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Bovine Spongiform Encephalopathy

Bovine Spongiform Encephalopathy (BSE) is also known as Mad Cow Disease. “Bovine” means that the disease affects cows, “spongiform” refers to the way the brain from sick animal looks spongy under a microscope, and “encephalopathy” indicates that it is a disease of the brain. It is a fatal infectious progressive neurologic disease of cows.

Etiology

Unusual transmissible agent called a prion is the causative agent of BSE. The nature of this agent is not well understood. Currently, most accepted theory is that the agent is a modified form of a normal protein known as prion protein. The normal prion protein changes into a pathogenic form that then damages the central nervous system of cattle.

Two forms of BSE agent can be distinguished: classical BSE (caused by C-type BSE agent), which occurs in bovines after ingesting prion contaminated feed, and atypical BSE (caused by H- and L-type agents), which is believed to occur spontaneously in all bovine populations.

Transmission

Classical BSE occurs as a result of foodborne exposure to prion via contaminated animal-source proteins (meat and bone meal) in cattle feed. It is not transmitted horizontally by contact or aerosols. There is no sex or breed predisposition. Calves born to infected mothers, are have greater risk of acquiring BSE than are calves born to non-infected cows. Dairy cattle are affected more often than beef cattle as they are fed with animal source protein supplements.

Atypical BSE have been reported even in countries where have no classical BSE has reported. Further, animals affected with atypical BSE are relatively old, and the disease incidence rates do not follow the trends observed in classical BSE outbreaks. Therefore, it is hypothesized that, atypical BSE results from spontaneous prion protein misfolding and it is not related to ingestion of prion contaminated

feed. But the mechanism and reason for spontaneous prion protein misfolding is still unknown.

Pathogenesis

BSE is common in cattle of 3-6 years old, but animals as young as 22 months old also have been diagnosed with the disease. The incubation period after exposure to the disease can vary from 2 years to 8 years. After oral exposure, the pathogenic agent replicates in the Peyer's patches of the ileum and then migrates via peripheral nerves to the CSN, where it accumulates and disrupts normal neuronal functions.

Clinical Signs

Initial clinical signs of BSE are behavioral signs which progress with the time to hyperesthesia, nervousness, reluctant to handling (eg: milking), depression, weight loss, low milk production, low head carriage, hypermetria, ataxia, tremors and aggression toward farm personnel or other animals, which is why BSE is often called 'mad cow disease'.

During the incubation period, there is no way to tell that the cow has BSE by looking at it. Once a cow starts to show symptoms, it gets sicker until it dies, usually within two weeks to six months.

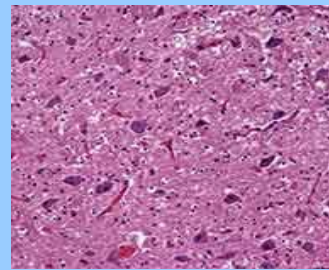


BSE infected cattle

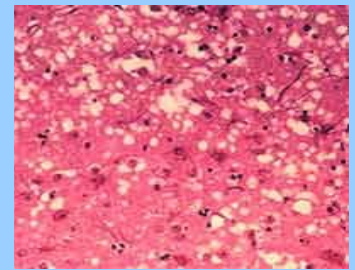
Diagnosis

Clinical examination of the animal does not provide definitive diagnosis for BSE. In suspected cases, animal should be euthanized and the brain samples should be subjected to neuropathologic examinations.

The identification of characteristic vacuolar changes by histopathology in specific targeted structures of the Central Nervous System is indicative of BSE. Detection of causative agent in brain sample is the only method for confirmatory diagnosis of the disease. Brain samples can be checked by ELISA, Western Immunoblot techniques, Immunohistochemical techniques and Ultrasensitive in vitro amplification techniques.



Healthy cow brain tissue under microscope



BSE infected cow brain tissue under microscope

Differential Diagnosis

Differential diagnosis of BSE are nervous ketosis, hypomagnesemia, polioencephalomalacia, lead poisoning, ingestion of toxic plants or fungi, rabies, listeriosis and other viral and bacterial infectious neurologic diseases. But when comparing to these infections BSE has a slow onset of clinical signs with an extended and progressive clinical course.

Treatment and Control

There is no effective treatment or vaccine for BSE. Euthanasia is advisable as soon as if there is clinical diagnosis, because animals become unmanageable as the disease progresses, compromising their welfare and handlers safety.

Most effective control measure is to prohibit the feeding of meat and bone meal to cattle. Meat and bone meal supplements for cattle have been banned in many countries as a consequence of the BSE epidemic.

The infectious agent of BSE is resistant to commercial inactivation procedures such as heat, which means that they may not be destroyed in the rendering process. However, their infectivity can be reduced following specific treatment procedures.

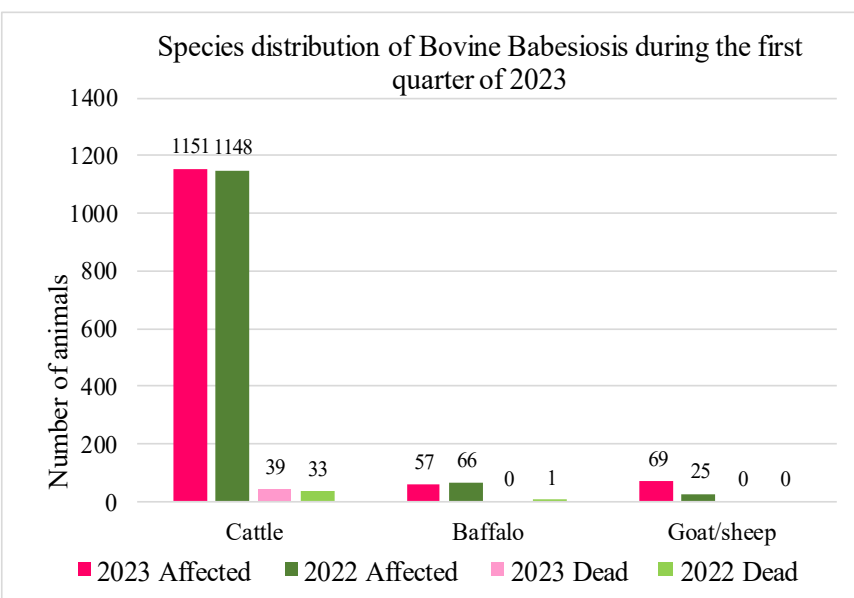
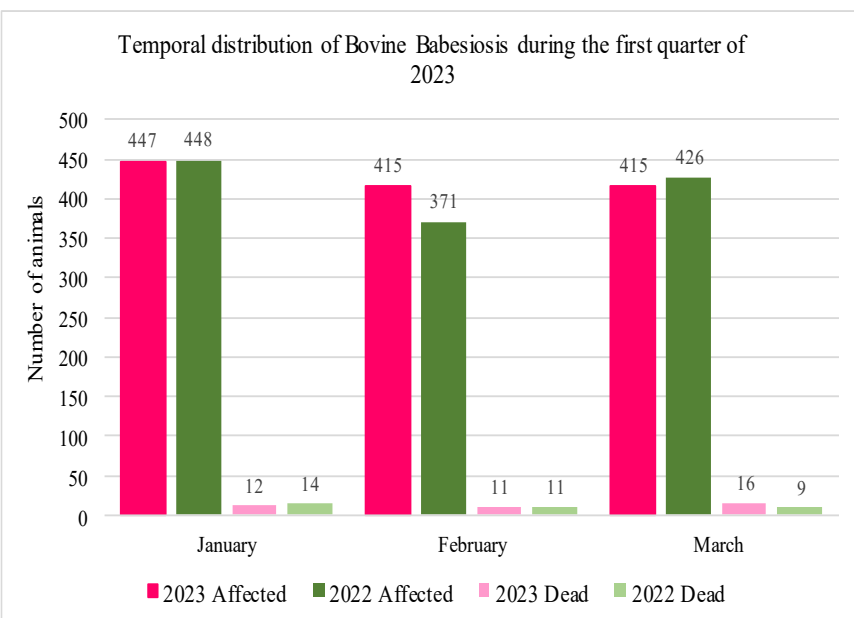
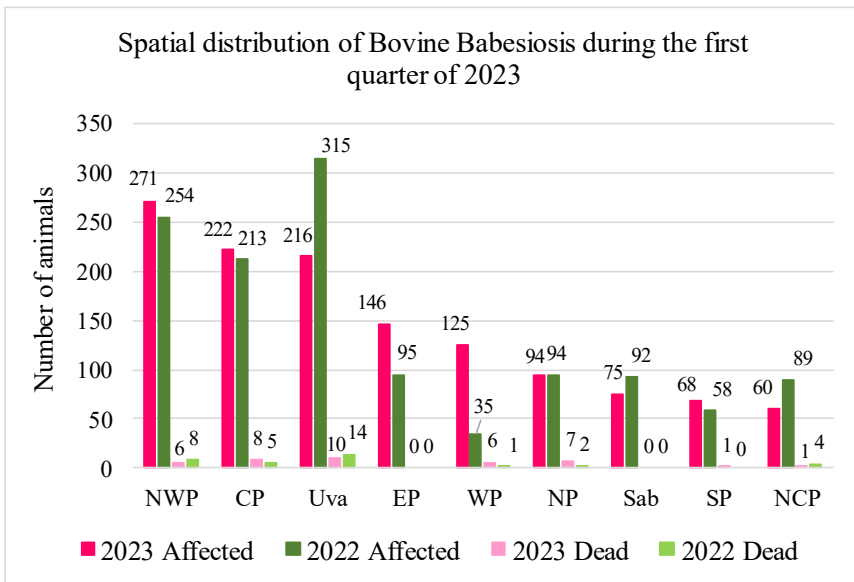
Zoonotic risk of BSE

A novel variant of Creutzfeldt-Jakob disease (vCJD) in the human population in Great Britain, initially observed in 1996, has been associated with emergence of the BSE agent. Humans become infected with the vCJD causing agent by eating infected bovine tissues, and in fatal human cases, BSE prion was identified in brain tissue. Therefore, many countries have practiced the removal of high risk bone tissues from the human food chain and/or banned the human consumption of cattle less than 24 months old. Further, safety precautions for handling the BSE agent and conduct the necropsies of cattle suspected of being infected are recommended.

