



Volume 15 No 01

Veterinary Epidemiological Bulletin Sri Lanka

ISSN 1800 -1881



Jan—March 2022

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Leishmaniasis

Leishmaniasis is a disease caused by protozoan parasites of genus *Leishmania*. More than 23 species of them have been described and most of species are zoonotic. Dogs are the main reservoir host for human visceral leishmaniosis caused by *L. infantum*, and the disease is potentially fatal in dogs and people.

TRANSMISSION

Leishmania is a diphasic parasite that completes its lifecycle in two hosts: a sand fly that harbors the flagellated extracellular promastigote form and a mammal in which the intracellular amastigote parasite form and develops. Two principal routes of transmission, vector born by phlebotomine sand flies and vertically from dam to pup. Dogs with or without clinical signs are infectious to sand flies and may transmit *Leishmania* parasite. Congenital vertical transmission from infected dam to pup and transfusion of blood products from infected dogs has been shown to cause infection in recipients.

PATHOGENESIS

L. infantum promastigotes deposit into the skin via the bites of infected sand flies. Promastigotes invade host macrophages and replicate as intracellular amastigotes. Immune responses mounted at the time of infection and thereafter appear to be the most important factor in determining whether a persistent infection will develop and progress from subclinical to clinical disease. The incubation period may last months to years, during when the parasite disseminate throughout the hosts body, primarily to the lymphatic system organs. Age, breed, host genetics, nutrition,

concurrent infectious and non-infectious -diseases, and other factors may also influence the disease.

CLINICAL FINDINGS

Clinical disease is associated with a marked antibody response that does not confer protection. In fact, immune-mediated mechanisms are responsible for much of the pathology in canine leishmaniosis. The sole presenting signs of the disease

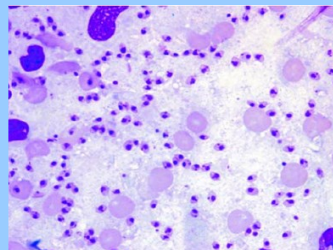
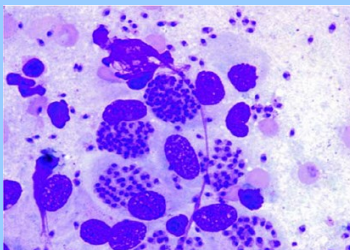
could be epistaxis, ocular abnormalities or manifestations of kidney disease without dermal abnormalities. The dermal lesions associated with leishmaniosis include exfoliative dermatitis, which can be generalized or localized over the face, ears and limbs. Ulcerative, nodular or mucocutaneous dermatitis are also seen. Cutaneous ulcers over the ears or other locations may be associated with considerable bleeding.



These animals are frequently accompanied by weight loss, exercise intolerance, lethargy, lymphadenomegaly, splenomegaly and abnormal nail growth (onychogryphosis). Other clinical signs may include polyuria and polydipsia due to kidney disease, vomiting, colitis, melena and lameness due to joint, muscle or bone lesions.

DIAGNOSIS

Leishmania amastigotes can be demonstrated by cytology from lymph nodes, spleen, skin scraping, bone marrow or joint fluids stained with Giemsa stain.



Detection of amastigotes by cytology is sometimes unrewarding because of a lower number of detectable parasites, even in dogs with severe disease. Parasite may also be viewed in histopathologic formalin-fixed, paraffin-embedded biopsy sections of skin or other infected or-

gans. Immunolabelling with immunohistochemical staining can verify the presence of *Leishmania* in tissues. Quantitative PCR is the most sensitive diagnostic technique for the disease.

TREATMENT

The main protocol used for treatment of canine leishmaniosis includes N-methylglucamine antimoniate at 50–100 mg/kg, SC, for 4–6 weeks combined with allopurinol (10 mg/kg, PO, twice daily, for 6–12 months or longer as needed). Miltefosine at 2 mg/kg/day, PO, for 4 weeks can also be combined with allopurinol (10 mg/kg, PO, twice daily) as an available alternative to N-methylglucamine antimoniate. Treatment frequently does not provide sterilizing cure. Treated dogs can remain carriers of infection and may relapse, so they may remain infectious to sand flies.

PREVENTION

Repellents with topical insecticides effectively reduce sand fly bites and transmission of leishmaniosis. A deltamethrin-impregnated collar and a spot-on formulation of permethrin and imidacloprid have been shown to confer protection against sand fly bites. The application of protective insecticides is recommended for dogs in Leishmaniosis endemic areas. Purified-fraction commercial vaccines against canine leishmaniosis are marketed in Europe and Brazil.

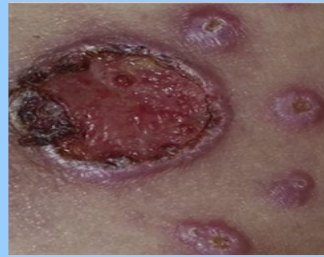
ZOONOTIC EFFECT OF LEISHMANIASIS

There are 3 main forms of the disease.

Visceral leishmaniosis (VL), is fatal if left untreated in over 95% of cases. It is characterized by irregular bouts of fever, weight loss, enlargement of the spleen and liver, and anaemia. Most cases occur in Brazil, East Africa and in India. An estimated 50 000 to 90 000 new cases of VL occur worldwide annually, with

only between 25 to 45% reported to WHO. It remains one of the top parasitic diseases with outbreak and mortality potential. In 2020, more than 90% of new cases were reported to WHO, occurred in 10 countries: Brazil, China, Ethiopia, Eritrea, India, Kenya, Somalia, South Sudan, Sudan and Yemen.

Cutaneous leishmaniasis (CL) is the most common form of leishmaniasis and causes skin lesions, mainly ulcers, on exposed parts of the body, leaving life-long scars and serious disability or stigma. About 95% of CL cases were occurred in the Americas, the Mediterranean basin, the Middle East and Central Asia. In 2020 over 85% of new CL cases were occurred in 10 countries: Afghanistan, Algeria, Brazil, Colombia, Iraq, Libya, Pakistan, Peru, the Syrian Arab Republic and Tunisia. It is estimated that between 600 000 to 1 million new cases occur worldwide annually.



Mucocutaneous leishmaniasis leads to partial or total destruction of mucous membranes of the nose, mouth and throat. Over 90% of mucocutaneous occur in Bolivia, Brazil, Ethiopia and Peru.



Leishmania donovani and *L. infantum* cause acute visceral disease worldwide. *L. major* and *L. tropica* cause most chronic cutaneous leishmaniasis in Europe, Asia and Africa. Chronic cutaneous and mucocutaneous leishmaniasis are caused by *L. amazonen*

sis, *L. mexicana*, *L. braziliensis*, *L. guyanensis* and *L. peruviana* in the Americas. The incubation period varies from about 10 days to several months. Hosts develop acquired immunity through cellular and humoral responses, but infection can spread through the lymphatic and vascular system and produce more lesions in the skin (cutaneous, diffuse cutaneous leishmaniasis), the mucosa (mucocutaneous leishmaniasis) and invade the spleen, liver and bone marrow (visceral leishmaniasis). Common symptoms are fever, malaise, weight loss and anemia, with swelling of the spleen, liver and lymph nodes in visceral human leishmaniasis.

Without treatment, most patients with the visceral disease will die and those with diffuse cutaneous and mucocutaneous disease can suffer long infections associated with secondary life-threatening infections. Treatment should be considered even for self-healing cutaneous leishmaniasis. There are no specific risk groups for leishmania infections.

Pentavalent antimonials were for a long time the first-choice of drugs for leishmaniasis, and remain so in many endemic tropical countries. In some regions, mainly where resistance has developed, miltefosine, paramycin and liposomal amphotericin B are gradually replacing the antimonials.

