

# Strategic Infectious Diseases in Beef Cattle in Balongpanggang during 2023

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## Abstract

Strategic infectious animal diseases have a great impact on the national economy as they may cause great economic loss, public anxiety, and high mortality. In Indonesia, among the diseases considered as strategic infectious animal diseases is foot and mouth disease (FMD). This study reported the incidence of strategic infectious animal diseases in Balongpanggang district during 2023. Throughout 2023, FMD only accounted for 4% of the total diseases of the year and was the only strategic infectious animal disease reported that year. Meanwhile, bovine ephemeral fever (BEF) incidence reached 57% (876/1546) of the total diseases in beef cattle in 2023. In addition to BEF, official veterinary services reported a total case of 1546 throughout 2023 that comprises; diarrhea (99), limping (24), helminthiasis (91), ectoparasite (11), hematochezia (3), wound (3), mastitis (4), allergy (1), dystocia (28), vaginal prolapse (11), dermatitis (45), enteritis (27), tympani (11), scabiosis (122), arthritis (67), ophthalmic problem (11), endometritis (1), uterine retention (13), indigestion (2), pneumonia (21), hypoglycemia (5), abscess (21), ovariohysterectomy (1), orchitis (1), intoxication (1), and papilloma (1). In conclusion, the only strategic infectious animal disease reported in 2023 in Balongpanggang was FMD with the incidence as high as 3% as compared to the non-strategic infectious animal diseases, BEF, which reached 54% of the total cases during 2023.

Keywords: Balongpanggang, foot and mouth diseases, strategic infectious animal diseases

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## INTRODUCTION

According to the Indonesia Central Bureau of Statistics, the estimated beef cattle population in 2022 was 17.25 million which spread through the 34 provinces. The data stated that East Java held the highest population of beef cattle with a total of 4.56 million or 26.43% of the total beef cattle population in Indonesia. The next highest population was in Central Java with 1.79 million followed by South Sulawesi with 1.41 million. These three provinces have a significant contribution to the total population of beef cattle in Indonesia (Central Bureau of Statistics, 2023).

The population of cattle and buffalo in May 2023 was recorded as 11.79 million, with 11.32 million of those being both beef and dairy cattle. Just as with the previous year, most of the population of this livestock commodity was

concentrated in East Java, Central Java, and South Sulawesi. Meanwhile, the 0.47 million buffalo were mainly concentrated in East Nusa Tenggara, South Sulawesi, and Aceh (Central Bureau of Statistics, 2023).

Comparing the population in 2023 to the previous year, there was a substantial decrease in number which was largely caused by the incidence of foot and mouth disease (FMD) in 2023. This has a significant impact on the animal protein consumption for the society. These facts have raised the alarm of the need to improve the productivity of the livestock in Indonesia, especially in East Java to achieve a stable and sustainable meat supply to answer the national demand shortly. In the developed country, major strides have been achieved in veterinary care, animal genetics, animal nutrition, and general farm management that have significantly reduced



the impacts of animal disease (Teberlet *et al.*, 2011; Oktanella *et al.*, 2023). In developing countries, however, diseases continue to cause dramatic losses. Diseases are a major constraint to the improvement of the livestock industry in the tropics (Davendra *et al.*, 2000). Animal health issues are barriers to trade in livestock and their products, whilst specific diseases decrease production and increase morbidity and mortality (Kappes *et al.*, 2023; Majid *et al.*, 2023; Septiyani *et al.*, 2023).

According to Government Regulation of the Republic of Indonesia No. 47/2014, strategic infectious is an animal disease that causes great economic loss, public anxiety, and high mortality. These strategic infectious animal diseases include eighteen diseases that had been previously reported to occur in Indonesia and three other diseases that have not yet been reported in Indonesia. These eighteen diseases are anthrax, rabies, salmonellosis, brucellosis, avian influenza, porcine reproductive and respiratory syndrome, hemorrhagic septicemia epizootic, infectious bovine rhinotracheitis, leptospirosis, membrane, surra, hog cholera, FMD, lumpy skin disease (LSD), African swine fever (ASF), bovine viral diarrhea, zoonotic coronavirus, dan zoonotic tuberculosis.

