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Listeriosis in Ruminants

Listeriosis is a sporadic bacterial infection that affects a wide range of animals, including humans and birds. Encephalitis or meningoencephalitis in adult ruminants is the most frequently recognized form. It is an infectious disease caused by a bacterium, *Listeria monocytogenes* and seen in worldwide, more frequently in temperate and colder climates.

The reservoirs of the infection are soil and the intestinal tracts of asymptomatic animals. Infected animals can shed *L. monocytogenes* in the feces, milk and uterine discharges. It also found in the aborted fetuses and occasionally in the nasal discharges and urine of asymptomatic animals. Soil or fecal contamination results in its presence of plant and in silage. Most infections are acquired through oral rout, but also it can spread by inhalation or direct contact.

Listeriosis also called 'Circling Disease' or 'silage sickness', is a disease of worldwide occurrence that can affect all ruminants as well as other animal species and humans. The number of animals clinically affected in an outbreak usually is <2%, but occasionally it may higher as 10% -30%.In sheep/ goat flocks the recovery rate is usually around 30% with aggressive and prompt treatments, but in cattle, it may higher as 50%. The abortion rate varies and may reach 20% in sheep/ goat flocks. Although this is an uncommon disease in swine, <1 month old piglets have high risk to get the disease and fatal course of 3-4 days.

Prevention is the key to listeriosis. In livestock industry, feeding of spoiled silage and other rotten vegetation should be avoided and any sick animals should be isolated from health animals. Good hygiene and sanitation on the farm is also important.

All materials from suspected cases of listeriosis carries the risk of zoonotic infection and should be handled with caution. Humans have developed fatal meningitis, sepsis, popular exanthema on arms after handling infected materials. Pregnant women should be protected from infection because of danger to fetus, with possible abortion and stillbirth. Since it is virtually impossible to produce *Listeria*-free food products, because *L. monocytogenes* infects many animal species and the bacterium can grow at refrigeration temperature levels. Prevention include thoroughly washing raw vegetables, thoroughly cooking raw meats, proper hygiene during food preparation and humans at risk should also avoid contact with animals that have aborted as well as with aborted materials on farm. Finally livestock crop producers can help in control the spread of *L. monocytogenes* by avoiding the use of untreated manure on vegetable crops.

Etiology

Listeria monocytogenes is a small, motile, gram-positive, nonspore-forming, extremely resistant, diphtheroid coccobacillus that grown in wide temperature range 4° – 44°C (39°—111°F). Its ability to grow at 4°C is an important diagnostic aid for isolation of organism.

Epidemiology

Primary isolation of the organism is enhanced under microaerophilic conditions. It is a ubiquitous saprophyte that lives in a plant-soil environment and that has been isolated from at least 42 species of domestic and wild mammals and other feedstuffs, milk, cheese, meconium, feces, and soil.

The natural reservoir of *L. monocytogenes* appear to be soil and mammalian GI tracts, both of which contaminate vegetation. Grazing animals ingest the organism and further contaminate vegetation and soil. Animal to animal transmission occurs via the fecal-oral route. Animal to human transmission is either directly through contact with infected animals or directly via milk, cheese, meat, eggs or vegetables.

Pathogenesis

Listeriosis affects all ages and sexes, but animals less than three years of age are more commonly prone clinical disease than older animals. The disease is seen clinically in animals as one of four forms. Adult animals usually get the encephalitis form when *L. monocytogenes* ascends the trigeminal nerve, while neonates get the septicemic or visceral form of the disease. Cattle and sheep can also get the abortion from the disease if there is an intra-uterine infection of the fetus. The fourth form is ophthalmitis, which associate bacterial contamination of cornea. Some lactating ruminants may also have clinical mastitis due to listeriosis.

Clinical Signs

The disease course in sheep and goat is rapid, and death may occur 24-48 hours after onset of clinical signs. In cattle, the disease course is less acute. And the recovery rate is higher than goat/sheep. Listeric encephalitis animals initially anorectic, depressed, and disoriented. They may propel themselves into corners, lean against stationary objects, or circle towards the affected side. Facial paralysis with a drooping ear, deviated muzzle, flaccid lip, and lowered eyelid on affected side, lack of menace response, salivation, paralysis of masticatory muscles.

