



# Veterinary Epidemiological Bulletin Sri Lanka



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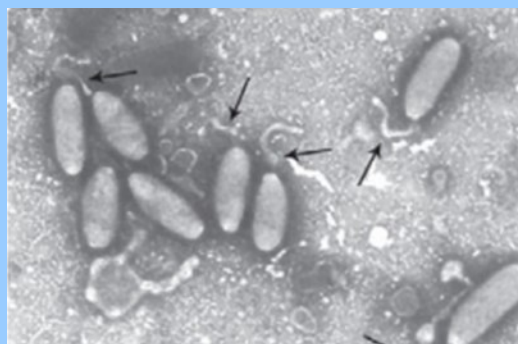
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## White Spot Disease

### Aetiology

Aetiology of the White Spot Disease is White Spot Syndrome Virus (WSSV), which known as the only member of the genus *Whispovirus* within the *Nimaviridae* family. This is a DNA virus with ellipsoid to bacilliform in shape, have regular symmetry and measure 120-150nm in diameter and 270-290nm in length. Most notable feature of the virus is the thread or flagella like extension (appendage) at one end of the virion.



*Electron micrograph showing WSSV virion with the tail like appendage*

The virus is viable for at least 30 days at 30 °C in sea water and is viable in ponds for at least 3-4 days. The agent can be inactivated <120 minutes at 50 °C and <1 minute at 60 °C. Replication cycle of the virus is approximately 20 hours at 25 °C.

### Epidemiology

WSSV has an extremely wide host range. The virus can infect a wide range of aquatic crustaceans including marine, brackish and freshwater penaeids, crabs and crayfish. All life stages from eggs to brood stock are potentially susceptible.

Vectors of the disease are rotifers, marine molluscs, polychaete worms and non-decapodal crustaceans and copepods, as well as non-crustacean aquatic arthropods such as sea slaters and Euphydradae insect larvae. All these species can accumulate high concentrations of viable WSSV, although there is no evidence of virus replication. Wild aquatic animal carriers have not been reported.

The infection can be transmitted vertically (trans-ovum), horizontally by consumption of infected tissues (by cannibalism, predation) and by water-borne routes. Dead or moribund animals can be a source of disease transmission.

Prevalence of the disease is highly variable, from <1% in infected wild populations to up to 100% in captive populations. All penaeid shrimp species are highly susceptible to disease, oftenly resulting high mortality. Crabs, crayfish, fresh water prawns, spiny lobsters and clawed lobsters are susceptible to disease, but morbidity and mortality as a consequence of infection is highly variable. Rapid mortalities have been reported in many countries upto 80% or more within 3 to 10 days.

Disease outbreaks may be induced by stress factors, such as eye stalk ablation, spawning, moulting and rapid changes in salinity, temperature and pH.

WSD has been identified from crustaceans in China, Japan, Korea, South East Asia, India, the Mediterranean, the Middle East and Americas. WSD free zones and compartments are known within these regions.

### **Pathogenicity**

WSSV infection sometimes cause the clinical disease, but sometimes not. Animals susceptible to disease show large number of viruses circulating in the heamolymph. Thus high viral loads in animal do not cause disease or mortality for all susceptible species.

The major targets of WSSV infection are tissues of ectodermal and mesodermal embryonic origin, especially the cuticular epithelium and subcuticular connective tissues. Although WSSV infects the underlying connective tissue to the hepatopancreas and midgut in the shrimp, the hepatopancreatic tubular epithelial cells of these two organs are of endothelial origin, so they do not become infected.

Persistent infection occurs commonly result in lifelong infections. Viral loads during persistent infection can be extremely low and potentially undetectable.

### **Diagnostic methods**

There is a higher probability of detecting the virus in crabs than in shrimp. The best life stages of crustaceans for detection WSSV are late PL stages, juveniles and adults. Probability of detection can be increased by exposure to stressful conditions.

## **1. Field diagnostic methods**

### **Clinical signs**

White spots embedded within the exoskeleton are the most commonly observed clinical sign. In most shrimp, these spots range from barely visible to 3mm diameter, and they sometimes coalesce into larger plates. The environmental stress factors such as high alkalinity or bacterial diseases can also cause white spots on carapace of shrimp, and that moribund shrimp may have few white spots. Therefore, the appearance of white spots is absolutely not a good diagnostic sign of WSSV infection. Certain crustaceans such as crayfish are show no or less signs of white spots when infected with WSSV.



*white spots on  
carapace of  
shrimp*



### **Behavioral changes**

Under non-stressful conditions, infected shrimp that have white spots may survive. If the shrimp appear lethargic, colour changes into pink or reddish-brown, gather around the edges of ponds/tanks at the water surface, rapid reduction of food consumption and high mortality rate in shrimp population can be expected within few hours to few days of the onset of these signs.

## **2. Clinical diagnostic methods**

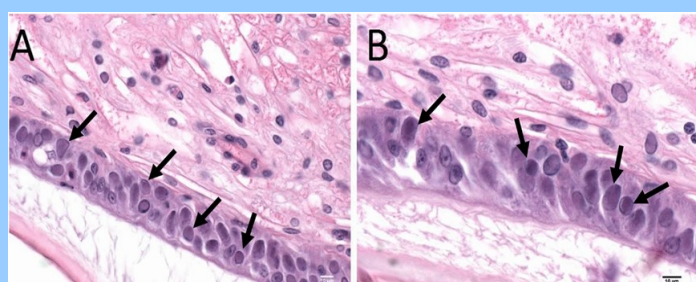
### **Clinical chemistry**

Haemolymph withdrawn from WSSV-infected shrimp always has a delayed clotting reaction or sometimes completely absent.

### **Microscopic pathology**

In *Wet mount*, hypertrophied nuclei in squash preparations of the gills and/or cuticular epithelium, which may be stained or unstained.

In *smears* WSSV aggregates in unstained smear preparations of heamolymph can be used to demonstrate the presence of WSSV using dark-field microscope. The aggregates appear as small reflective spots of 0.5 µm in diameter. Pathognomonic inclusion bodies in target tissues are detectable in *fixed sections* of histological preparations. By *in situ hybridization* method, WSSV-specific DNA probes with histological sections are used to demonstrate the presence of WSSV nuclei in infected cells. In *Immunohistochemistry* also WSSV-specific antibodies with histological sections or wet mounts are used to demonstrate the presence of WSSV antigen in infected cells. *Electron microscopical* demonstrations also possible in the tissue sections or semi-purified negatively stained virus preparations.



*Intranuclear basophilic inclusion bodies of white spot syndrome virus in the cuticular epithelia of P. vannamei. (A) Cross sections of the cuticular epithelia displaying numerous WSSV inclusion bodies indicated by the black arrows (×40 magnification). In (B) the WSSV inclusion bodies are shown at a higher magnification (×60 magnification).*

### 3. Agent detection and identification methods

There are five main methods for agent detection and identification in WSS.

#### Bioassay method

Use pleopods from a shrimp suspected of WSSV infection and prepare standard inoculum to inoculate the indicator shrimp (by injecting between the tergal plates into the muscle of the third abdominal segment of the indicator shrimp). After 3-5 days of inoculation, if still there are no moribund shrimp and all tests are negative, it is safe to conclude that the bioassay results are negative.

#### Cell culture/ artificial media

WSSV can be isolated from primary cultures of lymphoid or ovary cells. Due to the high risk of contamination and unavailability of standard recognized medium, primary cell culture is so difficult to initiate and maintain for virus isolation purposes.

#### Antibody-based antigen detection method

Both polyclonal and monoclonal antibodies raised against the virus/recombinant viral structural proteins have been used in various immunological assays including western blot analysis, immunodot assay, indirect fluorescent assay, immunohistochemistry or ELISA to detect WSSV. Antibody-based methods can be recommended only to confirm acute WSD.

#### Molecular techniques

Polymerase Chain Reaction (PCR) is recommended for all situations where WSSV diagnosis is required. There is a standard protocol for identification of WSSV by PCR. Serious infections as well as latent or carrier-states of infection can be identified by different steps of the procedure.

Agent purification: The virus can be purified on ice. Virus can collect from moribund crayfish or shrimp at 3 days to 1 week post-infection. Milk-like pure virus suspension has to be stored at 4°C until use.

### Control and Prevention

Vaccination of shrimp and crayfish may cause better survival rates after WSSV infection. However, this protection is effective only when the shrimps are infected with low doses of WSSV and the effect usually lasts only for few days, or in the case of crayfish for about 20 days. No consistently effective vaccination method has been developed.

To avoid the trans-ovarian transmission, disinfection of eggs is likely to be effective, but has not yet been confirmed formally. General husbandry practices like avoiding stocking in the cold season, use of specific pathogen free or PCR negative seed stocks and use of bio secure water and culture systems can be used to successfully manage the WSD.