Among these diseases, FMD should particularly alert the public and officials as its occurrence can result in national catastrophe (Winarsih, 2018; Adjid, 2020). Formerly Indonesia had been declared free from FMD for 36 years since its last occurrence in this country back in 1986 (Budipijoto, 2022). FMD re-emerged in Indonesia back in 2022 when several cases were reported in East Java and Nangroe Aceh Darussalam (Budipitojo, 2022). It was believed that this incident was initiated by the import policy that allows cattle from the country that haven't been declared to be free from FMD to enter the country since 2016 (Putra, 2022; Prihatin *et al.*, 2023; Sekarsana *et al.*, 2024). Previously, the regulation strictly prohibited cattle from the country with FMD from being imported to Indonesia.

According to Indonesia legal regulation released by Decree of the Minister of Agriculture

of the Republic of Indonesia No. 403/KPTS/PK.300/M/05/2022, Gresik regency is one among the four other regencies in East Java to be plagued by FMD along with Mojokerto, Sidoarjo, dan Lamongan. Based on the national statistics agency, East Java holds the highest beef cattle population in Indonesia, reaching up to 4.94 million or 27.36% of the total beef cattle population in Indonesia. Among the eighteen subdistricts of Gresik regency, Balongpanggang reported the 4th highest population based on data from 2022 after Wringinanom, Kedamean, and Sangkapura (Central Bureau of Statistics, 2023). This study aimed to investigate the incidence of strategic infectious animal diseases in the Balongpanggang in 2023.

## MATERIALS AND METHODS

### Ethical Approval

This study was a retrospective report and, therefore requires no ethical clearance from the ethical board.

### Study Period and Location

The data for this study was collected from secondary data from the veterinary service database from Balongpanggang, Gresik, East Java. The period of the data obtained was between January–December 2023. This study was conducted by collecting the data from veterinary service database from the Balongpanggang which includes the type of the disease and the number of occurrence or incidence for each month. To keep the discussion to focus on the theme of strategic infectious animal diseases and keep up with the latest issue of FMD, the data obtained was limited to those from beef cattle population. The number of disease incidence was reported in Table 1. In addition, several diseases were presented in geographic distribution (Figure 1).

### Study Design

The medical data included the presenting complaint, pertinent history relevant to the farm and diseased individual animal, physical examination findings, laboratory findings, clinical diagnoses, and medical or surgical

treatment recommended for the animal. Systemic viral and septicaemic bacterial infections were classified as conditions affecting multiple systems in this study. Animals that were presented with clinical signs suggestive of respiratory infections such as fever, coughing, and abnormal pulmonary sounds on auscultation with no other abnormalities involving any other body system were diagnosed with pneumonia regardless of the possible etiologic nature such as bacteria, virus, or parasites. Although bacterial culture of milk from cases of clinical mastitis is routinely performed, specific bacterial etiologic diagnosis was not reported in this study and the term “mastitis” was used for all cases of mastitis reported in this study.

### Statistical Analysis

The tabulated data was represented in tables and figures and then analyzed descriptively.

## RESULTS AND DISCUSSION

According to the data from the clinical veterinary service database from Balongpanggang, the diseases reported throughout 2023 with the highest number of incidence were BEF (876), scabies (122), unspecified diarrhea (99), helminthiasis (91), arthritis (57), FMD (55), unspecified dermatitis (45), dystocia (28), unspecified enteritis (27), unspecified limping (24), abscess (21), pneumonia (21), uterus retention (13), vaginal prolapse (11), unspecified ectoparasite (11), tympany (11), unspecified ophthalmic problems (11), hypoglycemia (5), mastitis (4), unspecified wound (3), hematochezia (3), indigestion (2), allergy (1), endometritis (1), papilloma (1), orchitis (1), and intoxication (1). The non-pathological conditions that were also reported in descending order were parturitions (88) and ovariohysterectomy (1). From this data, the disease with the highest incidence was bovine ephemeral fever (BEF). In 2023, BEF incidence reached 57% (876 cases) out of all the diseases reported in beef cattle of that year (1546 cases). The FMD, on the other hand, only accounted for 4% (55 cases) of the total diseases in that year

which was substantially lower compared to BEF. FMD was the only reported strategic infectious animal disease in beef cattle in Balongpanggang throughout 2023.