Prevention of emergence depends on efficient surveillance and prompt treatment of all human leishmaniasis infections. To reduce bites of peridomestic vectors, insecticide-treated nets and topically applied insecticides can be used. Control the infection of reservoir dogs also important.

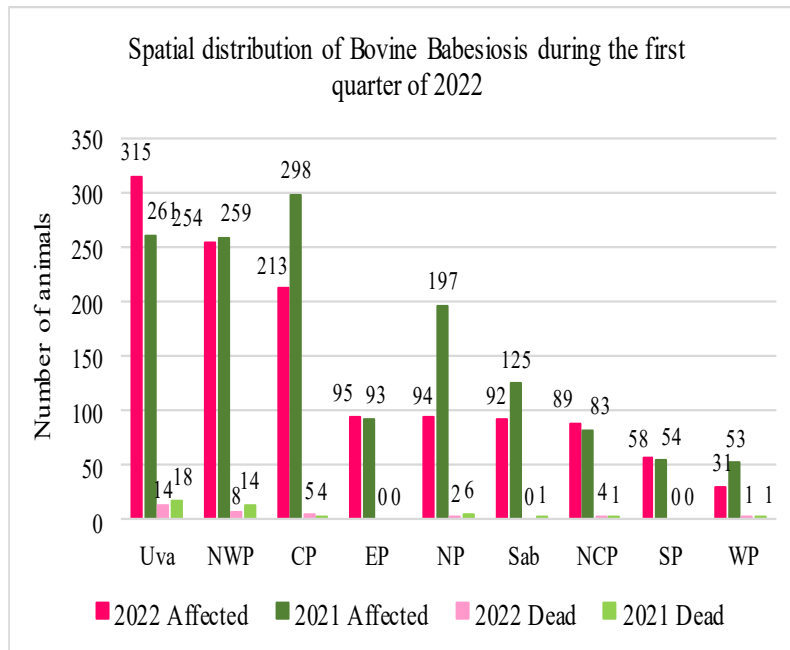
Compiled by: Dr. D. R. K. Perera.

Reference: <https://www.merckvetmanual.com>, <https://www.who.int>, <https://www.ecdc.europa.eu>

2. Status of Livestock Diseases : First Quarter (Jan - March) - 2022

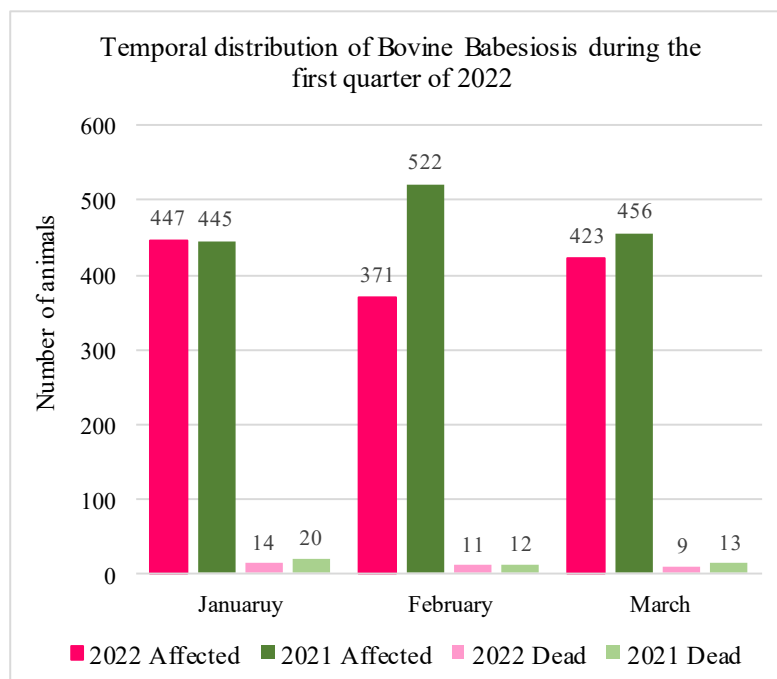
2.1 Bovine Diseases

2.1.1 Bovine Babesiosis :



Bovine Babesiosis is an endemic disease in Sri Lanka, which generally reports from all nine provinces of the country throughout the year. During the first quarter of 2022, 1241 Bovine Babesiosis cases were reported from the country along with 34 deaths. It reveals the reduction of Babesiosis cases by 12.78% in this year, as it was reported 1423 cases with 45 deaths during the first quarter of 2021. Usually higher number of cases report from the provinces where have higher cattle and buffalo population.

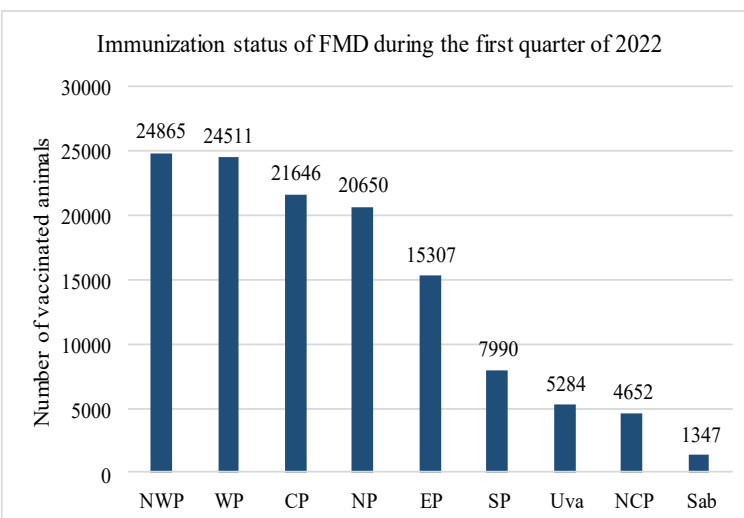
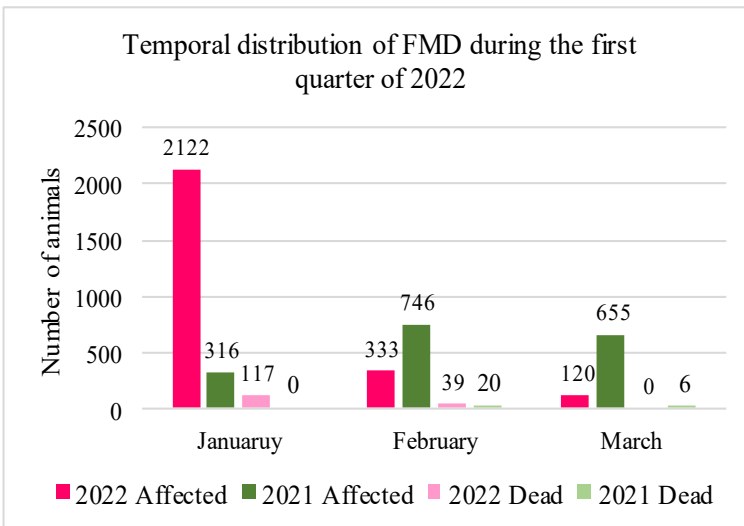
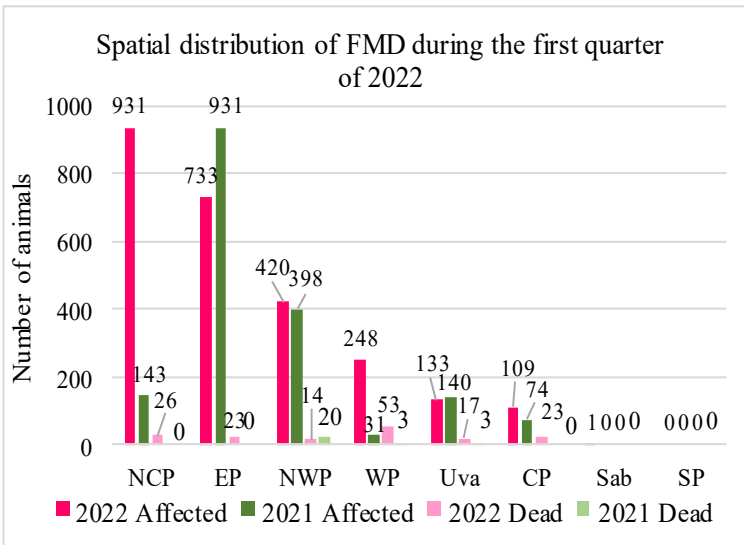
According to the spatial distribution of Babesiosis, graph shows the significant difference in distribution pattern of both 2021 and 2022 years. According to that, highest number of cases were reported from Uva, North western and Central provinces of the country which is over 63% of total cases reported during the period. In both years, least number of cases were reported from Western province as 31 diseased cases with 1 death in 2022 first quarter.



