



ANIMAL DISEASE SURVEILLANCE WEST BENGAL

**ANNUAL REPORT
2018-2019**



EPIDEMIOLOGICAL UNIT
DIRECTORATE OF ANIMAL RESOURCES AND ANIMAL HEALTH
GOVERNMENT OF WEST BENGAL

পশ্চিমবঙ্গ সরকার
প্রাণী সম্পদ ও প্রাণী স্বাস্থ্য অধিকার

দূরভাষ : (০৩৩) ২৩৩৫ - ১১৪৫

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ফ্যাক্স : (০৩৩) ২৩৩৫ - ১১৮৭

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PREFACE

The livestock sector constitutes the backbone of the agriculture sector in terms of income, employment generation, sustainability and foreign exchequer earnings for the stakeholders of the industries related to the sectors along with the Government. Along with food production, it is an important source of draught power, manure for crop production and fuel for domestic use. Thus, livestock make a positive contribution to the socio-economic development. The growth in the livestock sector is likely to contribute to poverty alleviation, as the livestock elements are largely concentrated among the marginal and small farmers in rural areas. Consequently, the impact of animal diseases in domesticated birds and livestock can be huge and diversified in the form of short fall in supply of animal foods particularly animal proteins, economic loss of the producer-farmers, deterioration of food quality and safety, loss of jobs and human health hazards through zoonotic diseases.

In this context, the Annual Report of Animal Disease Surveillance (ADS) of West Bengal for the year 2018-19, which contains the records of notifiable livestock and poultry diseases prevailed in the state, proclaims a vast implication through the promising activities of the Directorate of Animal Resources and Animal Health under the Animal Resources Development Department of our state. The data obtained from the districts on different animal diseases scenario with morbidity, mortality etc. are documented, analyzed and presented in this Annual Report by the Epidemiological Unit of the Directorate through Animal Disease Surveillance under Central Sponsored Scheme, 'ASCAD'. Judicious prophylaxis measures would aptly be implemented to reduce the incidence of animal diseases prevalent in our state, on the basis of the seasonal occurrence and geographical distribution depicted in this e-publication.

I sincerely aspire that this e-publication would help one and all engaged in the prevention and control of the dreadful animal diseases and thereby minimising the loss through occurrence of animal diseases, help augmenting the growth of the economy centred on livestock sector of our state.

[Dr. (Capt.) A.G. Bandyopadhyay]
Director of Animal Husbandry &
Veterinary Services, West Bengal

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- * Anthrax
- * Haemorrhagic Septicaemia
- * Black Quarter
- * Blood Protozoan Disease
- * Equine Infectious Anaemia
- * PPR
- * Goat Pox
- * Swine fever
- * Avian Influenza
- * Ranikhet Disease
- * Infectious Bronchitis
- * Infectious Bursal Disease
- * Duck Plague
- * Fowl Pox
- * Fowl Cholera
- * Avian Salmonellosis

INTRODUCTION

The Epidemiological Unit, Directorate of Animal Resources and Animal Health under Animal Resources Development Department, Government of West Bengal, had been rendered a centrally sponsored Scheme i.e. the Animal Disease Surveillance since 1979.

SCHEME

NAME OF THE SCHEME	ANIMAL DISEASE SURVEILLANCE
LOCATION OF THE UNIT	EPIDEMIOLOGICAL UNIT INSTITUTE OF ANIMAL HEALTH & VETERINARY BIOLOGICALS, 37 BELGACHIA ROAD, KOLKATA-700037
AREA OF OPERATION	WEST BENGAL

The West Bengal is divided in three administrative divisions consisting of a group of districts in each division.

DIVISION	DISTRICTS
A. PRESIDENCY DIVISION	Kolkata, North 24 Parganas, South 24 Parganas, Howrah, Nadia and Murshidabad
B. BURDWAN DIVISION	Purba Burdwan, Paschim Burdwan, Hooghly, Birbhum, Bankura, Purba Medinipur, Paschim Medinipur, Jhargram and Purulia
C. JALPAIGURI DIVISION	Jalpaiguri, Alipurduar, Coochbehar, Darjeeling, Kalimpong, Uttar Dinajpur, Dakshin Dinajpur and Malda.

But for smooth running of the Departmental works, Animal Resources Development Department creates four Administrative zones headed by Joint Director in each zone.

ZONE	DISTRICT
PRESIDENCY	Kolkata, North 24 Parganas, South 24 Parganas, Howrah, Purba Medinipur
BURDWAN	Purba & Paschim Burdwan, Hooghly, Paschim Medinipur, Bankura, Purulia
MURSHIDABAD	Murshidabad, Nadia, Birbhum, Malda
JALPAIGURI	Coochbehar, Alipurduar, Jalpaiguri, Darjeeling, Uttar Dinajpur, Dakshin Dinajpur

STAFF PATTERN

- | | | |
|--|-----------------------|-------|
| a) Deputy Director, ARD (Microbiology) | - W.B.H.A.H. & V.S. | - One |
| b) Assistant Director, ARD (Vety. R & I) | - W.B.A.H. & V.S. | - Two |
| d) English Stenographer | - Ministerial Service | - One |
| e) Peon | - Group 'D' | - One |

Dr. Arnab Das, Assistant Director, ARD, IAH&VB was the only person in this Unit and officiating the duties as In-charge, Deputy Director, ARD, Epidemiological Unit during the reporting Period.

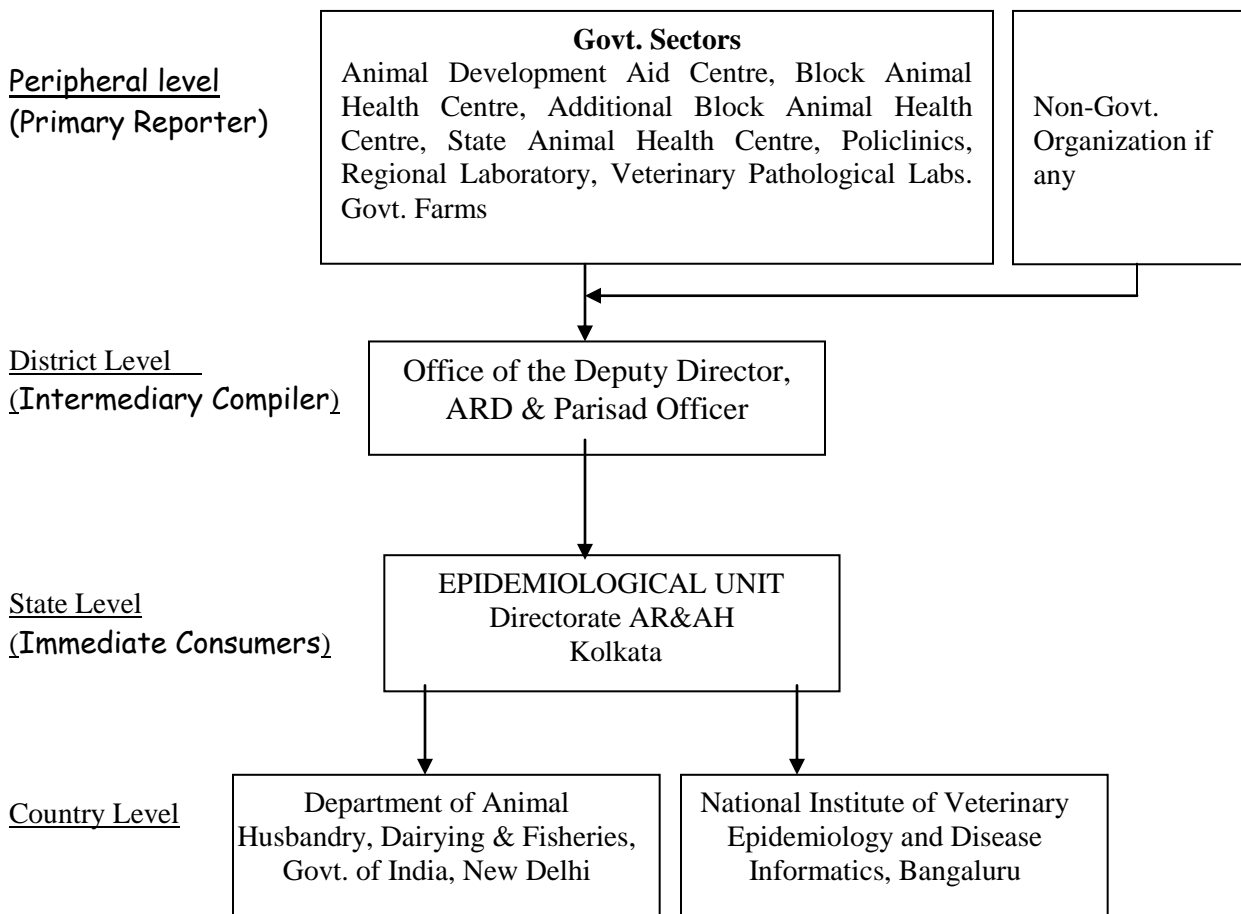
OBJECTIVE OF THE DISEASE SURVEILLANCE SCHEME

Surveillance is a intensive form of data recording. Originally, surveillance was used to describe the tracing and observation of population who were in contact with cases of infectious disease. It is now used in a much wider sense to include all types of diseases - infectious and non-infectious. It is normally a part of control programme for specific diseases.

The disease surveillance system is meant to provide ongoing information of disease in the animal and bird population present in the state and the factor that influence it. This activity necessitates a system for collecting, processing and summarizing data and disseminating information to appropriate agencies as well as individual. This information is supposed to provide a basis for decisions required to be made by the authorities responsible for formulation and management of disease control programme, which needs to be well designed from both biological and economical point of view.

SOURCES OF SURVEILLANCE DATA

The data are collected for Epidemiological study under Animal Disease Surveillance (ADS) Scheme from the existing infrastructure of the Directorate of Animal Resources and Animal Health of the state. For the shake of convenience, the infrastructure has been divided into three tires viz., a) Primary reporter i.e. at peripheral level of detection of diseases b) Intermediary compiler i.e. at the district level c) Immediate consumers i.e. state level (Epidemiological Unit).



NOTIFIABLE / REPORTABLE DISEASE OF THE STATE

Out of the large number of noticeable disease prevalent in the country, only 22 (twenty two) are being routinely reported by the state to the Department of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture, Govt. of India. These diseases are listed below and out of which a few are described elaborately with epidemiological analysis as they were prevailed in this state during the year 2018 – 2019.

DISEASE INFORMATION REPORTED TO THE GOVT. OF INDIA ANNUALLY

(1) Rinderpest (2) Foot & Mouth Disease (3) Contagious Bovine Pleuropneumonia (4) Blue Tongue (5) Swine Fever (6) Sheep & Goat Pox (7) Ranikhet Disease (8) Duck Plague (9) Black Quarter (10) Anthrax (11) Haemorrhagic Septicaemia (12) Fowl Cholera (13) Marek's Disease (14) Infectious Bursal Disease (15) Salmonellosis (Poultry) (16) Rabies (17) Theileriosis (18) Anaplasmosis (19) Trypanosomiasis (20) Contagious Pastular Dermatitis (21) PPR in Goat & Sheep (22) Avian Influenza

DISTRICTS UNDER AGRO-CLIMATIC ZONE OF WEST BENGAL

SL No.	Name of the Zone	Districts Name
1.	Hilly	Darjeeling
		Kalimpong
2.	Tarai	Jalpaiguri
		Alipurduar
3.	Laterite	Bankura
		Birbhum
		Purulia
4.	Old Alluvial	Kolkata
		North 24 Parganas
		Hooghly
		Paschim Burdwan
		Purba Burdwan
		Midnapur (West)
		Jhargram
		Howrah
5.	New Alluvial	Nadia
		Murshidabad
		Malda
		Uttar Dinajpur
		Dakshin Dinajpur
		Cooch Behar
6.	Coastal	Midnapur (East)
		South 24 Parganas

LIVE STOCK POPULATION IN WEST BENGAL*

(As per 19th Livestock Census, 2012)

CATTLE	165.14 Lakh	19.85 %	BUFFALO	05.97 Lakh	0.71 %
GOAT	115.06 Lakh	13.83 %	SHEEP	10.76 Lakh	1.29 %
PIG	6.48 Lakh	0.77 %	FOWL	462.16 Lakh	55.55 %
DUCK	65.35 Lakh	7.85 %	OTHERS	0.15 Lakh	0.15 %

* Including Poultry

RINDER PEST

In West Bengal, no outbreak of Rinderpest has been reported in the year 2018 - 2019. The work of Rinderpest eradication started in the state of West Bengal from the year 1954. Since 1954 with the continuous endeavor of the Rinderpest Eradication Programme of the state neither incidence nor outbreak of Rinderpest has been reported since 1988, as such the country was awarded with the Provisional Freedom from Rinderpest as per O.I.E. standard since April 1994. Under the strict guideline of the Central Management unit (C.P.M.U.) and as per O.I.E. pathway, the state has been completed all the working procedure of Rinderpest Eradication Programme. Vaccination against Rinderpest has been completely suspended in West Bengal since April 1995. Even after keeping the vaccination work suspended for consecutive five years, not a single case of Rinderpest could be detected during the period. This is probably due to absence of the causative organism in West Bengal. Now India has been recognized as free from Rinderpest infection by the International Committee of OIE on 25.06.2006.

In this year, Village Search and Stock Route Search were conducted as was done in the previous years in the state of West Bengal under the programme designated as NATIONAL PROGRAMME OF RINDERPEST ERADICATION (N.P.R.E.) .

T A B L E – I

VILLAGE SEARCH REPORT FOR THE STATE WEST BENGAL

YEAR	VILLAGE SEARCH TARGET	VILLAGE SEARCH ACHIEVED	PERCENTAGE ACHIEVED	OUTCOME OF SEARCH
2015-16	37966	36880	97.14 %	NEGATIVE TO RP
2016-17	37966	35311	93.00 %	NEGATIVE TO RP
2017-18	37966	27042	71.22 %	NEGATIVE TO RP
2018-19	37966	35946	94.68 %	NEGATIVE TO RP

T A B L E – II

DAY BOOK INSPECTION FOR THE STATE WEST BENGAL

STATE	DAY BOOK INSPECTION TARGET	DAY BOOK INSPECTION ACHIEVED	PERCENTAGE ACHIEVED	WHETHER ANY SYMPTOMS SUSPECTED FOR RP
2015-16	16025	15042	93.86 %	NIL
2016-17	16025	15471	96.54 %	NIL
2017-18	16025	11719	73.13 %	NIL
2018-19	16375	15535	94.87 %	NIL

FOOT & MOUTH DISEASE

Foot & Mouth Disease is an acute febrile disease of cloven footed animals, common in cattle, buffalo, sheep, goat, pig, rarely in camels and other wild animals. It is highly contagious and caused by enterovirus of picorna viridae family. The different subtypes of such virus which caused the disease in India are 'O', 'A', 'C', 'ASIA -I'. Among these, types 'O' has been most common and widespread followed by 'A' and 'ASIA-I'.

The disease is primarily transmitted through aerosol route. It may be transmitted through infected water, manure, hay and pasture by direct or indirect way. Cattle attendant also play an important role in spreading of disease. It is known to spread the disease through recovered animals, field rats and birds.

The usual site of affection FMD virus is in the mucus membrane of the throat. After primary infection animals develop fever then vesicle appears in the buccal cavity. The animal shows dullness, in appetite, shivering followed by smacking of the lips and kicking the feet. After vesicle formation, there is profuse salivation and lameness. Pregnant animals may abort and young animals may die. In West Bengal, the disease is endemic and occurs in all districts round the year with high morbidity but with low mortality or without mortality.

TABLE – I

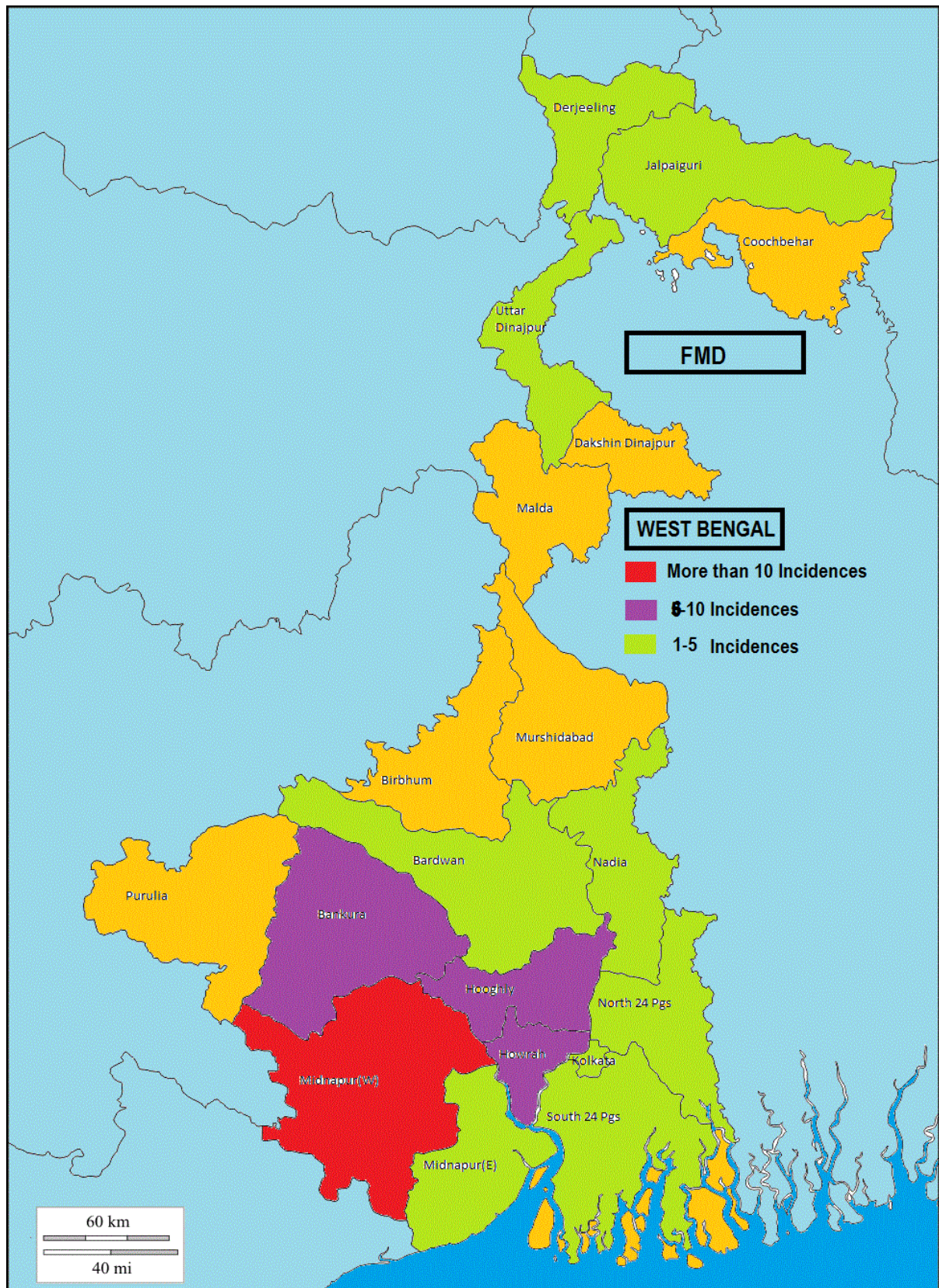
EPIDEMIOLOGICAL OBSERVATION ON FOOT & MOUTH DISEASE

Year	No. of Incidence	Population At Risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
2014-2015	9	4805	94	0	-	1.96	-
2015-2016	31	14440	1333	9	0.68	9.23	0.06
2016-2017	5	2040	181	8	4.42	12.35	0.55
2017-2018	0	0	0	0	0.00	0.00	0.00
2018-2019	62	54573	19903	368	1.85	36.47	0.67

There were 62 (sixty two) reported incidences of FMD in the year 2018-2019 all over the state. In previous year (0) zero numbers of incidences were reported from all over the state. It is also observed that disease incidences of FMD was suddenly increases hugely after a declining phase in West Bengal.