In this study, the frequencies of disease conditions affecting the cattle in the organ system were determined. The top five systems involved in the disease processes in the cattle in this study were: multiple organ system infections (932), gastrointestinal (233), skin (204), reproduction (55), and musculoskeletal (91) (Table 2). Musculoskeletal disease refers to any condition or abnormality associated with bone, joints, muscles, or skin. The most common losses associated with this classification result from some sort of lameness. This lameness may be due to infectious causes or it may be brought about by how the calves are transported or handled. The causes are also protruding nails, wire, or sharp metal objects that have resulted in multiple cattle getting injured and then becoming chronically lame. Infectious arthritis in cattle will often start as an infection somewhere else in the animal's body. The bacteria will then circulate through the bloodstream to one of the joints and set up there. When looking at the common infectious causes of lameness, there are several that we typically deal with. Conditions such as “foot rot”, toe abscesses, and infectious arthritis tend to make up most of these cases that fall into this category (Andrews *et al.*, 2004).

Dystocia can be defined as the inability of the cow to expel neonates through the birth canal from the uterus. This condition occurs as a result of problems with the dam's uterus or birth canal, or with the fetus. It can occur in conditions such as pelvic canal abnormalities, uterine inertia, fetal oversize, and mal-disposition of the fetus. Dystocia is important in the farm economy because it is the major factor in calf mortality at or near birth (Yehualaw *et al.*, 2017). The incidence of dystocia in various species is not properly recorded; the incidence of dystocia in cattle was about 3.3% and was reported to be higher in dairy cattle when compared with beef cattle (Roberts, 2004; Pradika *et al.*, 2019). Dystocia is commonly seen in heifer and multiparous cows; the more common types of

dystocia are flexion of the elbow joint, head down deviation in the anterior presentation of the fetus, whilst the less common type of dystocia is an incomplete extension of the hind limbs in the birth

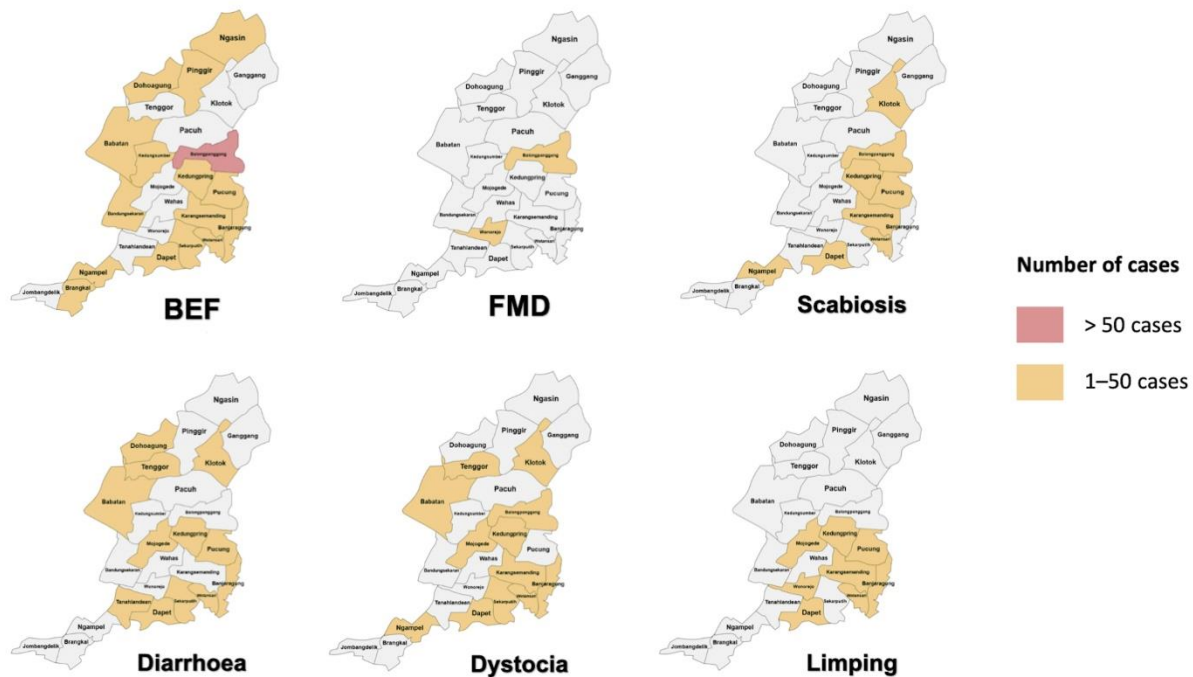
canal in the posterior presentation of the fetus. The effects of these types of dystocia on fetal viability in both heifer cows and multiparous cows are variable (Mahmood *et al.*, 2023).