Temporal distribution also shows the significant difference in disease trends throughout the quarter due to reduction of reported cases in February by 28.92% in 2022 than first quarter of 2021.

Majority of the cases were reported during the January month as 36.02% from total number of cases during the period. Mortality also decreased than previous year by 24.4% in corresponding quarter, as it was reported as 45 in the same quarter of the previous year.

2.1.2 Foot and Mouth Disease:



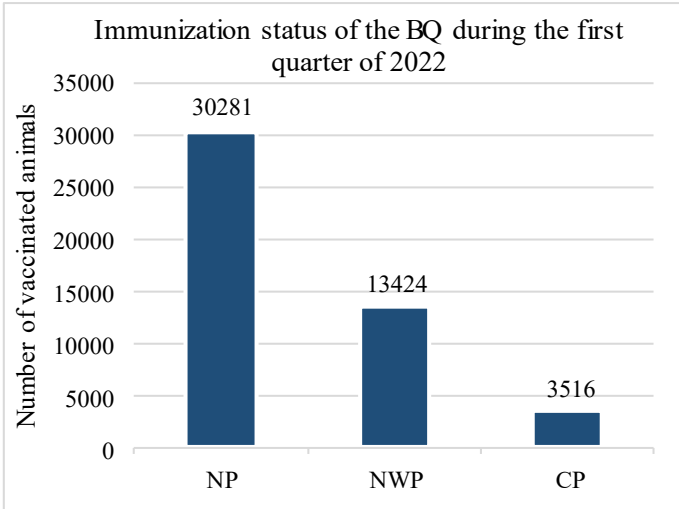
Foot and mouth disease is also an endemic disease in Sri Lanka which has seasonal pattern in disease distribution. During the first quarter of 2022 totally 2575 FMD infected animals with 156 deaths were reported in the country. It is a 49.97% increase of total number of cases number when comparing to the same quarter of previous year. Majority of the cases were reported from North central province as 931 cases, which is 36.15% of total cases. Eastern, North western and Western provinces also reported considerable amounts of cases while Southern province not reported any case.

Temporal distribution of the disease shows the highest disease incidence in January month, which is 82.4% out of total reported cases during the quarter. This is over six times increment of the cases than the number of cases reported in 2021 January. Gradually, the disease incidence was reduced throughout the period as only 120 cases were reported in March. The temporal distribution of 2022 first quarter shows significant deviation from previous year disease distribution pattern, as a consequence of severe FMD outbreak occurred at the end quarter of 2021.

Preventive vaccination for the disease was carried out based on the risk for the disease outbreak in each province. Based on those epidemiological data, majority of vaccines were distributed to North western, Western, Central, Northern and Eastern provinces of the country as these provinces usually report the FMD outbreaks more frequently and than the other provinces of the country.

2.1.3 Black Quarter:

Black Quarter disease is considered as an endemic disease in the certain provinces of Sri Lanka according to its epidemiological pattern throughout past few years. But during the first quarter of 2022, diseased cases were not reported from any province of the country, as same as the corresponding quarter of the previous year.

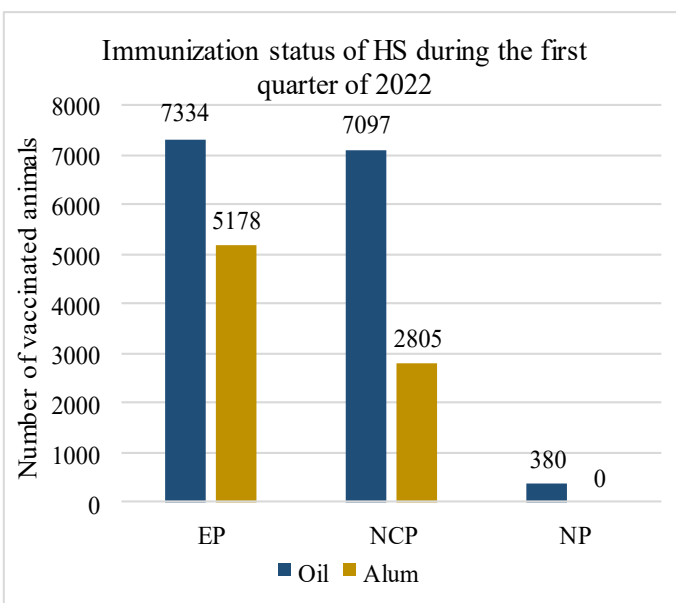


Considered endemic provinces to the disease are North western, Eastern, Northern, Central and North Central Provinces of Sri Lanka. Therefore prophylactic vaccination program is conducted mainly targeting those provinces and their temporal distribution pattern. During the first quarter of 2022 the immunization status of the animals through vaccination is indicated in the graph. According to that, 30281 animals in Northern province, 13424 animals in North western province and 3516 animals in Central Province were vaccinated.

2.1.4 Hemorrhagic septicemia:

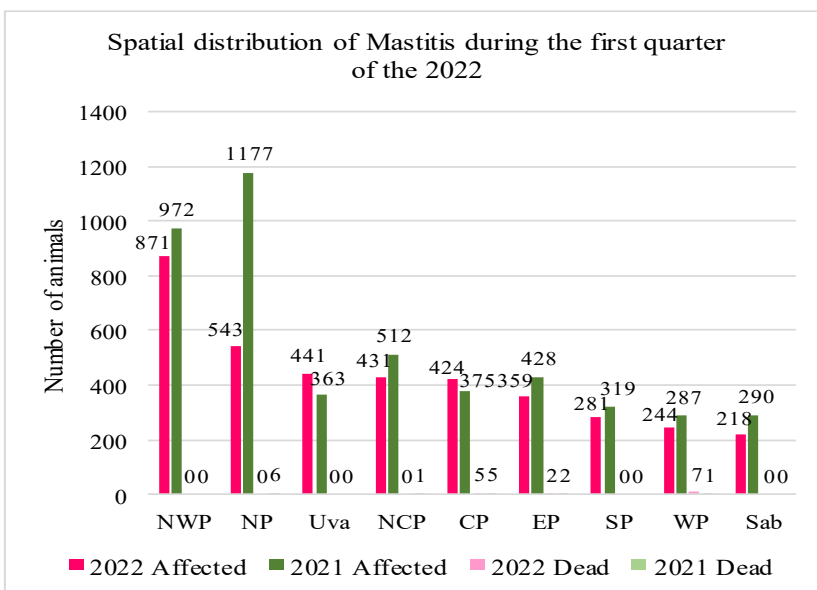
During the first quarter of the 2022, only one outbreak of Hemorrhagic septicemia was reported in February month from Madirigiriya VS division of North Central province. Totally 37 animals were infected and 1 died within the period. But in 2021, there were no any cases or deaths reported during the first quarter.