2. Status of Livestock Diseases - First Quarter (Jan - Mar) - 2023

2.1 Bovine Diseases

2.1.1 Babesiosis :



Babesiosis is an endemic disease in Sri Lanka, which is usually reported from all the provinces during the all four quarters of the year due to the favourable climate through the year and islandwide distribution of vector and host species.

According to the spatial distribution of Babesiosis during the first quarter of 2023, disease has been reported from all nine provinces of the country as 1277 cases with 39 deaths totally. Highest contribution (21.22%) to the disease incidence is from North Western province as 271 cases with 6 deaths. When comparing to the highest incidence of 2022 first quarter in Uva province, this is a 13.96% reduction in highest disease incidence. Further, disease incidence of Central, Eastern, Western and Southern provinces were increased in current quarter when comparing to the same quarter of previous year.

Temporal distribution of Bovine Babesiosis shows highest disease in January month and similar incidences in both February and March of the 2023. Further, disease incidences throughout the quarters are close each other which indicating very slight difference in distribution pattern in both years considering period.

As per the species distribution graph indicate, highest disease incidence reported in cattle species as 90.13% from total disease incidence reported during the quarter. Disease distribution pattern of both quarters show similar disease incidences in cattle species.

2.1.2 Foot and Mouth Disease:

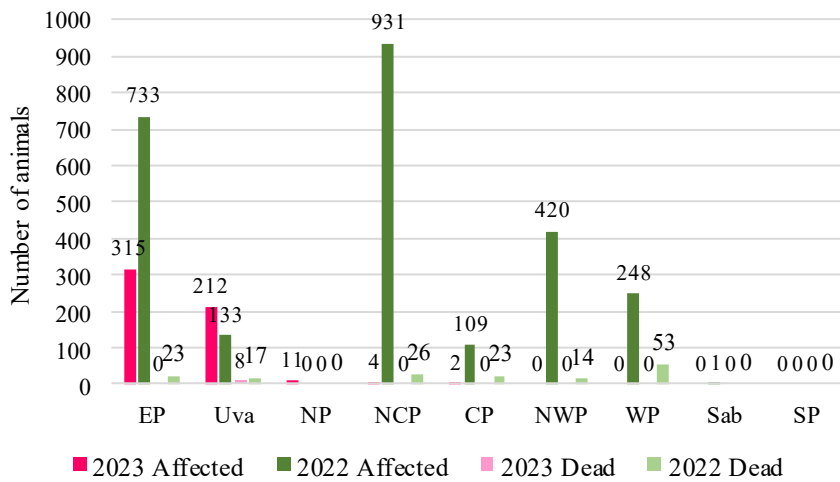
Foot and Mouth Disease (FMD) is an endemic disease to Sri Lanka.

It was reported in five provinces of the country during the first quarter of 2023. Disease incidence during the period is 544 cases with 8 deaths. It is 78.87% decrease of disease incidence when comparing to the first quarter of 2022. Highest number of cases were reported from Eastern province as 315 cases without any deaths. All 8 deaths were reported from Uva province with 212 diseased cases. FMD infected cases were not reported from Sabaragamuwa province during the first quarter of both 2022 and 2023.

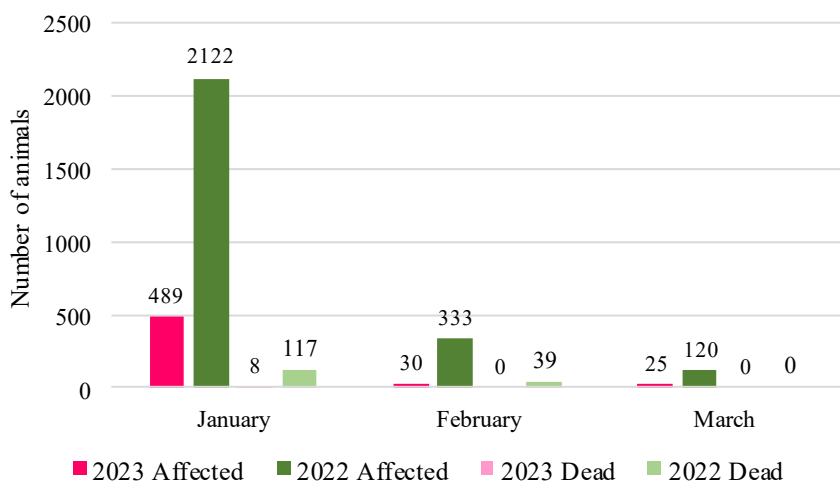
Temporal distribution shows similar distribution patterns of the disease during the both quarters but in significantly different disease incidences. Highest disease incidence (89.88% from total incidence) was reported during January month as 489 cases with 8 deaths, which indicates 76.95% reduction in disease incidence than previous year January month.

Under Contagious Disease Control Program of Department of Animal Production and Health, 43982 doses of FMD vaccines were distributed in seven provinces of the country. Majority (47.6%) of them were distributed to the Eastern province in order to control the highest disease outbreak reported during the period. Considerable amount of vaccines were distributed to Uva and Western provinces as well based on the severity and risk of the outbreak.

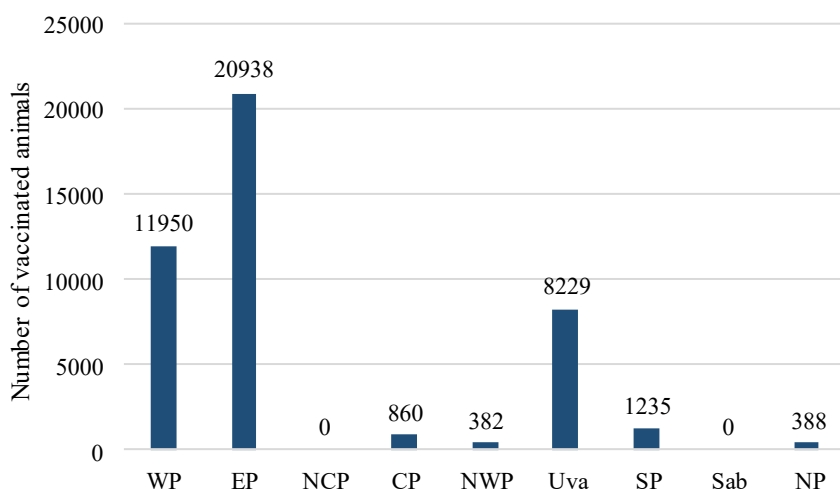
Spatial distribution of FMD during the first quarter of 2023



Temporal distribution of FMD during the first quarter of 2023



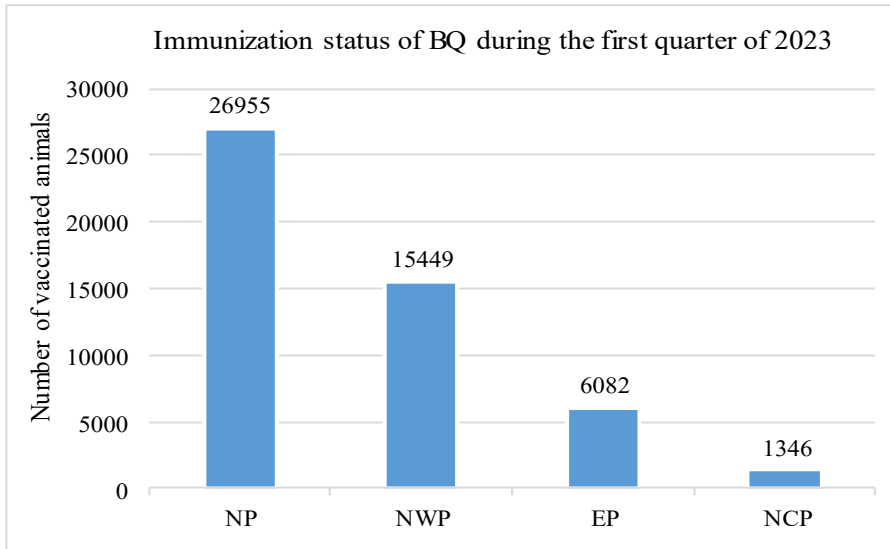
Immunization status of FMD during the first quarter of 2023



2.1.3 Black Quarter:

Black quarter is less common disease in Sri Lanka, though it is reported rarely in certain dry zone areas of the country. The disease has been well prevented and controlled by the on time prophylactic vaccination program conduct by the Department of Animal Production and Health.