Terminally animals fall, unable to rise, lie on the same side and involuntary running movements are common.

Diagnosis

Suspected based on clinical signs of asymmetric brain-stem dysfunction with depression. Definitive diagnosis can only be made postmortem by histopathology of pontomedullary region of the brain-stem. The characteristic microscopic lesions include multifocal asymmetrical micro-abscesses and mononuclear cell meningoencephalitis in the brain stem. Peroxydase - antiperoxydase test, a more accurate diagnostic test than histopathology, is used to detect degraded bacterial proteins as well as intact bacteria. Confirmation can be done by bacterial culture or immunofluorescence assay.

Listeriosis should be differentiated from pregnancy toxemia, ketosis, BSE, rabies and lead poisoning.

Treatment

Listeriosis is treated with antibiotics, depending on the form of the disease, treatment period may extend up to six weeks or more. Recovery of the disease depends on early, aggressive antimicrobial treatments.

Penicillin should be administered at a dosage of 22,000U/kg wt every 12 hours for 1-2 weeks. Intravenous oxytetracycline (16.5mg/kg per day) is also effective and results in high plasma OTC concentrations that attaining effective antimicrobial concentrations in the brain stem. Supportive therapy including fluid and electrolytes, high dose of dexamethasone (1mg/kg, IV) considered as beneficial.

Control and Prevention

Risk of listeriosis can be lowered by feeding good quality silage with low pH and avoid spoiled or moldy silage. In an outbreak, affected animals should be segregated, if silage is being fed, use of the particular silage should be discontinued as a trial. Rodent control will prevent spread of bacteria. Infected milk also hazardous, because the organism may survive in certain forms of pasteurization.

Results of vaccination is questionable due to sporadic nature of the disease which lead to questions about the cost-benefit of the vaccine.

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

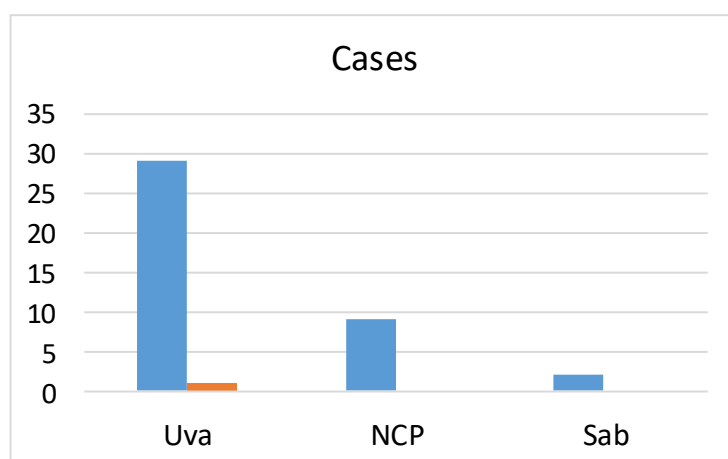
2. Status of Livestock Diseases 3rd Quarter - (July - Sept) 2021

2.1 Bovine Diseases

2.1.1 Bovine Brucellosis :

40 clinically suspected cases of Brucellosis has been reported from three provinces of the country during the third quarter of 2021. The highest disease incidence found in the Uva province (72.5%). As reported by VRI throughout the period, 23 serum samples were subjected to RBPT and 10 were positive and all those were got positive for CFT test as well.