**Compiled by: Dr. D. R. K. Perera.**

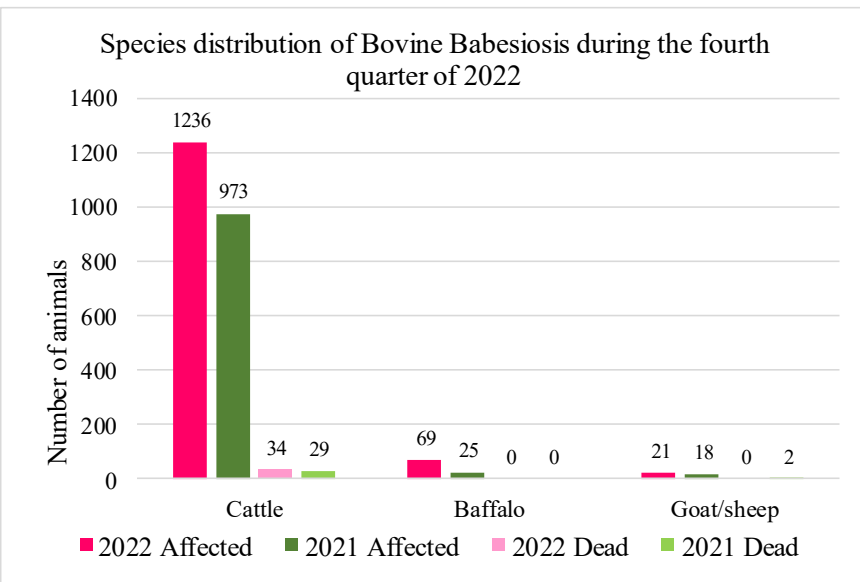
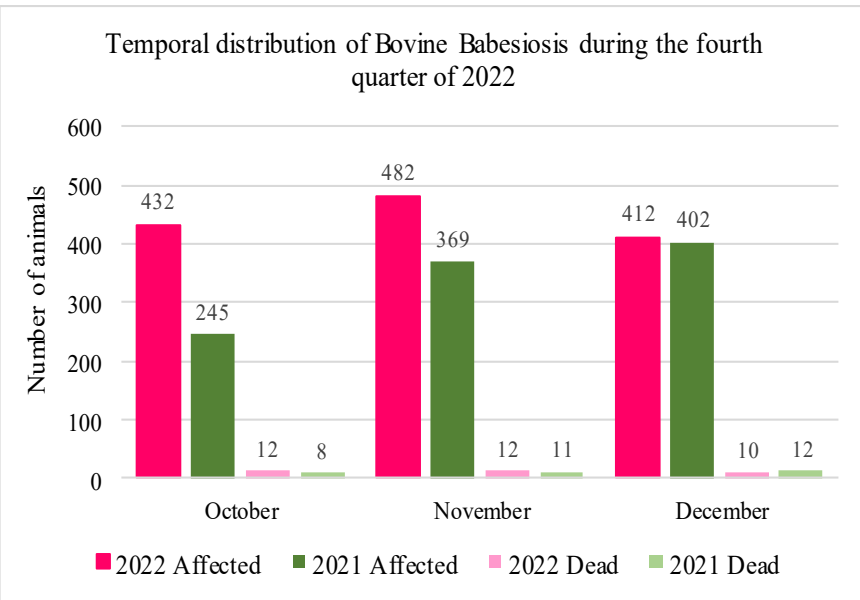
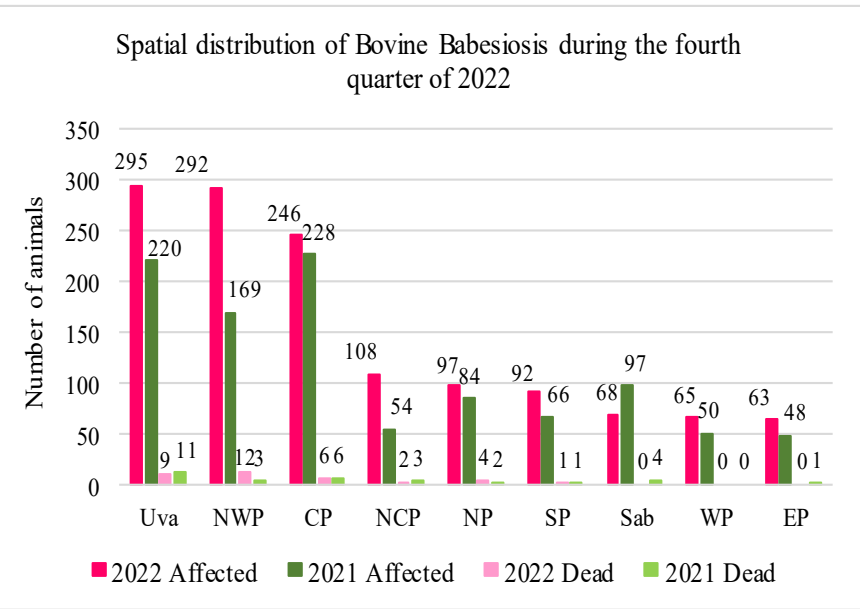
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## 2. Status of Livestock Diseases - Fourth Quarter (Oct - Dec) - 2022

### 2.1 Bovine Diseases

#### 2.1.1 Babesiosis :



Babesia is an intracellular protozoa which can infect to many animal species by different Babesiosis species. Two bovine infectious Babesia species are present in Sri Lanka; *Babesia bovis* and *Babesia bigemina*. Babesiosis is a tick born disease. The island spread tropical climate of the country facilitates the survival of host tick species which cause widespread disease distribution all over the country throughout the year..

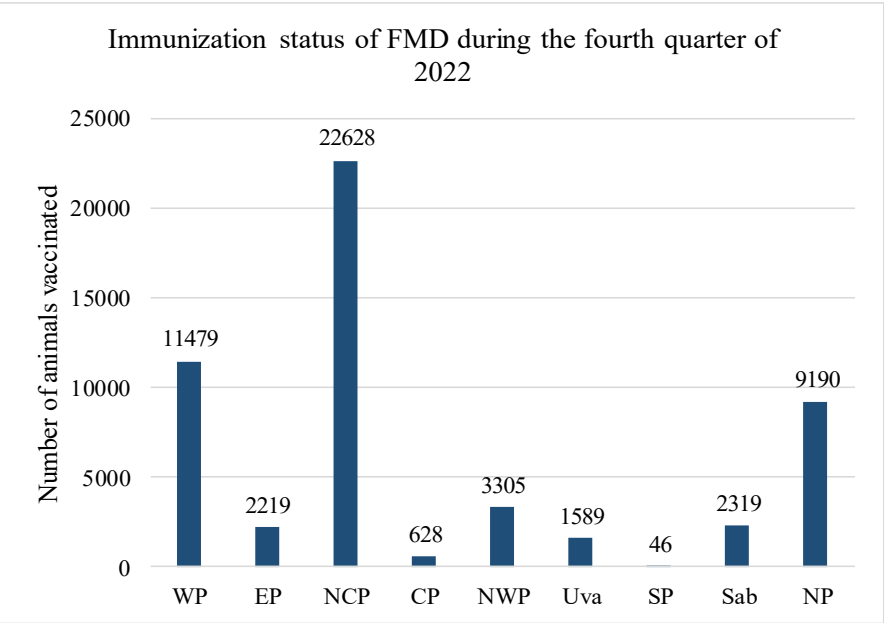
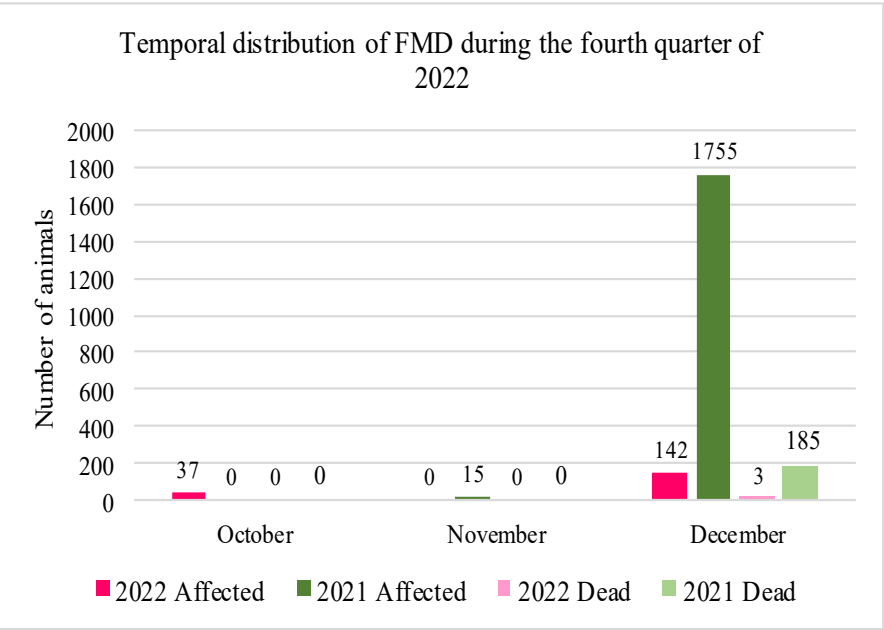
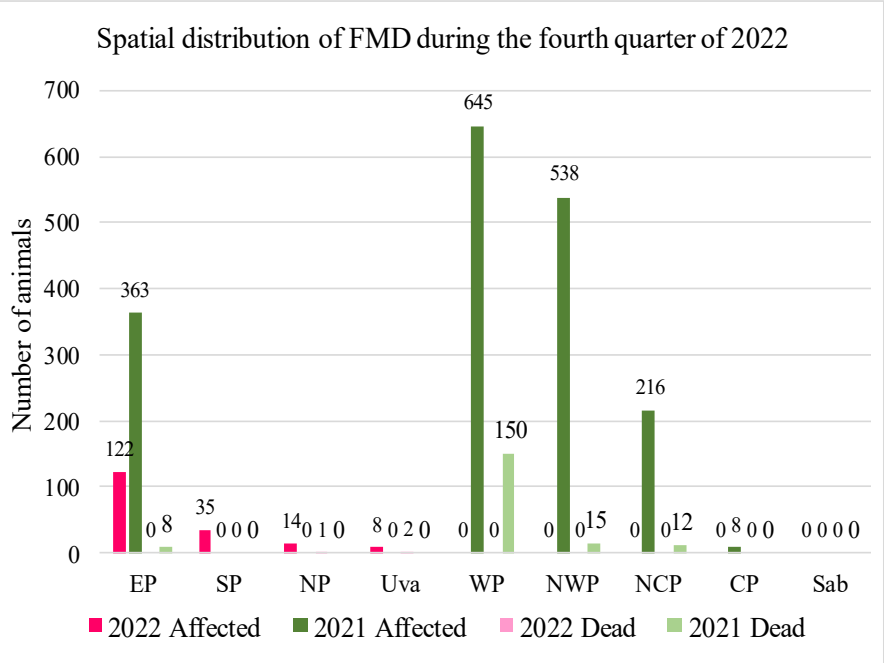
Spatial distribution of Bovine Babesiosis indicates the presence of disease in all nine provinces and high disease incidences in the provinces where have higher livestock population. Higher disease incidence were reported from Uva and North Western provinces province as 295 and 292 cases respectively. Total number of bovine babesiosis cases reported during the fourth quarter of 2022 is 1326 with 34 deaths. This is a significant increase by 30.5% , when comparing to the same quarter of previous year.