In general relatively low temperature; dry weather may help the FMD virus to propagate among the susceptible animals and the incidence of outbreaks reported during the late winter months and early summer. As the disease is an air-borne one and the rainfall prevents the propagation of the virus, the incidence of FMD generally happened in a very low intensity during the rainy season.

DISTRIBUTION OF FMD INCIDENCES IN WEST BENGAL FOR THE YEAR 2018-19



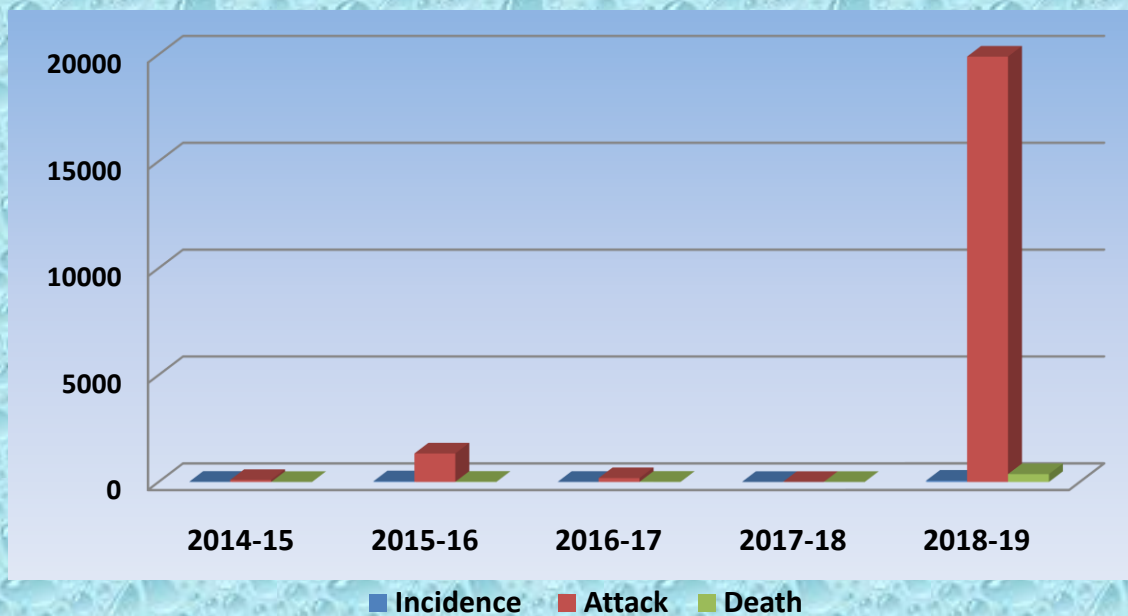
Regarding seasonal variation in our state the disease was occurred through the year especially post-monsoon months. This year highest incidence was recorded in the month of September with 18 incidences followed by October (9). Seven (7) incidences were recorded in the month of July and December followed by six (6) in August and five and four in November & May respectively. June, January and February were recorded with two (2) outbreaks in each month. For this particular year the seasonal variation has been shifted from pre-monsoon to post-monsoon and pre-winter i.e. from September to December.

So far geographic variation is concerned, Incidence reported from thirteen districts out of all 23 districts of West Bengal. In this year highest, twelve (12) incidences were reported from Paschim Mednipur district followed by Nine (9) incidences from Howrah, Eight (8) from Bankura, Six (6) from Hooghly and Five (5) from Purba Burdwan and Nadia districts. There were also incidences from South and North 24 Pgs with four (4) incidences each. Three (3) incidences from U. Dinajpur, Two (2) incidences each from Purba Mednipur & Jalpaiguri and One (1) from even Kolkata districts. It is desired that for controlling of the disease effectively, the vaccination work should be continued as per the guideline.

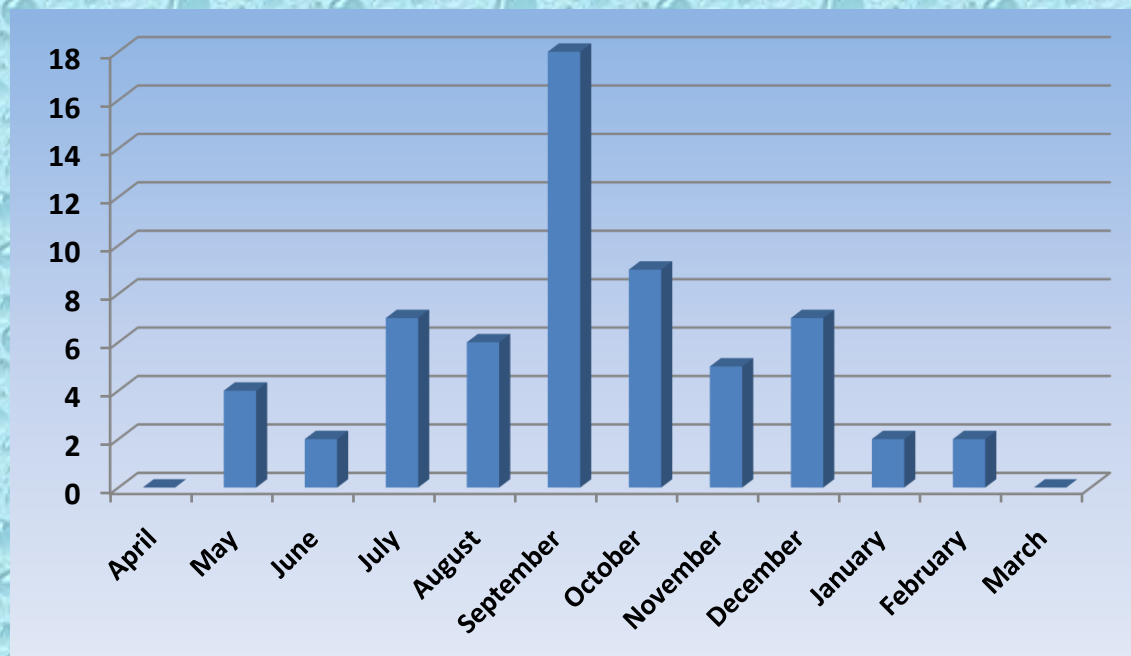
T A B L E – II
DISTRICTWISE FOOT & MOUTH DISEASE INCIDENCES REPORTED
IN WEST BENGAL FOR THE YEAR 2018-2019

District	No. of outbreak	Population at risk	Attack	Death	C.F.R (%)	Morbidity (%)	Mortality (%)
Coochbehar	0	0	0	0	0	0	0
Jalpaiguri	2	20	6	0	0.00	30.00	0.00
Darjeeling	1	128	11	0	0.00	8.59	0.00
U.Dinajpur	2	3736	88	0	0.00	2.36	0.00
D. Dinajpur	0	0	0	0	0	0	0
Malda	0	0	0	0	0	0	0
Murshidabad	0	0	0	0	0	0	0
Nadia	5	314	30	0	0.00	9.55	0.00
N.24 Pgs.	4	1881	34	2	5.88	1.81	0.11
S. 24 Pgs.	4	714	43	0	0.00	6.02	0.00
Kolkata	1	800	8	0	0.00	1.00	0.00
Howrah	9	15849	14015	280	2.00	88.43	1.77
Hooghly	6	2962	132	9	6.82	4.46	0.30
Burdwan	5	4420	320	0	0.00	7.24	0.00
Birbhum	0	0	0	0	0	0	0
Bankura	2	1788	118	0	0.00	6.60	0.00
Midnapur(E)	2	150	12	0	0.00	8.00	0.00
Mindapur(W)	12	21808	5038	70	1.39	23.10	0.32
Purulia	0	0	0	0	0	0	0
TOTAL	62	54573	19903	368	1.85	36.47	0.67

Year wise incidences, attack and death due to FMD in West Bengal in last 5 years



Month wise FMD incidences in West Bengal in 2018-19



T A B L E - III
MONTHWISE FOOT & MOUTH DISEASE INCIDENCE REPORTED IN WEST BENGAL
FOR THE YEAR 2018 – 2019

Month	No. of incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
April	0	0	0	0	0.00	0.00	0.00
May	4	2140	60	2	3.33	2.80	0.09
June	2	608	40	3	7.50	6.58	0.49
July	7	1541	84	0	0.00	5.45	0.00
August	6	2992	131	0	0.00	4.38	0.00
September	18	31476	18996	344	1.81	60.35	1.09
October	9	10266	380	19	5.00	3.70	0.19
November	5	883	36	0	0.00	4.08	0.00
December	7	4358	136	0	0.00	3.12	0.00
January	2	167	26	0	0.00	15.57	0.00
February	2	139	14	0	0.00	10.07	0.00
March	0	0	0	0	0.00	0.00	0.00
TOTAL	62	54573	19903	368	1.85	36.47	0.67

TABLE – IV
DISTRICT WISE FOOT & MOUTH DISEASE INCIDENCES REPORTED IN
WEST BENGAL DURING LAST TEN YEARS

DISTRICT	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
COOCHBEHAR	22	0	0	0	0	0	0	0	0	0
JALPAIGURI	29	0	4	1	3	3	0	0	0	2
DARJEELING	0	1	2	0	0	1	0	0	0	1
U. DINAJPUR	1	0	0	0	0	0	0	0	0	2
D. DINAJPUR	7	3	0	2	3	0	2	0	0	0
MALDA	12	2	0	0	0	0	0	0	0	0
MURSHIDABAD	8	1	2	2	1	0	1	0	0	0
NADIA	24	2	3	5	1	0	1	2	0	5
NORTH 24 PGS.	39	0	3	4	1	0	1	1	0	4
SOUTH 24 PGS.	12	1	1	2	3	1	1	0	0	4
KOLKATA	0	0	0	0	0	0	0	0	0	1
HOWRAH	22	1	4	3	2	1	0	0	0	9
HOOGHLY	56	4	2	2	3	0	1	1	0	6
BURDWAN	15	0	0	2	3	0	1	0	0	5
BIRBHUM	15	2	8	16	7	0	4	0	0	0
BANKURA	5	0	4	10	8	3	0	0	0	2
MEDINIPUR (E)	5	0	1	0	0	0	1	0	0	2
MEDINIPUR (W)	10	0	0	1	5	0	8	1	1	12
PURULIA	12	3	12	12	3	0	10	0	0	0
TOTAL	294	20	46	62	43	9	31	5	0	62

RABIES

Rabies is an acute viral infection in man and other warm blooded animals caused by R.N.A. virus belonging to the family Rhabdoviridae. The disease is noted in most of the tropical countries in the world. Rabies is a zoonotic disease that can affect all mammals. Carnivores circulate different rabies virus (RABV) variants and act as a reservoir for rabies, with occasional transmission to humans. Classical rabies virus is found throughout the world. Rabies infection is maintained in two epidemiological cycles, one urban and one sylvatic. In the urban rabies cycle, dogs are the main reservoir host. This cycle predominates in areas of Africa, Asia, and Central and South America. The sylvatic (or wildlife) cycle is the predominant cycle in the northern hemisphere. It can also present simultaneously with the urban cycle in some parts of the world. Despite being 100% preventable, canine-mediated rabies is one of the most important zoonosis and is estimated to cause up to 70,000 human deaths per year mostly affecting people in rural areas. It has important social costs due to human mortality and high economic consequences due to the losses in livestock and the cost of the implementation of preventive and control measures in both animals and humans.

In the year 2018-2019, there were two reported incidences of animal Rabies cases in West Bengal, one is from U. Dinajpur and other is from Howrah.

T A B L E – I

EPIDEMIOLOGICAL OBSERVATION ON RABIES IN WEST BENGAL

Year	No. of incidence	Population at Risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
2014-2015	1	250	1	1	100	0.40	0.40
2015-2016	4	550	4	4	100	0.73	0.73
2016-2017	2	351	2	2	100.00	0.57	0.57
2017-2018	0	0	0	0	0.00	0.00	0.00
2018-2019	2	115	2	2	100.00	1.74	1.74

ANTHRAX

Anthrax is an acute, infectious febrile disease of all warm-blooded animals including human caused by *Bacillus anthracis*. Fowls are resistant to Anthrax. It causes septicemia and is a fatal disease. It occurs worldwide, sporadic cases occur almost throughout the state, although it is more prevalent in certain hot and humid part of the state. Anthrax spores can remain viable in soil for a long time. Soil borne outbreaks occur in definite season and in definite area, known as Anthrax belt. Humidity and the pH of soil have got definite factors on spread of anthrax. Alkaline soil influences the occurrence of outbreak. The Stream Rivers and flood may carry the spore from one place to another and this may spread the disease to the virgin soil.

T A B L E – I

EPIDEMIOLOGICAL OBSERVATION ON ANTHRAX

Year	No. of incidence	Population at Risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
2014-2015	23	10260	44	43	97.73	0.43	0.42
2015-2016	03	4654	05	05	100.00	0.11	0.11
2016-2017	16	9292	40	40	100.00	0.43	0.43
2017-2018	2	1100	4	4	100.00	0.36	0.36
2018-2019	5	4478	8	8	100.00	0.18	0.18

In the reporting year, number of reported incidence (05) increased, case fatality rate (100.00) remain same, morbidity rate (0.18) and mortality rate (0.18) also decreased in comparison to last year. The incidence reported mainly in monsoon and post-monsoon period (June, July & August). In the current year, outbreaks were reported from Old Alluvial & New Alluvial zone. This year incidences are mainly sporadic in nature in West Bengal.

As per Species concern, mainly bovines were affected in the different districts from Anthrax as per the records available in the last year.

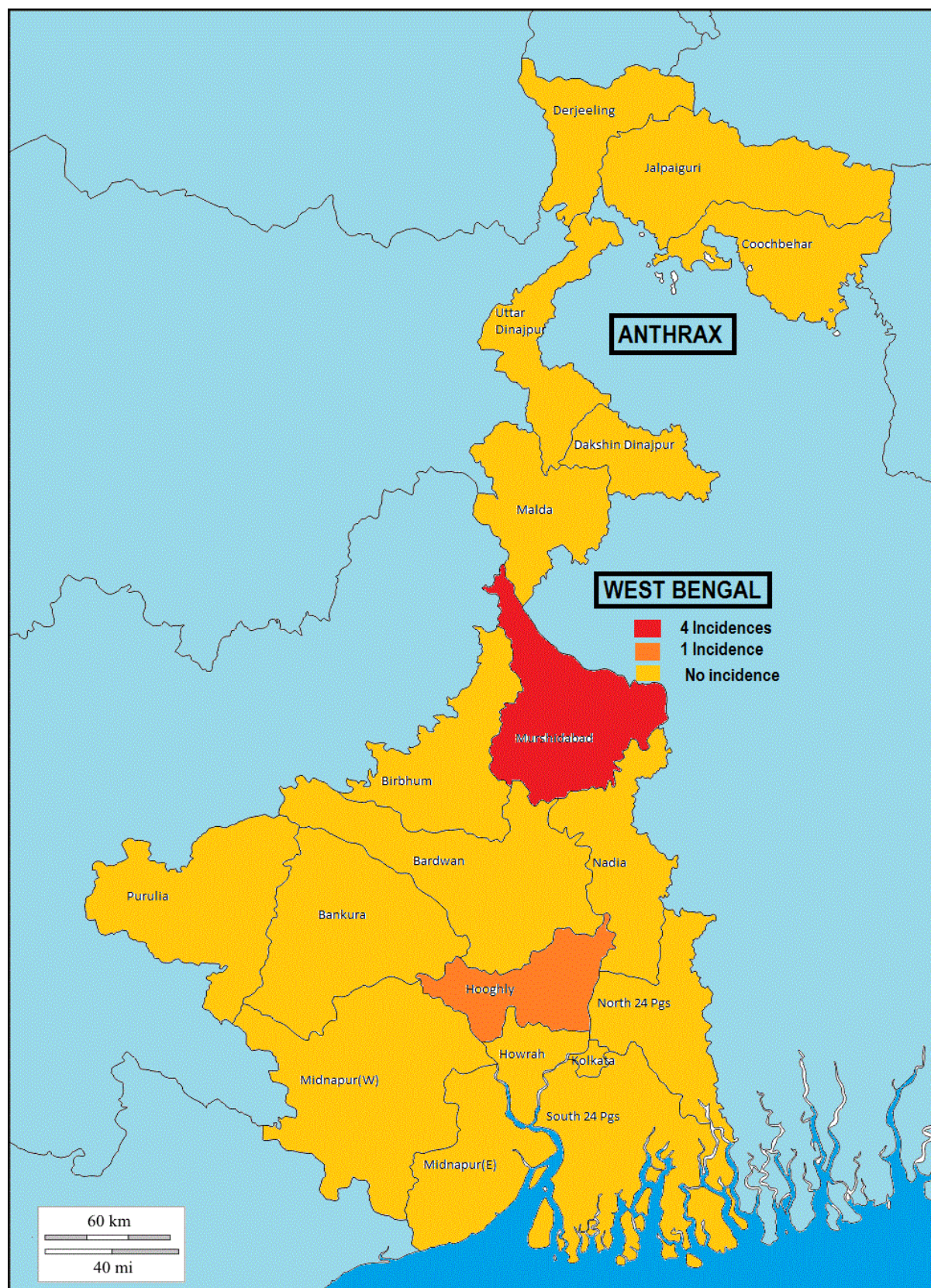
As per epidemiological information, regarding control of this disease, biannual vaccination should be done in the endemic zone.