Vaccination program is conducted by DAPH with the help of field Veterinary surgeons to prevent and control the

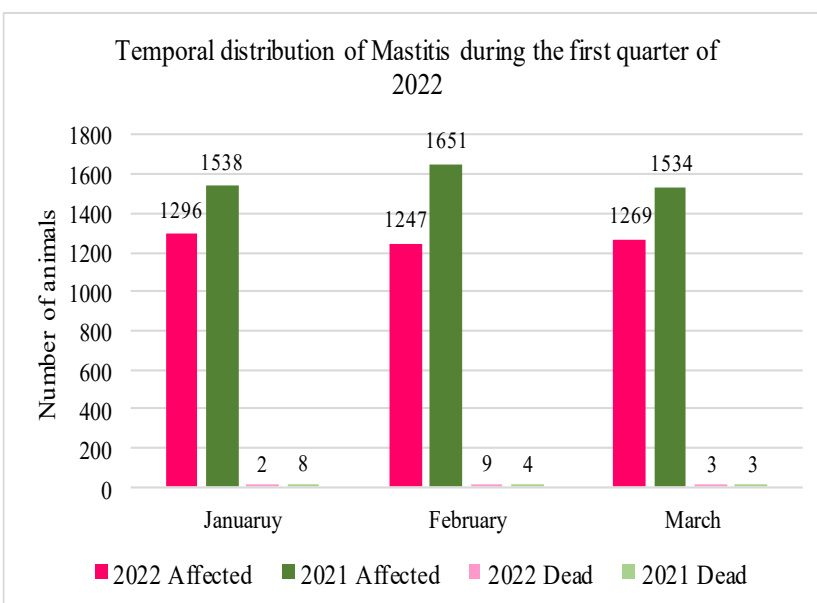


disease in susceptible provinces of the country. Oil base vaccine which use as prophylactic measure, is use mainly in in NCP and EP provinces. 7334 vaccine doses to Eastern province, 7097 vaccines to North central province and only 380 vaccines to Northern province were distributed. Alum adjuvant containing vaccine was used in the areas with disease outbreaks occurred, to provoke an strong immune response within short period time in order to control the disease outbreak. According to the reported data 5178 Alum vaccines were used in Eastern province and 2805 vaccines were used in North Central province during the first quarter of 2022.

2.1.5 Mastitis:



During the first quarter of 2022, Mastitis cases were reported from all nine provinces of the country. Total number of cases was 3812, and it is 19.28% reduction of total reported cases than the number of cases reported during the same period of previous year. Majority (22.84%) of cases were reported from North western province as 871 cases though it has been remarkably reduced than previous year by 53.86%.



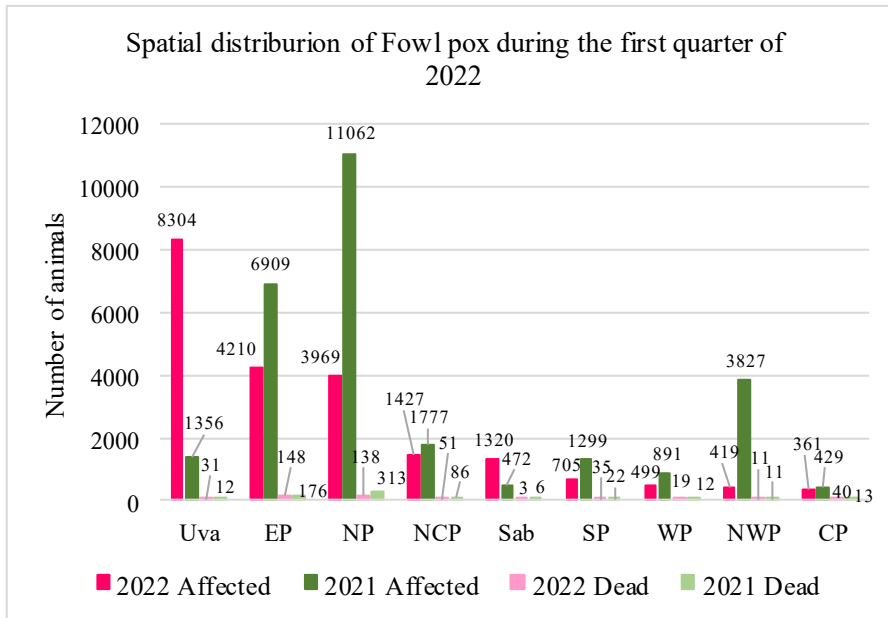
Temporal distribution shows the same pattern as previous year and overall reduction of the reported cases on each month is almost similar to each other. Average monthly reduction of reported cases than previous year is 19.15%.

In order to control the Mastitis in the country, DAPH has implemented the Mastitis Control Program with the collaboration of Veterinary Investigation Officers. Through this program, field mastitis identification tests, laboratory microbial isolation and antibiotic susceptibility tests, issuing of teat dip solution as precautionary measure as well as udder infusions as treatments are freely distributed among farmers when required. Contribution of this program towards controlling of mastitis during the first quarter of 2022 is indicated in the given in the table as below.

Mastitis Control Program	
Amount of CMT reagent issued (Liter)	48
Performed Mastitis screening Tests (CMT)	2845
Tested milk sample for ABST	124
Amount of teat dip solution issued (Liter)	809
Amount of Udder infusion vials freely issued	
* Lactating Cow	1990
* Dry Cow	29

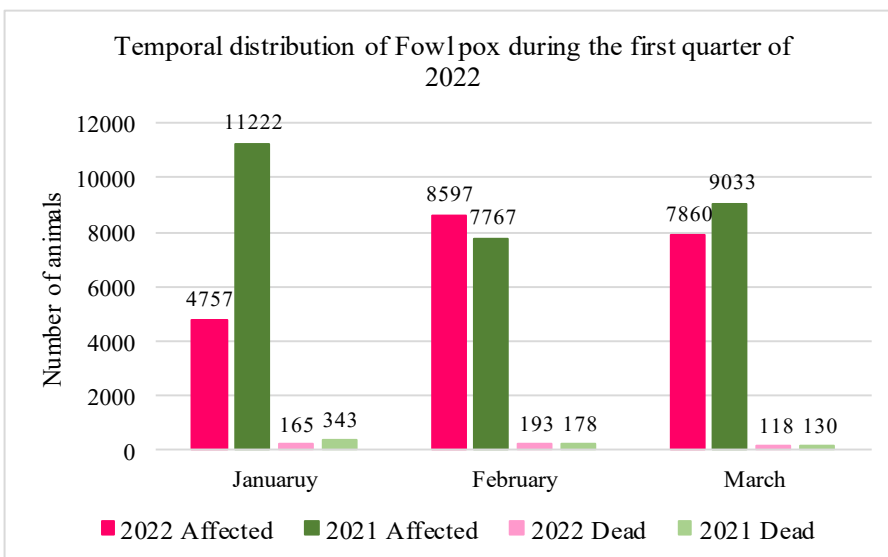
2.3 Poultry Diseases

2.3.1 Fowl pox:



Fowl pox is one of the common viral disease in Sri Lanka which affect the poultry industry. Due to its contagious nature, it usually reports in high numbers from almost all the provinces of Sri Lanka.

During the first quarter of 2022, totally 21214 birds were affected resulting 476 deaths. This amount is 24.29% reduction of total cases than previous year same quarter as it was reported 28022 cases with 651 deaths. Most of these cases were reported from Uva province as it is 39.14% of total reported cases of this quarter. Eastern and Northern provinces also reported considerable higher number of cases. Spatial distribution of the disease in same quarter of 2022 and 2021 has shown significant difference from each other.