During the first quarter of 2023, Black quarter cases were not reported from any province of the country as same as the first quarter of 2022.

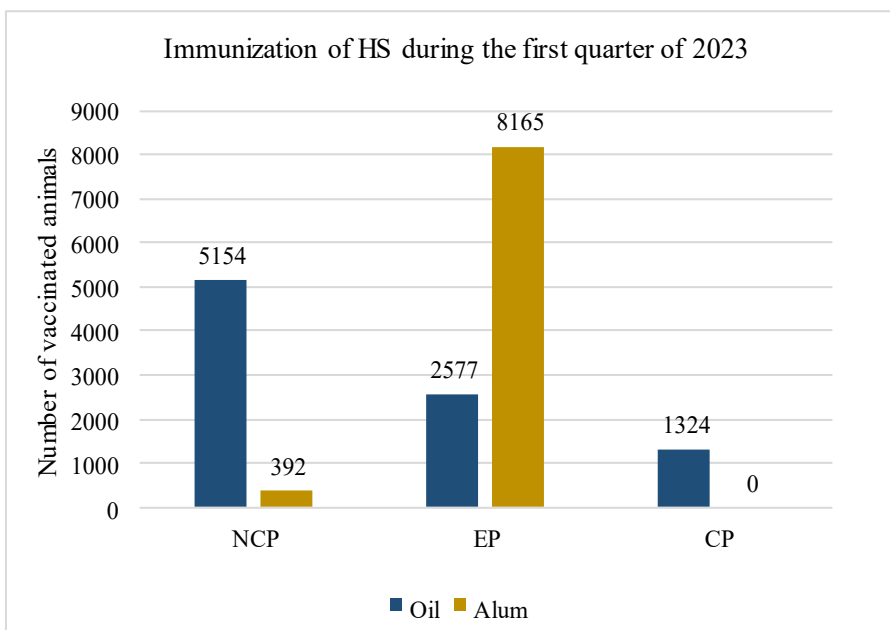


During the considering period, vaccination program was mainly targeted on the Northern, North Western, Eastern and North Central provinces of the country. Totally, 49832 vaccines were distributed among these provinces. Majority (54.09%) of them were issued to Northern province of the country.

2.1.4 Hemorrhagic Septicemia:

During the first quarter of 2023, Hemorrhagic Septicemia (HS) cases were not reported from any province of the country. But it was reported one HS outbreak during the February month of 2022 with 37 cases and one death from North Central province.

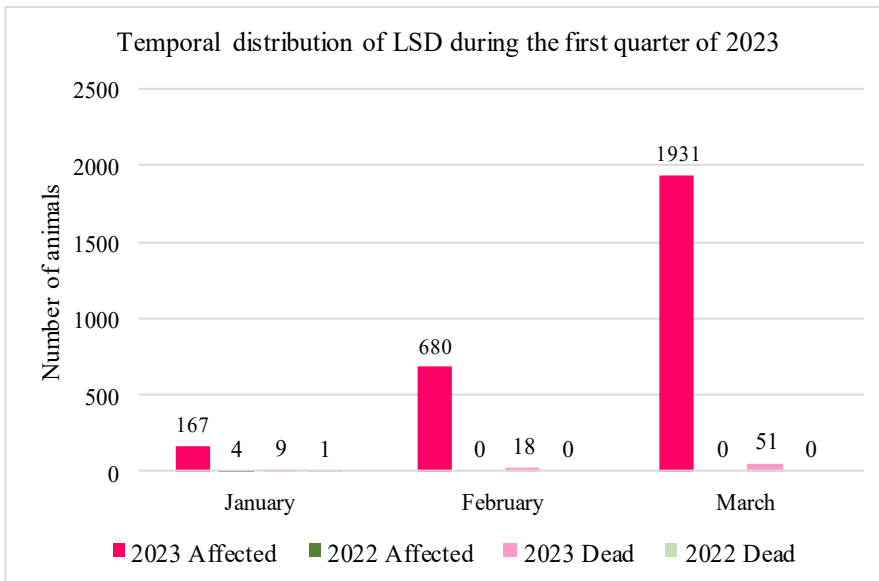
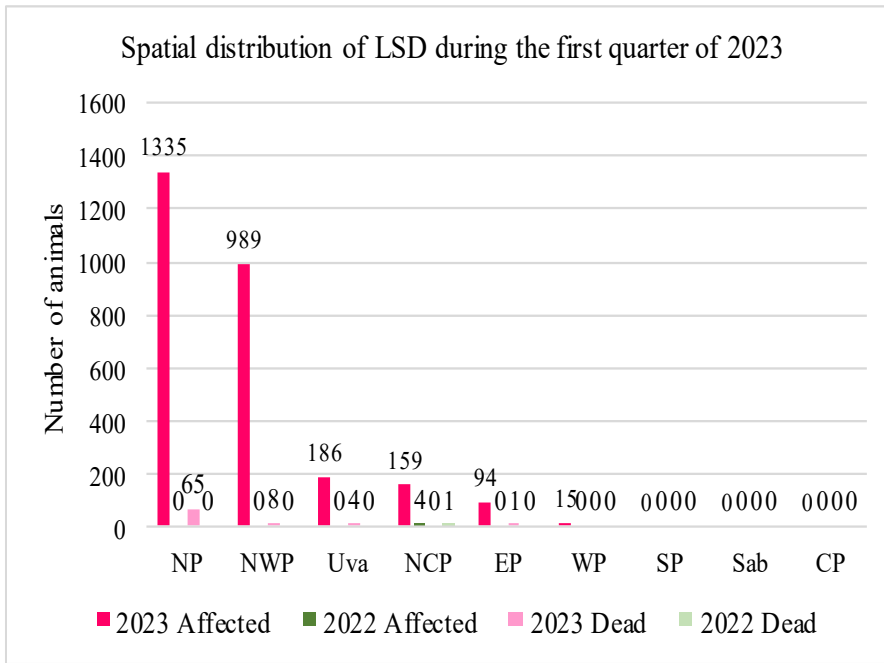
Hemorrhagic Septicemia also a well controlled disease in Sri Lanka through vaccination program. Two types of HS vaccines are used with the aim of control and prevention of the disease. During the considering period, totally 9055 number of oil HS vaccines were used for prevent the disease prior to a disease outbreak to encourage the gradual development immunity against the disease.



Majority of the vaccines (56.9%) were distributed to the North Central province of the country.

HS alum adjuvant vaccine is used to control the disease outbreaks through sudden immunity boost in susceptible animals. Totally 8557 alum adjuvant vaccines were also used in Eastern and North Central provinces, in order to arrest a disease outbreak occurred in Eastern province which was suspected as HS.

2.1.5 Lumpy Skin Disease:



Lumpy Skin Disease (LSD) is a recently introduced viral disease to the country. The initial outbreak was reported in 2019 from Northern province. Despite the effort to control the disease, it was gradually spread towards Southern parts of the country due to the presence of the vector species.