Temporal distribution shows the considerable increase in reported babesiosis cases during October and November months than previous year. But death:diseased ratio has been reduced in 2022 (0.025) than same months of 2021 (0.03).

Disease incidence of cattle is several times higher than the incidence of other species. Disease incidences of all three species have been increased during the fourth quarter of 2022. When comparing to the same quarter of 2022, high cattle population in more susceptible areas can consider as the reason for this.



### 2.1.2 Foot and Mouth Disease:



Foot and Mouth Disease is a contagious viral infection which can affect to all cloven hooved animals. Serotype O of the FMD virus is the only serotype present in Sri Lanka and it is successfully controlled by monovalent vaccine which produced in Sri Lanka. During the fourth quarter of 2022, totally 53403 animals were vaccinated all over the country and highest number of animals were vaccinated in North Central, Western and Northern provinces where have high population disease susceptible animals.

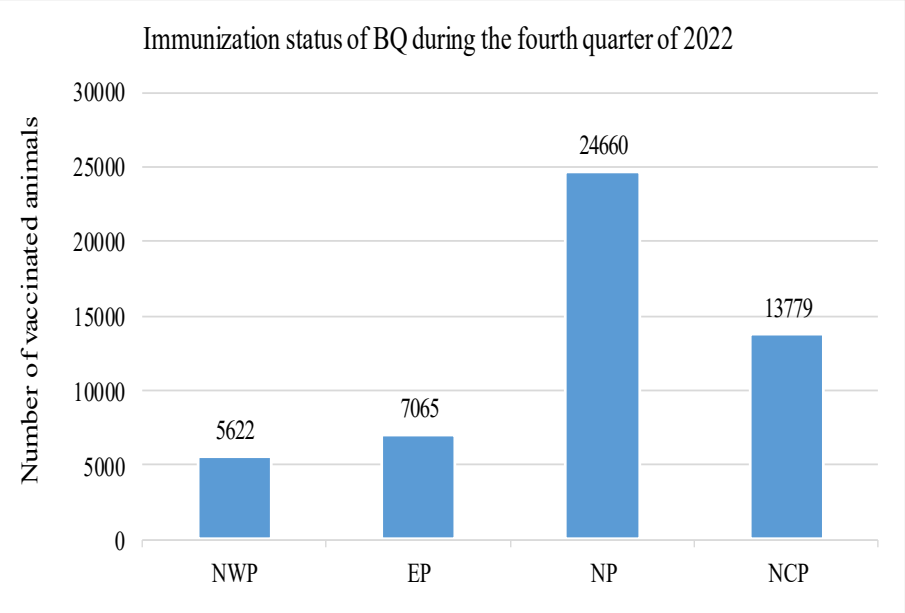
During the fourth quarter of 2022, totally 179 animals were infected. Out of them highest incidence, 122 (68.15%) was reported from Eastern province. The disease was reported from other three provinces (Southern, Northern and Uva provinces) as well, but in low incidences as sporadic cases. However, huge reduction in disease incidence can be seen in current quarter than previous year, as it was 1770 cases with 185 deaths. This is 89.88% decrease in disease incidence. Reason for this significant difference in disease incidences is huge FMD outbreak in Western and North Western provinces occurred during the December of 2021.

During the fourth quarter of 2022, disease was reported during October in Southern and Northern provinces and during December in Northern Eastern and Uva provinces. Those were considered as sporadic outbreaks with mild spreading to adjacent farms.

2.1.3 Black Quarter:

As per the reported disease data, there were no Black Quarter disease outbreaks occurred during the fourth quarter of 2022.

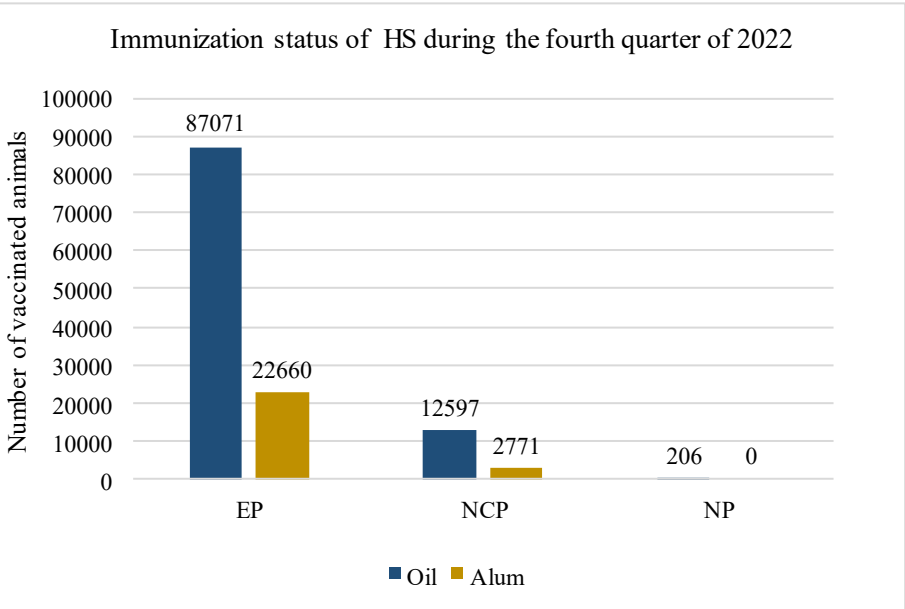
Due to successful disease prevention through vaccination program conducted by Department of animal Production and Health, disease was not occurred in current quarter, but only one outbreak was reported in same quarter of previous year from North Western province in October month.



Under BQ Control Program, 51126 animals were vaccinated in four provinces of the country. Majority of them were in Northern province as 24660 cattle, which is 48.23% from total vaccinated population during the quarter. Rest of the vaccines were used to immunize the animals in North Central, North Western and Eastern provinces where have risk to disease outbreaks happen according to the past disease epidemiological data.