**Table 1.** Percentage of disease incidence in beef cattle during 2023

Diseases	Cases	%	Diseases	Cases	%
Bovine ephemeral fever (BEF)	875	56.63	Vaginal prolapse	11	0.71
Scabiosis	122	7.90	Tympani	11	0.71
Diarrhoea	99	6.41	Ophthalmic problem	11	0.71
Helminthiasis	91	5.89	Hypoglycaemia	5	0.32
Arthritis	57	3.69	Mastitis	4	0.26
Foot and mouth disease (FMD)	55	3.56	Hematochezia	3	0.19
Dermatitis	45	2.91	Wound	3	0.19
Dystocia	28	1.81	Indigestion	2	0.13
Enteritis	27	1.75	Alergy	1	0.06
Limping	24	1.55	Endometritis	1	0.06
Pneumonia	21	1.36	Ovariohisterectomy	1	0.06
Abscess	21	1.36	Orchitis	1	0.06
Uterine retention	13	0.84	Intoxication	1	0.06
Ectoparasite	11	0.71	Papiloma	1	0.06

**Table 2.** Distribution of disease based on clinical signs

System	Diseases	Number of cases	Total
Gastrointestinal	Diarrhea	99	233
	Helminthiasis	91	
	Hematochezia	3	
	Enteritis	27	
	Tympani	11	
	Indigestion	2	
Udder/tead	Mastitis	4	4
Reproduction/Obstetrics	Dysctocia	28	55
	Vaginal prolapse	11	
	Endometritis	1	
	Uterine retention/placental retention	13	
	Ovariohisterectomy	1	
	Orchitis	1	
Respiratory	Pneumonia	21	21
Metabolic	Hypoglycaemia	5	6
	Intoxication	1	
Muskuloskeletal	Limping	24	81
	Arthritis	57	
Multiple system	BEF	876	931
	FMD	55	
Eyes/ears	Ophthalmic problems	11	11
	Ectoparasite	11	
Skin	Wound	3	204
	Allergy	1	
	Dermatitis	45	
	Scabiosis	122	
	Abscess	21	
	Papiloma	1	



**Figure 1.** Geographic representation of BEF, FMD, scabiosis, diarrhea, dystocia, and limping cases in Balongpanggang during 2023.

Gastrointestinal nematodes are the major infective organisms in ruminants. Gastrointestinal nematode infections cause a wide range of symptoms and complications, from mild to severe, depending on the species of parasite, their invasive or non-invasive pathogenesis, and the number of parasites. Even when anthelmintics are administered, the number of cases is not significantly reduced due to misuse and overuse of the drugs, leading to drug resistance. Gastrointestinal nematodes are major parasites of the digestive system of the cattle. Gastrointestinal nematode infections are ubiquitous and lead to poor health because of tissue destruction. Infection rates have increased in this century due to climate change (Filipe *et al.*, 2023). Several nematodes have been reported to be pathogenic in cattle and cause gastroenteritis in dairy and beef cattle in large farming areas of Thailand (Wangboon *et al.*, 2024).

In tropical climates, the presence of ectoparasites almost occurs throughout the year. Indonesia as a tropical country has big problems due to ectoparasite infestation in ruminant farms. The existence of these ectoparasites is increasingly detrimental if not controlled properly (Prihandono *et al.*, 2021). Economic losses arising from ectoparasite infestations can cause

emaciation, decreased body resistance, and slow growth in livestock so it will reduce meat production, body weight, and selling value in livestock (Yadav *et al.*, 2017). Bovine ephemeral fever is a viral disease transmitted by arthropods. The causative agent is bovine ephemeral fever virus (BEFV) which is a single-stranded RNA virus and belongs to the genus Ephemerovirus and family Rhabdoviridae. The occurrence of the disease has expanded over a wide range of areas ranging from Africa to the Nile River, South Asia to the Middle East, Korea, Taiwan, and Southern Japan (Ashraf *et al.*, 2023).