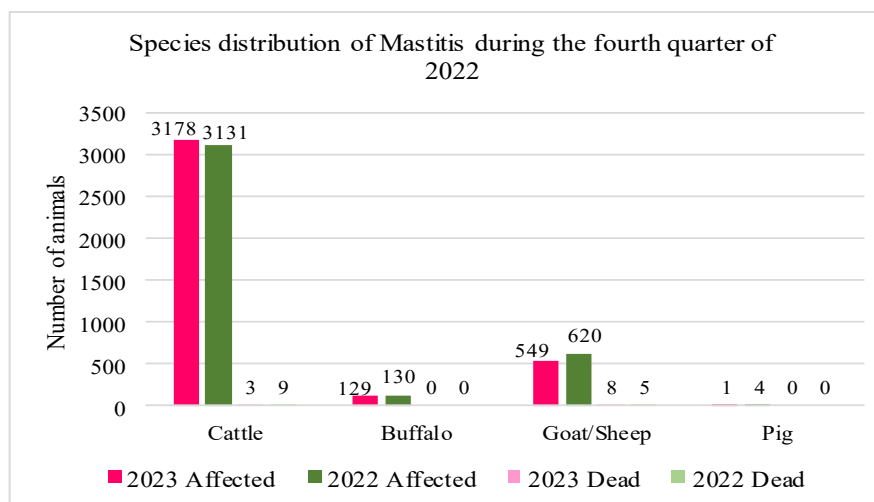
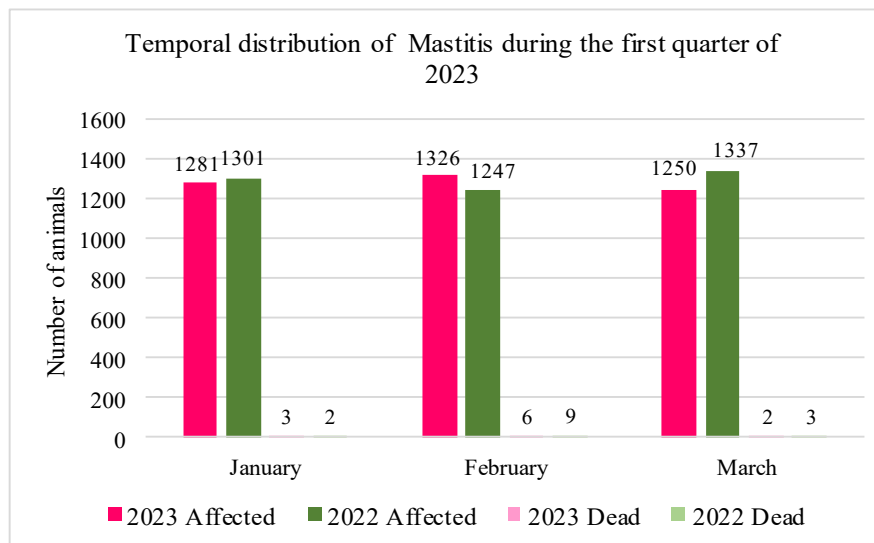
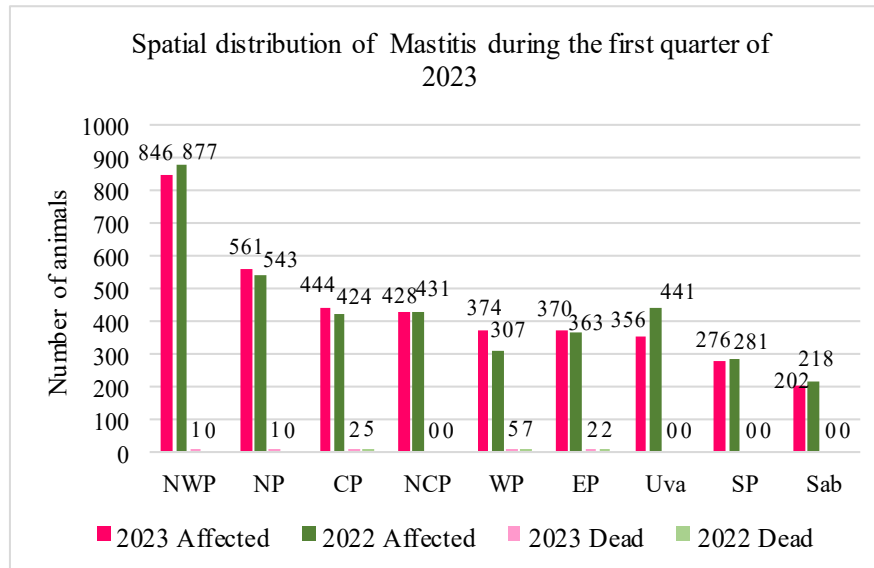
During the first quarter of 2023, totally 2778 LSD cases with 78 deaths were reported from six provinces of the country. Highest number of cases were reported from Northern province as 1335 cases with 65 deaths, which represent the 48% of total disease incidence. Second highest disease incidence was reported from North Western province as 989 cases with 8 deaths. When comparing to the spatial distribution of previous year first quarter, disease incidence has been increased significantly, as it was only 4 cases from North Central province in last year.

Temporal distribution of the LSD during the considering quarter shows exponential growth of the disease incidence with the time. According to that, highest number of cases were reported in March, as 1931 cases with 51 deaths due to the extensive spreading of the disease in Northern and North Western provinces of the country. Death rate has been decreased throughout the period and it was highest in Northern province as 4.8%.

As per the spatial and temporal distribution patterns of the disease during the first quarter of Sri Lanka, the disease transmission has become more efficient and extensive in 2023, which suggests the increase of vector population as the reason for this.

LSD control program is conducted by Department of Animal Production and Health in order to minimize the disease spreading from infected areas to non infected areas. Under this, farmer awareness programs are organized in provincial and regional levels, targeting the disease prevention through vector control and strict biosecurity practices in farm level. Vaccination program has not been initiated still in Sri Lanka as a preventive measure.

2.1.6 Mastitis:



As the graph indicated, Mastitis is a common disease in Sri Lanka, which usually reports from all the provinces of the country throughout the year.

As per the graph indicated, spatial distribution of the disease during the first quarter of both years shows more similar distribution patterns. Totally 3857 cases with 11 deaths were reported during the first quarter of this year. This is 0.72% decrease in disease incidence. As same as 2022, highest disease incidence was reported from North western province as 21.93% from total number of cases reported during the first quarter. Lowest number of cases were reported from Sabaragamuwa province in both quarters of 2022 and 2023.

Temporal distribution shows different distribution patterns in considering quarter of 2022 and 2023 due to slight differences in disease incidence. Average disease incidence during the 2022 and 2023 are close to each other as 1285.66 and 1295 respectively.

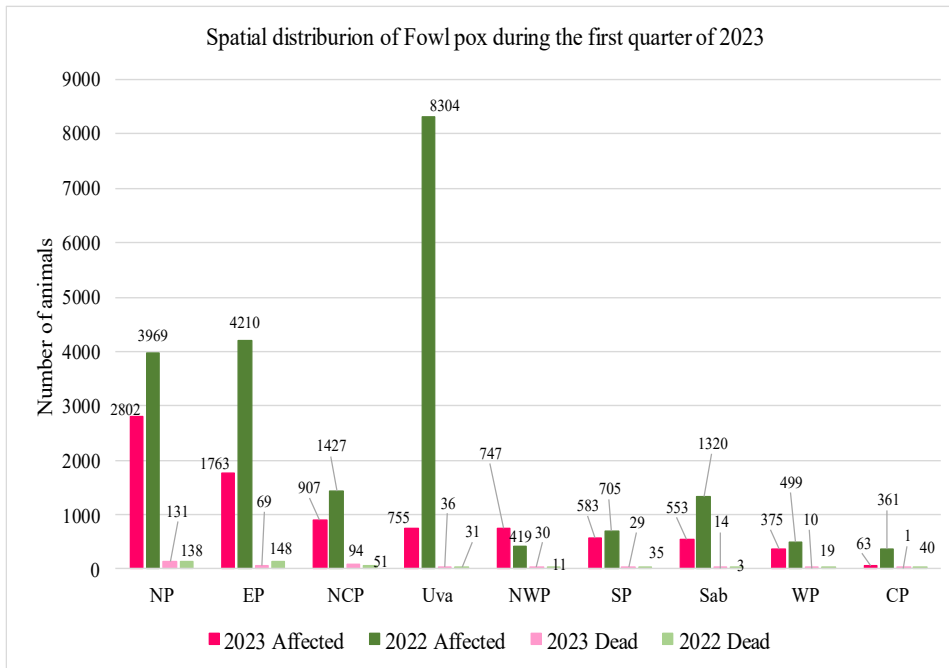
Species distribution graph clearly indicate the higher disease occurrence in cattle than other species, it is 82.39%.

During the first quarter of 2023, under the Mastitis Control Program conducted by Department of Animal production and Health, 2917 mastitis screening tests were done, 223 ABST tests were performed and 1461 Lactating cow udder infusions and 425 Dry cow udder infusions were distributed to Mastitis infected farms through Veterinary Investigation Offices. Further 676 liters of teat dip solution also issued to dairy farms to use as preventive measure for Mastitis.

Mastitis Control Program	
Amount of CMT reagent (Liter) issued	65L
Performed Mastitis screening (CMT) Tests	2917
Tested milk samples for ABST	223
Amount of teat dip solution issued (Liter)	676
Amount of Udder infusion vials freely issued	
Lactating Cow	1461
Dry Cow	425

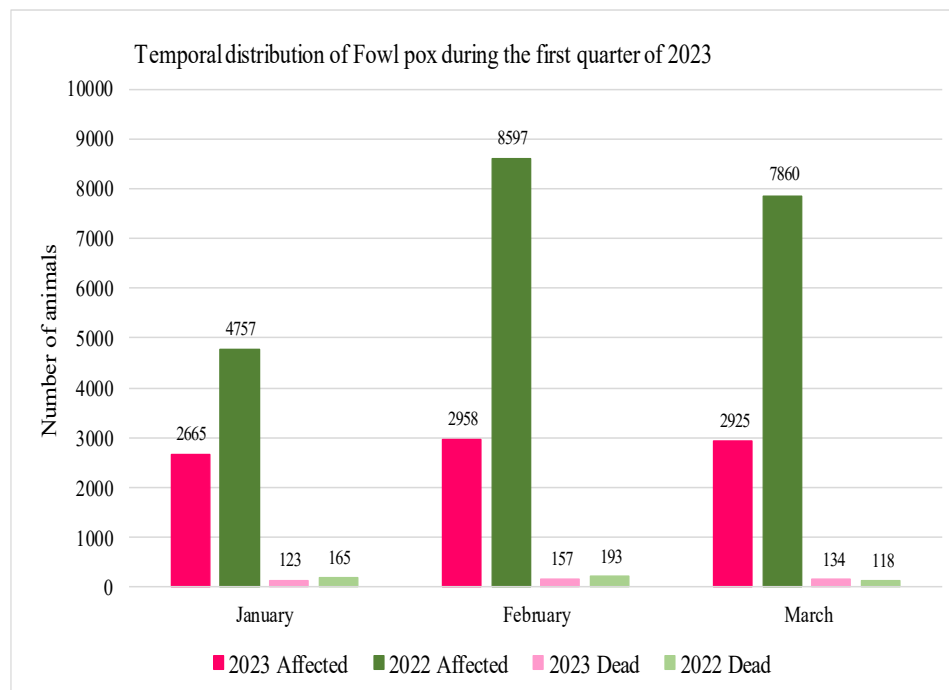
2.2 Poultry Diseases

2.2.1 Fowl pox:



Fowl pox is a vaccine preventable disease which affects the poultry in all ages. It is a slowly spreading viral infection which has high morbidity but low mortality. The disease results in nodular lesions on unfeathered skin area of the birds is common in cutaneous form. But it can affect to the gastrointestinal and respiratory tracts when infected by more virulent strains.