Provincial Distribution – 3rd Quarter 2021

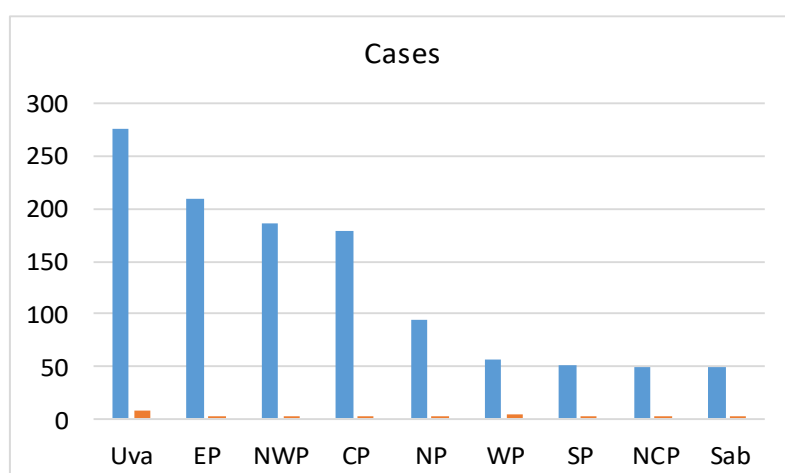


Province	Cases	Deaths
Uva	29	1
NCP	9	0
Sab	2	0
Total	40	1

2.1.2 Bovine Babesiosis :

During the respective period, 1151 Bovine Babesiosis cases and 23 deaths were reported in Island wide. Pre-immunization program against Bovine Babesiosis was carried through Veterinary investigation Centers of the country. As a result of vaccination, the number of cases have been reduced to 1151, when comparing with the 1406 cases reported in the same quarter of previous year. Majority of cases were found in the Uva, Eastern and North Western Provinces where as the North Central province and Sabaragamuwa provinces had very limited number of cases. Comparison shows decrease in cases as 1406 cases were reported in the third quarter 2020

Provincial Distribution – 3rd Quarter 2021



Province	Cases	Deaths
Uva	277	7
EP	209	1
NWP	186	2
CP	178	1
NP	94	1
WP	57	4
SP	51	1
NCP	50	3
Sab	49	3
Total	1151	23

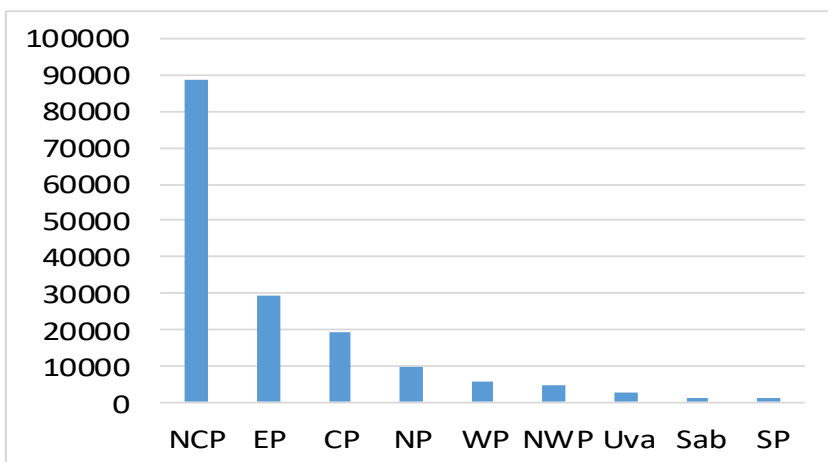
2.1.3 Black Quarter :

As reported during the third quarter of 2021, there were 7 Black Quarter cases and 3 deaths in North Western province of Sri Lanka . In 2020, there were no cases reported during the particular time period. Throughout the corresponding quarter, 32935 of BQ vaccination were carried out island wide to minimize the disease incidence and deaths due to BQ.

2.1.4 Foot and Mouth disease:

During the third quarter of 2021, Foot and Mouth Disease cases were not reported from any province of the country. In comparison with disease status of 2020 , 93 cases and 03 deaths were reported in the corresponding quarter. A total of 162,178 vaccination were carried out island wide during the same period in order to prevent the disease outbreaks.

FMD Immunization – 3rd Quarter 2021



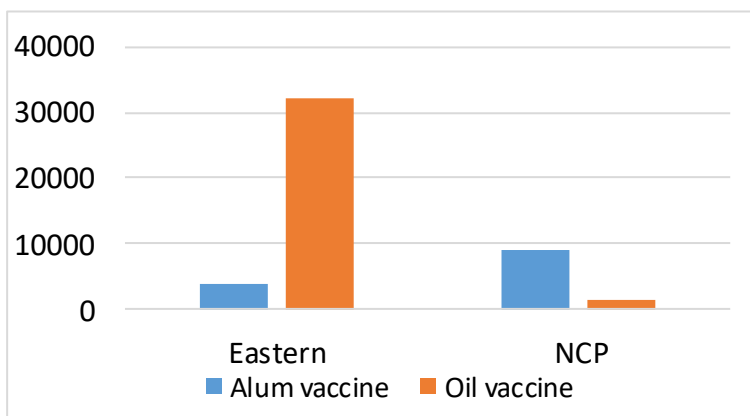
Province	Immunization
NCP	88,856
EP	29,209
CP	19,431
NP	9,491
WP	5,504
NWP	4,531
Uva	2,744
Sab	1,314
SP	1,098
Total	162,178

2.1.5 Hemorrhagic Septicemia :

Totally 27 cases were reported in the third quarter of 2021, from Batticaloa district of Eastern province without any deaths.