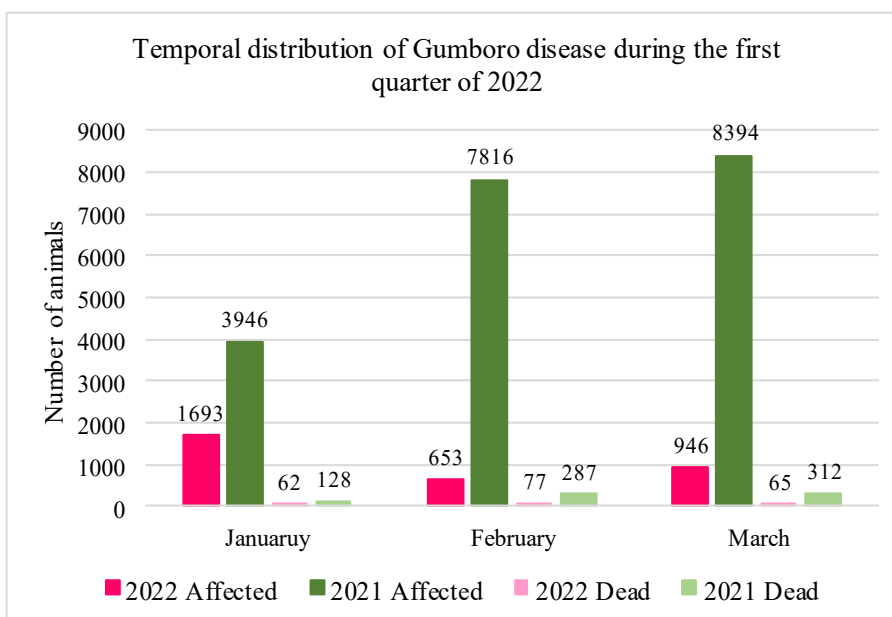
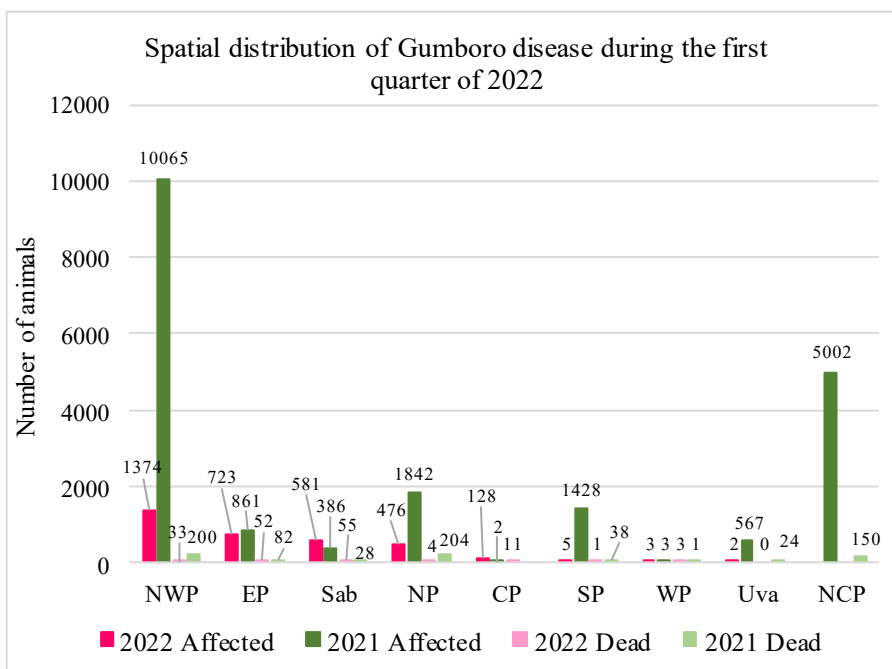


Temporal distribution of the dis-

-ease during the corresponding quarter showed the fluctuation in number of cases and deaths. First quarter of previous year reported the highest number of cases in January as 11222 in number, but in 2022 highest number of cases were reported in February month as 8597 cases with 193 deaths.

As preventive measure of the disease, vaccination of the birds in young and growing age is practiced currently in small to large scale commercial and backyard farms as it can rapidly spread among the birds if it was introduced to an unvaccinated bird flock. Although it does not cause high mortality rate, it may lead high morbidity and considerable reduction in laying percentage in laying flocks.

2.3.2 Gumboro Disease:



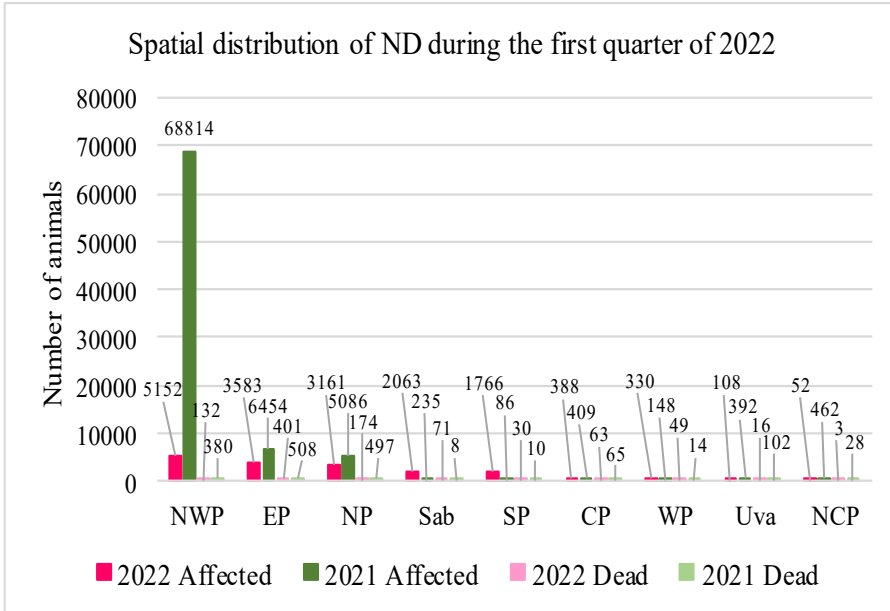
Gumboro is one of the main avian disease in Sri Lanka which affect the poultry industry. Since this is highly contagious disease with high morbidity and high mortality rates, vaccination of birds at very young age is being practiced in Sri Lanka as the main preventive measure.

During the first quarter of 2022, very low number of cases were reported, when comparing to 2021. It is 83.66% reduction of affected birds number. Highest number of cases (1374 cases as 41.73% of total affected population) was reported from North Western province where has highest poultry population. In 2022 first quarter it was 1374 and in previous year it was 10065 during the same quarter. During the same quarter of both years, North western province shows the highest affected: death ratio as 50.32 in 2021 and 41.63 in 2022. Least amounts of cases

were reported from Western and Uva province as 3 and 2 cases respectively while North Central province did not report any case.