T A B L E – II

DISTRICTWISE ANTHRAX REPORTED IN WEST BENGAL FOR THE YEAR 2018- 2019

District	No. of incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
MURSHIDABAD	04	3828	5	5	100.00	0.13	0.13
HOOGLY	01	650	3	3	100.00	0.46	0.46
TOTAL	05	4478	8	8	100.00	0.18	0.18

DISTRIBUTION OF ANTHRAX INCIDENCES IN WEST BENGAL FOR THE YEAR 2018-19



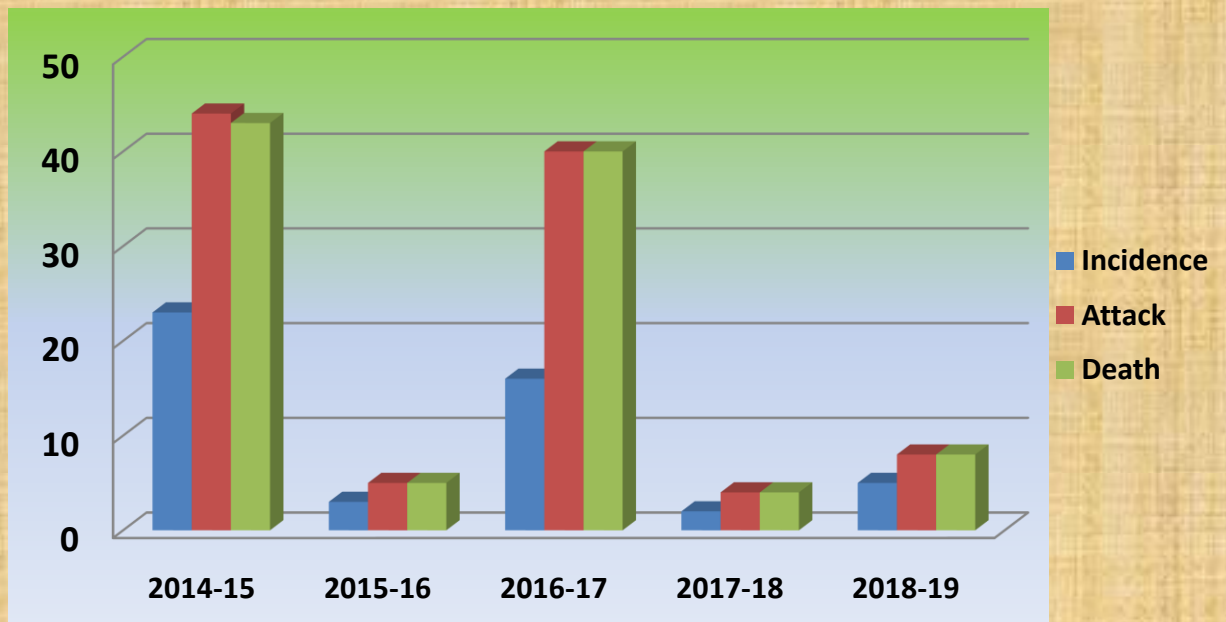
T A B L E - III
MONTHWISE ANTHRAX INCIDENCE REPORTED IN WEST BENGAL
FOR THE YEAR 2018 – 2019

Month	No. of incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
April	0	0	0	0	0.00	0.00	0.00
May	0	0	0	0	0.00	0.00	0.00
June	2	3050	4	4	100.00	0.13	0.13
July	1	626	1	1	100.00	0.16	0.16
August	2	800	3	3	100.00	0.38	0.38
September	0	0	0	0	0.00	0.00	0.00
October	0	0	0	0	0.00	0.00	0.00
November	0	0	0	0	0.00	0.00	0.00
December	0	0	0	0	0.00	0.00	0.00
January	0	0	0	0	0.00	0.00	0.00
February	0	0	0	0	0.00	0.00	0.00
March	0	0	0	0	0.00	0.00	0.00
TOTAL	05	4478	8	8	100.00	0.18	0.18

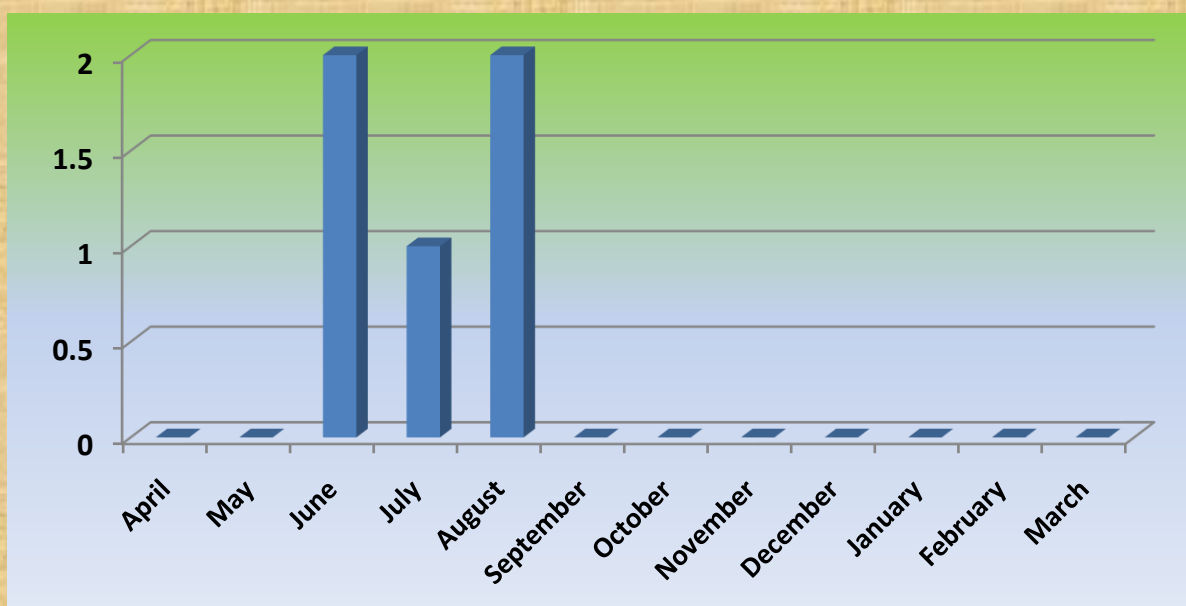
T A B L E – IV
DISTRICT WISE ANTHRAX INCIDENCE REPORTED IN WESTS BENGAL
DURING LAST TEN YEARS

District	2009 -10	2010 -11	2011 -12	2012 -13	2013 -14	2014- 15	2015 -16	2016 -17	2017 -18	2018- 19
CoochBehar	1	1	1	0	0	0	0	0	0	0
Jalpaiguri	0	0	0	0	0	0	0	0	0	0
Darjeeling	0	0	0	0	0	0	0	0	0	0
Uttar Dinajpur	0	0	0	0	0	0	0	0	0	0
Dakshin Dinajpur	0	0	0	0	0	0	0	0	0	0
Malda	0	0	0	0	0	0	0	0	0	0
Murshidabad	10	19	14	3	5	21	0	8	1	4
Nadia	8	1	2	2	4	0	1	6	1	0
North 24Parganas	1	0	1	0	0	0	0	0	0	0
South 24Parganas	0	0	0	0	0	0	0	0	0	0
Kolkata	0	0	0	0	0	0	0	0	0	0
Howrah	0	0	0	0	0	0	0	0	0	0
Hooghly	2	1	0	2	0	0	1	0	0	1
Burdwan	0	1	3	1	4	0	0	0	0	0
Birbhum	0	0	0	0	0	0	0	1	0	0
Bankura	1	0	0	1	2	2	0	0	0	0
Purba medinipur	0	0	0	0	0	0	0	1	0	0
Paschim Medinipur	0	0	0	0	0	0	1	0	0	0
Purulia	0	0	0	0	0	0	0	0	0	0
TOTAL	23	23	21	9	15	23	3	16	2	5

Year wise incidences, attack and death due to Anthrax in last 5 years in West Bengal



Monthwise Anthrax Incidences in West Bengal in 2018-19



During last ten years the outbreaks were reported mainly from Murshidabad district involving 5-6 no. of blocks and Nadia & Hooghly district. There are some endemic zones where outbreaks occurred in every year. It is desired that for controlling of the disease effectively, vaccination should be completed before monsoon in endemic zone.

T A B L E – V
MONTHWISE AND DISTRICTWISE ANTHRAX REPORTED IN
WESTBENGAL FOR THE YEAR 2018- 2019

Month	District	No. of incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
April	-	0	0	0	0	0	0	0
May		0	0	0	0	0	0	0
June	Murshidabad, Nadia	2	3050	4	4	100.00	0.13	0.13
July	Murshidabad	1	626	1	1	100.00	0.16	0.16
August	Murshidabad	2	800	3	3	100.00	0.38	0.38
September	-	0	0	0	0	0	0	0
October	-	0	0	0	0	0	0	0
November	-	0	0	0	0	0	0	0
December	-	0	0	0	0	0	0	0
January	-	0	0	0	0	0	0	0
February	-	0	0	0	0	0	0	0
March	-	0	0	0	0	0	0	0
TOTAL		05	4478	8	8	100.00	0.18	0.18

HAEMORRHAGIC SEPTICAEMIA

Haemorrhagic Septicaemia generally occurs in low-lying areas periodically inundated by rainwater and in areas where irrigation facilities have developed. The organism may be picked up by adult cattle and buffalo and act as carriers and harbored the organism frequently in their upper respiratory tract and sometimes in the intestine without showing any clinical signs. Since the bacteria are relatively susceptible to chemical and physical agents, the carrier animal would seem to play an essential role in the life history of these bacteria and in their distribution from one host to another. The rapid multiplication of the bacteria in the respiratory tract, particularly in the groups of animals is very common, when they are subjected to certain stresses. Certain environments also plays important role, particularly among the working animals during the rainy season, resulting into outbreaks of the disease. The affected animals may also contaminate the environment by excreting large number of bacteria in the saliva and faeces.

The disease most commonly occurred during and following monsoon. The disease has got some correlation with relative humidity and most outbreaks are seen during the period of high humidity.

T A B L E – I
EPIDEMIOLOGICAL OBSERVATION ON HEAMORRHAGIC SEPTICAEMIA

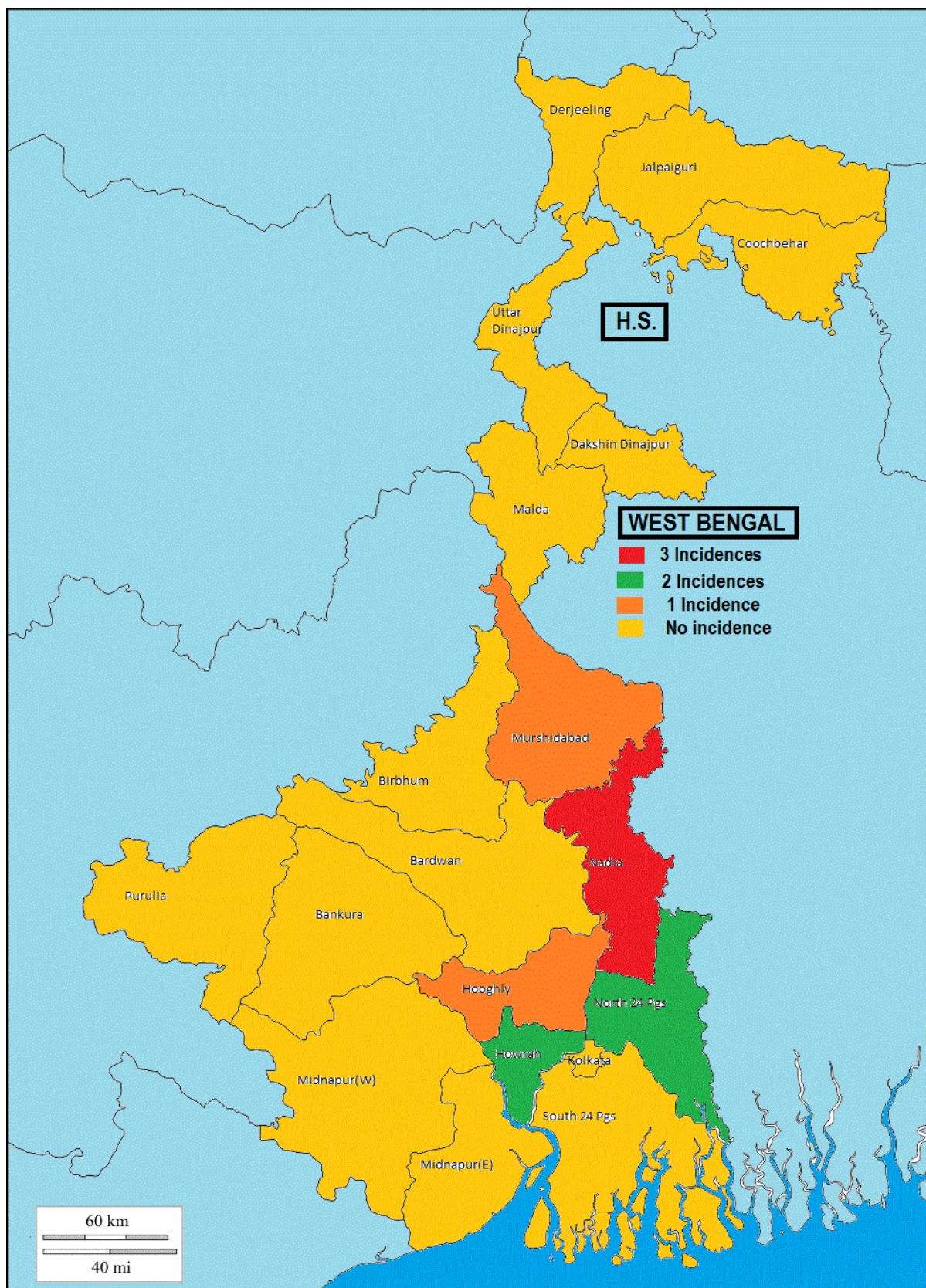
Year	No. of incidence	Population at Risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
2014-2015	32	22304	174	86	49.43	0.78	0.39
2015-2016	07	2000	56	21	37.50	2.80	1.05
2016-2017	16	8748	184	91	49.46	2.10	1.04
2017-2018	7	1390	30	16	53.33	1.78	0.95
2018-2019	9	3189	108	40	37.04	3.39	1.25

In the year 2018-2019, reported incidence (9) has been increased in comparison with the previous year (07). Case fatality rate (37.04) was decreased but morbidity rate (3.39) and mortality rate (1.25) both were increased as compared to previous year.

Regarding seasonal variation the disease was occurred through the year especially pre-monsoon and monsoon months. But for this year higher incidence were recorded in the month of April, May, June, July, August, September & even in December. For this particular year the seasonal variation has been shifted from monsoon and post-monsoon i.e. from April to pre-monsoon, monsoon and post-monsoon even in early winter.

So far geographic variation is concerned, Incidence reported only from six districts out of all districts of West Bengal. In this year highest, three (3) incidences were reported from Nadia district followed by two (2) incidences from N-24 Pgs & Howrah districts, followed by Murshidabad & Hooghly districts with one incidence from each. It can be interpreted from last five years observation that there are some endemic zones in the districts like Bankura, Purulia, Burdwan, Birbhum, Nadia, N-24 Pgs and Howrah with incidences almost in every year. It is desired that for controlling of the disease effectively, the vaccination work should be completed before monsoon in every year in the endemic zones.

DISTRIBUTION OF HAEMORRHAGIC SEPTICAEMIA INCIDENCES IN WEST BENGAL FOR THE YEAR 2018-19



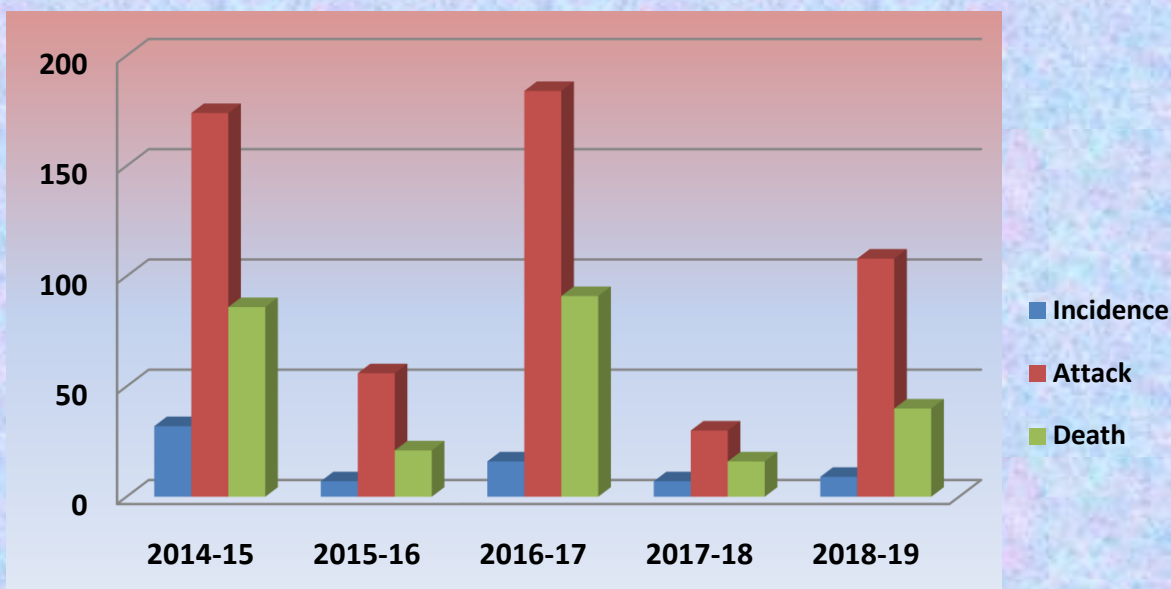
T A B L E – II
DISTRICTWISE HAEMORRHAGIC SEPTICAEMIA OUTBREAK REPORTED
IN WEST BENGAL FOR THE YEAR 2018-2019

District	No. of outbreak	Population at risk	Attack	Death	C.F.R (%)	Morbidity (%)	Mortality (%)
Coochbehar	0	0	0	0	0	0	0
Jalpaiguri	0	0	0	0	0	0	0
Darjeeling	0	0	0	0	0	0	0
U.Dinajpur	0	0	0	0	0	0	0
D. Dinajpur	0	0	0	0	0	0	0
Malda	0	0	0	0	0	0	0
Murshidabad	1	500	10	7	70.00	2.00	1.40
Nadia	3	499	7	4	57.14	1.40	0.80
N.24 Pgs.	2	90	3	1	33.33	3.33	1.11
S. 24 Pgs.	0	0	0	0	0	0	0
Kolkata	0	0	0	0	0	0	0
Howrah	2	700	37	20	54.05	5.29	2.86
Hooghly	1	1400	51	8	15.69	3.64	0.57
Burdwan	0	0	0	0	0	0	0
Birbhum	0	0	0	0	0	0	0
Bankura	0	0	0	0	0	0	0
Midnapur(E)	0	0	0	0	0	0	0
Mindapur(W)	0	0	0	0	0	0	0
Purulia	0	0	0	0	0	0	0
TOTAL	9	3189	108	40	37.04	3.39	1.25

T A B L E – III
MONTHWISE HAEMORRHAGIC SEPTICAEMIA OUTBREAK REPORTED
IN WEST BENGAL FOR THE YEAR 2018-2019

Month	District	No. of Incidence	Population at risk	Attack	Death
April	North 24 Pgs	1	80	1	1
	Howrah	1	650	32	17
	Nadia	1	49	4	1
May	North 24 Pgs	1	10	2	0
June	Nadia	1	200	2	2
August	Nadia	1	240	1	1
	Murshidabad	1	540	7	10
September	Howrah	1	50	5	3
December	Hooghly	1	1400	51	8
	TOTAL	9	3189	108	40