The comparison shows a slight decrease of cases by 03 , throughout the particular period of 2020. Totally of 46,620 vaccinations (HS Alum 13,033 and HS Oil 33,587) were carried out Island wide during the same period.

**HS Immunization –
3rd Quarter 2021**

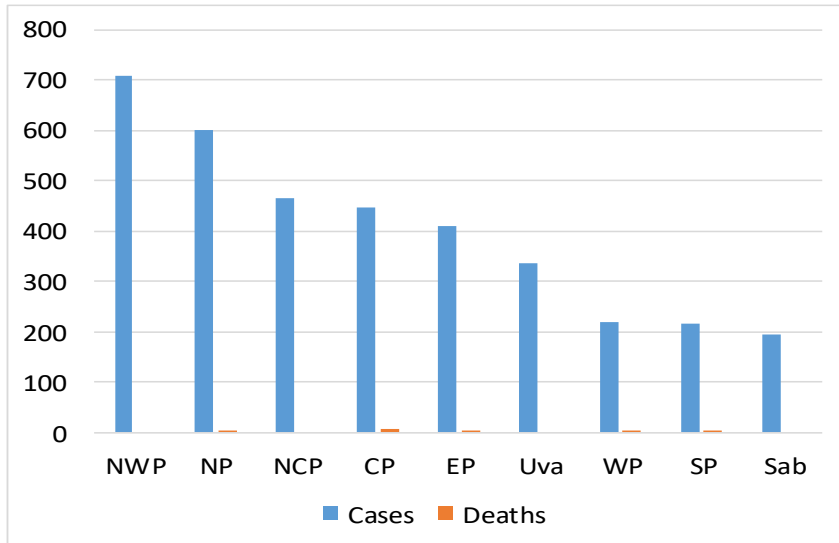


Province	Alum vaccine	Oil vaccine
Eastern	3,897	32,222
NCP	9,136	1,365
Total	13,033	33,587

2.1.6 Mastitis :

Total number of Mastitis cases during the third quarter of the year 2021, were 3603 with 12 deaths. Majority of them were found in North Western and Northern Provinces. In comparison to the year 2020, significant reduction of cases can be seen in this year as it was 4666 cases in previous year. 30.5 liters of CMT reagent and 245.5 liters of teat dip solution have been issued to the field by Veterinary Investigation Centers in order to control mastitis. As well as 18 ABST and 301 CMT screenings were done by VIOs spread in island wide during the same period of 2020.

Provincial Distribution – 3rd Quarter 2021



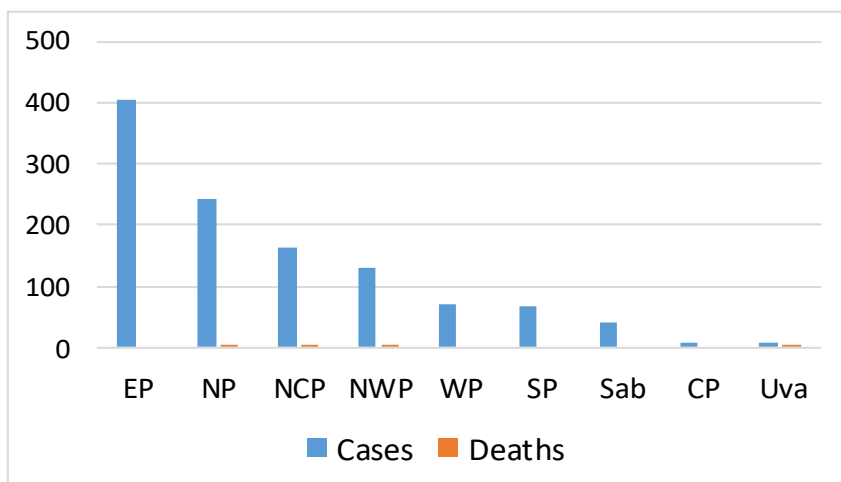
Province	Cases	Deaths
NWP	710	0
NP	600	1
NCP	466	0
CP	447	6
EP	410	1
Uva	338	0
WP	221	1
SP	217	3
Sab	194	0
Total	3603	12