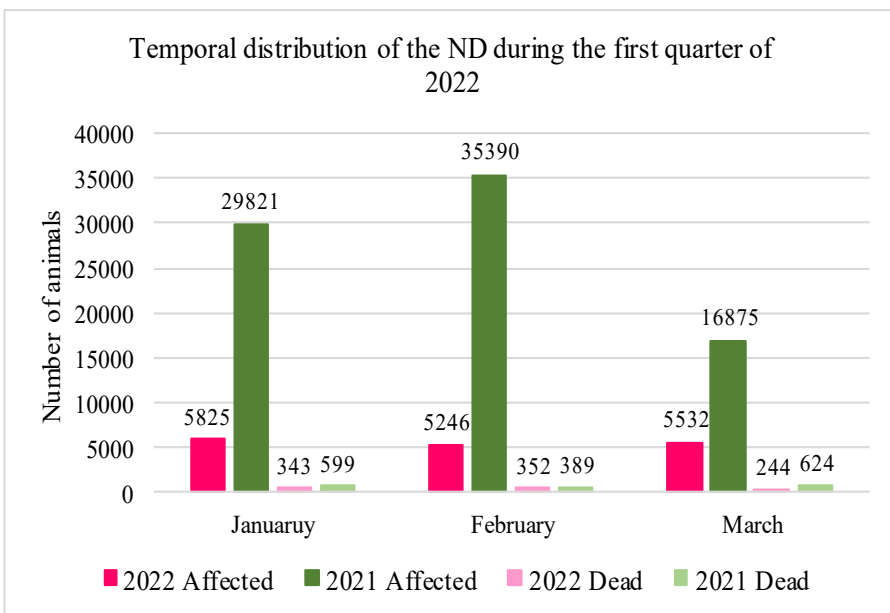
Temporally highest number of cases reported in January of current year (1693 cases), as it is 51.42% of total number of cases. But in previous year, highest number of cases (8394 cases) were reported in March of the corresponding quarter as 41.62% of total affected birds. According to the reported data, highest affected: death ratio (30.82) was reported from January of 2021 and lowest affected: death ratio was reported from February of 2022 as 8.48.

2.3.3 Newcastle Disease:



Newcastle disease is the mainly concern avian disease in Sri Lanka which has huge potential to negatively affect on poultry industry of the country.

During the first quarter of 2022 total diseased cases were reported as 16603 with 939 deaths. It is a 79.77% decrease of total cases when comparing the same quarter of the previous year. Majority of cases were reported from North western province as 5152 cases, which is 31.03% of total number of cases. Eastern and Northern provinces also reported considerable amounts of cases while North-central province reported least number of cases as 52 with 3 deaths.



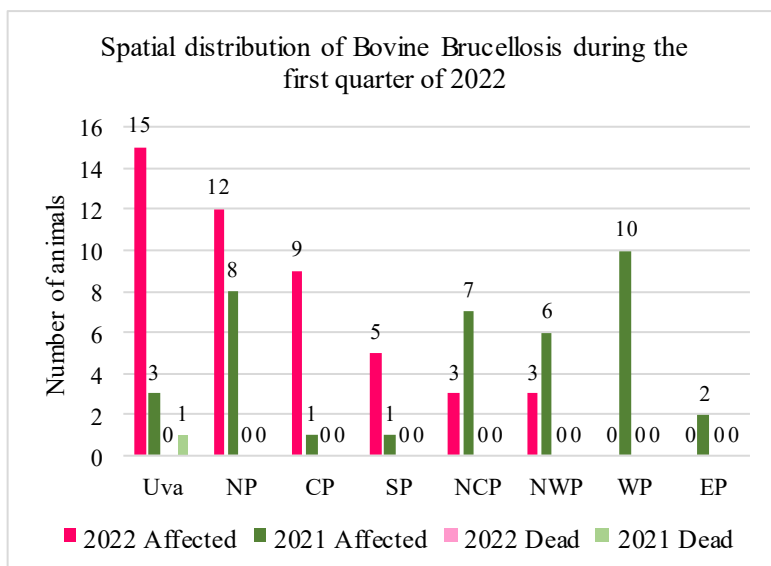
Temporal distribution of the ND shows the highest incidence in January month, which is 35.08% out of total reported cases during the period. The disease incidence throughout the period of 2022 first quarter is not show significant

fluctuation and the average number of cases per month is 5534. But it has been significantly deviated from the distribution pattern of the corresponding quarter of the previous year.

Preventive vaccination program for the disease carry out by DAPH in each province with the participation of range veterinary surgeons. It is a live oral vaccine which prepared in VRI. According to the reported vaccination data, cumulatively 974559 number of birds were vaccinated against ND under this program, during the first quarter of 2022. Majority of them were used in Northern and Eastern provinces of the country.

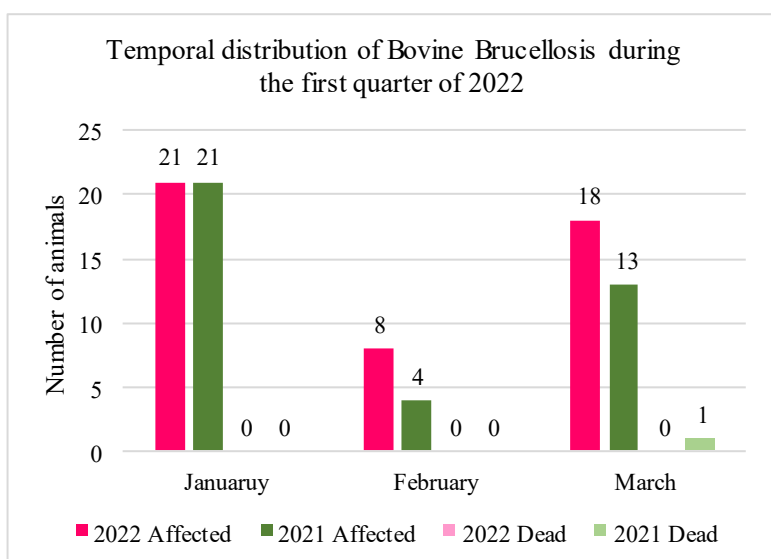
3. Status of Zoonotic Diseases : First Quarter (Jan - March) - 2022

3.1 Bovine Brucellosis :



In the first quarter of 2022, Bovine brucellosis has been reported only from six provinces of Sri Lanka. Among them, highest incidence was reported from Uva province as 15 cases, while lowest incidence was from North Western and North Central Provinces as 3 cases.

With regard to the temporal distribution of the disease during the considering period of 2022, though the disease incidence has been fluctuated, it shows the similar temporal pattern to the distribution of previous year.

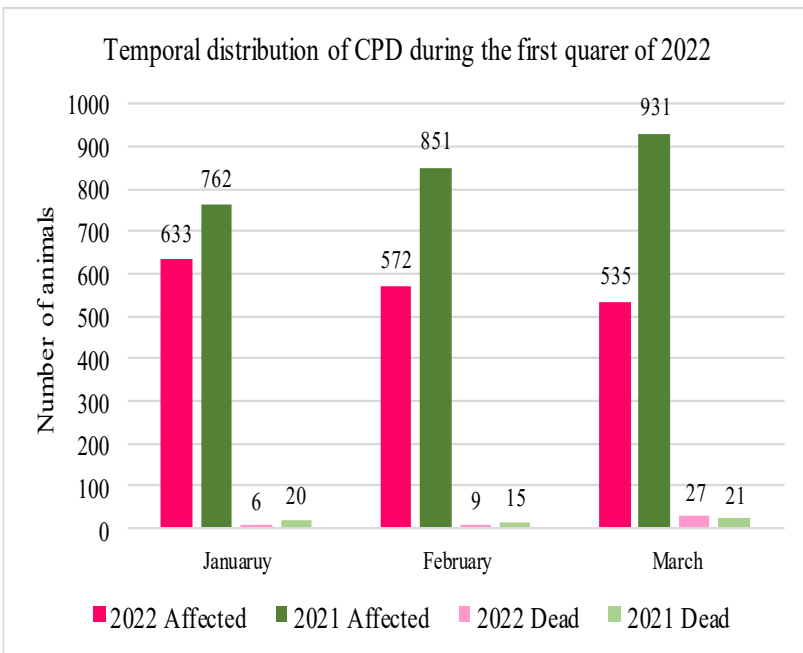
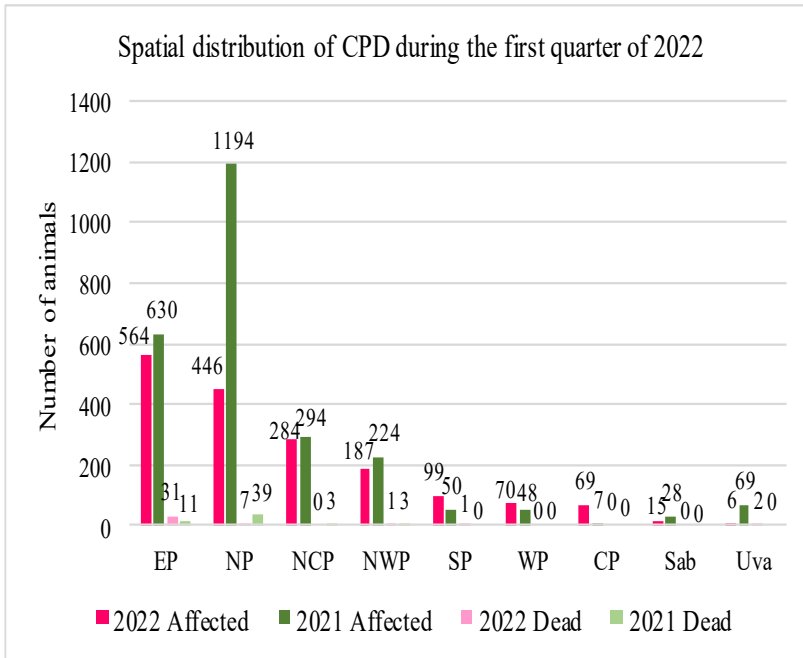