Year wise incidences, attack, death due to H.S. IN West Bengal in Last 5 Years



Montly wise H.S. Incidences in West Bengal in 2018-19

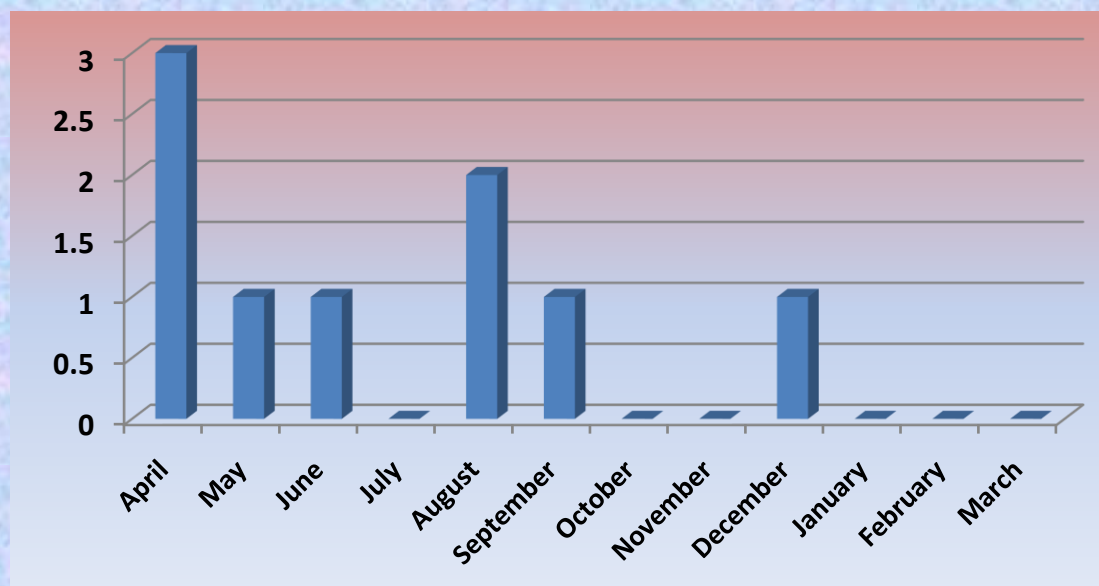


TABLE – IV
DISTRICT WISE HAEMORRHAGIC SEPTICAEMIA OUTBREAKS REPORTED
IN WEST BENGAL DURING LAST TEN YEARS

District	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Coochbehar	0	1	0	1	1	0	0	1	0	0
Jalpaiguri	0	1	1	1	0	0	0	0	0	0
Darjeeling	0	0	0	0	0	0	0	0	1	0
Uttar Dinajpur	0	0	0	0	0	1	0	0	0	0
Dakshin Dinajpur	0	0	1	0	0	0	0	0	0	0
Malda	2	1	0	0	0	0	0	0	1	0
Murshidabad	0	0	0	1	2	0	0	1	0	1
Nadia	1	0	0	0	0	0	1	0	1	3
North 24 Pgs.	0	0	0	0	0	0	0	4	1	2
South 24 Pgs.	0	0	0	0	0	0	0	0	0	0
Kolkata	0	0	0	0	0	0	0	0	0	0
Howrah	0	1	0	0	0	0	1	0	2	2
Hooghly	0	0	1	3	4	2	0	1	0	1
Burdwan	7	2	10	0	2	1	1	5	1	0
Birbhum	5	0	6	2	1	1	0	1	0	0
Bankura	0	1	7	0	8	23	4	0	0	0
Midnapur(E)	0	0	0	0	0	0	0	0	0	0
Mindapur(W)	2	4	1	0	3	0	0	2	0	0
Purulia	2	0	1	6	13	4	0	1	0	0
TOTAL	19	11	28	14	34	32	7	16	7	9

BLACK QUARTER

Black quarter is a bacterial disease produces gas gangrene affecting cattle and sheep and very occasionally in other animals caused by bacterium, *Clostridium chauvoei*, and characterized by sudden onset of acute fever with a crepitating swelling in the limbs or loins.

Black quarter is a sporadic disease in India with a seasonal and regional distribution, recurrent losses seen in the field. Cattle probably acquire infection through ingestion of spores of the organism contained in feed or in soil. Infection may also occur through cuts and wounds. The spores may remain dormant in the animal body for a long period until predisposing factors arise which stimulate the development of vegetative forms by damaging tissue cells resulting into rapid multiplication of the organism in a particular area of the tissues and develop a typical black quarter lesion. Six months to three years old healthy animals are mainly affected. In pigs, disease is clinically characterized by inflammation of heavy muscles, severe toxæmia and high mortality.

The disease is common in areas with moderate rainfall and where dry crop cultivation is common. B.Q spreads rapidly after heavy rainfall by contamination of soil with spores of the organism. Areas where previous death occurs from *Clostridium* infection have a higher incidence or risk of disease because of increased environmental contamination. Infection with *Clostridium chauvoei* occurs most commonly during the warmer season, but the disease occurs sporadically throughout the year.

T A B L E – I
EPIDEMIOLOGICAL OBSERVATION ON BLACK QUARTER

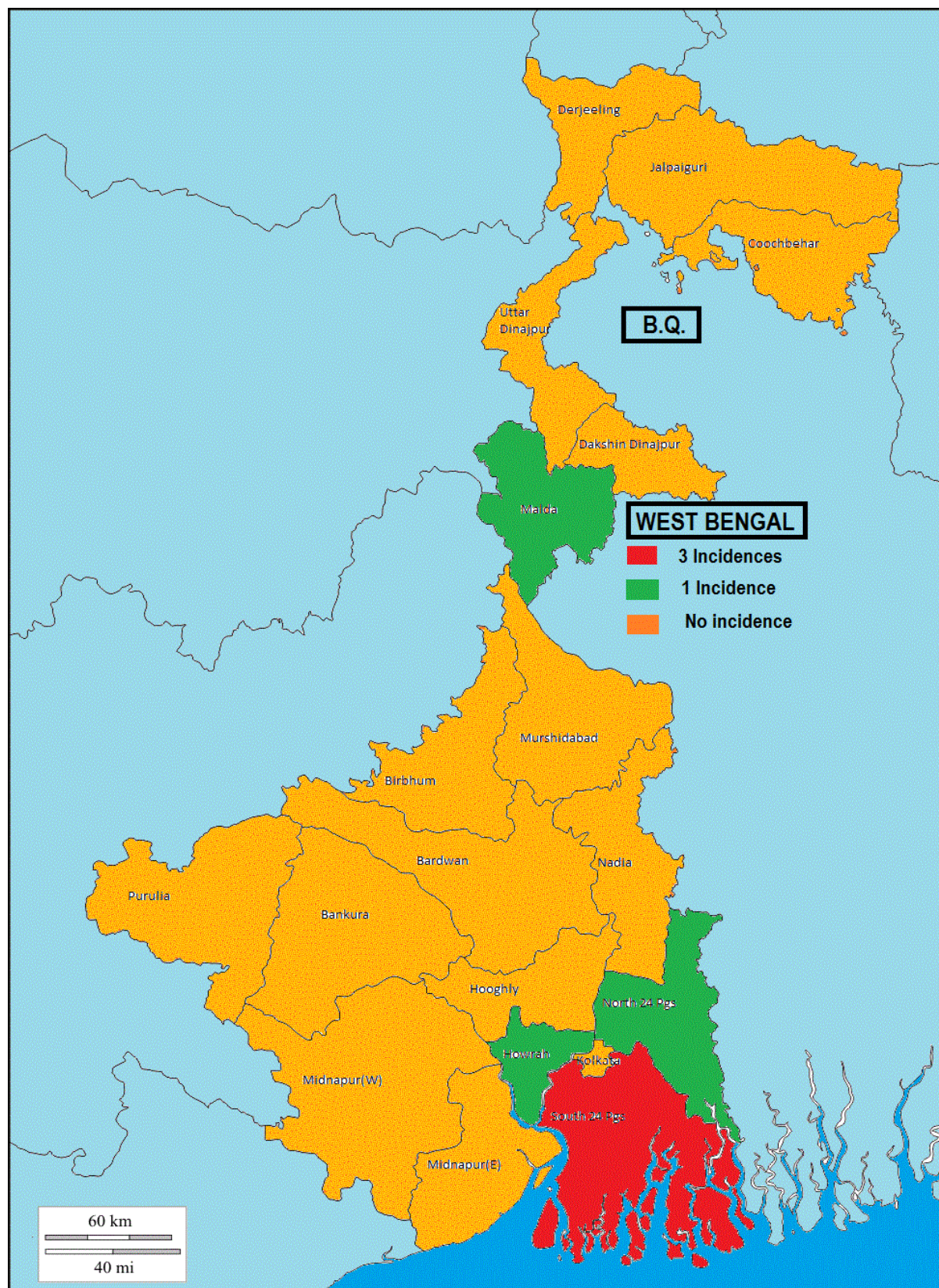
Year	No. of incidence	Population at Risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
2014-2015	29	5945	109	24	22.02	1.83	0.40
2015-2016	23	5515	120	42	35.00	2.18	0.76
2016-2017	11	8150	48	19	39.58	0.59	0.23
2017-2018	8	1107	26	11	42.31	2.35	0.99
2018-2019	6	3070	54	19	35.19	1.76	0.62

Total 6 (six) incidences of Black Quarter recorded in this year which is decreased in number in comparison to the previous year. Case fatality rate (35.19%) decreased whereas; morbidity rate (1.76%) and mortality rate (0.62%) were also decreased.

The incidence of Black quarter mostly occurred during pre-monsoon, monsoon and post-monsoon i.e. in April, May, June, July & August. In the reporting year two (2) incidences were recorded in the month of March, May & June involving four districts i.e., Soth24-Pgs, North 24-Pgs, Malda & Nadia districts. All the six incidences were recorded from March to June i.e. mainly in the month of pre-rainy season. So, pre-monsoon vaccination may be followed to minimize the risk of incidence of West Bengal.

So far geographical variation is concern; highest three (3) incidences were reported from South 24-Pgs district followed by one incidence from North 24-Pgs, Malda and Hooghly district in the years 2018-19.

DISTRIBUTION OF BLACK QUARTER INCIDENCES IN WEST BENGAL FOR THE YEAR 2018-19



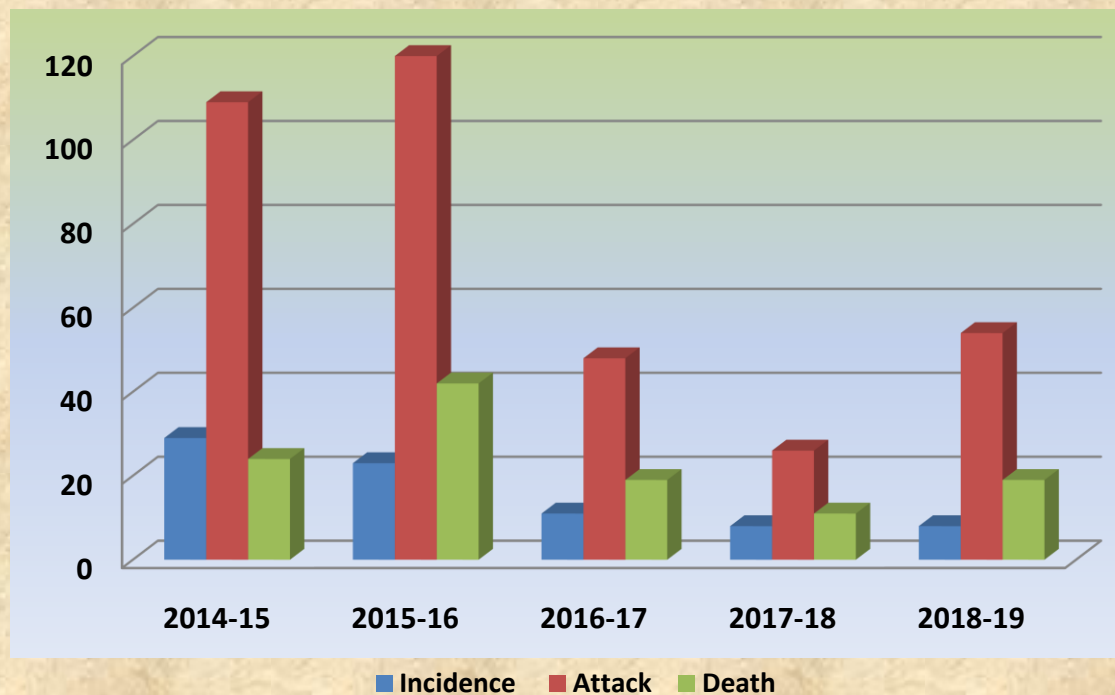
T A B L E – II
DISTRICTWISE BLACK QUARTER OUTBREAK REPORTED IN
WEST BENGAL FOR THE YEAR 2018-2019

District	No. of outbreak	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
Coochbehar	0	0	0	0	0.00	0.00	0.00
Jalpaiguri	0	0	0	0	0.00	0.00	0.00
Darjeeling	0	0	0	0	0.00	0.00	0.00
U.Dinajpur	0	0	0	0	0.00	0.00	0.00
D. Dinajpur	0	0	0	0	0.00	0.00	0.00
Malda	1	800	29	6	20.69	3.63	0.75
Murshidabad	0	0	0	0	0.00	0.00	0.00
Nadia	0	0	0	0	0.00	0.00	0.00
N.24 Pgs.	1	1800	18	11	61.11	1.00	0.61
S. 24 Pgs.	3	288	5	1	20.00	1.74	0.35
Kolkata	0	0	0	0	0.00	0.00	0.00
Howrah	1	182	2	1	50.00	1.10	0.55
Hooghly	0	0	0	0	0.00	0.00	0.00
Burdwan	0	0	0	0	0.00	0.00	0.00
Birbhum	0	0	0	0	0.00	0.00	0.00
Bankura	0	0	0	0	0.00	0.00	0.00
Midnapur(E)	0	0	0	0	0.00	0.00	0.00
Mindapur(W)	0	0	0	0	0.00	0.00	0.00
Purulia	0	0	0	0	0.00	0.00	0.00
TOTAL	6	3070	54	19	35.19	1.76	0.62

T A B L E - III
MONTHWISE BLACK QUARTER OUTBREAK REPORTED IN
WEST BENGAL FOR THE YEAR 2018 – 2019

Month	No. of outbreak	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
April	2	160	4	0	0.00	2.50	0.00
May	0	0	0	0	0.00	0.00	0.00
June	2	2600	47	17	36.17	1.81	0.65
July	0	0	0	0	0.00	0.00	0.00
August	0	0	0	0	0.00	0.00	0.00
September	0	0	0	0	0.00	0.00	0.00
October	0	0	0	0	0.00	0.00	0.00
November	0	0	0	0	0.00	0.00	0.00
December	0	0	0	0	0.00	0.00	0.00
January	0	0	0	0	0.00	0.00	0.00
February	0	0	0	0	0.00	0.00	0.00
March	2	310	3	2	66.67	0.97	0.65
TOTAL	6	3070	54	19	35.19	1.76	0.62

Year wise incidences, attack and death due to B.Q. in West Bengal in Last 5 Years



Month wise B.Q. Incidences in West Bengal in 2018-19

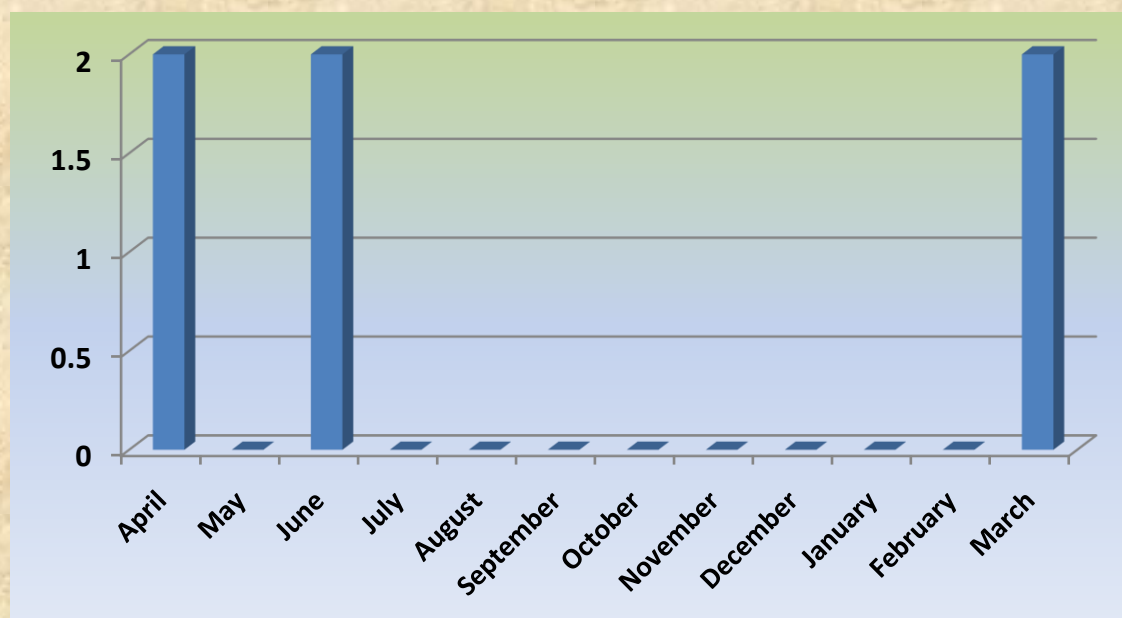


TABLE – IV
DISTRICT WISE BLACK QUARTER OUTBREAKS REPORTED IN
WEST BENGAL DURING LAST TEN YEARS

District	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Coochbehar	3	4	3	2	2	1	0	0	0	0
Jalpaiguri	0	4	2	1	1	0	0	0	0	0
Darjeeling	0	0	0	0	0	0	0	0	0	0
Uttar Dinajpur	0	0	0	0	5	4	0	0	0	0
Dakshin Dinajpur	2	5	1	4	11	10	5	1	0	0
Malda	2	10	0	1	0	0	0	0	0	1
Murshidabad	5	0	3	0	1	0	0	0	0	0
Nadia	5	16	3	3	7	0	2	0	0	0
North 24 Parganas	2	4	0	0	1	0	0	0	0	1
South 24 Parganas	1	2	0	0	0	0	0	0	1	3
Kolkata	0	0	0	0	0	0	0	0	0	0
Howrah	8	14	17	13	7	6	0	0	1	1
Hooghly	9	11	6	2	4	0	0	0	0	0
Burdwan	10	3	4	2	1	3	8	4	0	0
Birbhum	2	6	20	1	4	3	0	0	3	0
Bankura	0	1	4	3	7	1	2	1	0	0
Purba Medinipur	8	8	0	1	1	0	5	4	3	0
Paschim Medinipur	1	5	7	0	6	0	1	1	0	0
Purulia	1	7	5	8	4	1	0	0	0	0
TOTAL	59	100	75	41	62	29	23	11	8	6

BLOOD PROTOZOAN DISEASES

ANAPLASMOSIS

Bovine anaplasmosis is a rickettsial disease transmitted by one host cattle tick, *Rhipicephalus (Boophilus) microplus* and also by blood sucking flies e.g. Tabanid flies and Stomoxys. Outbreaks of bovine anaplasmosis are due to infection with *Anaplasma marginale*. *Anaplasma centrale* is capable of producing a moderate degree of anaemia, but clinical outbreaks in the field are extremely rare. Clinical signs of anaplasmosis are fever (early stage but subnormal temp. at later stage), severe anaemia, jaundice, reduced milk yield, emaciation, panting and exhaustion.

In the year 2018 – 2019, reported 13 incidences were recorded in West Bengal which is increased in comparison to previous year (7). These three (13) incidences were recorded from Coochbehar, Birbhum, Purba Burdwan, Howrah, Hooghly, Kolkata & S24-Pgs districts.