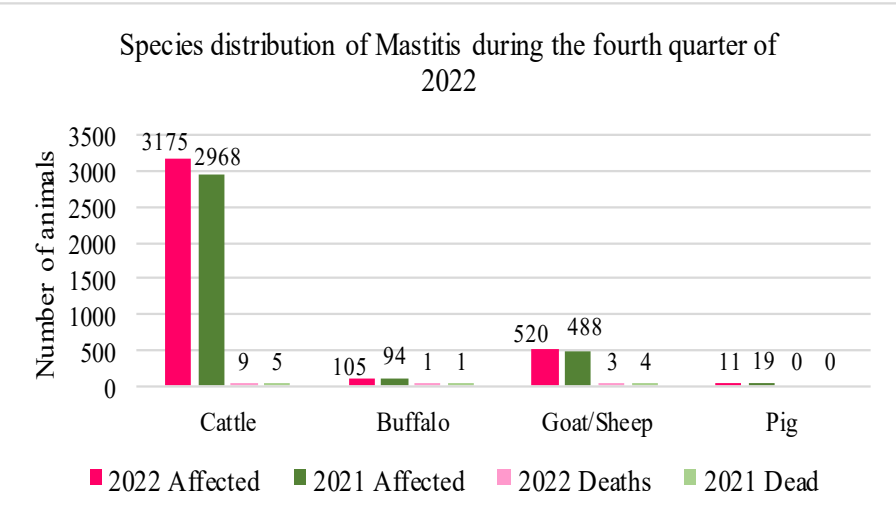
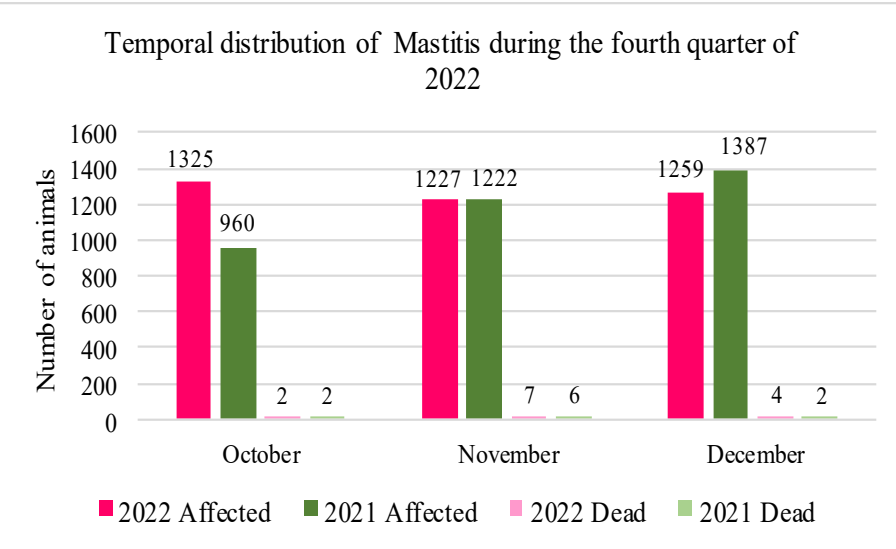
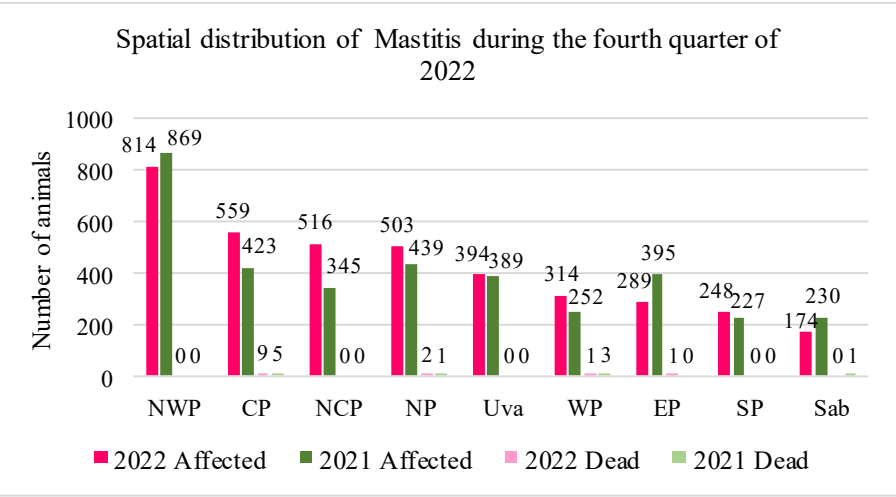
2.1.4 Hemorrhagic septicemia:

During the fourth quarter of 2022, two disease outbreaks were reported from Eastern and North Central provinces of the country. Total disease incidence during the quarter is 163 cases with 104 deaths. The initial outbreaks of 2022 fourth quarter were occurred in Kiran and Chenkallady veterinary ranges during the October month affecting 151 animal and causing 99 deaths in cattle. Later it was spread towards the North Central Province and resulting disease in 12 animals and 5 deaths in Jayagampura and Gallalla veterinary ranges. Compared to the previous year fourth quarter this is a significant increase in disease incidence as it was only 6 cases in previous year.



Under HS control program of Sri Lanka, HS Oil vaccine as well as HS Alum adjuvant vaccine are distributed among risk areas and areas where outbreak reported. During the fourth quarter of 2022, totally, 99874 Oil vaccines and 25431 Alum adjuvant vaccines were distributed among Eastern, North Central and Northern provinces as indicated in the graph.

2.1.5 Mastitis:



Spatial distributions of Mastitis during the fourth quarter of 2022 and 2021, show similar distribution patterns. In both quarters highest incidence was reported from North Western Province and lowest incidence was reported from Sabaragamuwa province. In 2022 fourth quarter 3811 cases with 13 deaths were reported due to Mastitis. This is a 6.78% increase in disease incidence when comparing to the 2021 fourth quarter.

Temporal distribution indicates the different distribution patterns in considering period of both years. In 2022 highest disease incidence was reported in October month as 1325 cases with 2 deaths, but in 2021 it was highest in December month as 1387 cases with 2 deaths.

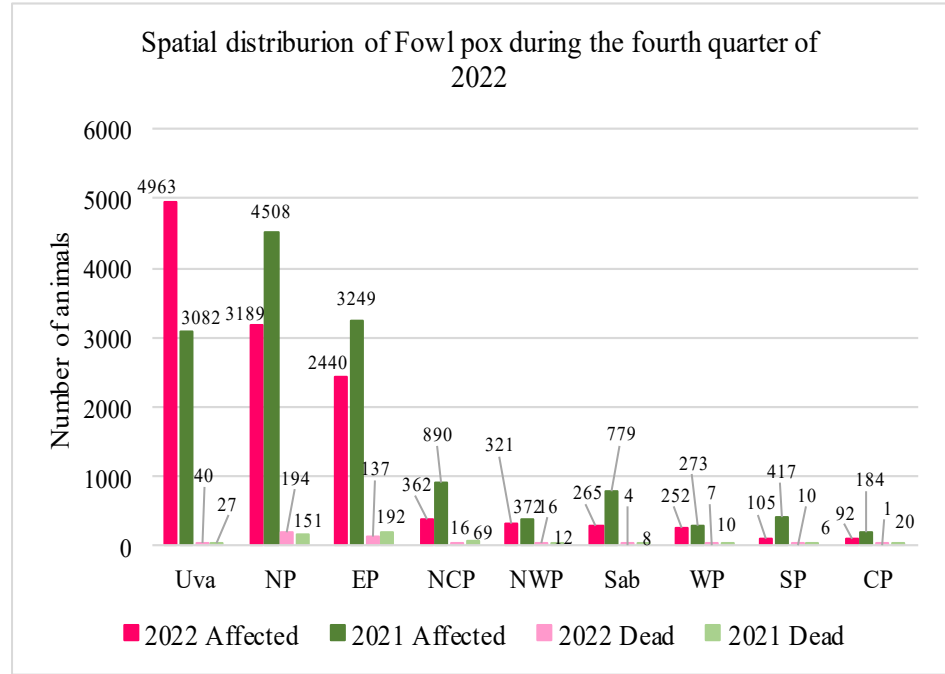
Considering the species distribution of Mastitis, cattle is the most affected species among other animal species. Higher population of them as well as higher milk production capacity act as main reasons for their high susceptibility to the disease than other species. As reported by, it is 3175 cases with 9 deaths in 2022 fourth quarter.

In order to control the Mastitis in Sri Lanka, under Mastitis Control Program conducted by Department of Animal Production and Health, 87 liters of CMT reagent was issued, 2290 Mastitis screening tests were performed, 309 infected milk samples were subjected to culture and ABST, 963 liters of teat dip solution were issued, 7100 Lactation cow udder infusions and 1117 Dry cow udder infusions were issued freely to the dairy farmers.

Mastitis Control Program	
Amount of CMT reagent issued (Liter)	87
Mastitis screening (CMT) tests performed	2290
Milk samples tested for ABST	309
Amount of teat dip solution issued (Liter)	963
Amount of Udder infusion vials issued freely	
Lactating Cow	7100
Dry Cow	1117

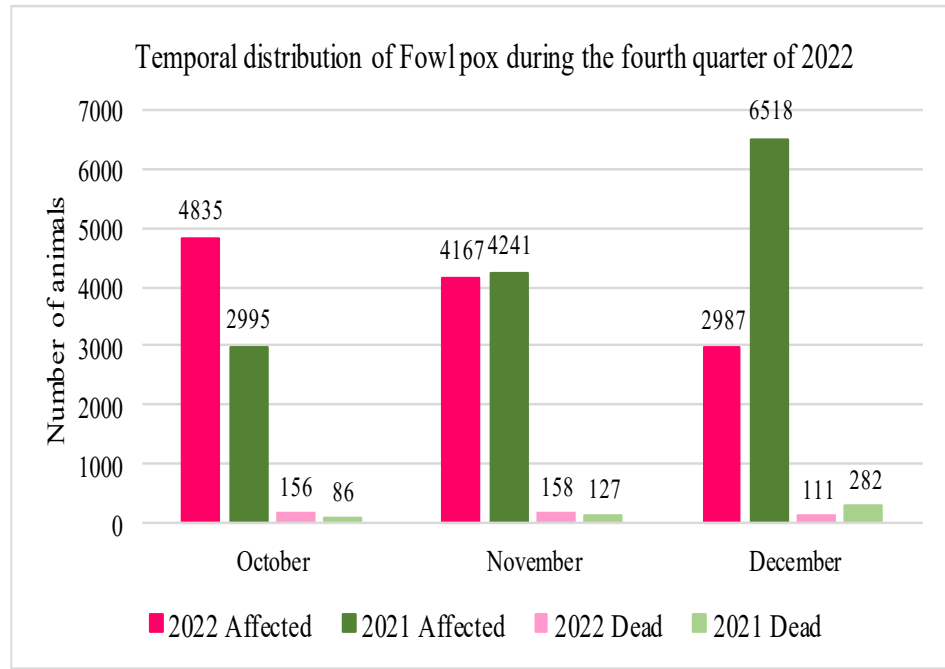
2.2 Poultry Diseases

2.2.1 Fowl pox:



As Fowl pox disease is a contagious viral infection which can affect the poultry in any age, most Sri Lankan commercial poultry farmers do vaccination as the main preventive measure of this disease. Though it is not a fatal disease in poultry, the effect of the disease on production and growth is significant.