In conclusion, both graphs clearly show the increase in reported number of affected animals in 2022 first quarter than the corresponding quarter of 2021. The increment is 23.68%.

In order to control the Brucellosis in Sri Lanka, Brucellosis vaccination and Surveillance Program conduct with the collaboration of VICs and VRI. Under this program, 2191 animals were vaccinated with S19 Brucella vaccine during the first quarter period. 801 farms were screened by VIOs to identify the infected farms. Further, 355 animals in MRT positive farms were subjected to RBPT. Totally, 135 samples were tested with RBPT by VRI and 28 of them were positive. 92.85% of RBPT positive samples were got positive for CFT, confirming the presence of Brucella in 26 samples.

Number of dairy herds screened by VIOs with MRT	801
No. of animals screened by VIOs in suspected herds with RBPT	355
Number of samples submitted by VIOs to VRI for CFT	75
Number of animals vaccinated with S19 vaccine	2191
Total number of samples subjected to RBPT (by VRI)	135
Number of RBPT positive samples	28
Number of CFT positive samples	26

3.2 Contagious Pustular Dermatitis:

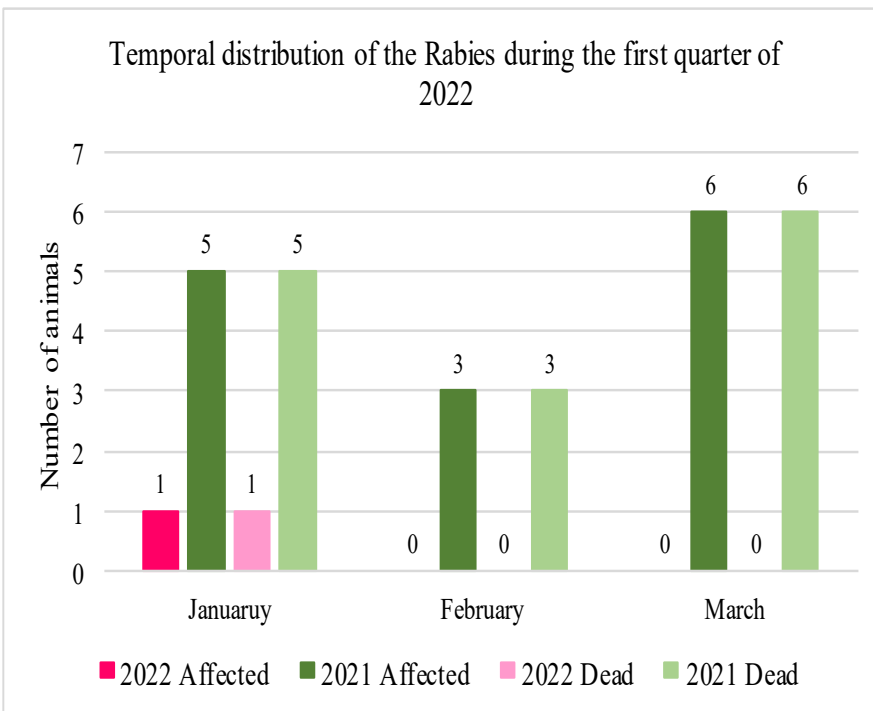
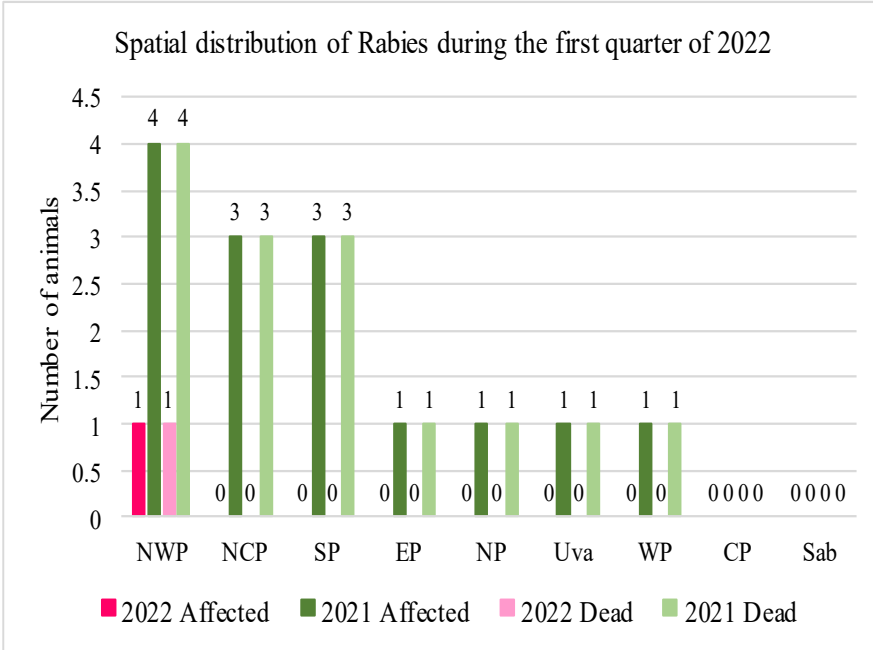


Contagious Pustular Dermatitis is a common caprine disease in Sri Lanka, which usually report from all nine provinces of the country during the all four quarters. The total number of cases reported during the first quarter of 2021 was 1740 and 42 deaths. It is 31.6% reduction in reported cases, as 2544 cases and 56 deaths were reported during the same time period of previous year. Highest number of cases were reported from Eastern province, it is 32.41% from total reported CPD cases. Lowest number of cases was reported from Uva province as only 6 cases. Greatest reduction of the reported cases can be seen in Northern province, as 62.64% of reduction than the first quarter of 2021. According to the spatial distribution, in both years the highest number of cases were reported from Northern and Eastern provinces where have higher goat population.

Temporal distribution shows converse pattern of the disease in the first quarter of 2021 and 2022. In 2022, the number of cases has been gradually decreased although it has been gradually increased in 2021.

In order to control the CPD disease, vaccine production and distribution are done by Veterinary Investigation Officers in each district Veterinary Investigation Center. Under this, totally 24 goat farms were vaccinated during the first quarter of 2022 with the aim of control the disease when outbreak of the disease in the herd. Out of these 24 farms 20 of them were located in Northern province, where usually report higher incidence of the disease.

3.3 Rabies:



Rabies is a multi-species fatal disease which can affect mammals like cattle, buffalo, goats, sheep, dogs, cats as well as humans. Though the disease is present in the country, reported rabid cases are very less in number according to the disease data of past few years.