TABLE – I
MONTHWISE INCIDENCE OF ANAPLASMOSIS
REPORTED IN WEST BENGAL FOR THE YEAR 2018-2019

Month	No of Incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
April	0	0	0	0	0.00	0.00	0.00
May	1	50	3	0	0.00	6.00	0.00
June	1	50	1	0	0.00	2.00	0.00
July	0	0	0	0	0.00	0.00	0.00
August	2	5	2	0	0.00	40.00	0.00
September	0	0	0	0	0.00	0.00	0.00
October	0	0	0	0	0.00	0.00	0.00
November	0	0	0	0	0.00	0.00	0.00
December	1	28	5	1	20.00	17.86	3.57
January	3	128	3	0	0.00	2.34	0.00
February	2	120	2	1	50.00	1.67	0.83
March	3	22	3	1	33.33	13.64	4.55
TOTAL	13	403	19	3	15.79	4.71	0.74

TABLE – II
DISTRICTWISE INCIDENCE OF ANAPLASMOSIS
REPORTED IN WEST BENGAL FOR THE YEAR 2018-2019

District	No. of Incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
Coochbehar	1	50	1	0	0.00	2.00	0.00
Birbhum	1	28	5	1	20.00	17.86	3.57
Pur Burdwan	3	128	3	0	0.00	2.34	0.00
Howrah	1	2	1	0	0.00	50.00	0.00
Hooghly	5	144	5	2	40.00	3.47	1.39
Kolkata	1	1	1	0	0.00	100.00	0.00
South-24-Pgs	1	50	3	0	0.00	6.00	0.00
TOTAL	13	403	19	3	15.79	4.71	0.74

THEILERIOSIS

Bovine tropical Theileriosis is a blood protozoan disease of cattle and buffalo caused by *Theileria annulata* transmitted by *Hyalomma anatolicum anatolicum*. Exotic and cross-bred cattle, young indigenous calves are more susceptible and indigenous cattle remain as a carrier. The disease occurs particularly in summer and rainy season (May to October). The pleomorphic erythrocytic forms (0.5-1.5 μ m)-80% round or annular/rest-oval, rod shaped, comma shaped. Recovery from infection leads to the development of premunity and the animals act as carrier. The disease is manifested by high fever (105° – 107 °F), enlargement of superficial lymph nodes and face, increase respiratory and heart rates, nasal discharge and lachrymation, laboured breathing, coughing, haemoglobinuria (rare), nervous signs due to cerebral form of Theileriosis and urticarial type of skin lesions.

During the reporting year 2018-19, eighteen (77) incidences of Theileriosis observed in West Bengal. There is a huge increase in incidence in comparison to the previous year. In this year highest Twenty seven (27) incidences recorded each in Howrah district and Fifteen(15) incidences from Hooghly followed by Thirteen (13) incidences from North 24 Pgs and Nine(9) incidences from South 24 Pgs.

Regarding seasonal variation the disease was occurred throughout the year. But for this year highest incidence were recorded in the month of October with Eleven (11) incidences.

TABLE – III
MONTHWISE INCIDENCE OF THEILERIASIS REPORTED
IN WEST BENGAL FOR THE YEAR 2018-2019

Month	No of Incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
April	3	453	23	1	4.35	5.08	0.22
May	6	172	21	0	0.00	12.21	0.00
June	7	310	44	2	4.55	14.19	0.65
July	5	147	16	0	0.00	10.88	0.00
August	7	567	41	1	2.44	7.23	0.18
September	7	1002	28	0	0.00	2.79	0.00
October	11	1871	71	0	0.00	3.79	0.00
November	6	2416	28	0	0.00	1.16	0.00
December	6	348	24	0	0.00	6.90	0.00
January	9	458	24	0	0.00	5.24	0.00
February	4	149	19	1	5.26	12.75	0.67
March	3	90	9	0	0.00	10.00	0.00
TOTAL	77	7983	352	6	1.70	4.41	0.08

DISTRIBUTION OF BLOOD PROTOZOAN DISEASES INCIDENCES IN WEST BENGAL FOR THE YEAR 2018-19

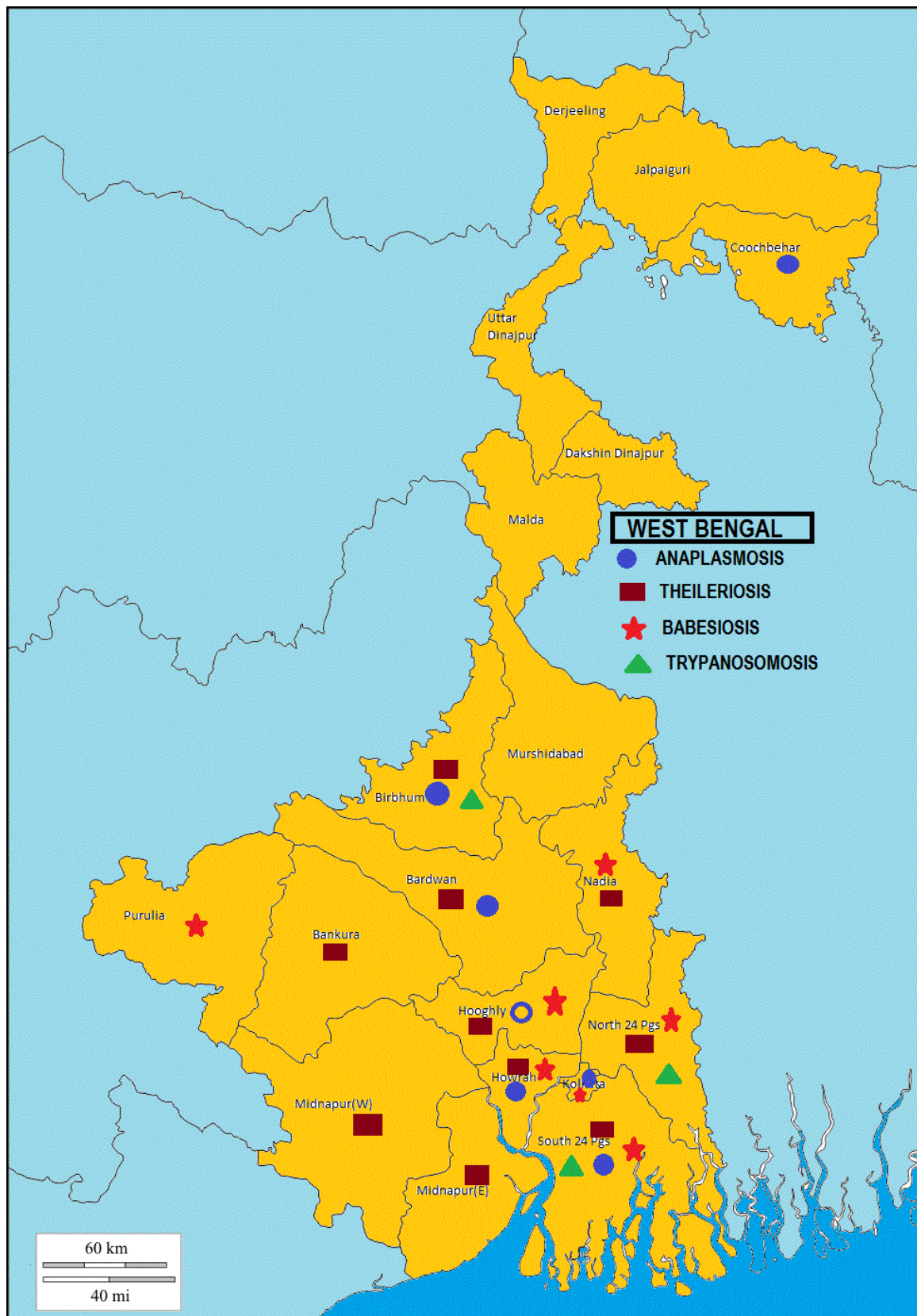


TABLE – IV
DISTRICTWISE INCIDENCE OF THEILERIASIS REPORTED
IN WEST BENGAL FOR THE YEAR 2018-2019

District	No. of Incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
N-24 Parganas	13	382	51	0	0.00	13.35	0.00
S 24 Parganas	9	1053	90	4	4.44	8.55	0.38
Howrah	27	1520	102	2	1.96	6.71	0.13
Hooghly	15	814	25	0	0.00	3.07	0.00
Pu Burdwan	2	200	3	0	0.00	1.50	0.00
Birbhum	1	140	3	0	0.00	2.14	0.00
Bankura	1	10	1	0	0.00	10.00	0.00
Mednipur (E)	2	150	5	0	0.00	3.33	0.00
Mednipur (W)	5	3650	69	0	0.00	1.89	0.00
Nadia	2	64	3	0	0.00	4.69	0.00
TOTAL	77	7983	352	6	1.70	4.41	0.08

BABESIOSIS

Bovine babesiosis is caused by protozoan parasites of the genus *Babesia*, order Piroplasmida, phylum Apicomplexa. Of the species affecting cattle, two – *Babesia bovis* and *B. bigemina* are widely distributed and of major importance in Africa, Asia, Australia, and Central and South America. Tick species are the vectors of *Babesia*. *Rhipicephalus (Boophilus) microplus* is the principal vector of *B. bigemina* and *B. bovis* and is widespread in the tropics and subtropics. *B. bovis* is generally more pathogenic than *B. bigemina*. The infections are characterised by high fever (105°-107° F), ataxia, anorexia, general circulatory shock, initially profuse diarrhoea followed by marked constipation and sometimes also nervous signs as a result of sequestration of infected erythrocytes in cerebral capillaries. Anaemia and haemoglobinuria (coffee coloured urine) may appear later in the course of the disease. An inverse age susceptibility occurs in Babesiosis. Infected animals develop a life-long immunity against re-infection with the same species.

In the year 2018 – 2019, Nineteen (19) incidences of Babesiosis were reported from three districts of West Bengal. Three highest incidences were reported from Howrah district with six (6) incidences followed by North 24 Pgs with Four (40 incidences and Purulia and Kolkata with three (30 incidences each, one incidence each from South 24 Parganas, Hooghly and Nadia districts.

Regarding seasonal variation the disease was occurred throughout the year. But for this year highest incidence were recorded in the month of June and November with three (03) incidences each.

TABLE – V
MONTHWISE INCIDENCE OF BABESIOSIS
REPORTED IN WEST BENGAL FOR THE YEAR 2018-2019

Month	No of Incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
April	2	139	4	1	25.00	2.88	0.72
May	1	58	2	0	0.00	3.45	0.00
June	3	450	12	0	0.00	2.67	0.00
July	2	70	8	0	0.00	11.43	0.00
August	1	3	1	0	0.00	33.33	0.00
September	1	3	1	0	0.00	33.33	0.00
October	1	4	1	0	0.00	25.00	0.00
November	3	62	4	0	0.00	6.45	0.00
December	1	5	1	1	100.00	20.00	20.00
January	1	38	4	1	25.00	10.53	2.63
February	1	26	1	0	0.00	3.85	0.00
March	1	22	3	0	0.00	13.64	0.00
TOTAL	19	880	42	3	7.14	4.77	0.34

TABLE – VI
DISTRICTWISE INCIDENCE OF BABESIOSIS
REPORTED IN WEST BENGAL FOR THE YEAR 2018-2019

District	No. of Incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
N-24 Parganas	4	69	10	0	0.00	14.49	0.00
S 24 Parganas	1	300	1	0	0.00	0.33	0.00
Howrah	6	179	9	1	11.11	5.03	0.56
Hooghly	1	26	2	0	0.00	7.69	0.00
Purulia	3	162	13	2	15.38	8.02	1.23
Kolkata	3	118	6	0	0.00	5.08	0.00
Nadia	1	26	1	0	0.00	3.85	0.00
TOTAL	19	880	42	3	7.14	4.77	0.34

TRYPANOSOMIOSIS

Trypanosomosis, also known as “Surra” in India, is a haemoprotozoan disease caused by an extra-cellular parasite, *Trypanosoma evansi*. The disease is mechanically transmitted by biting flies. i.e., Tabanus, Stomoxys, Haematopota, Chrysops, Hippobosca. Trypanosomosis in susceptible animals, including camels (dromedary and bactrian), horses, dog, buffalo, cattle, goat and pigs is manifested by intermittent fever, directly associated with parasitaemia, together with a progressive anaemia, loss of condition, transient local or general urticarial eruptions cachectic, staggering gait, paraplegia, circling movements, nervous excitement, hitting of head against hard object, profuse salivation, coma, death (per-acute cases within 6-12 hrs). Abortions have been reported in buffalos and camels and there are indications that the disease causes immunodeficiency. Animals subjected to stress – malnutrition, pregnancy, work – are more susceptible to disease.

In the year 2018-2019, total four (4) incidences were reported from N 24 Pgs district with two (20 incidences, followed by S 24 Pgs and Birbhum district with one incident from each.

Regarding seasonal variation the disease was occurred throughout the year, but in this year it is reported in month May, June, November & March.

TABLE – VII
MONTHWISE AND DISTRICTWISE INCIDENCE OF TRYPANOSOMIOSIS
REPORTED IN WEST BENGAL FOR THE YEAR 2017-2018

Month	District	No of Incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
May	N 24 Pgs	1	15	1	0	0.00	6.67	0.00
June	N 24 Pgs	1	400	3	0	0.00	0.75	0.00
November	S 24 Pgs	1	140	1	0	0.00	0.71	0.00
March	Birbhum	1	80	1	0	0.00	1.25	0.00
TOTAL		4	635	6	0	0.00	0.94	0.00

TABLE – VIII
BLOOD PROTOZOAN DISEASES RECORDED DURING
LAST SEVEN YEARS IN WEST BENGAL

Disease	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Trypanosomiosis	12	7	2	4	2	2	4
Anaplasmosis	28	22	50	8	7	3	13
Theileriaosis	18	14	7	7	13	18	77
Babesiasis	25	15	4	3	4	5	19

EQUINE INFECTIOUS ANAEMIA (SWAMP FEVER)

Equine Infectious Anaemia (EIA) is a contagious disease of horses, caused by a virus and characterized by a long chronic illness after an initial acute attack. The causative virus of EIA is a non-oncogenic Retrovirus. It is a RNA virus and this virus has got resemblance with human AIDS virus.

The incubation period is 2 - 4 weeks. The cardinal symptoms are high rise of temperature (intermittent fever), prostration, jaundice, petechiation, depression, weakness, anorexia, wasting, sweating, ocular and nasal discharge, anaemia, oedema of the body and legs may develop in the disease. Pregnant mares may abort.

The disease has been diagnosed on all continents. The morbidity varies considerably and may approach 100% in small areas where the population of carrier horses and insect vectors are particularly dense. The Case fatality rate is usually about 50%. All breeds and age groups of equidae are susceptible. The virus is destroyed by direct sunlight. The virus persists for several months in room temperature, in urine, faeces, dried blood and serum.

There is marked seasonal incidence of the disease, most cases occurring in the summer and autumn. It has been associated with low lying and newly settled bush areas due to greater number of insect vector in such areas. Undernourished, parasitized and debilitated animals are most susceptible.

In West Bengal, no incidence of EIA was reported during last Ten (10) years. In the year 2018-19, 11 (eleven) serum samples from Swami Vivekananda State Police Academy, Barrackpur, 2 (two) serum samples from Dhabdhabi, Baruipur and 13 (thirteen) samples were collected from Murshidabad Municipality of horses sent for test to National Research Centre on Equine (NRCE), Hissar. As per laboratory diagnosis all samples were found negative to EIA.

PESTE -des - PETITS RUMINANTS (PPR)

PPR is called Pseudo-Rinderpest of small ruminants. It is an acute or sub-acute viral disease of goats and sheep characterized by fever, necrotic stomatitis, gastro-enteritis and pneumonia. The disease is caused by *Morbillivirus* of Paramyxoviridae family that is closely related to the causative agent of measles, canine distemper.

This virus has a particular affinity for lymphoid tissue and epithelial tissue of gastro-intestinal tract in which it produces viraemia. Secretions and excretions of the sick animals are the main source of infection.

T A B L E – I

EPIDEMIOLOGICAL OBSERVATION ON PPR

Year	No. of incidence	Population at Risk	Attack	Death	C.F.R (%)	Morbidity (%)	Mortality (%)
2014-2015	62	9928	652	118	18.10	6.57	1.19
2015-2016	131	19518	1456	177	12.16	7.46	0.91
2016-2017	54	9435	869	146	16.80	9.21	1.55
2017-2018	18	3258	324	9	2.78	9.94	0.28
2018-2019	11	1332	251	25	9.96	18.84	1.88

T A B L E – II

MONTHWISE PPR OUTBREAK REPORTED IN WEST BENGAL FOR THE YEAR 2018-2019

Month	No. of incidence	Population at risk	Attack	Death	C.F.R (%)	Morbidity (%)	Mortality (%)
April	4	400	36	0	0.00	9.00	0.00
May	2	420	135	2	1.48	32.14	0.48
June	0	0	0	0	0.00	0.00	0.00
July	0	0	0	0	0.00	0.00	0.00
August	1	25	1	0	0.00	4.00	0.00
September	1	50	1	0	0.00	2.00	0.00
October	0	0	0	0	0.00	0.00	0.00
November	0	0	0	0	0.00	0.00	0.00
December	1	250	50	20	40.00	20.00	8.00
January	0	0	0	0	0.00	0.00	0.00
February	1	122	16	0	0.00	13.11	0.00
March	1	65	12	3	25.00	18.46	4.62
TOTAL	11	1332	251	25	9.96	18.84	1.88