2.2 Caprine Diseases :

2.2.1 Contagious Pustular Dermatitis :

During the corresponding quarter of 2021 Contagious Pustular Dermatitis cases were reported from all 9 provinces of the country. While Eastern and Northern Provinces recorded the higher incidence of the disease as 404 and 242 respectively, total amount of the country was recorded as 1134 cases with 9 deaths. In comparison to the 2020 (1626 cases with 21 deaths), significant decrease of the disease status can be seen in this year particular quarter.

Provincial Distribution 3rd Quarter 2021



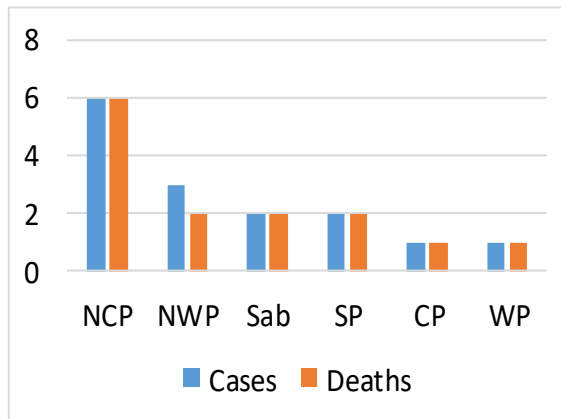
Province	Cases	Deaths
EP	404	0
NP	242	1
NCP	162	3
NWP	131	4
WP	72	0
SP	68	0
Sab	41	0
CP	8	0
Uva	6	1
Total	1134	9

2.3 Multi Species Diseases : Rabies

15 rabies cases have been reported from six provinces in the country during the third quarter of 2021, while North Central province recording nearly 40% of rabies cases.

In the same quarter of 2020, 26 rabies cases were reported.

Provincial Distribution - 3rd Quarter 2021



Province	Cases	Deaths
NCP	6	6
NWP	3	2
Sab	2	2
SP	2	2
CP	1	1
WP	1	1
Total	15	14

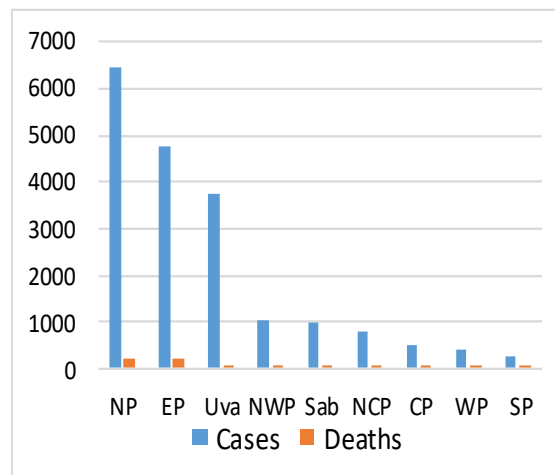
2.4 Poultry Diseases :

2.4.1 Fowl Pox :

A total of 18942 Fowl Pox cases with 548 deaths were reported from Island wide and the majority of cases have been reported from Northern province of the country.

In the third quarter of 2020, 17893 fowl pox cases and 767 deaths had been reported from Island wide.

Provincial Distribution - 3rd Quarter 2021



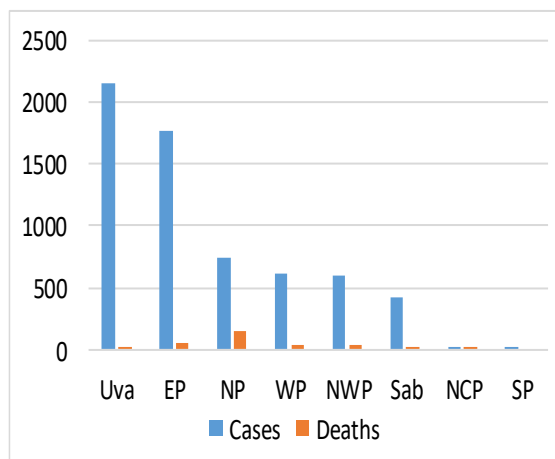
Province	Cases	Deaths
NP	6441	232
EP	4777	199
Uva	3737	17
NWP	1043	16
Sab	974	5
NCP	776	32
CP	514	23
WP	413	14
SP	267	10
Total	18942	548