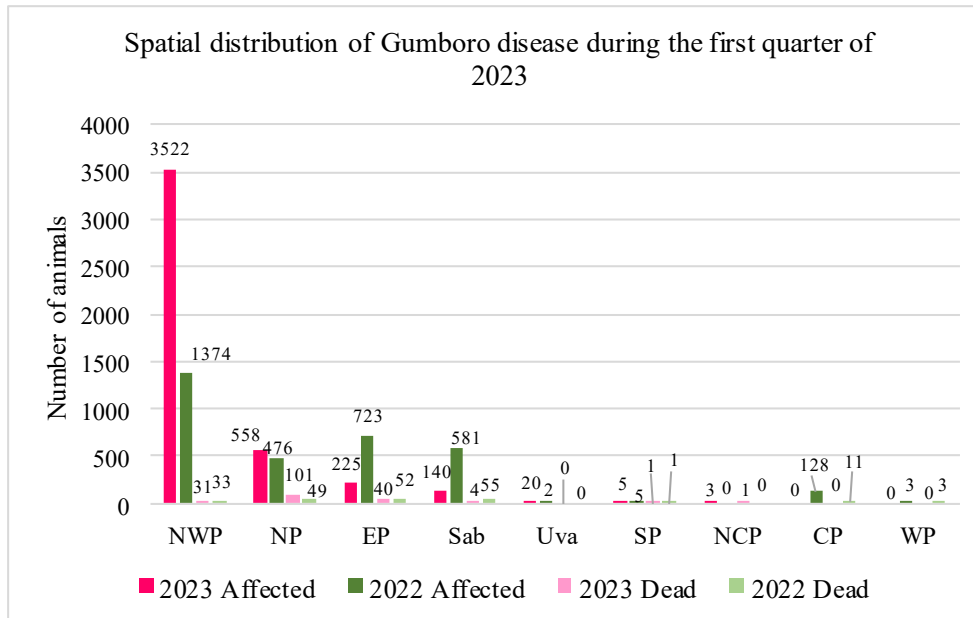
The disease is usually reports in every province of Sri Lanka throughout the year. During the first quarter of 2023, totally 8548 cases were reported from whole country with 414 deaths. The disease incidence has been reduced by 59.7% during current quarter when comparing to the same quarter of previous year. Highest disease incidence was reported from Northern province as 2802 cases with 131 deaths. This incidence is 32.77% from the total incidence during the period.



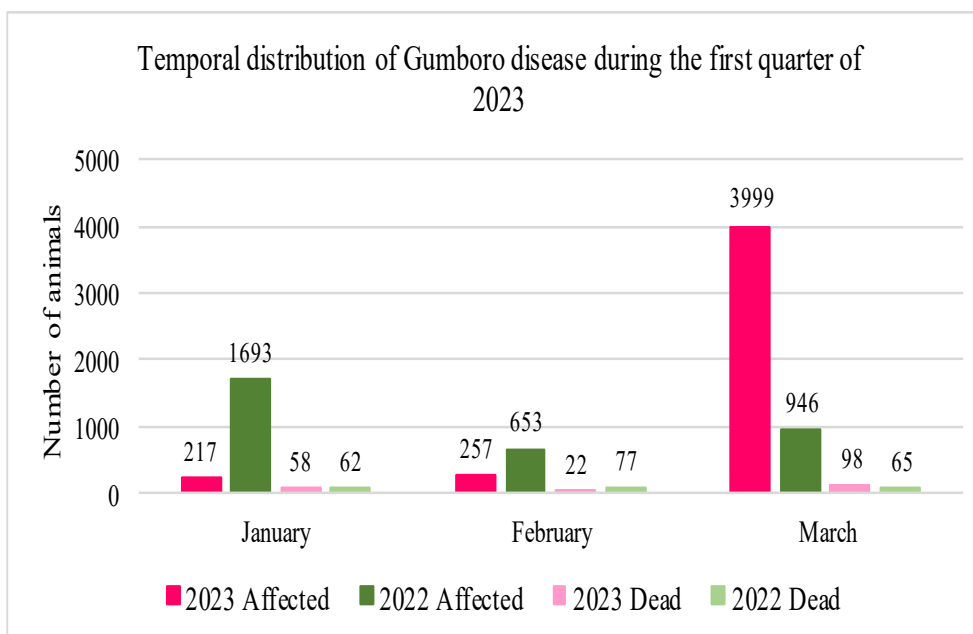
Most significant difference in reported number of cases can be seen in Uva province. The disease incidence has been reduced by 90.9% in Uva province when comparing both quarters. Though all nine provinces have reported the disease, the disease occurrence is low in wet zone provinces than the dry zone provinces of the country.

Temporal distribution of the Fowl pox disease during the first quarter of 2023 shows more similar distribution pattern to the 2022 first quarter but in significantly different disease incidences. Average number of cases per month during the current quarter is 2849 while it was 7071 during the previous year first quarter, which indicates the 59.7% decrease in average monthly disease incidence in 2023 during the considering quarter. In particular quarter of both years, highest number of cases were reported in February month and lowest number of cases were reported in January month.

2.2.2 Gumboro Disease:



Gumboro disease is also known as Infectious Bursal Disease, which affects the birds in very young ages. As this is a highly contagious and virulent viral infection, morbidity and mortality levels are very high if infection introduced to a young birds flock. Therefore, prophylactic vaccination is practiced in Sri Lankan poultry farms as a general practice.

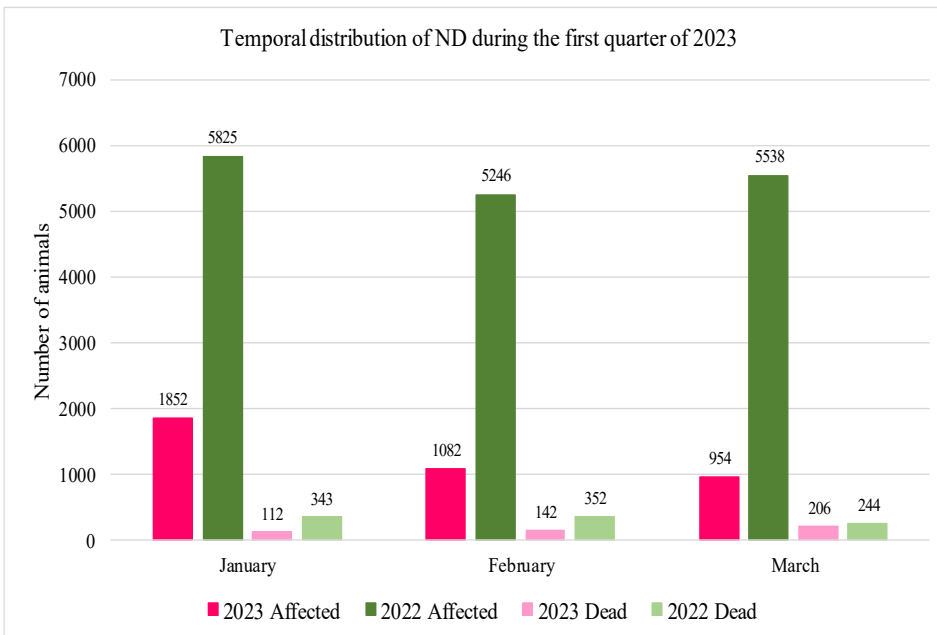
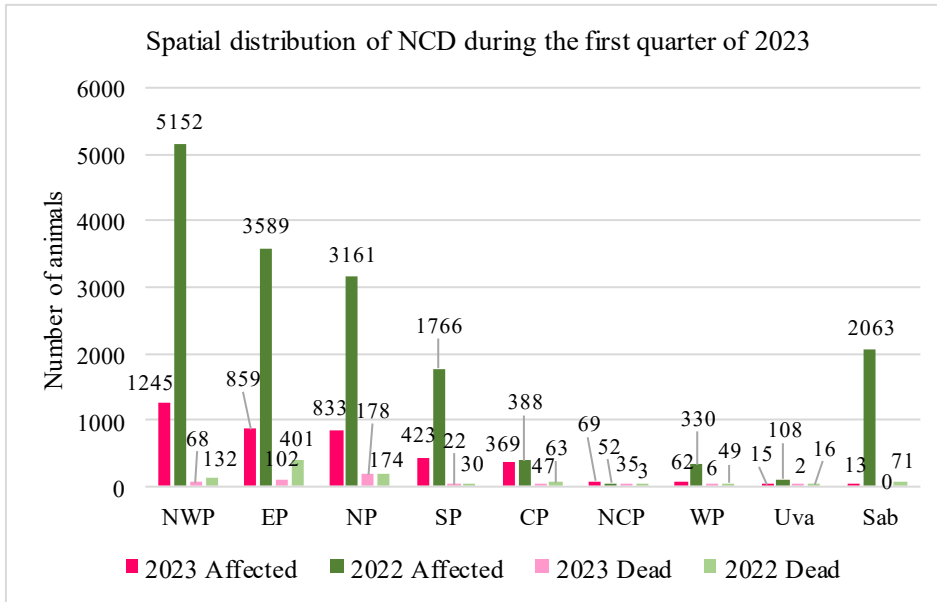


During the first quarter of 2023, total Gumboro incidence in the country is 4473 cases with 178 deaths, and it was reported from seven provinces of the country. Highest number of cases were reported from North Western province where have high poultry population. This is 78.73% from total disease incidence and it is over 65% increase of the provincial

disease incidence when comparing with the previous year first quarter. Lowest number of cases were reported from North Central province as 3 cases with one death. Any Gumboro cases were not reported from Central and Western provinces of the country during the considering quarter period of this year. However, the disease incidence of 2023 first quarter has been increased by 35.87% than 2022 first quarter due to the huge disease outbreaks happened in Panduwasnuwara veterinary range of North Central province during March month.

