the spread of disease in healthy cattle. Quarantine is carried out by separating cattle that have just been bought or those that have been exposed to disease from other cattle, so as to prevent the spread of disease to healthy cattle populations.

In practice, quarantine is carried out for several weeks, depending on the type of disease suspected or on the health condition of the newly purchased cattle. During the quarantine period, cattle are isolated and intensively observed by breeders or veterinarians to ensure the health condition of the cattle.

During the quarantine period, breeders or veterinarians also carry out health checks, such as blood tests and tuberculin tests, to ensure that the cattle are free from disease. If the cattle are declared free from disease, then the cattle can be returned to other cattle populations.

Quarantine is very important for cattle that have just been purchased or have been exposed to disease. By carrying out quarantine, it can prevent the spread of disease in healthy Bali cattle and maintain the health of cattle as a whole. In addition, quarantine can also reduce the risk of financial losses caused by disease in cattle.

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that have just been bought or those that have been exposed to disease from other cattle, so as to prevent the spread of disease to healthy cattle populations. Quarantine is very important for cattle that have just been bought or who have been exposed to disease to maintain the health of the cattle as a whole.

e. Access Restrictions

Access restrictions are a form of disease control management in cattle which aims to prevent the spread of disease through people or vehicles coming from outside. Restricting access can be done by limiting people or vehicles entering the farm or cattle shed.

In practice, access restrictions are carried out by installing a fence or gate around the farm or cattle barn. Breeders or livestock managers can also put up entry prohibiting signs or place security officers to check every vehicle or person who wants to enter the farm or cattle shed. Access restrictions are especially important on farms or cattle sheds that are near roads or areas that are frequently passed by vehicles or people. By limiting access, you can prevent the entry of people or vehicles carrying diseases into the farm or cattle shed.

f. Provide education

Management of disease prevention in cattle is important because disease can cause large economic losses for livestock, including medical costs, decreased milk or meat production, and even animal death. Therefore, disease prevention efforts are very important in maintaining the health and productivity of Bali cattle.

One of the effective ways to prevent disease in Bali cattle is to educate farmers about proper practices. This can be done by holding training or counseling to farmers about the management of disease control in cattle. This education and training can be organized by the government, universities or institutions related to the livestock industry.

In addition, breeders can also obtain information from other sources, such as books or brochures, scientific journals, and official websites that provide information on cattle management. In this case, the government can play an important role by providing adequate resources and access to farmers so that they can obtain the latest and most reliable information.

By increasing the understanding and awareness of farmers about the management of disease control in cattle, farmers can take preventive action and take the necessary actions quickly and precisely when their cattle are exposed to disease. This will reduce the risk of disease spreading on the farm and help maintain the overall health and productivity of the cattle.

Overall, providing education is an important step in disease management in cattle. Education can help farmers understand the importance of maintaining the health and productivity of cattle and increase their awareness of the actions that must be taken to prevent and control disease in Bali cattle.

E. CONCLUSION

Based on the results of the study, it can be concluded that disease control management strategies in Bali cattle include disease prevention, treatment, surveillance, quarantine, access restrictions and education. Disease prevention is carried out through the implementation of vaccination programs, environmental sanitation, and selection of disease-resistant cattle breeds. Treatment is carried out through the use of appropriate drugs and doses according to the condition of the livestock. Supervision is carried out regularly and strictly on the health conditions of the livestock, including monitoring of the environment and the quality of the feed given. Quarantine is carried out for livestock that have contracted the disease so that it does not spread to other livestock, as well as maintaining the health quality of healthy livestock. Access restrictions are carried out to prevent the spread of disease through people or vehicles coming from outside. Education includes information about early signs of disease, ways to identify

diseases in livestock, ways to reduce the risk of spreading disease between animals, and how to keep the farm environment clean. By implementing an appropriate disease control management strategy, it is expected to increase the productivity of Bali cattle and maintain the health and welfare of livestock.

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