During the fourth quarter of 2022, totally 11989 cases were reported island wide with 425 bird deaths due to fowl pox in poultry. This is a significant decrease in disease incidence by 12.83% when comparing to the previous year same quarter. Highest number of cases were reported from Uva province as 4963 cases with 40 deaths. Northern and Eastern provinces also reported significant number of cases as 3189 and 2440 cases respectively. As same as previous year fourth quarter, lowest number of cases were

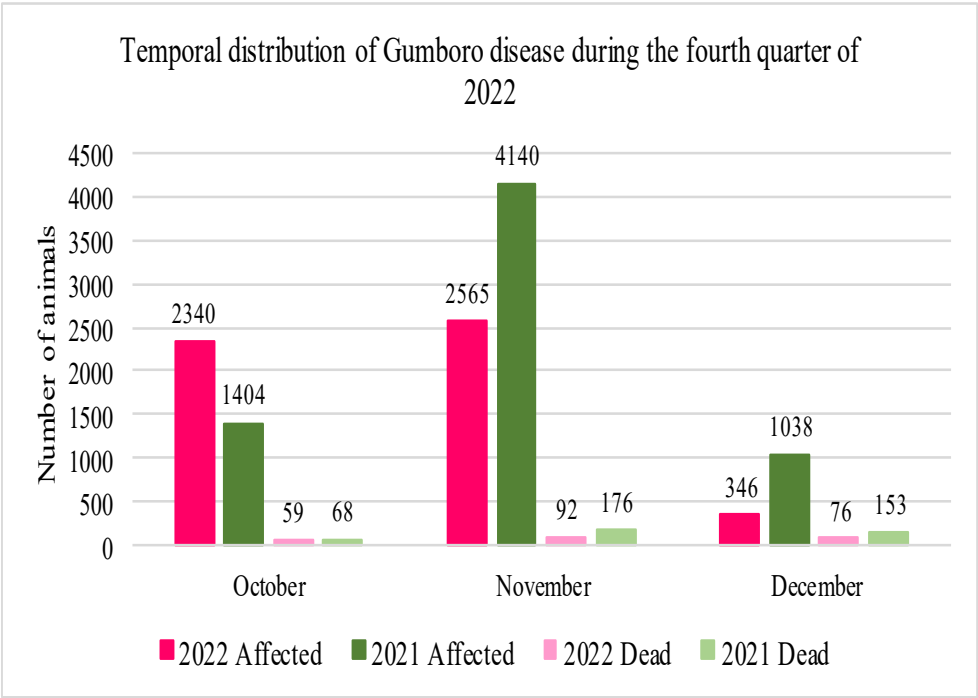
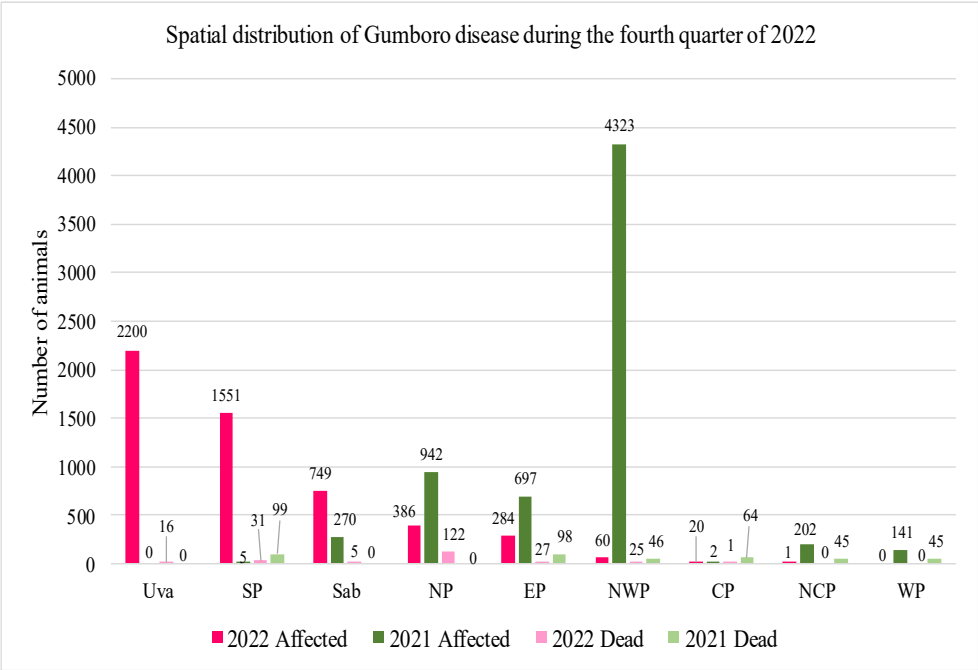


reported from Central province as 92 diseased cases with 1 death. When comparing to the same quarter of previous year, disease incidences of all provinces have been reduced, except in Uva province .

Temporal distribution of Fowl pox disease during 2022 and 2021 fourth quarters shows completely converse distribution patterns to each other. In 2022, highest disease incidence was reported in October month as 4835 cases with 156 deaths. This is 61.43% increase in disease incidence than 2021 October. As graph indicates lowest disease incidence was reported in 2022 December month as 2987 cases with 111 deaths. This is 54.17% decrease in disease incidence when comparing to the previous year December. Disease incidence of November month is close to each other as 4167 and 4241 in 2022 and 2021 respectively.



2.2.2 Gumboro Disease:



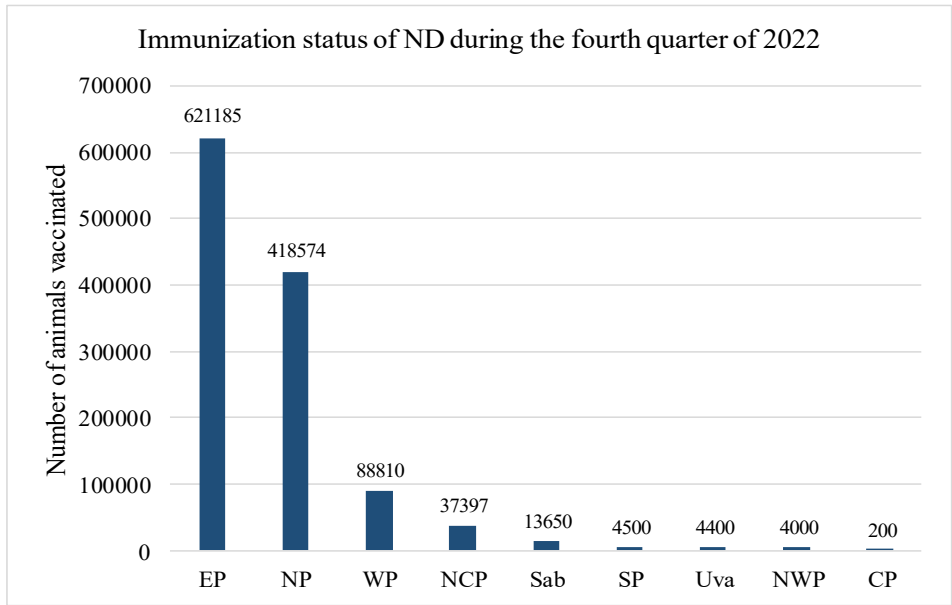
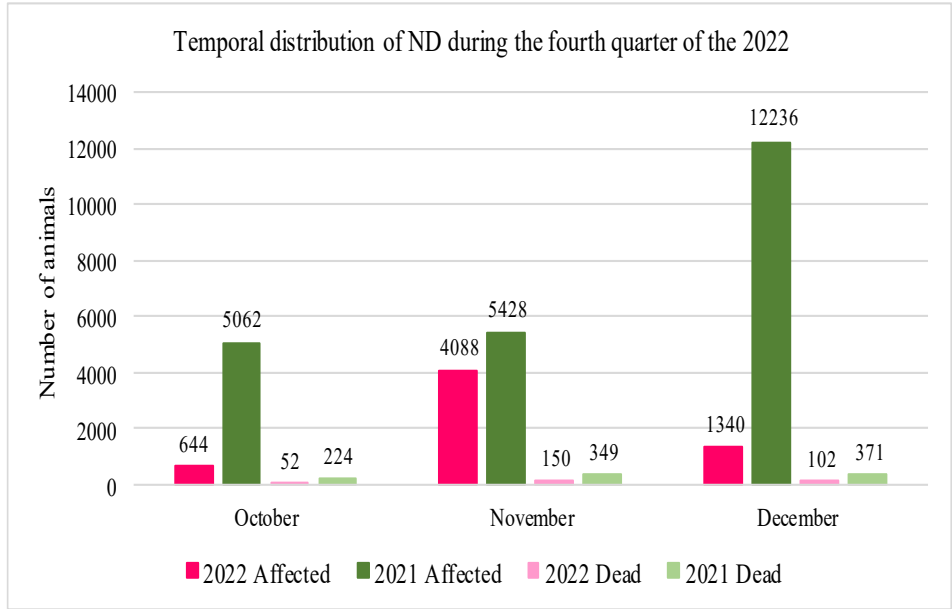
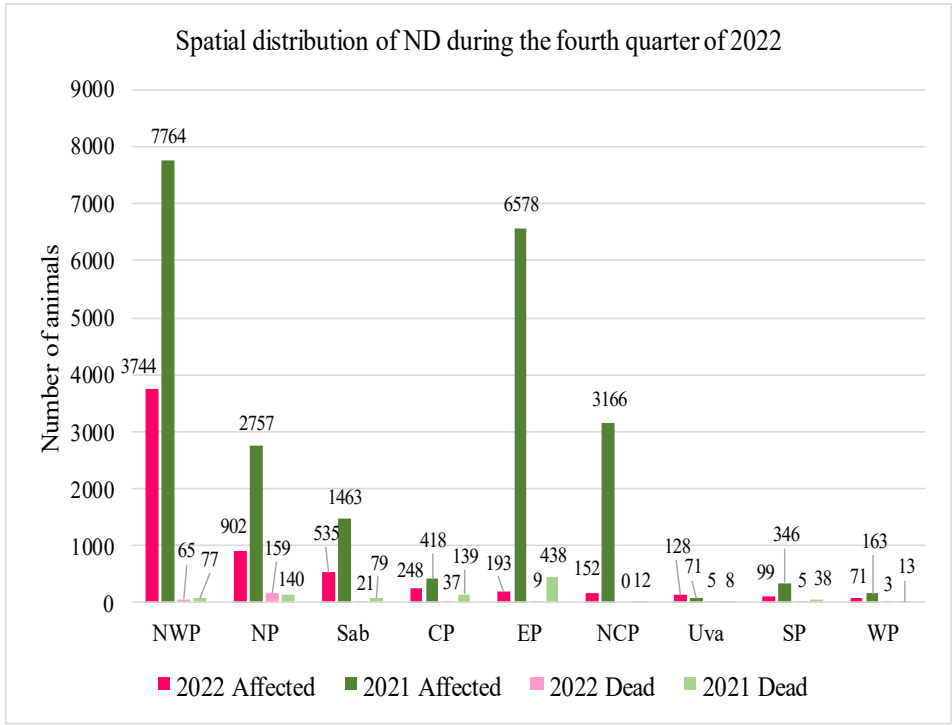
Gumboro disease in poultry is a highly contagious fatal infection in young birds with high morbidity and mortality levels. Vaccination is considered as the only effective preventive measure for the disease.