2.4.1 Gumboro Disease :

In the third quarter of 2021, 6330 cases of Gumboro with 302 deaths have been reported from Island wide. Majority of them were reported from North Western province.

Comparison with the same quarter of the previous year reveals a significant decrease of cases as it was 11881 cases and 1255 deaths in 2020.

Provincial Distribution - 3rd Quarter 2021

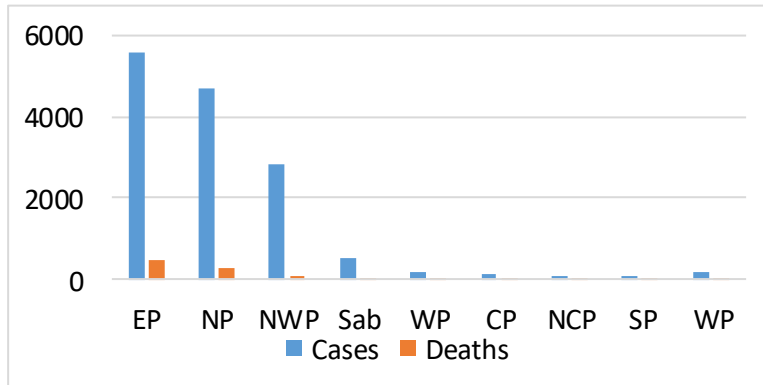


Province	Cases	Deaths
Uva	2150	10
EP	1776	55
NP	738	152
WP	613	32
NWP	605	34
Sab	420	12
NCP	27	7
SP	1	0
Total	6330	302

2.4.2 Newcastle Disease :

A total cases of New Castle Disease and deaths were reported as 14185 and 891 respectively in the third quarter of 2021. The majority of cases were reported from Eastern province. Comparison shows a noticeable decrease in cases and deaths as 20980 cases with 3000 deaths reported in the third quarter 2020. Totally 682,248 vaccination were carried out island wide in the third quarter 2021.

Provincial Distribution 3rd Quarter 2021



Province	Cases	Deaths
EP	5609	462
NP	4692	268
NWP	2840	61
Sab	538	25
WP	190	31
CP	149	23
NCP	98	9
SP	52	9
WP	190	31
Total	14185	891