DISTRIBUTION OF P.P.R. INCIDENCES IN WEST BENGAL FOR THE YEAR 2018-19

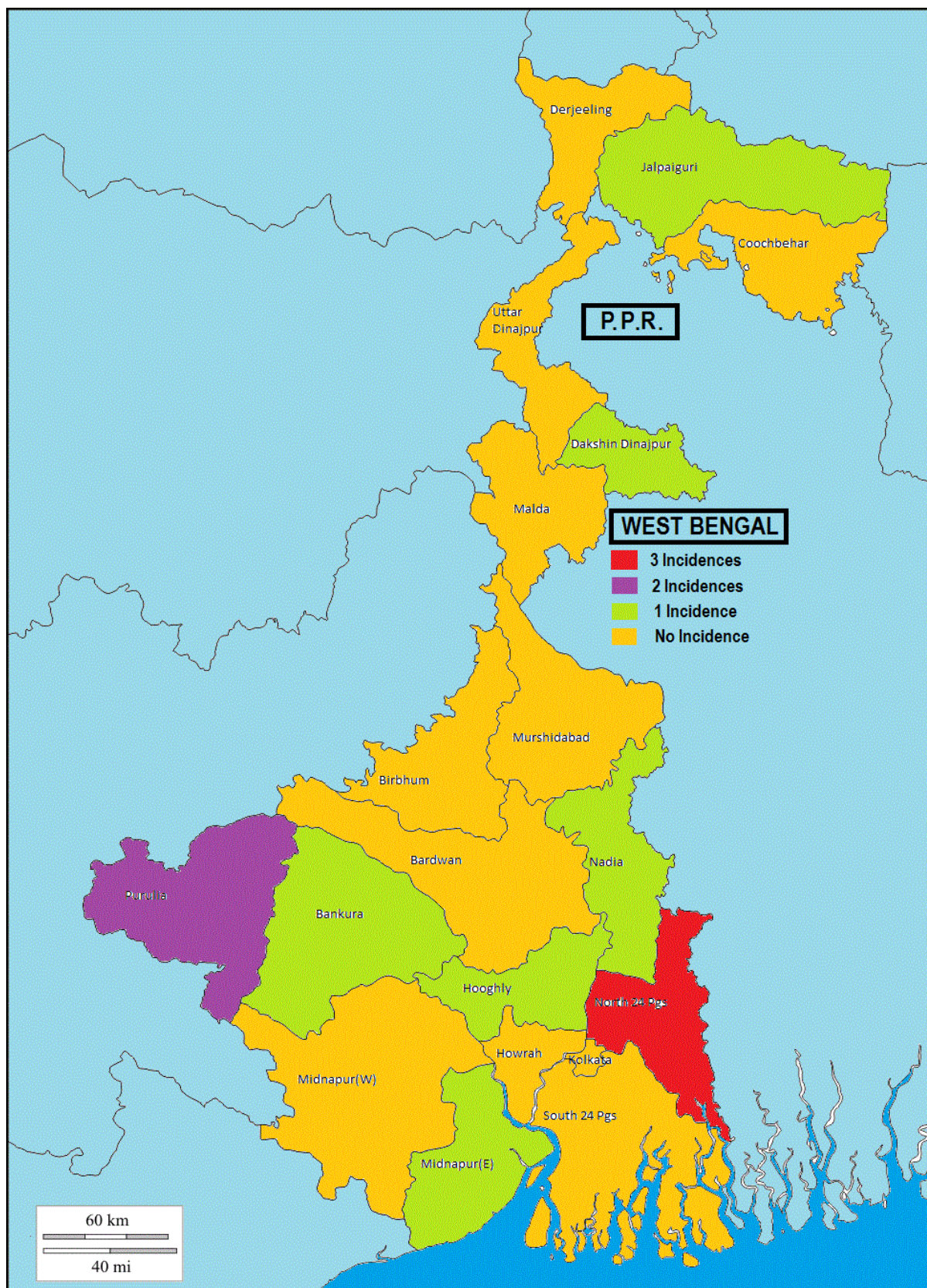


TABLE - III
DISTRICTWISE OUTBREAKS OF PPR REPORTED IN WEST BENGAL
FOR THE YEAR 2018 – 2019

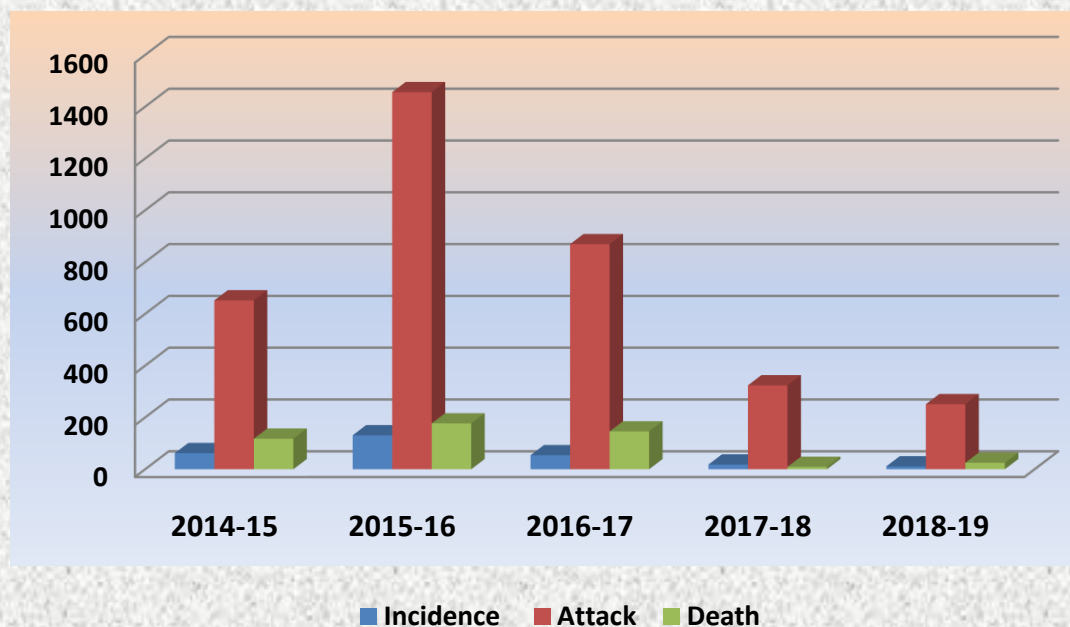
District	No. of incidence	Population at risk	Attack	Death	C.F.R (%)	Morbidity (%)	Mortality (%)
Cooch Behar	0	0	0	0	0	0	0
Jalpaiguri	1	25	1	0	0.00	4.00	0.00
Darjeeling	0	0	0	0	0	0	0
Uttar Dinajpur	0	0	0	0	0	0	0
Dakshin Dinajpur	1	250	50	20	40.00	20.00	8.00
Malda	0	0	0	0	0	0	0
Murshidabad	0	0	0	0	0	0	0
Nadia	1	300	125	2	1.60	41.67	0.67
North 24 Parganas	3	220	16	0	0.00	7.27	0.00
South 24 Parganas	0	0	0	0	0	0	0
Kolkata	0	0	0	0	0	0	0
Howrah	0	0	0	0	0	0	0
Hooghly	1	122	16	0	0.00	13.11	0.00
Burdwan	0	0	0	0	0	0	0
Birbhum	0	0	0	0	0	0	0
Bankura	1	65	12	3	25.00	18.46	4.62
Purba Medinipur	1	120	10	0	0.00	8.33	0.00
Paschim Medinipur	0	0	0	0	0	0	0
Purulia	2	230	21	0	0.00	9.13	0.00
TOTAL	11	1332	251	25	9.96	18.84	1.88

In the year 2018 – 2019, eleven (11) outbreaks were reported in West Bengal which is decreased in comparison to last year. The case fatality rate (9.96%) increased markedly, morbidity rate (18.84%) increased more than two folds and mortality rate (1.88%) was also increased markedly as compared to previous year. The highest, three (3) incidences of PPR were reported from North 24 Pgs district followed by two (2) incidences from Purulia district and one (1) incidence from Jalpaiguri, D. Dinajpur, Hooghly, Nadia and Midnipur (E) district.

So far seasonal variation, it has been observed that PPR outbreaks occur throughout the year. Maximum four (4) incidences were reported in the each pre- monsoon months ie, in April followed by two incidences in May. And one incidence reported in August, September, December, February and March. It reveals that maximum number of outbreaks occurred during summer and pre-monsoon period i.e., March to August in this year. So vaccination programme should be scheduled before pre monsoon period to control the disease.

In the year 2018–2019, out of all districts in the state, the disease was reported from eight (8) districts only. No PPR incidence reported from other eleven (15) districts. So surveillance programme at the field level should be improved to give any reason, if there is any under-reporting.

Year wise incidences, attack and death due to PPR in West Bengal in Last 5 Years



Month wise incidences of PPR in West Bengal in 2018-19

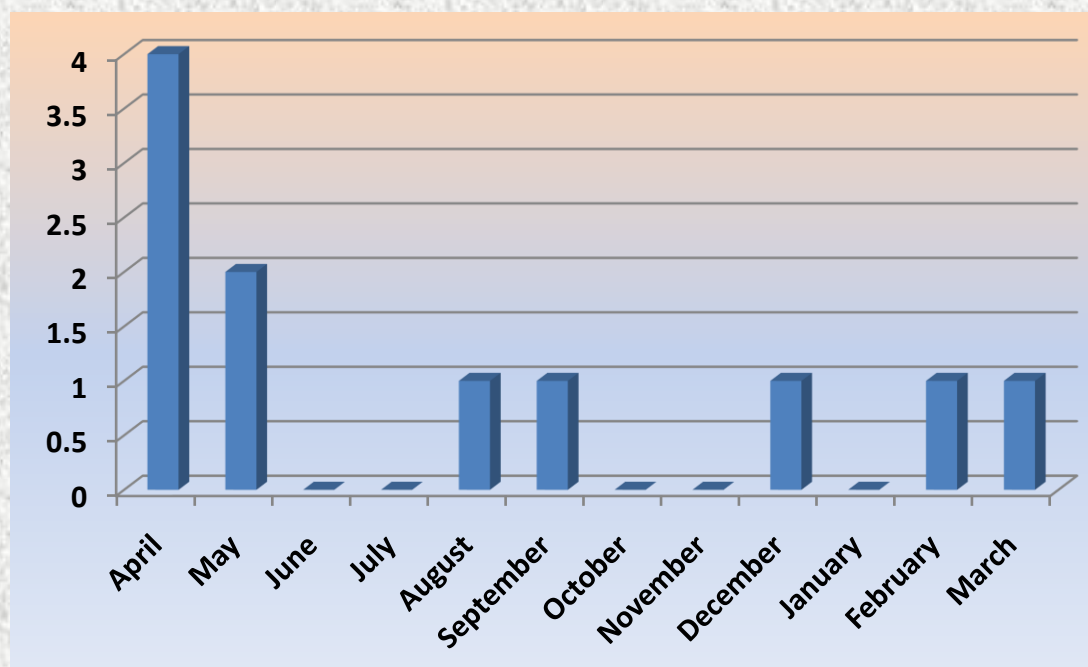


TABLE – IV**DISTRICT WISE PPR OUTBREAK REPORTED IN WEST BENGAL
DURING LAST TEN YEARS**

District	2009-10	2010- 11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Cooch Behar	0	0	0	0	0	0	0	0	0	0
Jalpaiguri	2	15	8	6	6	4	5	0	1	1
Darjeeling	0	9	2	0	0	0	0	0	0	0
Uttar Dinajpur	0	0	1	3	1	0	6	3	0	0
Dakshin Dinajpur	12	1	1	1	1	1	3	4	0	1
Malda	59	80	14	20	14	7	4	2	0	0
Murshidabad	2	4	2	0	1	0	1	1	0	0
Nadia	0	5	6	0	1	4	11	3	0	1
North 24 Parganas	2	3	0	2	2	1	1	0	0	3
South 24 Parganas	0	0	0	0	1	0	2	0	2	0
Kolkata	1	0	0	0	2	2	1	0	0	0
Howrah	8	13	8	13	4	12	13	9	1	0
Hooghly	0	8	11	8	5	4	9	3	2	1
Burdwan	18	5	1	2	6	9	4	4	2	0
Birbhum	11	17	47	18	14	4	22	3	1	0
Bankura	3	22	14	2	5	9	9	2	0	1
Purba Medinipur	0	1	0	0	0	0	0	0	0	1
Paschim Medinipur	9	2	2	2	5	1	7	6	6	0
Purulia	6	9	3	2	7	4	33	14	3	2
TOTAL	133	194	120	79	75	62	131	54	18	11

GOAT POX

Goat Pox is a highly contagious disease of goat and sheep caused by *Capri pox* virus and characterized by fever and vesicular eruption on body surface. Skin lesion and scabs are major sources of virus. The virus may survive in scabs for at least 3 months. Transmission is often through skin abrasions or by inhalation. Viraemia occurs and the virus is carried to other sites in the skin, regional nodes, spleen, kidney and lungs. Virus is excreted from skin lesions, nasal exudates and milk. Young animals are most severely affected. When the disease first enters in a susceptible flock, morbidity and mortality especially in kids is high.

T A B L E - I
EPIDEMIOLOGICAL OBSERVATION ON GOAT POX

Year	No. of incidence	Population at Risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
2014-2015	6	934	84	9	10.71	8.99	0.96
2015-2016	2	400	5	0	0.00	1.25	0.00
2016-2017	3	850	61	2	3.28	7.18	0.24
2017-2018	7	1084	55	2	3.64	5.07	0.18
2018-2019	10	9930	78	28	35.90	0.79	0.28

During the reporting year (2018-19), total ten (10) incidences were recorded which is increased in comparison to the previous year but decreased dramatically with the year 2012-13 and 2013-14. Morbidity rate (0.79%) decreased a lot and mortality rate (0.28%) is increased but case fatality rate (35.90%) increased dramatically in comparison with last year. In this year, incidences were reported only from two (2) districts, i.e., Howrah and North 24-Pgs.

So far seasonal variation, it has been observed that highest three (3) incidences was reported in November and two incidences in June followed by one each was reported in the month May, August, September, October, November & February.

It reveals from the report that most of the incidences reported only from 1 to 6 districts during last five years. So, it is necessary to improve the surveillance programme to justify the absence of disease in the districts and to take control measure to prevent spread of disease. Veterinary Officers and Assistant Directors, ARD (DI) of all districts should be careful about collection and sending of materials for diagnosis as well as about disease reporting system of respective districts

T A B L E – II
DISTRICTWISE GOAT POX OUTBREAK REPORTED IN WEST BENGAL
FOR THE YEAR 2018 – 2019

District	No. of incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
Howrah	5	1645	16	0	0.00	0.97	0.00
N-24-Pgs	5	8285	62	28	45.16	0.75	0.34
TOTAL	10	9930	78	28	35.90	0.79	0.28

T A B L E – III
MONTHWISE GOAT POX OUTBREAK REPORTED IN WEST BENGAL
FOR THE YEAR 2018-2019

Month	No. of incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
May	1	300	4	0	0.00	1.33	0.00
June	2	164	4	1	25.00	2.44	0.61
August	1	178	4	0	0.00	2.25	0.00
September	1	753	4	0	0.00	0.53	0.00
October	1	300	2	0	0.00	0.67	0.00
November	3	8160	58	27	46.55	0.71	0.33
February	1	75	2	0	0.00	2.67	0.00
TOTAL	10	9930	78	28	35.90	0.79	0.28

TABLE – IV
DISTRICT WISE REPORTED OUTBREAK OF GOAT POX DURING LAST TEN YEARS

District	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Cooch Behar	0	0	0	0	0	0	0	0	1	0
Jalpaiguri	0	0	0	0	0	0	0	0	0	0
Darjeeling	0	0	0	0	0	0	0	0	0	0
Uttar Dinajpur	0	0	0	0	0	0	0	0	0	0
Dakshin Dinajpur	0	0	0	4	0	0	0	0	0	0
Malda	0	0	0	0	0	0	0	0	0	0
Murshidabad	0	0	0	0	0	0	0	0	0	0
Nadia	0	0	0	0	1	1	0	0	2	0
North 24 Pgs	6	23	9	6	12	3	0	0	0	5
South 24 Pgs	0	2	4	0	4	0	0	0	0	0
Howrah	13	33	19	0	0	0	0	2	3	5
Kolkata	0	0	0	4	5	0	0	0	0	0
Hooghly	18	35	25	10	3	0	2	0	0	0
Burdwan	14	16	34	9	10	2	0	1	0	0
Birbhum	4	3	4	3	4	0	0	0	1	0
Bankura	1	0	1	0	0	0	0	0	0	0
Purba medinipur	0	6	8	0	0	0	0	0	0	0
Paschim Medinipur	0	3	0	0	0	0	0	0	0	0
Purulia	3	6	0	0	0	0	0	0	0	0
TOTAL	59	127	104	36	39	6	2	3	7	10

SWINE FEVER (HOG CHOLERA)

Swine fever is a highly infectious viral disease characterised by rapid spread and a high morbidity and mortality rate. This virus belongs to the genus Peste virus in the family of Togaviridae. The virus affects only in swine. Initially the disease is manifested by fever, loss of appetite, followed by diarrhoea, weakness in the hindquarter and animals stagger. Mucopurulent discharge from the eyes is frequently seen. Nervous symptoms occur quite commonly followed by encephalomyelitis and death.

The source of virus is always an infected pig and its products. The infection is usually acquired by ingestion and inhalation. When the disease is introduced into a susceptible population an epidemic usually develops rapidly because of the low resistance against the virulent virus and the short incubation period.

TABLE – I

EPIDEMIOLOGICAL OBSERVATION ON SWINE FEVER

Year	No. of incidence	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
2014-2015	1	3	1	33.33	15.00	5.00
2015-2016	0	0	0	0	0	0
2016-2017	0	0	0	0	0	0
2017-2018	0	0	0	0	0	0
2018-2019	1	1	1	100.00	10.00	10.00

In the reporting year (2018-19) one (1) incidence was reported from Kolkata district out of nineteen districts of our State. It reveals from the report that 0 to 1 incidences were reported during last five years. Hence, surveillance of all districts where pig population is more, should be improved to give any reason for under-reporting.

AVIAN INFLUENZA

Avian Influenza is a highly infectious and extremely contagious multi organ involving disease of birds caused by Influenza type A virus belonging to Orthomixoviridae (RNA) family. Wild birds are thought to be the natural hosts of the virus. The virus circulates among birds worldwide.

The Avian influenza virus primarily infects birds and does not typically infect humans. In 1997, however, the first instance of direct bird-to-human transmission of H5N1 was documented during an outbreak of avian influenza among poultry in Hong Kong; the virus caused severe respiratory illness in 18 people, among them 6 were died. Since that time, there have been other instances of H5N1 infection among humans. However, so far, H5N1 viruses have not been capable of efficient human-to-human transmission. This is something that is being watched carefully and is being investigated during recent epizootics. Outbreaks of low-pathogenic avian influenza (LPAI) cause little mortality and are easily overlooked, but they may evolve to become HPAI by simple drifting of virus even by a single point mutation. Therefore, it may also be a potential source of origin of deadly human influenza virus.

Recently, Government of India has given importance for active surveillance of H9N2 Avian Influenza virus in the country with routine surveillance as usual in this regard.

EPIDEMIOLOGY

All influenza viruses are genetically labile, genetic composition of the viruses' changes from time to time. These constant changes in the antigenic composition or "point mutation" of influenza viruses are known as antigenic drift. Influenza viruses including subtype from different species can swap or "re-assort" genetic materials and merge during re assortment process. This phenomenon is known as antigenic shift.

Infected birds shed virus through faecal materials, saliva, nasal and ocular secretions. Avian influenza viruses spread among susceptible birds with contaminated excretions. It is believed that most of H5N1 infection in human has resulted from contact with infected poultry or contaminated surfaces. The HPAI can survive in contaminated manure for 3 months. A single gram of contaminated manure can contain enough viruses to infect 1 million birds. In water virus can survive from 4 days to 30 days.

EPIDEMIOLOGICAL OBSERVATION ON AVIAN INFLUENZA

Year	No. of incidence	No. of District involved	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
2014-2015	0	0	0	0	0	0	0
2015-2016	0	0	0	0	0	0	0
2016-2017	0	0	0	0	0	0	0
2017-2018	0	0	0	0	0	0	0
2018-2019	0	0	0	0	0	0	0

In the year 2018-2019, no outbreak was reported from any district of West Bengal.

RANIKHET DISEASE (NEW CASTLE DISEASE)

Ranikhet disease is a highly contagious and destructive disease, which attacks mostly chickens and guinea fowl. Man is susceptible and there are numerous reports of self-limiting conjunctivitis in laboratory workers and in poultry farmers exposed to diseased birds and living virus vaccines.

The causative agent is a member of paramixogroup-I of virus, which can cause mortality upto 100% in susceptible chickens. It is characterised by respiratory distress, nervous signs leading to wing paralysis, in-coordination of movement and lameness, haemorrhagic ulcerative enteritis with viscerotropic and neurotropic strains. The lesions of the digestive tract are more prominent, haemorrhages often with ulceration of the lymphoid patches may be found in the mucosa of the gizzard and along the length of the intestinal tract. Petechial haemorrhages may be present in the mucosa of the pro-ventriculus, ilio-caecal region, on the mesentery, peritoneum, heart and other tissues.