During 2022 fourth quarter, 5251 diseased birds and 227 deaths were reported from all provinces of Sri Lanka except Western province. This is over 20% decrease in disease incidence when comparing to the previous year fourth quarter. Most significant and highest disease incidence was reported from Uva province as 2200 cases with 16 deaths. This is due to huge Gumboro disease outbreak in Sevanagala veterinary range during October and November months of 2022. Highest decrease in disease incidence can be seen in North Western

province by 98.61% when comparing to the considering quarter of previous year. Disease incidence of Uva, Southern, Sabaragamuwa and Central provinces were increased and disease incidence of Northern, Eastern, North Western, North Central provinces were decreased than same quarter of previous year.

Temporal distribution pattern of both quarters are similar though the disease incidences are significantly different from each other. Highest disease incidence was reported during the November month of both years as 2565 cases and 4140 cases in 2022 and 2021 respectively. They represent 48.84% and 62.89% of total disease incidence reported during the particular period. Lowest disease incidences were reported during the December month of both years.

2.2.3 Newcastle Disease:



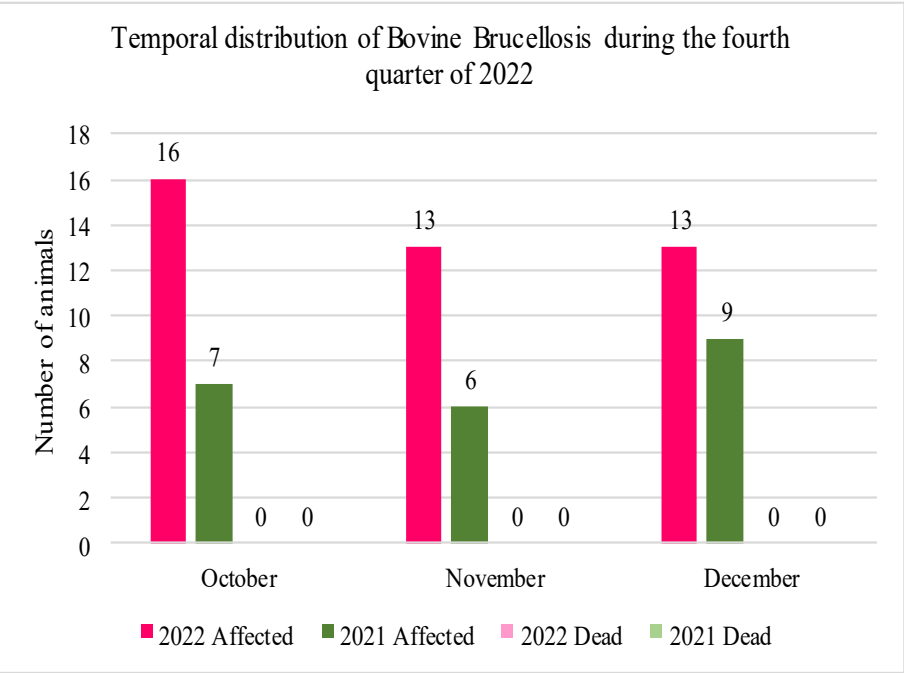
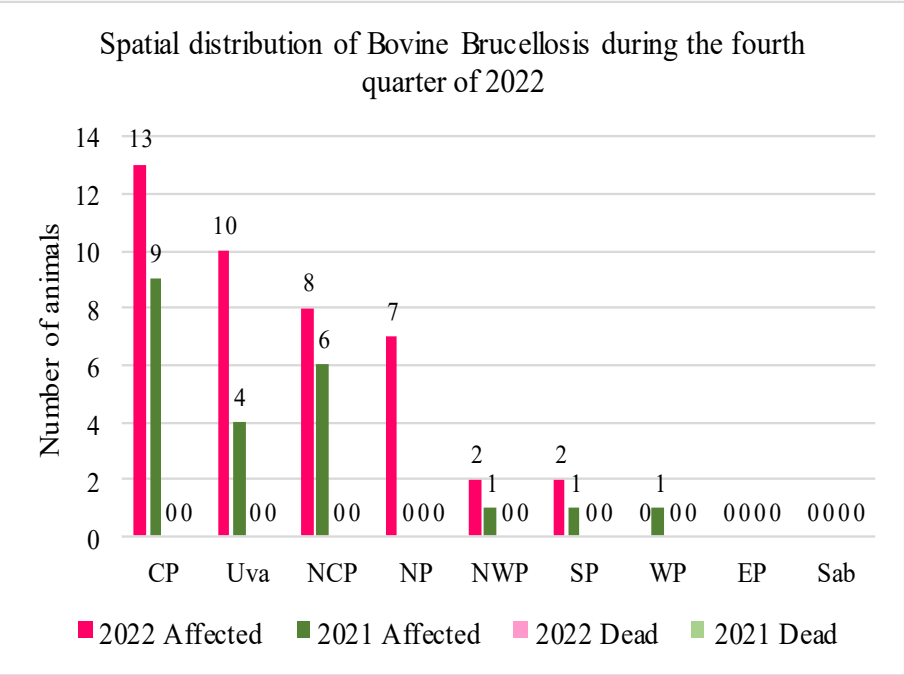
Spatial distribution of Newcastle disease during the fourth quarter of 2022 shows island wide distribution of the disease in the all nine provinces of the country. Disease incidence during the considering period is 6072 cases and 304 deaths. This is a 73.28% decrease in disease incidence when comparing to the 2021 fourth quarter. North Western province reported the highest disease incidence as 3744 cases with 65 deaths, which represents 61.66% from total incidence during the period.

Temporal distribution pattern of both quarters significantly different from each other. In 2022 fourth quarter, highest number of diseased cases were reported during November month as 4088 cases. But most remarkable difference in disease incidence can be seen in December month as 1340 in 2022 and 12236 in 2021, which represents 89.04% decrease.

Under Newcastle disease control program of Sri Lanka, vaccines were distributed to the all provinces of the country according to their requirement. Totally 1192716 vaccines were distributed during the fourth quarter of 2022. Majority of them, 52.08% (621185 vaccine doses) were distributed among veterinary ranges in Eastern province.

3. Status of Zoonotic Diseases - Fourth Quarter (Oct - Dec) - 2022

3.1 Bovine Brucellosis :



Bovine brucellosis is a zoonotic disease which has a potential to transmit from cattle to human. Though it is not an oftently reporting disease in Sri Lanka, it is considered as one of the highly concerning disease due to it's public health importance.

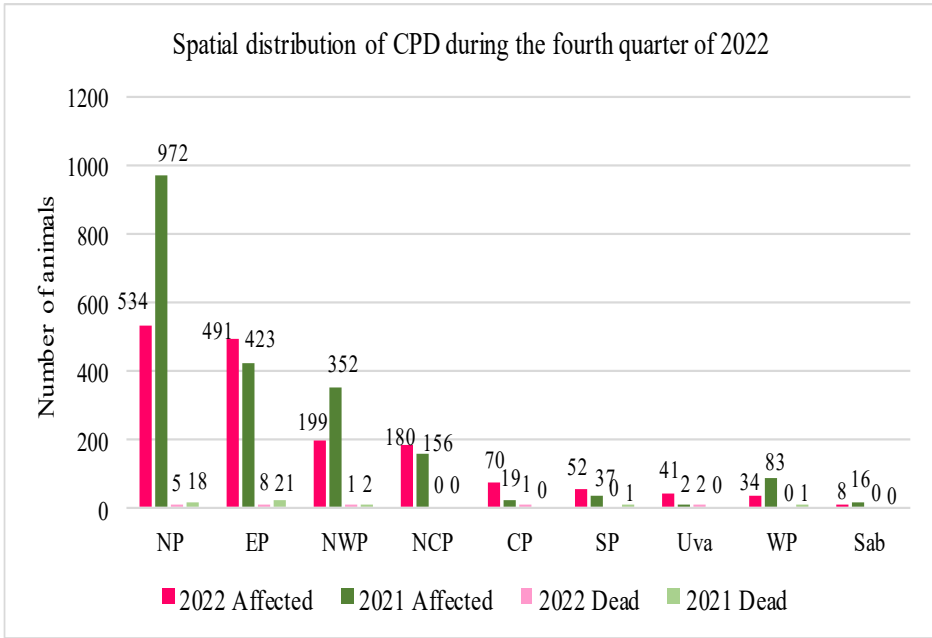
During the fourth quarter of 2022, all provinces reported fairly higher number of bovine brucellosis cases than previous quarters. It is 42 cases. This is over 90% increase in disease incidence than same quarter of 2021. Highest number of cases were reported from Central province as 13 cases. Significant difference in disease incidence can be seen in Uva and Northern provinces.