During the first quarter of 2022 only one case of Goat rabies was reported from North Western province of the country. In previous year same quarter it was reported 14 Rabies cases and all were died by the disease. According to the reported data, there is 92.85% reduction of reported rabid cases than the first quarter of previous year.

Major source for the Rabies in livestock is dog bite or wild animal attacks. In order to minimize the disease risk to humans and animals, routine vaccination of vaccinate domestic and stray dogs are done by the Health Ministry as well as private veterinary practitioners of the country.

3.4 Highly Pathogenic Avian Influenza:

3.4.1 National HPAI Surveillance Program:

Avian Influenza Control Program	
1. No. of serum samples collected	1085
2. No. of dropping samples collected from Hotspots	2361
3. No. of cloacal swabs (Backyard) collected	2096
4. No. of sample collected from live bird market	261
5. No. of Cloacal swabs collected from pet bird Establishments	36
7. No. of Duck serum samples collected	155
8. No. of Duck cloacal swabs collected	147

Active surveillance program against Highly Pathogenic avian Influenza of Sri Lanka, consists with sero-surveillance in commercial poultry and epidemiological surveillance (fresh droppings and cloacal swabs) in migratory birds, pet birds and backyard poultry.

Sample collection is carried out by VIOs, based on the bird population of their respective areas. During the first quarter of 2022, total collection of serum samples is 1240 from commercial poultry and duck. The number of fresh droppings and cloacal swabs collected from migratory birds hotspots, backyard poultry, pet bird establishment, ducks and live bird market is 4901.

The collected samples are tested in VRI. As reported by, out of 365 number of serum samples and 2688 fresh droppings and cloacal swab samples which were tested during this quarter, none of them were positive for HPAI. During the same quarter of the previous year also showed all negative test results for HPAI. Hence, still Sri Lanka remains as a disease free country for Highly Pathogenic Avian Influenza.

Se. No	District VIC	Serum samples from commercial poultry		Fresh droppings and cloacal swabs of migratory birds & Backyard poultry	
		No. tested	Results	No. tested	Results
1	Badulla	0	–	20	Negative
2	Batticaloa	75	Negative	45	Negative
3	Chilaw	150	Negative	966	Negative
4	Dambulla	0	–	55	Negative
5	Hambanthota	32	Negative	181	Negative
6	Kegalle	8	Negative	39	Negative
7	Kalutara	46	Negative	30	Negative
8	Moneragala	30	Negative	0	–
9	Mullathivu	0	–	35	Negative
10	Polonnaruwa	40	Negative	55	Negative
11	Rathnapura	0	–	150	Negative
12	Vavuniya	0	–	675	Negative
13	Wariyapola	150	Negative	405	Negative
14	Pannala	60	Negative	85	Negative
15	Ampara	0	–	150	Negative
16	Anuradhapura	30	Negative	315	Negative
17	Jaffna	0	–	465	Negative
18	Kilinochchi	0	–	240	Negative
19	Kundasale	0	–	83	Negative
	Total	356		2688	

3.4.2 Global Distribution of Notifiable Avian Influenza:

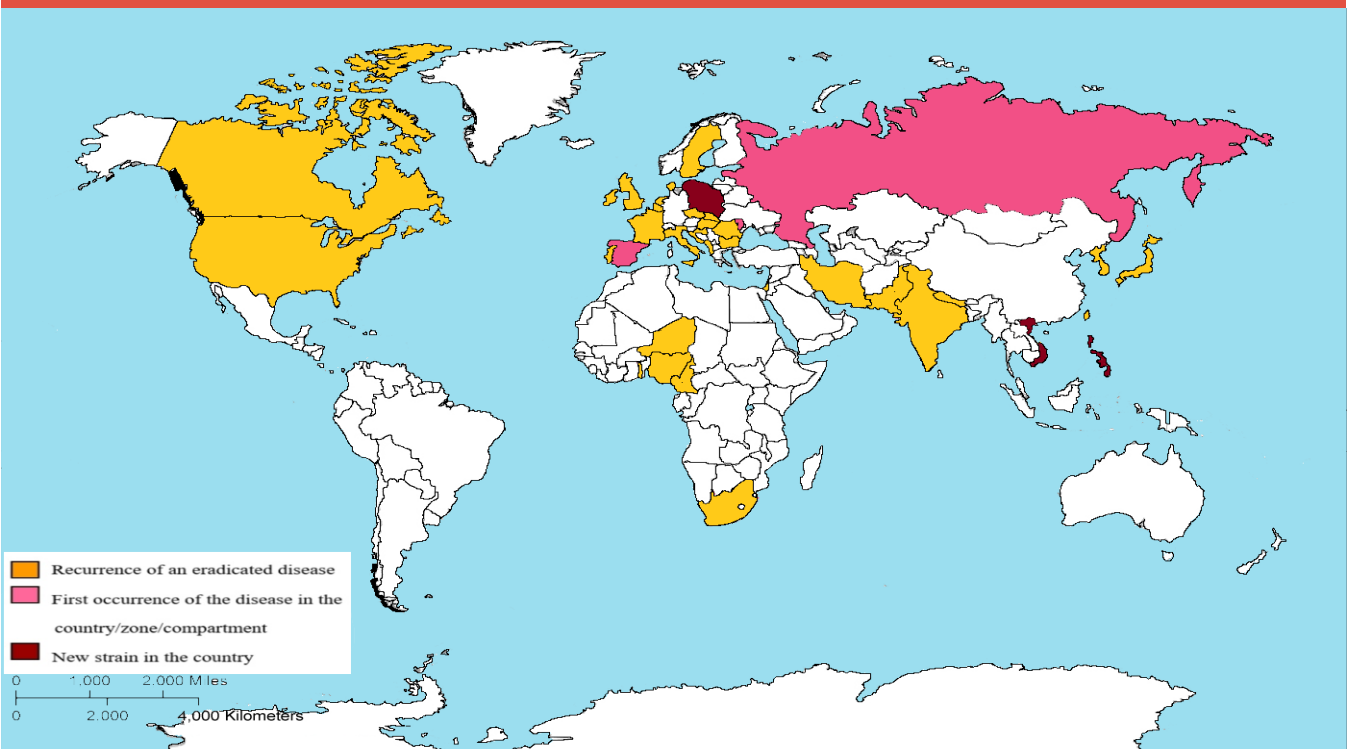
Avian influenza (AI) is a highly contagious viral disease that affects both domestic and wild birds. This complex disease is caused by viruses divided into multiple subtypes (i.e. H5N1, H5N3, H5N8 etc.) whose genetic characteristics rapidly evolve. The disease occurs worldwide, but different subtypes are more prevalent in certain regions than others.

During the first quarter of 2022, H5N1 recurrences reported from Niger, Cameroon, Romania, Spain, Russia, Denmark, Hong Kong, Nepal, Eryngo, Namibia, Senegal, Germany and UK. H5N8 recurrences reported from Denmark. These new disease information were reported to WOAHP through immediate notifications.

Ongoing events of the previous disease outbreaks were reported through follow-up reports from different countries of the world. According to them, subtype H5N1 reported from South Africa, Israel, Japan, Korea, Vietnam, Nepal, Philippines, Korea, Czech Republic, France, Germany, Hungary, Ireland, Italy, Netherland, Poland, Belgium, UK, USA, Canada, Austria, Portugal, Slovakia, Spain, Greece, Lithuania and Switzerland while H5N8 was reported from Korea.

According to the Global Situation Update Reports of OIE, there were 864 new outbreaks in poultry and 786 new outbreaks in non poultry were reported from different countries and territories worldwide.

3.4.3 Global Situation of Notifiable Avian Influenza outbreaks:



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