The disease occurs worldwide in a variety of domestic and wild birds. Virus is present in exhaled air, in respiratory discharges, in faeces, in eggs laid during clinical stage and in all parts of the carcass during acute infection and at death. Chickens are readily infected by aerosols and by ingesting of water or food contaminated with the virus. Mortality depends on virulence of the virus strain, environmental and flock conditions.

T A B L E - I
EPIDEMIOLOGICAL OBSERVATION ON RANIKHET DISEASE

Year	No. of incidence	Population at Risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
2014-2015	80	59,975	7087	2578	36.38	11.82	4.30
2015-2016	40	27635	27635	1150	29.57	4.16	1.23
2016-2017	49	167450	7425	4079	54.94	4.43	2.44
2017-2018	33	40,893	14,823	8492	57.29	36.25	20.77
2018-2019	36	62238	26542	15268	57.52	42.65	24.53

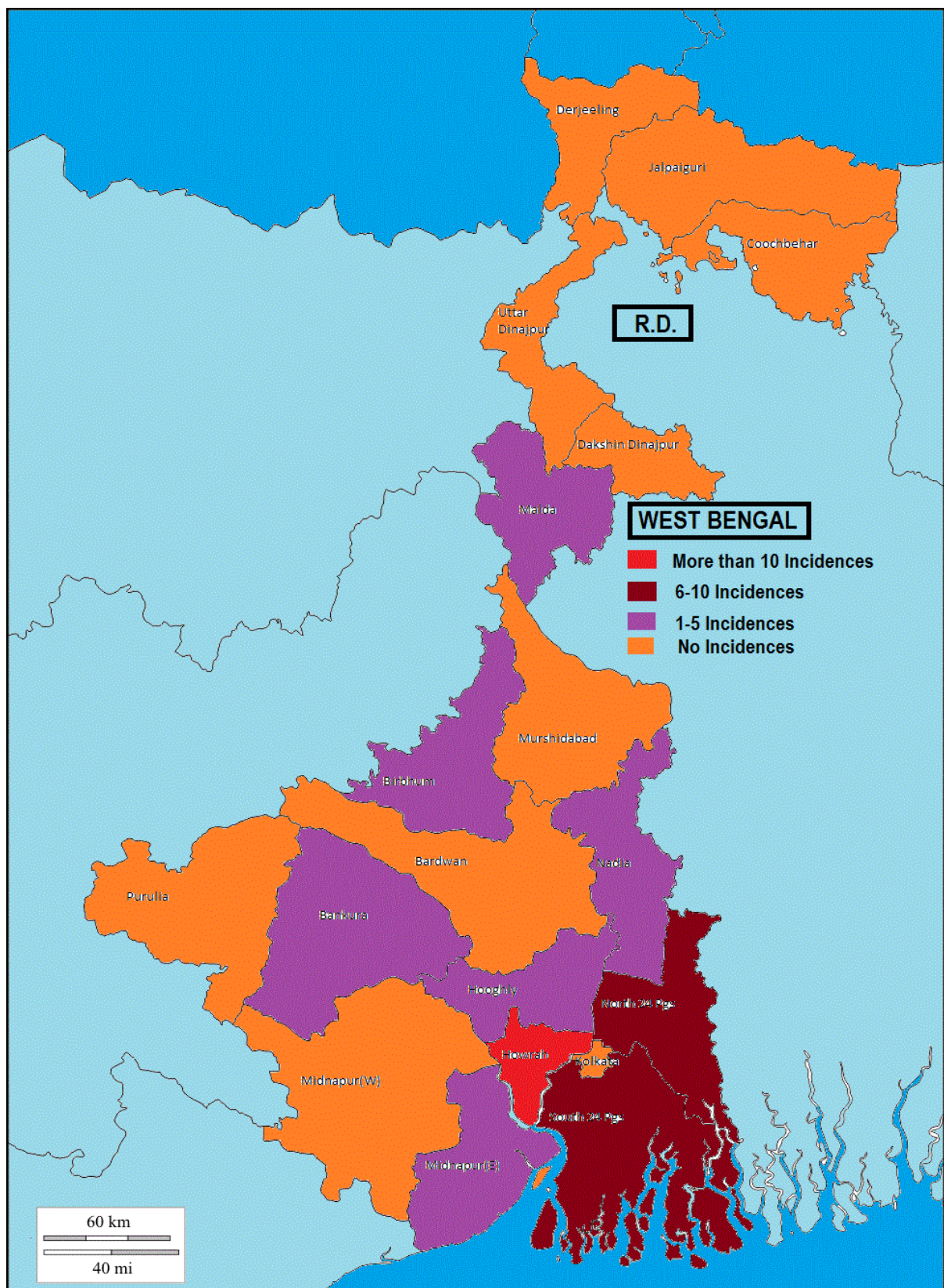
In the year 2018 - 2019, total 36 outbreaks were reported which is increased as compared to previous year. Case fatality rate (57.74%), Morbidity rate (42.49%) and Mortality rate (24.53%) were increased in comparison to previous year. Morbidity rate and Mortality rate were increased markedly in comparison to previous year.

The disease occurs throughout the year. The highest 17 incidences were recorded in the month of March involving six districts (North 24 Parganas, South 24 Parganas, Hooghly, Purba Medinipur, Nadia & Howrah), Three (3) outbreaks were recorded in the month of October & June followed by two (2) outbreaks recorded from the month of May, July, September, December & February. Incidences were higher in the months of winter and post-winter. So vaccination approach against the disease may be intensive in nature on the basis of seasonal variation.

So far geographic variation is concerned, the highest Thirteen (13) incidences were reported from Howrah followed by Nine (9) outbreaks were reported from North 24 Parganas, followed by seven (7) in South 24 Parganas district.

Out of twenty three districts in the state, the disease was reported only from seven (09) districts. No outbreak was reported from Darjeeling, Jalpaiguri, Siliguri MP, Uttar Dinajpur, Dakshin Dinajpur, Murshidabad, Purba & Paschim Burdwan, Birbhum, Paschim Medinipur, Jhargram, Purulia, and Kolkata districts. The Ranikhet disease is an important disease of poultry in our state.

DISTRIBUTION OF RANIKHET DISEASE INCIDENCES IN WEST BENGAL FOR THE YEAR 2018-19



Veterinary Officers and Assistant Director; ARD (Disease Investigation) of each district should be alert about diagnosis as well as about disease reporting system.

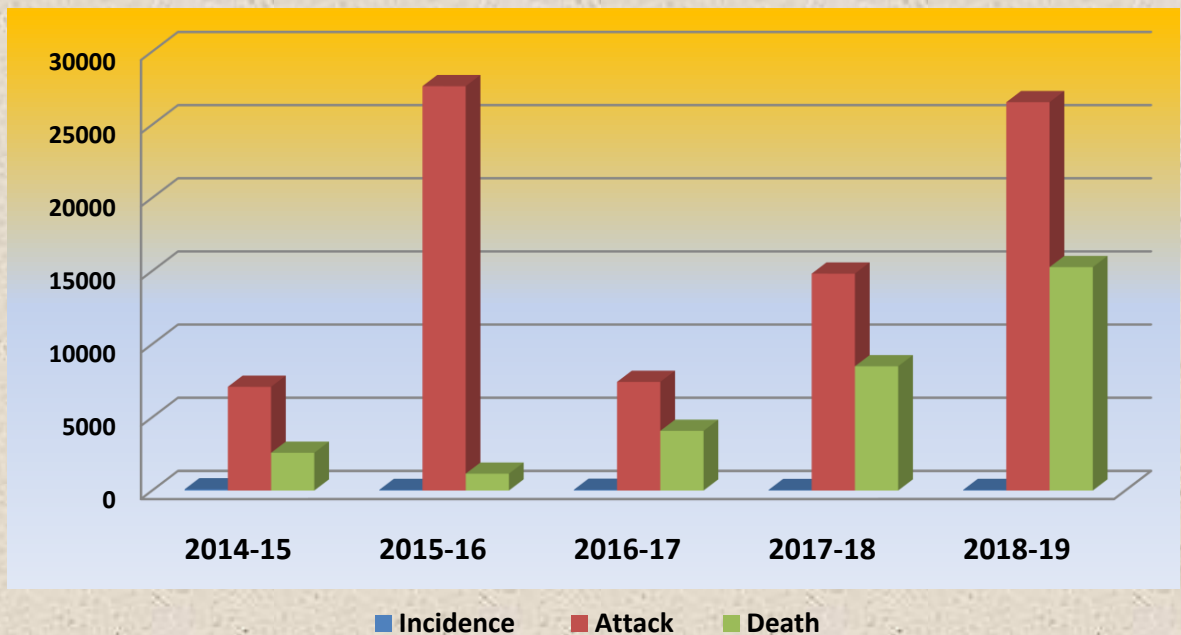
The disease still is a problem in the state, we are very much aware that meat type bird farming is mainly prevailing in our state than that of layer farming and farmers are maintaining the birds in the multi age system of rearing and they are very much habituated with more or less schedule vaccination programme. These high incidences of Ranikhet Disease may be due to poor management practice and some other infective and non-infective immuno suppresser. However, due to the calamity of Ranikhet Disease, farmers are facing a huge economic loss. So, vaccination schedule including molecular activity of field virus may be studied for taking effective control programme.

T A B L E – II

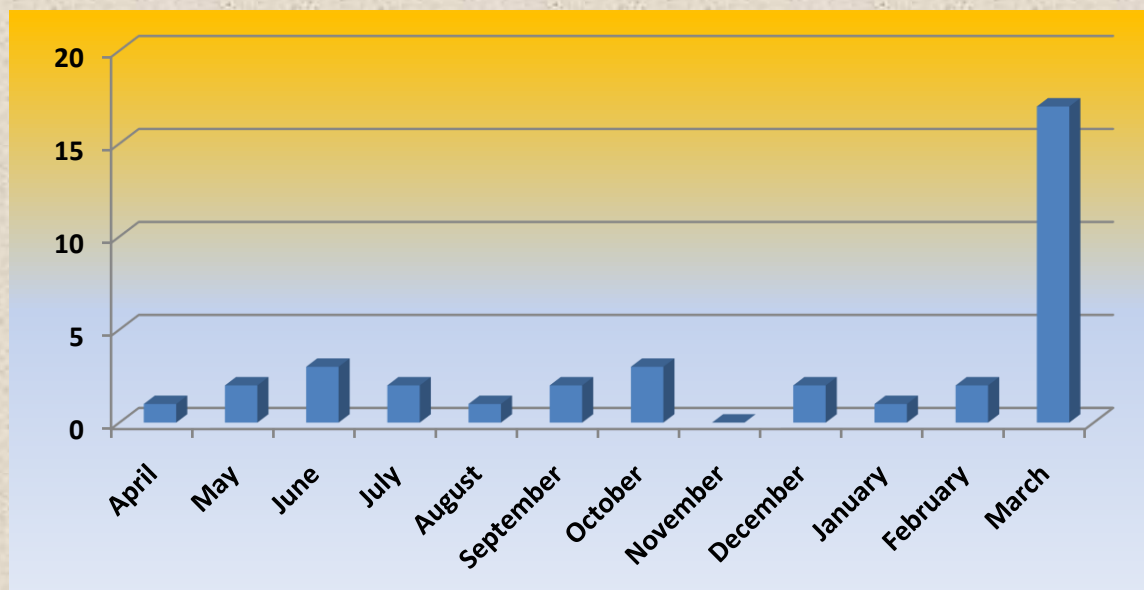
**DISTRICTWISE OUTBREAKS OF RANIKHET DISEASE REPORTED
IN WEST BENGAL FOR THE YEAR 2018 – 2019**

District	No. of incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
Cooch Behar	0	0	0	0	0	0	0
Jalpaiguri	0	0	0	0	0	0	0
Darjeeling	0	0	0	0	0	0	0
Uttar Dinajpur	0	0	0	0	0	0	0
Dakshin Dinajpur	0	0	0	0	0	0	0
Malda	1	100	23	13	56.52	23.00	13.00
Murshidabad	0	0	0	0	0	0	0
Nadia	2	30100	8530	560	6.57	28.34	1.86
North 24Parganas	9	5056	1224	374	30.56	24.21	7.40
South 24Parganas	7	8840	2314	1398	60.41	26.18	15.81
Kolkata	0	0	0	0			
Howrah	13	4112	1941	1080	55.64	47.20	26.26
Hooghly	1	1500	1000	700	70.00	66.67	46.67
Burdwan	0	0	0	0			
Birbhum	1	1200	390	103	26.41	32.50	8.58
Bankura	1	11000	11000	11000	100.00	100.00	100.00
Purba Medinipur	1	300	120	40	33.33	40.00	13.33
Paschim medinipur	0	0	0	0	0	0	0
Purulia	0	0	0	0	0	0	0
TOTAL	36	62238	26542	15268	57.52	42.65	24.53

Year wise incidences, attack and death due to R.D. Incidence in West Bengal in Last 5 Years



Month wise R.D. Incidences in West Bengal for the year 2018-19



T A B L E – III
MONTHWISE OUTBREAKS OF RANIKHET DISEASE REPORTED
IN WEST BENGAL FOR THE YEAR 2018 –2019

Month	No. of incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
April	1	69	17	11	64.71	24.64	15.94
May	2	11073	11001	11000	99.99	99.35	99.34
June	3	710	125	41	32.80	17.61	5.77
July	2	570	31	17	54.84	5.44	2.98
August	1	158	100	5	5.00	63.29	3.16
September	2	340	46	9	19.57	13.53	2.65
October	3	532	57	27	47.37	10.71	5.08
November	0	0	0	0	0.00	0.00	0.00
December	3	532	57	27	47.37	10.71	5.08
January	1	200	30	10	33.33	15.00	5.00
February	2	400	39	13	33.33	9.75	3.25
March	17	46786	14651	4022	27.45	31.31	8.60
TOTAL	36	62238	26542	15268	57.52	42.65	24.53

T A B L E – IV
DISTRICT WISE RANIKHET DISEASE OUTBREAKS REPORTED IN
WEST BENGAL DURING LAST TEN YEARS

District	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Coochbehar	1	0	0	1	1	0	0	0	2	0
Jalpaiguri	5	33	29	6	13	4	3	0	1	0
Darjeeling	0	3	8	0	0	0	0	0	0	0
Uttar Dinajpur	5	0	0	4	14	10	1	7	0	0
Dakshin Dinajpur	4	14	32	13	8	14	6	2	0	0
Malda	1	0	2	1	1	0	0	1	0	1
Murshidabad	2	0	2	1	0	1	0	3	0	0
Nadia	7	2	2	6	11	1	0	3	0	2
N-24 Parganas	34	63	40	12	21	11	1	2	9	9
S-24 Parganas	9	7	10	10	26	4	0	3	8	7
Kolkata	1	0	1	5	0	3	0	0	0	0
Howrah	32	29	31	23	21	5	1	4	9	13
Hooghly	19	24	26	21	9	1	0	0	1	1
Burdwan	8	15	26	12	14	6	1	4	0	0
Birbhum	4	4	0	3	4	6	9	13	0	1
Bankura	0	0	2	3	2	0	0	2	0	1
Purba Medinipur	14	9	4	3	3	2	9	6	3	1
Pasch. Medinipur	14	0	0	3	1	0	0	0	0	0
Purulia	36	24	31	11	14	12	9	0	0	0
TOTAL	196	227	246	133	163	80	40	49	33	36

INFECTIOUS BRONCHITIS

Infectious Bronchitis (IB) is an extremely contagious viral disease that affects chickens of all ages and types. The causative organism is a single stranded RNA virus of the family Coronaviridae which predominantly affects chickens. Collectively the adverse effects make IB the biggest single cause of infectious disease-related economic loss in some countries.

The disease spreads very rapidly, and all birds in an infected flock tend to become infected. Young chicks are most severely affected, although all age groups are susceptible. Morbidity is commonly close to 100%. In most outbreaks mortality is about 5%, although mortality rates are higher when disease is complicated by concurrent bacterial infection & may reach up to 60%. Typically, the disease results in respiratory signs such as coughing, sneezing and rattling and occasionally facial swelling in young chicks. In laying hens, morbidity is very high and egg production drops sharply. These symptoms usually manifest 18-24 hours post-exposure and may last for about 2-3 weeks.

Prevention of IB, and other respiratory diseases, requires an environment that reduces potential damage to the respiratory tract. Prevention is best achieved through good management by creating draft free environments, good ventilation and required optimal temperature.

T A B L E – I
EPIDEMIOLOGICAL OBSERVATION ON INFECTIOUS BRONCHITIS

Year	No. of incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
2018-2019	40	168408	20180	8023	39.76	11.98	4.76

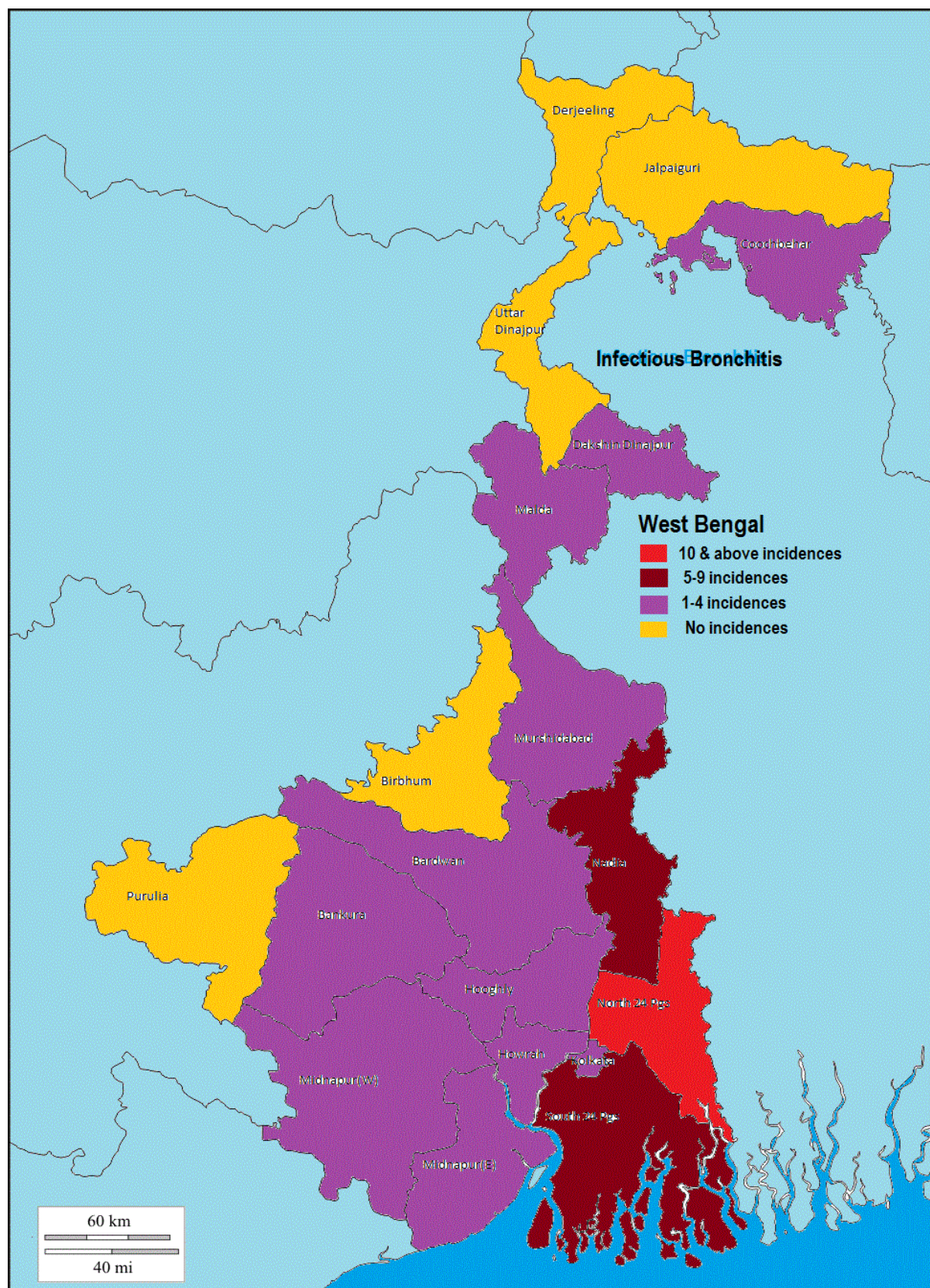
During the reporting year (2018-19), Forty (40) incidences were reported from the entire state.