Temporal distribution graph indicates the increase of disease incidence in every month of the fourth quarter of 2022 when comparing to the 2021. Highest number of cases were reported in October month as 16 cases.

Under Bovine Brucellosis Control Program of Sri Lanka, during the fourth quarter of 2022, 1539 animals were vaccinated against Brucellosis by S19 vaccine, 633 dairy herds were screened and 624 cattle in above suspected herds were tested with RBPT. 266 samples which were received to VRI subjected for RBPT and 68 of them were got positive. Out of RBPT positives, 66 of them were give positive results for CFT, confirming the presence of Brucellosis.

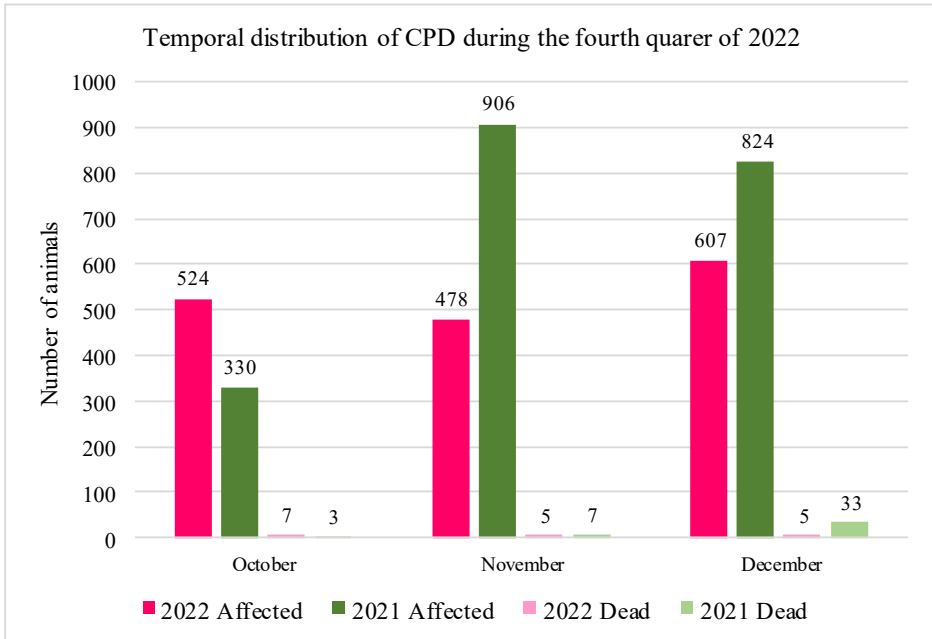
Bovine Brucellosis Control Program	
Number of milk samples screened by VIOs with MRT	633
No. of animals screened by VIOs in suspected herds with RBPT	624
Number of samples submitted by VIOs to VRI for CFT	234
Number of animals vaccinated with S19 vaccine	1539
Total number of samples subjected to RBPT (by VRI)	266
Number of RBPT positive samples	68
Number of CFT positive samples	66

3.2 Contagious Pustular Dermatitis:



Contagious Pustular Dermatitis is a zoonotic animal disease which affects goats and sheep and has potential to transmit to human mainly by direct contact with infected animals. Usually, it is reported from all nine provinces of the country throughout the year.

The total number of CPD cases reported during the fourth quarter of 2022 is 1609 cases and 17 deaths. It is 21.8% reduction in disease incidence when comparing to the same period of the previous year. Highest number of cases of CPD was reported from Northern province, it is 534 cases and 5 deaths which represents 33.18% from total cases reported during the considering quarter of 2022. Disease incidences of Eastern, North Central, Central, Southern, and Uva provinces were increased. Lowest number of cases were reported from Sabaragamuwa province during the both quarters of 2022 and

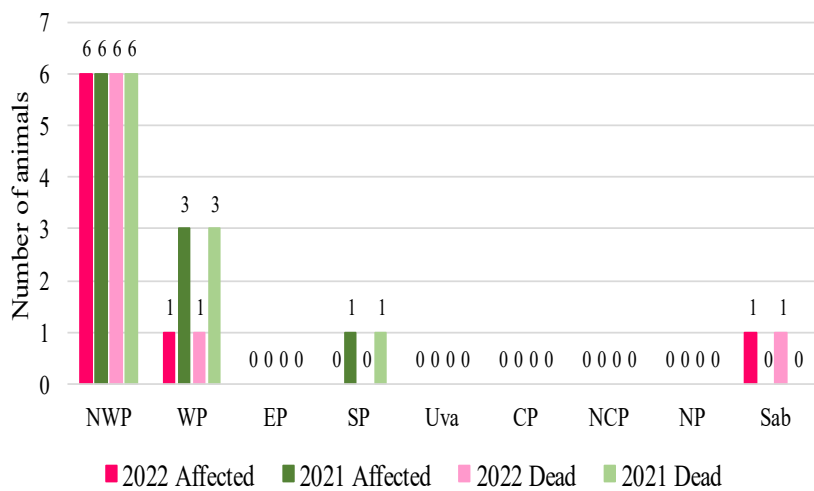


2021 as 8 and 16 cases respectively. Temporal distribution of the fourth quarter of 2022 and 2021, show different patterns from each other. In 2022 fourth quarter, the number of cases were varied throughout the quarter, reporting highest incidence in December month as 607 cases with 5 deaths (37.72% of total reported cases). But in 2021 fourth quarter, highest number of cases were reported in November month as 906 cases as 43.98% of total cases. The average number of cases per month during the quarters is higher in 2021 than 2022, as 686 and 536 cases per month respectively.

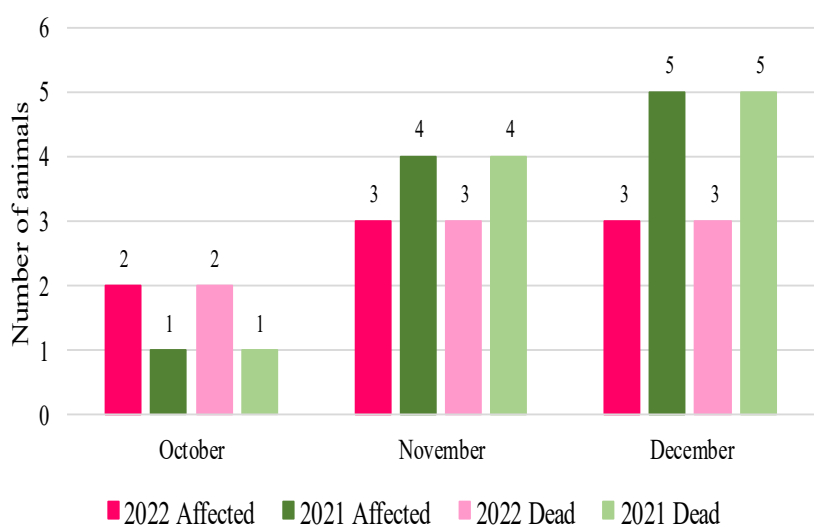
Main control measure of Contagious Pustular Dermatitis in small ruminants is vaccination. Auto-vaccines are produced by Veterinary Investigation Officers in each district Veterinary Investigation Centers to control the disease when outbreak occurred. According to the reported data, totally 44 goat farms were vaccinated by Veterinary Investigation Officers during the fourth quarter of 2022.

### 3.3 Rabies:

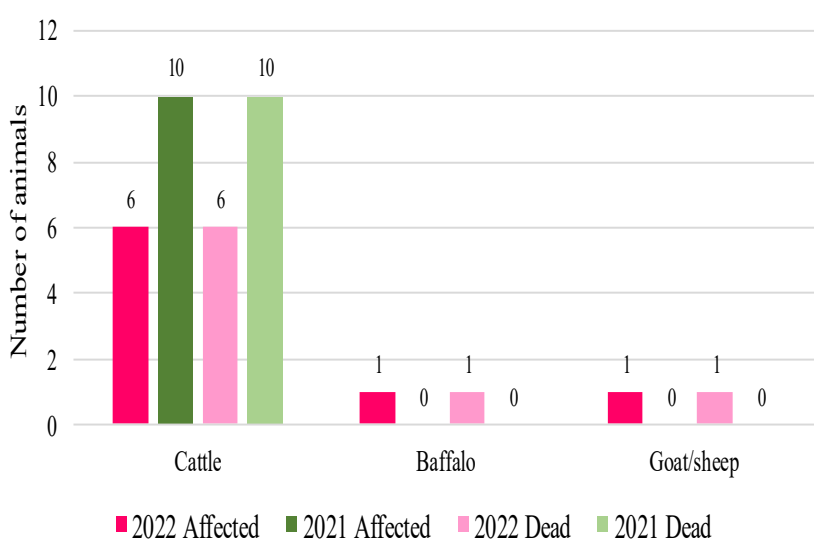
Spatial distribution of Rabies during the fourth quarter of 2022



Temporal distribution of the Rabies during the fourth quarter of 2022



Species distribution of Rabies during the fourth quarter of the 2022



Rabies is a dead-end viral infection for mammals, but preventable by proper vaccination.

