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Seropositive Brucellosis in Beef Cattle in The First Semester at Pantoloan Animal Installation

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ABSTRACT

Brucellosis is an infectious disease caused by bacteria of the genus Brucella and classified as a zoonotic disease. Brucellosis is usually asymptomatic in infected female animals, but it can cause placentitis, which leads to abortion in the fifth to ninth months of pregnancy in pregnant animals. Brucella infection is lifelong in animals, and Brucella bacteria can be found in the blood, urine, milk, and sperm. To prevent the spread of brucellosis in beef cattle that will be trafficked through the Pantoloan animal quarantine installation**.** From January to June, blood serum of male beef cattle was collected at the Pantoloan Animal Quarantine Installation, Palu Agricultural Quarantine. The Rose Bengal Test method was used on up to 7.046 serum samples. In the first semester of 2018, the positive incidence of blood serum testing for beef cattle using the Rose Bengal Test (RBT) method at ten beef cattle traffic frequencies revealed seropositive brucellosis in 38 out of 7,046 samples tested. Beef cattle were sourced from the Central Sulawesi, Gorontalo, and South Sulawesi provinces. Blood serum samples from Central Sulawesi showed the highest positive incidence. Based on the prevalence of seropositive brucellosis based on RBT in beef cattle transported through the Pantoloan animal quarantine installation, several cattle breeding areas should be monitored during subsequent traffic, and public awareness should be raised to prevent the spread of brucellosis.

Keywords: Seropositive, RBT, cattle, Animal Quarantine

INTRODUCTION

The International Office of Epizooties (OIE) and the World Health Organization classify brucellosis as a zoonotic disease caused by bacteria of the genus Brucella (WHO, 2006; OIE, 2022). Brucella is a microbe classified as a BSL III. (OIE, 2018). Each species has a reservoir animal: Brucella abortus in

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cattle, B. ovis in sheep, and B. melitensis in sheep and goats (WHO, 2006; OIE, 2022).

Infected females are usually asymptomatic, but in breeding animals, brucellosis can cause placentitis, which leads to abortion between the fifth and ninth months of pregnancy. In the absence of abortion, Brucella bacteria can enter the placenta, fetal fluid, and vaginal lining. Infections can also occur in the milk and lymph glands, and these microorganisms are excreted in milk. (OIE, 2018).Brucella infection persists in animals throughout their lives, with Brucella bacteria found in blood, urine, milk, and sperm (Brucellosis Fact Sheet, 2003). The Brucella pathogenic species in humans include B. melitensis, B. abortus, B. suis, and B. canis. (OIE, 2022). The morbidity of the disease is determined by the species of Brucella that infects humans through contact or direct contact with infected animals or their products (WHO. 2006). In humans, brucellosis is acute in approximately half of cases, with an incubation period of two–three weeks. In the other half, the onset is insidious, with signs and symptoms developing over a period of weeks to months after infection. The clinical manifestations vary and are nonspecific. These include fever, sweats, fatigue, malaise, anorexia, weight loss, headache, arthralgia, and back pain (WHO, 2006).

According to Noor (2006), consumption of unpasteurized milk and dairy products can result in the transmission of brucellosis in humans. Brucella bacteria are also transmitted to humans through raw meat and the bone marrow. Brucellosis is typically transmitted through aerosols, injured skin, and mucous membranes in domestic workers who cut animals and farmers. When animals are vaccinated with *B. abortus* and *B. melitensis* , veterinarians can become infected. On the other hand, microbiological laboratory workers may be exposed to aerosols during specimen processing.

This study was conducted to identify beef cattle origin locations that have the potential to transmit Brucella bacteria, so that it can be used as a reference for further action when shipping beef cattle through Pantoloan animal quarantine installatios.

MATERIAL AND METHOD

7.046 samples of serum from blood cattle of male cows aged over 2 years were collected in the Pantoloan Animal Installation, Palu Agriculture Quarantine. The Rose Bengal Test method was used at the laboratory Palu Agriculture Quarantine (accreditation number LP-1299-IDN), which is described below in the OIE Terrestrial Manual, Chapter 3.1.4.2018 Bovine brucellosis.