FMD is a type of disease that is infectious and acute and its transmission is very high in animals with even or split hooves the main agent that causes FMD is the virus from the genus Aphthovirus. It is recorded that Indonesia first discovered PMK in 1887 in Malang, East Java. Indonesia has been declared FMD-free by the OIE since 1990 and should maintain its status without vaccination. In the last few months, starting from April 2022, FMD had begun to spread widely infecting livestock, especially cattle. FMD transmission occurs fast with a morbidity rate of almost 100% (Sarsana and Merdana, 2022). Various efforts are made by the government to overcome the spread of FMD in livestock. The



three forms of treatment carried out by the FMD task force on cattle are livestock isolation and quarantine, symptomatic treatment, and vaccination (Sirajudin *et al.*, 2024; Dinana *et al.*, 2024).

Vaccination is the main strategy implemented to combat FMD in Indonesia during the recent outbreaks. During the early implementation of the vaccination program nationally, many farmers opposed the program due to misunderstanding and manipulation by the butcher who sought to gain profit from the situation. However, through persistent education by the field veterinarian, the farmer gradually accepted the vaccination program, and the status of the outbreaks improved substantially. According to the data from the Ministry of Agriculture Republic Indonesia, the national realization of FMD vaccination reached 98.04% (FMD Crisis Center, 2023). Aside from vaccination, another strategy from the government includes sanitation and biosecurity, controlling and limiting the traffic of animal mobilization from and to the affected area, and quarantine (Purnama *et al.*, 2019; Ristiani, 2022).

In 1974, vaccination had also been implemented in Indonesia during the past outbreaks. This vaccination program was called the “crash program” and mainly targeted the areas where livestock originated from, which were Bali, South Sulawesi, and Java. The vaccine used at that time was the O1 BFS vaccine which had a great performance and resulted in Bali and South Sulawesi being free from FMD in 1980. Another outbreak hit Java and the serological test showed FMD type O to be the virus responsible, known as O ISA 3/38 isolate or O java 83 (Adjid, 2020). Massive vaccination was conducted using the strain and finally, Indonesia was declared free from FMD in 1990–2022. In the present issue, the vaccine distributed around East Java was inactive vaccine type O (strain O1 Campos) commercially known as AFTOGEN OLEO (East Java Provincial Communication and Information Service, 2023).

East Java was targeted to reach 7.5 million dosages of vaccination for 2023. In conjunction with that, public communication and education

were also enhanced especially targeting the farmers on the importance of vaccination (East Java Provincial Communication and Information Service, 2023). In contrast with FMD, a vaccination program has not been implemented in Indonesia for BEF. BEF, not considered a strategic infectious animal disease, has been reported in Indonesia since the occupation of the Netherlands in the country. BEF generally had a low fatality rate but had a high morbidity. Aside from the acute febrile illness that lasts for three days, BEF can be manifested as stiffness and paralysis that will spontaneously resolve after three days. The diagnosis of BEF is generally based on clinical signs, however, serological tests, virology, and pathology are also pertinent to confirm the diagnosis. Since in general the clinical signs are mild and recovery is good, serological testing is seldom performed. In Indonesia, serological testing was reported back in 1992 where the reactive sample was reported to be 24% in total from 527 samples taken from 12 provinces (Nururrozi *et al.*, 2019). Generally, serological testing is not performed for BEF. This carried the risk of false diagnosis, but since the nature of the disease is self-limiting and spontaneous resolve could occur, the urgency for serological testing is neglectable. Still, in the future, serological testing is recommended to confirm the true prevalence of this disease.

## CONCLUSION

FMD was the only strategic infectious animal disease reported in Balongpanggang during 2023. The incidence of FMD throughout the year 2023 was 4% (55 cases) of the total diseases that year (1546). This was substantially lower compared to BEF which reached 57% (876 cases) throughout the year 2023 in Balongpanggang.

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## AUTHORS' CONTRIBUTIONS

WMY and BSL: Conceptualization, Project administration, Resources, Validation, Writing – original draft. BS, ISY, NT, MAMH, and LS: Conceptualization, Formal Analysis, Resources, Visualization, Writing – review and editing. WMY, BSL, ANH, and BSS: Data curation, Formal Analysis, Resources. All authors have read, reviewed, and approved the final manuscript.

## COMPETING INTERESTS

The authors declare that they have no competing interests.

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