Temporal distribution of Gumboro during the first quarter of both years show significantly different distribution patterns from each other. According to that disease incidence has been gradually increased during the 2023 first quarter and highest number of cases were reported in March as 89.43% from the total number of cases. Lowest disease incidence was reported in January month of 2023, though it has reported significantly high death: diseased ratio as 0.267 which is over four times higher than rest of the months of the quarter.

2.2.3 Newcastle Disease:



Newcastle disease is not a very common disease in Sri Lanka, but usually it reports from most of the provinces in variable incidences.

The Newcastle disease incidence during the first quarter of 2023, is 3888 infected birds and 460 deaths. This is a remarkable decrease in disease incidence, as 76.059% decrease when comparing to the same quarter of 2022. Highest number of cases were reported from North Western province where reported most significant disease incidence difference as 1245 cases in 2023 and 5152 cases in 2022 first quarter. This is a 75.83% decrease of disease incidence. Lowest number of cases were reported from Sabaragamuwa province as 13 cases without any deaths. Disease incidence of this province has

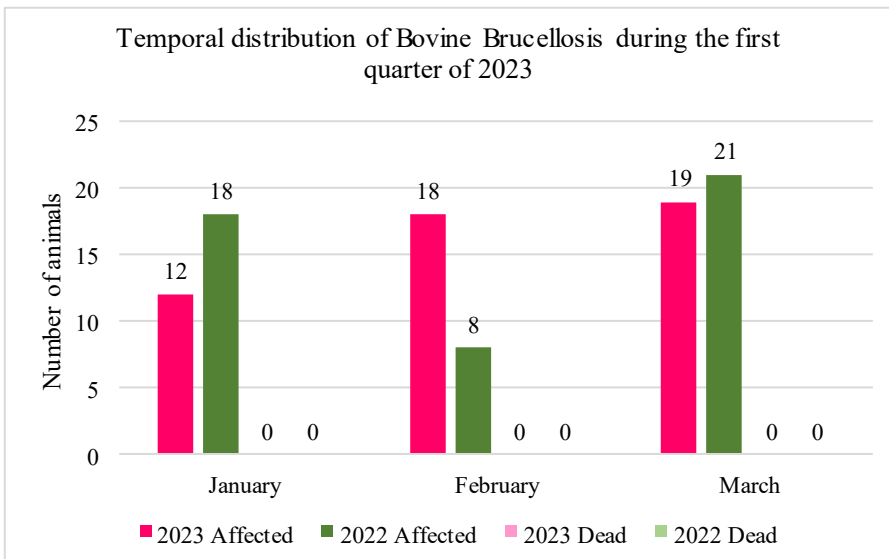
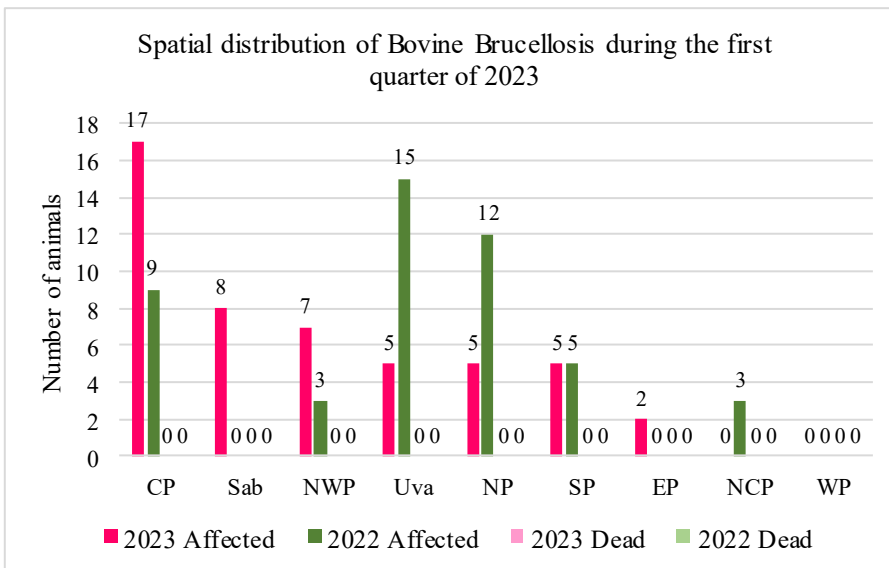
been reduced significantly from 2063 cases to 13 cases of Newcastle disease when comparing to the first quarter of both years.

Temporal distribution of the disease during the considering quarters shows significant differences in disease incidence as well as distribution pattern. During 2023 first quarter, incidence was gradually decrease with the time resulting highest in January (1852 cases and 112 deaths) and lowest in March (954 cases and 206 deaths). As per the graph indicated, the average number of cases per month during the 2023 and 2022 first quarter are 1296 cases and 5536 cases respectively.

In order to control the Newcastle disease in Sri Lanka, free vaccination program has being conducted by Department of Animal production and Health by distributing vaccines through Veterinary Investigation Offices and Veterinary Offices of Sri Lanka. Under this disease control program, totally

3. Status of Zoonotic Diseases - First Quarter (Jan - Mar) - 2023

3.1 Bovine Brucellosis :



Bovine Brucellosis control program	
Number of milk samples screened by VIOs with MRT	1135
No. of animals screened by VIOs in suspected herds with RBPT	234
Number of samples submitted by VIOs to VRI for CFT	74
Number of animals vaccinated with S19 vaccine	504
Total number of samples subjected to RBPT (by VRI)	253
Number of RBPT positive samples	105
Number of CFT positive samples	101

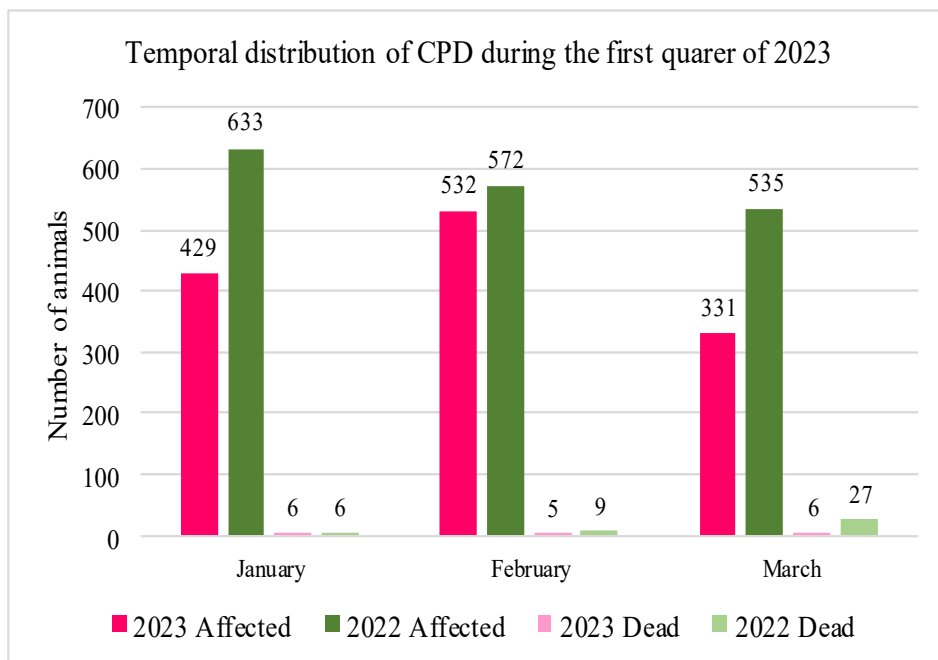
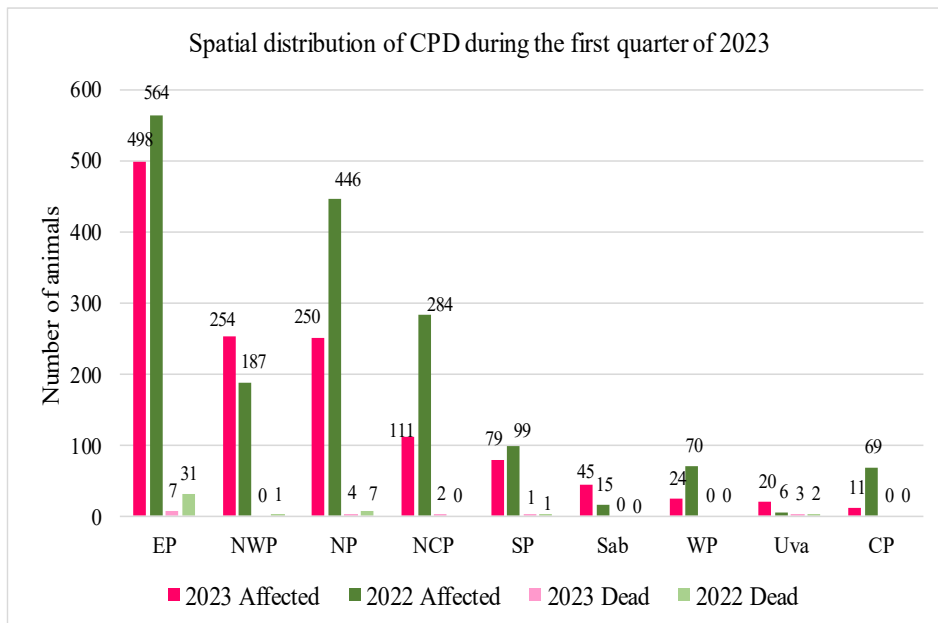
production and Health, totally 1135 milk samples were screened by Veterinary Investigation Officers. Based on their results, 234 suspected milk samples also tested for Brucellosis by RBPT and out of them, 74 positive milk samples were submitted to VRI for CFT for disease confirmation. Totally 253 milk samples were tested (RBPT) in VRI during the period and 105 of them were gave positive results. 101 number of samples of them were gave positive results for CFT confirming the presence of Brucella in the samples. During the first quarter of 2023, 504 cattle were vaccinated against the disease by Veterinary Investigation Officers.