Materials

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Serum of blood, RBT antigen, Fingertip, WHO Plate, Single Channel Micropipet 20-200 µL, Mixer tool, Positive Control, and Negative Control.

Methods

A plate filled with 25 µl of blood serum from a cow or cow was tested. Then, into each hole containing bovine blood serum, pour 25 µl of the Pusvetma-producing RBT antigen Brucella. Mix until the solution is completely smooth. Soak for 4 min and then read. The same method was used for the control group.

When there was no agglutination, no marginal boundaries, and the antigen and serum mixture remained homogeneous, the results were considered seronegative. Seropositive when sandy clots (agglutination) are observed and border boundaries appear as clear lines.

RESULTS AND DISCUSSION

From January to June 2018, sampling was conducted on the first day after entering the animal quarantine facility. The total sample size was 7,046 male cows over the age of two years, with 38 positive and 7,008 negative samples.

Table 1. Data from *Rose Bengal Test* at the Palu Agriculture Quarantine Laboratory in 2018.

Month	Seronegative	Seropositive	Sample
January	1411	15	1426
February	1154	12	1166
March	1275	3	1278
April	1271	3	1274
May	879	3	882
June	1018	2	1020
Total	7008	38	7046

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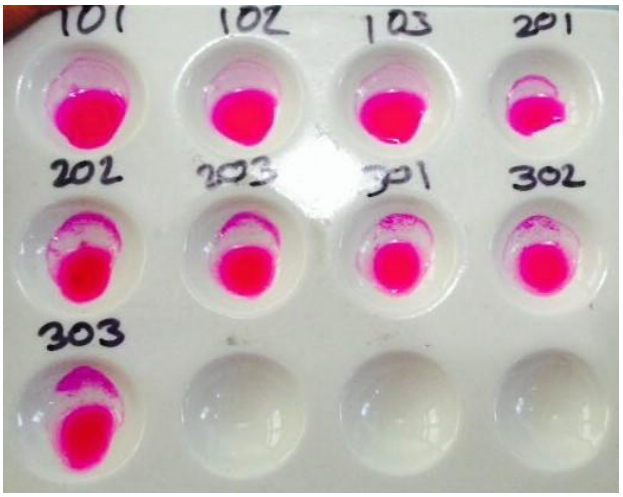

Figure 1. Seropositive Brucellosis is defined by the presence of fine lines on samples 101,102, and 103, or the presence of agglutination accompanied by visible lines in samples 201,202,203,301,302,303

Table 2. Rose Bengal Seropositive Test Results

Acceptance	Sample	Result	City
January 6th	39	Positive (+) 2, Negative (-) 37	Palu
January 12th	12	Positive (+) 4, Negative (-) 8	Sigi
January 20th	142	Positive (+) 8, Negative (-) 134	Donggala
January 23rd	72	Positive (+) 1, Negative (-) 71	Donggala
February 24th	134	Positive (+) 10, Negative (-) 124	Banggai
February 26th	13	Positive (+) 2, Negative (-) 11	Wajo
March 20th	121	Positive (+) 3, Negative (-) 118	Parigi Moutong
April 24th	19	Positive (+) 3, Negative (-) 16	Morowali
May 29th	102	Positive (+) 3, Negative (-) 99	Banggai
June 4th	102	Positive (+) 2, Negative (-) 100	Gorontalo

DISCUSSION

On January 6, 2018, two samples from the city of Palu tested positive for the Rose Bengal Test (RBT), four samples from the district of Sigi tested positive on January 12, 2018, and eight samples from Donggala District tested positive on January 20, 2018. Three positive test frequencies were observed in the Central Sulawesi Province

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districts of Sigi, Donggala, and Kota Palu.

In February, 1,166 samples were tested using the Rose Bengal Test (RBT). One sample from Donggala District tested positive on February 23, 2018, 11 samples from Banggai District tested positive on February 24, 2018, and 13 samples from Wajo District tested positive on February 26, 2018. The three positive test frequencies discovered came from the districts of Donggala and Banggai in the Central Sulawesi region as well as from the Wajo district in the South Sulawesi province.