3. Highly Pathogenic Avian Influenza :

3.1 National HPAI Surveillance Programme :

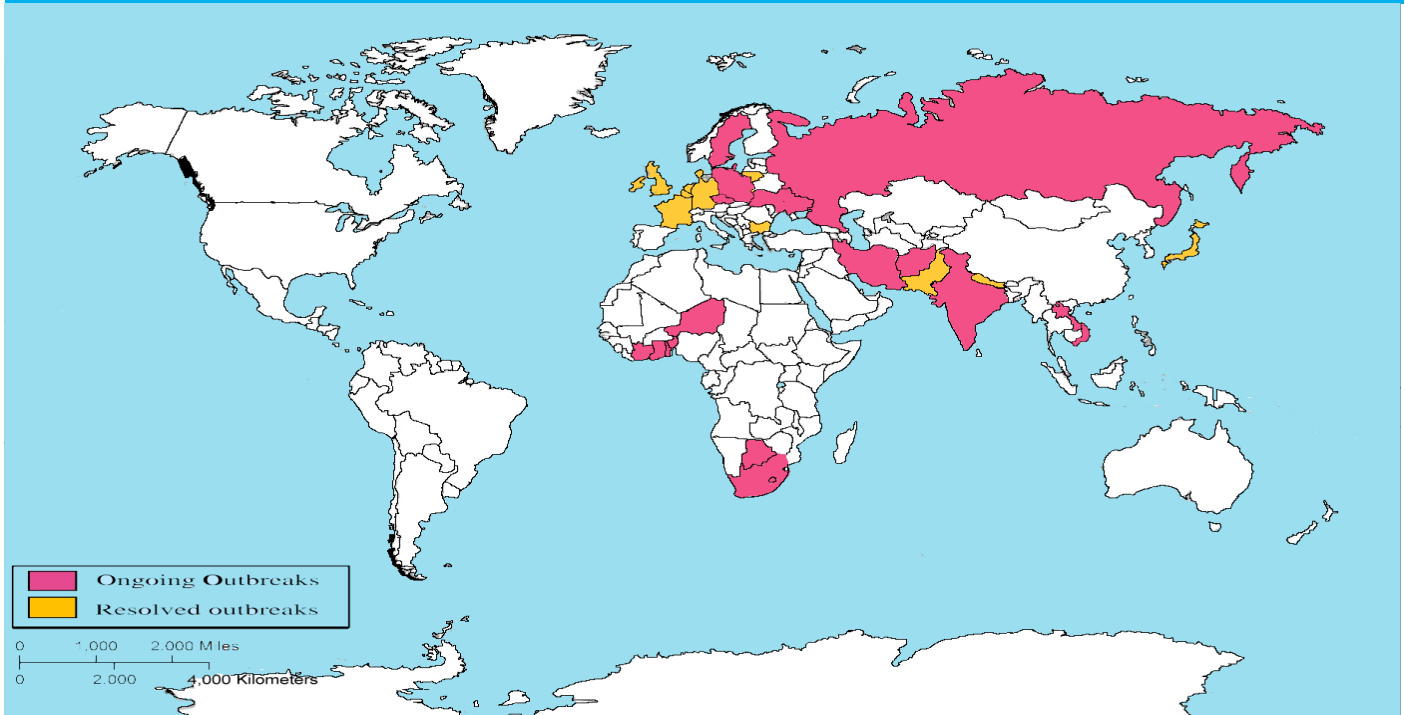
Se. No.	District	Serum Samples (Commercial Poultry)		Pools dropping (Migratory Birds) & Cloacal swabs (back yard poultry)	
		No. of Samples	Result	No. of Samples	Result
1	Ampara	-	-	-	-
2	Anuradhapura	-	-	270	Negative
3	Badulla	15	Negative	-	-
4	Batticaloa	-	-	45	Negative
5	Chilaw	-	-	-	-
6	Dambulla	-	-	-	-
7	Galle	-	-	-	-
8	Homagama	-	-	-	-
9	Jaffna	-	-	-	-
10	Mambanthota	-	-	-	-
11	Kalutara	-	-	-	-
12	Kegalle	-	-	-	-
13	Kilinochchi	-	-	-	-
14	Kundasale	-	-	-	-
17	Mullaitivu	-	-	-	-
18	Nuwara Eliya	-	-	-	-
19	Pannala	-	-	-	-
20	Polonnaruwa	-	-	-	-
21	Ratnapura	-	-	-	-
22	Trincomalee	-	-	125	Negative
23	Vavuniya	-	-	-	-
24	Wariyapola	-	-	-	-
25	Welisara	-	-	95	Negative
Total		15		535	

3.2 Global Distribution of Notifiable Avian Influenza :

Active surveillance against Highly Pathogenic Avian Influenza consist with clinical surveillance, sero-surveillance in commercial poultry and epidemiological surveillance on migratory birds and backyard poultry. Total of 15 serum samples, 535 pooled droppings and cloacal samples were collected representing 4 districts in country during the third quarter of the year 2021. All the samples were declared as negative for the Highly Pathogenic Avian Influenza Virus and this result was confirmed by the Animal Virus Laboratory, Polgolla.

According to the OIE records on HPAI global situation, nineteen countries (Poland, Laos, Togo, S. Africa, Russia, Vietnam, India, UK, Botswana, Benin, Iran, Cote D'Ivoire, Netherland, Niger, Sweden, Ukraine, Afghanistan, France, Ghana) in the world have reported ongoing HPAI status and ten countries (Bulgaria, Lithuania, Nepal, Pakistan, Chinese Taipei, Ireland, Denmark, Czech republic, Japan, Germany) have resolved their disease status by the end of the 3rd quarter of 2021.

3.3 Global Situation of Notifiable Avian Influenza outbreaks :



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