During the first quarter of 2023, totally 49 Brucellosis cases were reported from the seven provinces of the country. The spatial distribution patterns of the considering two periods shows significant difference from each other. Highest number of cases were reported from Central province as 17 cases which represents 36.6% from total disease incidence during the quarter. This is 88% increase of disease incidence in Central province. Sabaragamuwa province also reported 8 new Brucellosis cases during this quarter. Remarkable decrease in disease incidence can be seen in Uva and Northern provinces. Further, no diseased cases were reported from North Central and Western provinces during the first quarter of 2023.

Temporal distribution pattern of 2023 first quarter shows significantly deviated from previous year one. It has been increased over the quarter period in slow rate. According to that, Highest disease incidence was reported in March month as 19 cases without deaths. Most prominent disease incidence difference can be seen in February month as shown in the graph.

Under Brucellosis control program conduct by the Department of animal

3.2 Contagious Pustular Dermatitis:



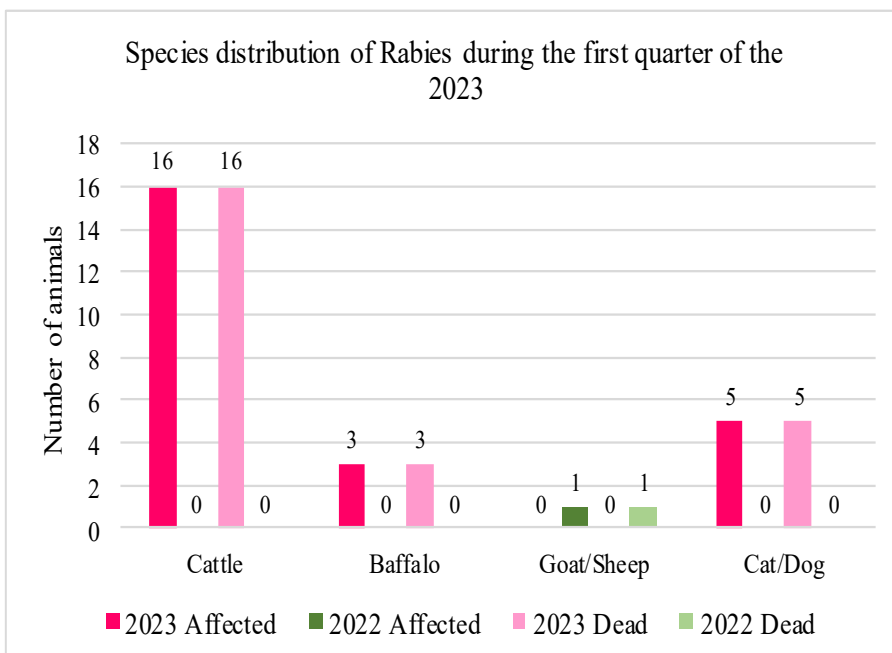
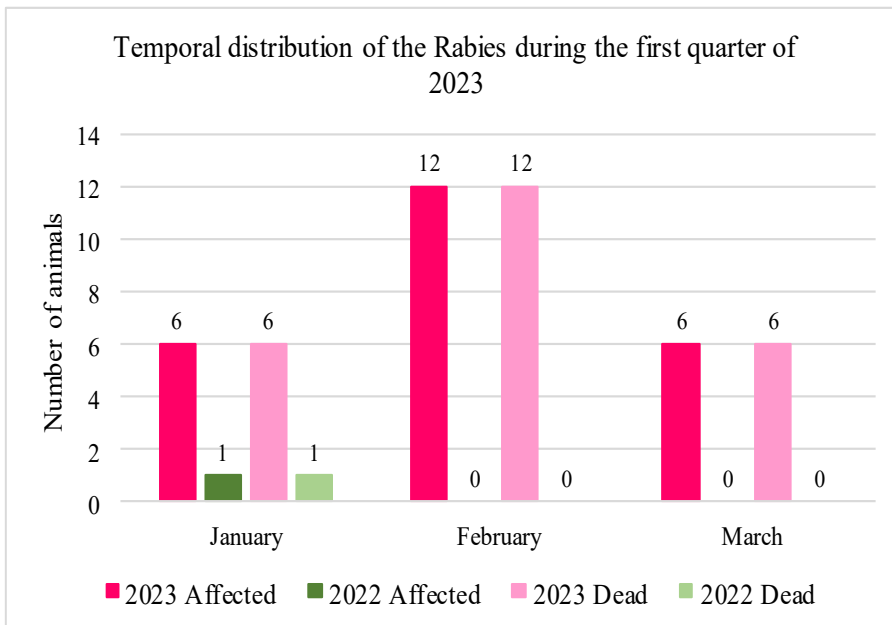
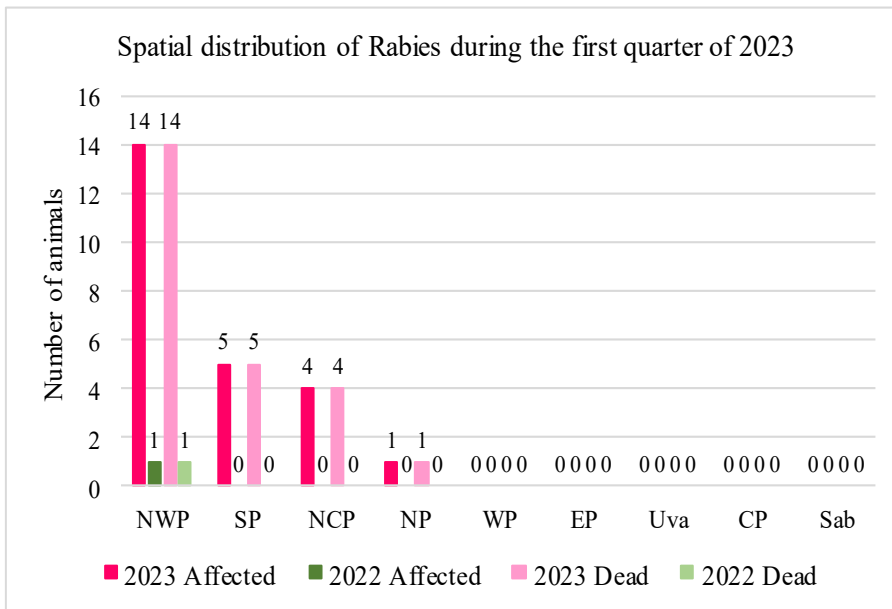
Contagious Pustular Dermatitis is one of the commonest disease in Sri Lanka, which usually reports throughout the year. The disease affects small ruminants and is more common in dry zone provinces than others. Preventive vaccination program for CPD is conducted by Department of animal Production and Health through Veterinary Investigation Offices in each district. Under this control program infected animals in 18 farms were vaccinated against the disease during the first quarter of 2023.

Totally 1292 infected animals and 17 deaths were reported from all nine provinces of the country. When comparing to the same quarter of previous year, this is 25.74% reduction of number of cases. Highest number of cases were reported from Eastern province as 498 cases with 7 deaths.

This is 11.7% decrease of disease incidence in eastern province when comparing to the first quarter of previous year. Most significant differences in disease incidence were reported from North Central and Northern provinces as 60.91% and 43.94% reduction respectively. Disease incidence of Northern, North Central, Southern, Western, Eastern and Central provinces have been decreased than previous year first quarter while it has been increased in North Western, Sabaragamuwa and Uva provinces. Least number of cases were reported from Central province as 11 cases without any deaths.

Temporal distribution patterns of the CPD during the first quarter of 2022 and 2023 shows different distribution patterns from each other. During 2023 highest disease incidence was reported in February month as 532 cases with 5 deaths. But it was highest in January month as 633 cases with 6 deaths in 2022. When considering the both quarters highest death rate was reported in 2022 March month as 27 deaths for 535 infected cases.