In March, 1,278 samples were subjected to the Rose Bengal Test (RBT). Three samples from the district of Parigi Muotong in the Central Sulawesi Province tested positive on March 20, 2018. In April, 1,274 samples were subjected to the Rose Bengal Test (RBT). Three samples from Morowali district in Central Sulawesi Province tested positive on April 24, 2018.

In May, 882 samples were subjected to the Rose Bengal Test (RBT). On May 29, 2018, three samples from the Banggai district of the Central Sulawesi Province tested positive.

On June 4, 2018, out of 1,020 samples tested, two from the Gorontalo district in the province of Gorontalu tested positive in the Rose Bengal Test (RBT).

In the first half of 2018, ten cattle traffic frequencies showed positive incidences of brucellosis based on the RBT test, with 38 out of 7,046 samples tested. There was one case of beef cattle trafficking, with two samples from the province of South Sulawesi. One traffic-positive incident was discovered in two samples from Gorontalo Province. Furthermore, eight positive trafficking frequencies were discovered in 35 samples from the Central Sulawesi Province.

Positive RBT samples were discovered at 15 different locations throughout Palu, Sigi, and Donggala in January. In February, 12 seropositive RBT samples were collected from Banggai and Wajo. In March, there were three seropositive RBT samples from Parigi Muotong. In April, there were three seropositive RBT samples from Morowali. In May, there were three seropositive RBT samples from Banggai, and in June, there were two seropositive RBT samples from Gorontalo district.

A variety of factors, including age, equipment maintenance, and season, contribute to seropositivity. The cow's age, shepherded cow factor, and the fact that the cow was a herder of other cows were all factors associated with the occurrence of brucellosis (Sari and Mulyani, 2015). Cows that have been pasted with others are 4.24 percent more likely to contract brucellosis than cows that have not been pasted. Adult cows are 5.94 times more likely to be pregnant than young cows. Sulawesi's maintenance management system remains ambitious.

According to Jatmiko (2019), the method used to keep cattle can increase

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the likelihood of brucellosis spread. The virus can spread through marriage with an infected cow, abortion fluid, a fetus, or possibly through air. Cows with extensive maintenance systems had a 47.9% higher incidence of seropositive Brucella than those with intensive and semi-intensive maintenance systems (Anka *et al*. 2014).

The beef cattle that have passed through the Pantoloan quarantine installation cage are of decent age, as evidenced by a certificate of decent cutting from the farm service, which confirms the animal's origin. Sanogo et al. (2012) reported that seropositivity is more common in animals over the age of 5 years than in animals under the age of 3 years (2.8; 95% CI:1.3, 6.3). According to Rivera *et al*. (2007), the prevalence of brucellosis in cattle aged over 24 months was higher than that in cows aged under 24 months, with a prevalence of 6% in cattle aged under 24 months and 11% in cattle aged over 24 months. This suggests that age influences the prevalence of seropositivity in cattle.

In January, the number of seropositive RBTs found in crossed cows decreased by 1.05% and 1.03% in February, 0.23% in March, 0.24% in April, 0.34% in May, and 0.2% in June, respectively. This is possible because the rainy season begins this month. High humidity, low temperatures, and a lack of sunlight are caused by weather influences, such as the rainy season, allowing this organism to survive for several months in water, fetal abortion, wool, silk, mud, equipment, and clothing (Budiarta and Widiasih, 2012).

The subsequent decrease in seropositive RBTs was also due to public awareness of quarantine service users who failed to return the allegedly positive area of origin on previous load.

CONCLUSION

The incidence of seropositive brucellosis based on RBT in beef cattle transported through the Pantoloan quarantine installation must be monitored during subsequent travel from several points of origin for livestock. The complement fixation test (CFT), the gold standard for brucellosis diagnosis, is recommended for seropositive samples. Public awareness must be raised to prevent the spread of brucellosis.

APPROVAL OF ETHICAL COMMISSION

In carrying out its duties and powers, quarantine must comply with the professional code of ethics, as defined in Article 13 letter a. Law no. 21 of 2019 on animal, fish, and plant quarantine

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