In Sri Lanka, during the fourth quarter of 2022, totally 8 rabid farm animal cases were reported from three provinces of the country. Majority of them were reported from North Western province as 6 cases (75% from total disease incidence) as same as the fourth quarter of previous year. New cases were reported from Western and Southern provinces as well.

According to the temporal distribution, highest number of cases were reported in both November and December months when comparing to the October month of both years.

When considering the species wise distribution of the disease, around 75% of them are cattle rabid cases (8 cases). But it has been reduced by 40% in 2022. Goat/Sheep and Buffalo cases were reported as 1 from each group during the fourth quarter of 2022.



### 3.4 Highly Pathogenic Avian Influenza:

#### 3.4.1 National HPAI Surveillance Program:

1. No. of serum samples collected from Commercial Poultry	1112
2. No. of dropping samples collected from the Hotspots of Migratory Birds	2551
3. No. of cloacal swabs collected from Backyard Poultry	3315
4. No. of samples collected from Live Bird Markets	522
5. No. of cloacal swabs collected from Pet Bird Establishments	81
6. No. of samples collected from Poultry Processing Establishments	680
7. No. of serum samples collected from Duck Farms	264
8. No. of cloacal swabs collected from Ducks	241

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

Under National HPAI Surveillance Program, different types of samples were collected from all the districts of the country to monitor the HPAI situation of Sri Lanka. Under this program, 1376 serum samples were collected from commercial poultry and ducks. Totally, 4839 cloacal swabs were collected from Backyard poultry, Live Bird Markets, Pet Bird Establishments, Poultry processing Establishments and Duck farms. 2551 Fresh droppings samples were collected from the Hotspots of migratory birds. According to that, totally 8766 samples were collected from various possible risk spots representing the whole country and were dispatched to the reference laboratory (Veterinary Research Institute) during the fourth quarter of 2022.

The samples were checked in laboratory for the detection of Avian Influenza virus. During the considering period of the year 2022, 1239 of serum samples and 6134 number of other samples (fresh droppings, cage swabs and cloacal swabs) were examined in virology laboratory of VRI and all of them were gave negative results for viral detection tests.

As per the above laboratory confirmed data, Sri Lanka is still remain as Highly Pathogenic Avian Influenza free country in the world.

Se. No	District VIC	Serum samples		Fresh droppings, cage swabs and cloacal swabs	
		No. tested	Results	No. tested	Results
1	Ampara	29	Negative	165	Negative
2	Anuradhapura	30	Negative	285	Negative
3	Badulla	7	Negative	15	Negative
4	Batticaloa	0	Negative	30	Negative
5	Chilaw	75	Negative	781	Negative
6	Colombo	68	Negative	397	Negative
7	Galle	45	Negative	150	Negative
8	Gampaha	30	Negative	60	Negative
9	Hambanthota	14	Negative	220	Negative
10	Jaffna	105	Negative	1200	Negative
11	Kandy	22	Negative	215	Negative
12	Kalutara	55	Negative	60	Negative
13	Kegalle	72	Negative	200	Negative
14	Kilinochchi	30	Negative	115	Negative
15	Kurunegala	435	Negative	60	Negative
16	Mathale	8	Negative	0	Negative
17	Matara	60	Negative	60	Negative
18	Moneragala	11	Negative	206	Negative
19	Mullathivu	55	Negative	553	Negative
20	Polonnaruwa	0	Negative	135	Negative
21	Rathnapura	18	Negative	300	Negative
22	Trincomalee	0	Negative	285	Negative
23	Vavuniya	40	Negative	420	Negative
24	AQ Katunayaka	30	Negative	94	Negative
25	AQ Maththla	0	Negative	122	Negative
26	AQ Colombo	0	Negative	6	Negative
	<b>Total</b>	<b>1239</b>		<b>6134</b>	

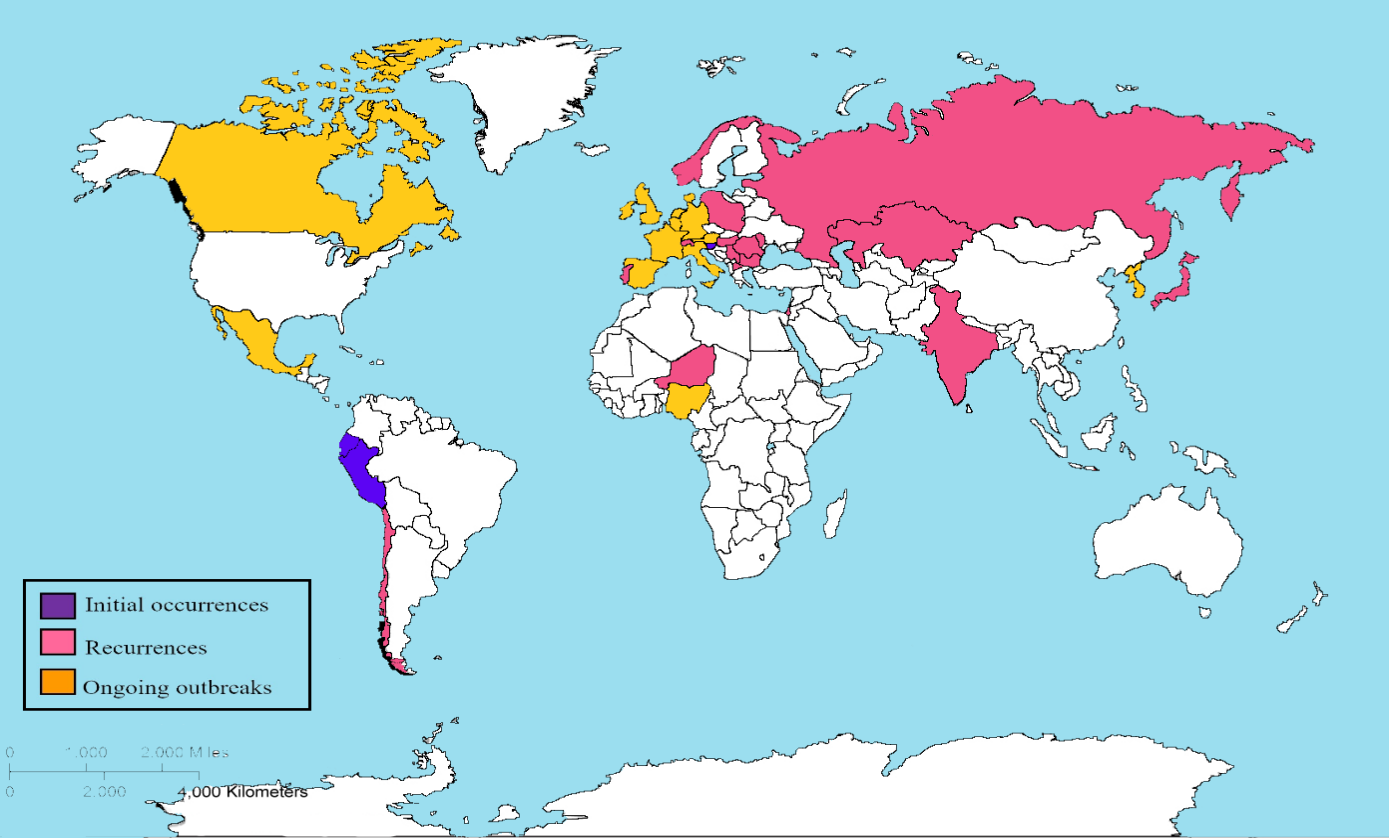
3.4.2 Global Distribution of Notifiable Avian Influenza:

As per the Avian Influenza situation reporting of World Organization for Animal Health, several initial occurrences and recurrences of HPAI have been reported from the world during the fourth quarter of 2022. Three countries reported initial occurrences of HPAI in their countries through immediate notifications; Slovenia reported H5N1 strain outbreak in non-poultry, Ecuador reported H5 strain outbreak in poultry sector and Peru also reported H5N1 strain outbreak in poultry sector. Recurrences of H5N1 were reported from India, Japan, Bulgaria, Norway, Russia, Hungary, Israel, Moldova, Niger, Poland, Serbia, North Macedonia, Switzerland, Romania, Portugal, Kazakhstan and Chile. H5N2 recurrence was reported from Japan and H5 recurrence was reported from Norway.

But on-going events of previously reported outbreaks were reported through follow up reports. Ongoing events of H5N1 outbreaks were reported from Nigeria, Japan, Korea, France, Netherland, United Kingdom, Canada, Germany, Italy, Austria, Spain, Belgium, Mexico, Denmark and Ireland.

During the fourth quarter of 2022, HPAI outbreaks were reported in both Poultry and Non-poultry sectors throughout the world; 460 outbreaks were reported in poultry sector from 46 countries and 344 outbreaks were reported in non– poultry sector from 54 countries. Predominant subtype of the HPAI during the considering quarter is H5N1.

3.4.3 Global Situation of Notifiable Avian Influenza outbreaks:



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