3.3 Rabies:



During the first quarter of year 2023, number of rabid cases which were reported are 24 with 100% mortality. This is a significant increase in disease incidence for a quarter period as it was only one case during the same quarter of 2022.

During the considering period of this year, rabies cases were reported from North Western, Southern, North Central and Northern provinces of the country. Spatial distribution graph shows the remarkable increase in rabies infected cases in North Western Province by 13 cases. Further, Southern, North Central and Northern provinces also reported 5, 4 and 1 rabid cases respectively.

Temporal distribution indicates the highest number of cases in February month as 12 cases. January and March months reported equal number of cases as 6 cases per month.

Out of total 24 rabies infected cases, majority 16 of them are cattle. Most possible reason for that is bitten by a rabies infected dogs. 3 buffalo and no Goat/sheep rabid cases were reported during the period. The reported number of rabid dog cases were indicated as 5 cases, but the actual number of cases may be higher than this as the disease reporting of non-livestock species is not well established yet in Sri Lanka.

3.4 Highly Pathogenic Avian Influenza:

3.4.1 National HPAI Surveillance Program:

Se. No	District VIC	Serum samples from commercial poultry		Fresh droppings, cage swabs and cloacal swabs of migratory birds & Backyard poultry	
		No. tested	Results	No. tested	Results
1	Ampara	40	Negative	105	Negative
2	Anuradhapura	45	Negative	465	Negative
3	Badulla	30	Negative	–	–
4	Batticaloa	–	–	60	Negative
5	Chilaw	15	Negative	807	Negative
6	Colombo	10	Negative	408	Negative
7	Galle	210	Negative	78	Negative
8	Gampaha	190	Negative	375	Negative
9	Hambanthota	–	–	40	Negative
10	Jaffna	30	Negative	1740	Negative
11	Kandy	46	Negative	50	Negative
12	Kalutara	–	–	79	Negative
13	Kegalle	80	Negative	145	Negative
14	Kilinochchi	–	–	350	Negative
15	Kurunegala	180	Negative	–	–
16	Mathale	36	Negative	359	Negative
17	Moneragala	15	Negative	60	Negative
18	Mullathivu	14	Negative	325	Negative
19	Polonnaruwa	15	Negative	45	Negative
20	Trincomalee	45	Negative	180	Negative
21	Vavuniya	–	–	645	Negative
22	AQ Katunayala	407	Negative	1128	Negative
23	AQ Maththla	–	–	50	Negative
24	AQ Colombo	–	–	25	Negative
	Total	1408		7519	

Highly Pathogenic Avian Influenza (HPAI) is an exotic disease to Sri Lanka.

Under National HPAI Surveillance Program, different types of samples were collected representing all the districts of the country to monitor the HPAI situation and identify the disease as early as possible if it has been introduced. Under this program, 1113 serum samples were collected from commercial poultry and ducks. Totally, 3295 cloacal swabs were collected from Backyard poultry, Live Bird Markets, Pet Birds Establishments and Duck farms. 3105 Fresh droppings samples were collected from the Hotspots of migratory birds and different types of 405 samples were also collected from Poultry Processing Establishments. According to that, totally 7918 samples were collected from various possible risk spots and dispatched to the reference laboratory during the first quarter of 2023.

The all samples HPAI were checked in virology laboratory of VRI for the detection of Avian Influenza virus. During the considering period of the current year, 1408 of serum samples and 7519 number of other samples (fresh droppings, cage swabs and cloacal swabs) were checked in the laboratory and all of them were gave negative results for heam-agglutnation tests.

As per the laboratory confirmed data, Sri Lanka is able to maintain the Highly Pathogenic Avian Influenza disease free status further.

1. No. of serum samples collected	961
2. No. of dropping samples collected from Hotspots	3105
3. No. of cloacal swabs (Backyard) collected	2685
4. No. of sample collected from live bird market	357
6. No. of samples (Poultry Processing Establishment)	405
7. No. of Duck serum samples collected	152
8. No. of Duck cloacal swabs collected	253

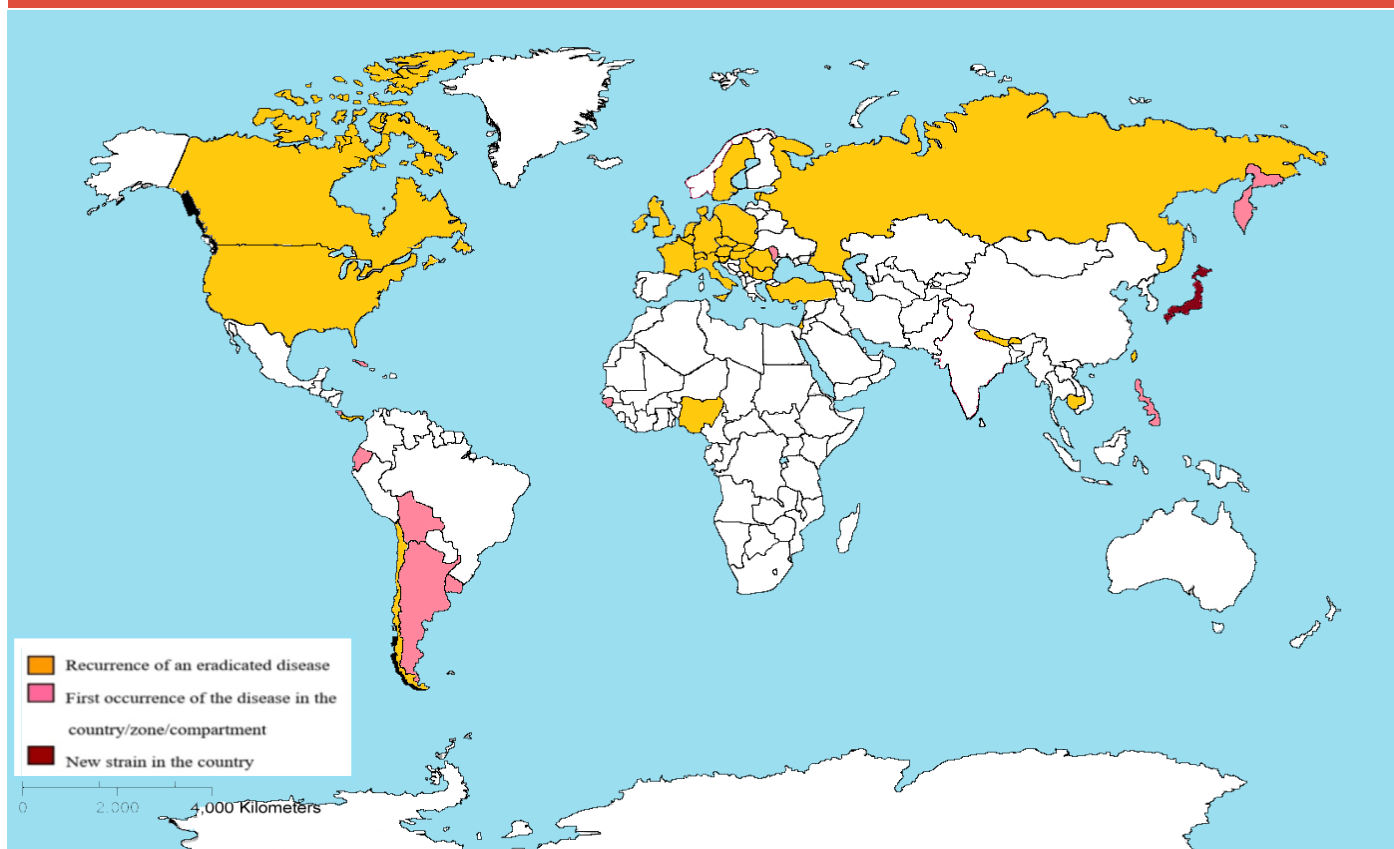
3.4.2 Global Distribution of Notifiable Avian Influenza:

As reported by the World Organization for Animal Health in the Avian Influenza situation reports, several initial occurrences of HPAI have been reported during the first quarter of 2023. Ten countries/regions reported initial occurrences through immediate notifications. They are Soroca of Moldova, Capiz of Philippines, Kamchatka of Russia, Costa Rica, Bolivia, Cuba, Ecuador, Argentina, Uruguay and Dakar of Senegal.

Recurrences of eradicated diseases was reported from Germany, Austria, Moldova, United States of America, Israel, Belgium, Czech Republic, Denmark, France, Hungary, Netherland, Poland, United Kingdom, Russia, Slovakia, Serbia, Ireland, Italy, Romania, Sweden, Switzerland, Slovenia, Turkey, Canada, Nepal, Chinese Taipei, Bulgaria, Chile, Luxembourg, Estonia, Cambodia, Nigeria, Bhutan, Panama. Disease outbreak due to a new strain (H5N2) was reported from Japan during the first quarter of 2023.

During the first quarter of 2023, HPAI outbreaks were reported in both Poultry and Non-poultry sectors throughout the world; 177 outbreaks were reported in poultry sector from 52 countries and 521 outbreaks were reported in non-poultry sector from 77 countries. Predominant subtype of the HPAI in the world during the considering quarter is H5N1.

3.4.3 Global Situation of Notifiable Avian Influenza outbreaks:



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