In West Bengal, the disease is in such a state where the clinical manifestation is not well marked or morbidity rate and mortality pattern is low. But in this year case fatality rate is 39.76% is very high but morbidity rate is decreased (11.98%) and mortality rate is also decreased ie, 4.76 %. The disease is very much prevalent in early age group of birds with clinical manifestation and in laying birds high degree of loss of productivity as per reports of this year.

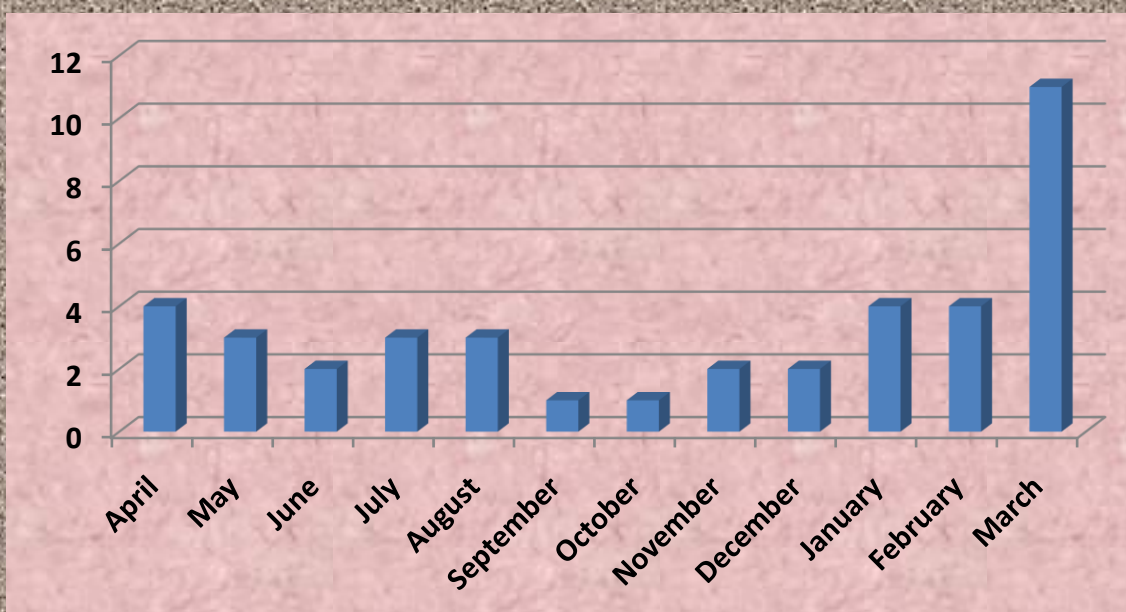
Maximum eleven (11) numbers of incidences was reported in the months of March, followed by four (4) incidences in January, February and April. Lowest One (1) number of incidence was reported in September & October. In reporting year the diseases was flourished mainly in winter & post winter season, however the disease was reported through all over the year.

Out of twenty three districts in the state, the disease was reported only from four (4) districts, namely North 24 Pgs, South 24 Pgs, Paschim Burdwan & Purba Mednipur. It has not been reported from some districts where incidences might have occurred. Veterinarians and Assistant Director, ARD (Disease Investigation) of each district should be alert about diagnosis as well as about disease reporting system as the disease is of immuno-suppressive in nature.

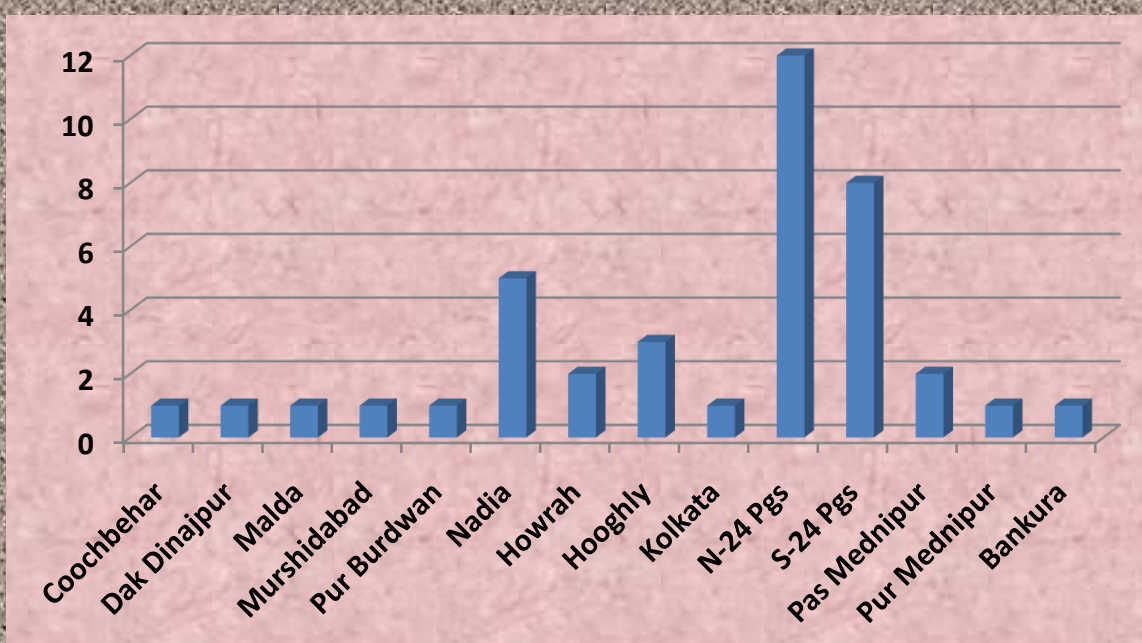
DISTRIBUTION OF INFECTIOUS BRONCHITIS INCIDENCES IN WEST BENGAL FOR THE YEAR 2018-19



Month wise I.B. incidences in West Bengal for the year 2018-19



District wise I.B. Incidences in West Bengal for the year 2018-19



T A B L E – II
DISTRICTWISE REPORTED INCIDENCE OF INFECTIOUS BRONCHITIS IN
WEST BENGAL FOR THE YEAR 2018-2019

District	No. of incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
Coochbehar	1	1500	400	214	53.50	26.67	14.27
Dak Dinajpur	1	1379	350	110	31.43	25.38	7.98
Malda	1	200	80	40	50.00	40.00	20.00
Murshidabad	1	2324	2275	49	2.15	97.89	2.11
Pur Burdwan	1	2400	250	25	10.00	10.42	1.04
Nadia	5	13600	4950	2580	52.12	36.40	18.97
Howrah	2	4000	1350	274	20.30	33.75	6.85
Hooghly	3	3525	1450	475	32.76	41.13	13.48
Kolkata	1	250	50	25	50.00	20.00	10.00
North 24 Parganas	12	18180	1964	1003	51.07	10.80	5.52
South 24 Parganas	8	21200	1356	592	43.66	6.40	2.79
Paschim Mednipur	2	5325	2135	1425	66.74	40.09	26.76
Purba Mednipur	1	1000	70	35	50.00	7.00	3.50
Bankura	1	93525	3520	1226	34.83	3.76	1.31
TOTAL	40	168408	20180	8023	39.76	11.98	4.76

T A B L E – III
MONTHWISE REPORTED INCIDENCE OF INFECTIOUS BRONCHITIS IN
WEST BENGAL FOR THE YEAR 2018 – 2019

Month	No. of incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
April	4	6200	3150	2075	65.87	50.81	33.47
May	3	95325	3821	1329	34.78	4.01	1.39
June	2	5580	870	236	27.13	15.59	4.23
July	4	4000	1075	377	35.07	26.88	9.43
August	3	6000	780	270	34.62	13.00	4.50
September	1	500	50	10	20.00	10.00	2.00
October	1	250	50	25	50.00	20.00	10.00
November	2	2000	1200	250	20.83	60.00	12.50
December	1	6700	450	330	73.33	6.72	4.93
January	4	7725	679	409	60.24	8.79	5.29
February	4	4925	1030	120	11.65	20.91	2.44
March	9	29203	7025	2592	36.90	24.06	8.88
TOTAL	40	168408	20180	8023	39.76	11.98	4.76

INFECTIOUS BURSAL DISEASE (GUMBORO DISEASE)

Infectious Bursal Disease (IBD) is an infectious and highly contagious viral disease of young chickens usually up to six weeks of age, although the disease may be seen in birds upto 15 weeks of age. The disease onset suddenly after an incubation period of 3 - 4 days and characterised by short course and extensive destruction of lymphocytes particularly in the bursa of fabricius and also in other lymphoid tissue, haemorrhages in the leg and thigh muscles, watery diarrhoea, soiled vent feather, inflammation of the cloaca and anorexia. The causal agent is IBD virus. It is most readily isolated from the cloacal bursa and may be isolated from any organs. The virus is very stable and difficult to eradicate from premises.

Results of IBDV infection are dependent upon age, breed of chicks and virulence of the virus. 3 to 6 weeks of age is the most susceptible to clinical disease. The affected chicks excretes virus in its dropping for upto two weeks after infection which is an important factor in the transmission of infection.

Morbidity is often high but mortality is variable. The immuno-suppressive capabilities are now considered as greatest threat to poultry industry in this state.

TABLE – I
EPIDEMIOLOGICAL OBSERVATION ON INFECTIOUS BURSAL DISEASE

Year	No. of incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
2014-2015	4	1970	98	58	59.18	4.97	2.94
2015-2016	0	0	0	0	0	0	0
2016-2017	4	2900	468	300	64.10	16.14	10.34
2017-2018	8	25026	13937	5771	25.96	97.85	25.40
2018-2019	5	23250	3909	1953	49.96	16.81	8.40

During the reporting year (2018-19), Five (5) incidences were reported from the entire state. Surveillance of all districts should be improved to give any reason if there any under-reporting.

In West Bengal, the disease is in such a state where the clinical manifestation is not well marked or morbidity and mortality pattern is very low. But in this year case fatality rate is 49.96% is very high but morbidity rate is decreased (16.81%) and mortality rate is also decreased i.e., 8.40%. The disease is very much prevalent in early age group of meat type birds without clinical manifestation with high degree of immunosuppressive activity as per reports of different years.

One incidence each was reported in the months of June, August, September, October & March. These are the mainly post-monsoon months.

Out of twenty three districts in the state, the disease was reported only from four (4) districts, namely North 24 Pgs, South 24 Pgs, Paschim Burdwan & Purba Mednipur. It has not been reported from some districts where incidences might have occurred. Veterinarians and Assistant Director, ARD (Disease Investigation) of each district should be alert about diagnosis as well as about disease reporting system as the disease is of immuno-suppressive in nature.

T A B L E – II
DISTRICTWISE REPORTED INCIDENCE OF IBD IN WEST BENGAL
FOR THE YEAR 2018-2019

District	No. of incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
North 24 Parganas	2	2350	123	78	63.41	5.23	3.32
South 24 Parganas	1	10000	266	50	18.80	2.66	0.50
Paschim Burdwan	1	10000	3400	1800	52.94	34.00	18.00
Purba Mednipur	1	1000	120	25	20.83	12.00	2.50
TOTAL	5	23250	3909	1953	49.96	16.81	8.40

T A B L E – III
MONTHWISE REPORTED INCIDENCE OF IBD IN WEST BENGAL
FOR THE YEAR 2018 – 2019

Month	No. of incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
June	1	10000	266	50	18.80	2.66	0.50
August	1	2100	118	75	63.56	5.62	3.57
September	1	10000	3400	1800	52.94	34.00	18.00
October	1	250	5	3	60.00	2.00	1.20
March	1	1000	120	25	20.83	12.00	2.50
TOTAL	5	23250	3909	1953	49.96	16.81	8.40

T A B L E – IV
DISTRICT WISE IBD OUTBREAKS REPORTED IN
WEST BENGAL DURING LAST TEN YEARS

District	2009- 10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Coochbehar	0	0	0	1	0	0	0	0	0	0
Jalpaiguri	0	1	1	0	0	0	0	0	0	0
Darjeeling	0	0	0	0	0	0	0	0	0	0
Uttar Dinajpur	0	0	0	0	2	0	0	0	0	0
Dakshin Dinajpur	0	0	0	0	1	1	0	0	0	0
Malda	0	0	1	0	1	0	0	0	0	0
Murshidabad	0	0	0	0	0	0	0	0	0	0
Nadia	0	0	2	1	0	0	0	0	0	0
North 24 Parganas	9	0	6	12	0	1	0	3	2	2
South 24 Parganas	1	3	8	4	2	1	0	1	4	1
Howrah	3	2	4	0	0	1	0	0	0	0
Kolkata	0	0	0	1	3	0	0	0	0	0
Hooghly	0	1	3	1	0	0	0	0	0	0
Paschim Burdwan	0	0	0	0	0	0	0	0	2	1
Birbhum	1	1	0	0	0	0	0	0	0	0
Bankura	0	0	0	0	0	0	0	0	0	0
Purba Medinipur	0	0	0	0	1	0	0	0	0	1
Paschim Medinipur	11	0	0	0	0	0	0	0	0	0
Purulia	0	0	0	0	0	0	0	0	0	0
TOTAL	25	8	25	20	10	4	0	4	8	5

DUCK PLAGUE (DUCK VIRUS ENTERITIS)

Duck Plague is an acute highly contagious disease of duck, geese and swans of all age caused by herpes virus. Adult birds are most susceptible. The disease has been reported from Europe, Asia, North America, and India resulting in serious economic losses in the duck industries.

Symptoms may not be observed before death. Multiple petechiae are seen throughout the body. Diphtheritic cloacitis and oesophagitis are seen. There is enteritis with an enlargement of the annual bands of the intestine. Dropping of wings and disinclination to walk are common sign of the disease.

The disease spread rapidly by direct or indirect contact between infected and healthy birds and by contaminated feed and water.

The disease may be controlled by vaccination. In face of epidemic a live chicken egg adopted vaccine can protect the infected birds due to interference mechanism.

TABLE – I
EPIDEMIOLOGICAL OBSERVATION ON DUCK PLAGUE

Year	No. of incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
2014-2015	14	6595	164	65	39.63	2.49	0.99
2015-2016	9	2064	56	32	57.14	2.71	1.55
2016-2017	8	31168	93	21	22.58	0.30	0.07
2017-2018	0	0	0	0	0.00	0.00	0.00
2018-2019	0	0	0	0	0.00	0.00	0.00

During the reporting year, total no incidence reported in the state which is decreased as compared to previous year.

The disease was not reported in 2018-19 from any of the districts of the West Bengal.

From any districts out of twenty three, a single incidence was not recorded. Veterinarians and Assistant Director, ARD (Disease Investigation) involved in disease diagnosis of the all districts should be alert about diagnosis as well as about disease reporting system.

TABLE-II
DISTRICTWISE INCIDENCE OF DUCK PLAGUE

Districts	No. of incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
NIL	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

T A B L E – III
MONTHWISE INCIDENCE OF DUCK PLAGUE
REPORTED IN WEST BENGAL FOR THE YEAR 2018– 2019

Month	No. of incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
NIL	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

T A B L E – IV
DISTRICT WISE DUCK PLAGUE OUTBREAKS REPORTED IN
WEST BENGAL DURING LAST TEN YEARS

District	2008- 09	2009-10	2010- 11	2011 -12	2013- 14	2014-15	2015-16	2016- 17	2017- 18	2018-19
Coochbehar	0	0	0	0	0	0	0	0	0	0
Jalpaiguri	1	0	1	0	0	0	0	0	0	0
Darjeeling	1	0	0	0	0	0	0	0	0	0
Uttar Dinajpur	1	0	0	0	0	0	0	0	0	0
Dakshin Dinajpur	6	1	0	2	2	8	3	1	0	0
Malda	2	1	0	0	1	0	0	0	0	0
Murshidabad	1	0	0	0	0	0	0	0	0	0
Nadia	0	0	0	0	0	0	0	0	0	0
N- 24 Parganas	0	1	3	1	1	1	0	0	0	0
S-24 Parganas	0	0	0	0	4	0	0	0	0	0
Kolkata	0	0	0	0	0	0	0	0	0	0
Howrah	4	3	1	0	0	0	0	0	0	0
Hooghly	1	2	7	15	5	0	0	0	0	0
Burdwan	3	1	2	10	2	0	0	0	0	0
Birbhum	1	0	0	0	3	4	6	7	0	0
Bankura	0	0	0	0	0	0	0	0	0	0
Purba medinipur	0	1	0	0	0	0	0	0	0	0
Paschim Medinipur	0	0	0	0	0	0	0	0	0	0
Purulia	1	3	0	3	5	1	0	0	0	0
TOTAL	22	13	14	31	23	14	9	8	0	0

FOWL POX

Fowl Pox is a mild infectious disease of birds caused by epitheliotropic pox virus. The disease is most common during warm and humid climates. Losses due to Fowl pox are associated with a decrease in growth rate although the infection does not causes primary mortality. The virus is mosquito borne. Direct transmission by contact between infected and susceptible birds occurs. In fowl the disease is manifested in three forms-

1. Cutaneous or Comb form: In this form the lesions are found as wart like nodules on the comb, wattles and eyelids. Other parts of the body are affected less frequently.
2. Diphtheric form: Here a diphtheric membrane is found on the mucosa of mouth and nostrils.
3. Occulonasal form: In this form catarrhal inflammation in eyelid and nostrils are present and in sinuses found cheesy mucosa.

Mortality may occur in the 2nd and 3rd form. The causes of mortality are - (a) Asphyxia: - when the mouth, pharynx and nostrils are affected. (b) Starvation: - when the eyes are affected, the eyelids become glued with sticky inflammatory exudates rendering the parts blind and as a result they are not able to pick their feed and so starve to death. When eyes are affected the birds should be individually (artificially) fed. Preventive measures such as segregation of suffering birds, regular vaccination may curve down the incidence of fowl pox.

TABLE – I
EPIDEMIOLOGICAL OBSERVATION ON FOWL POX

Year	No. of incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
2014-2015	10	1175	151	6	3.97	12.85	0.51
2015-2016	18	4425	422	48	11.37	9.54	1.08
2016-2017	8	1925	304	17	5.59	15.79	0.88
2017-2018	4	790	103	4	3.88	13.04	0.51
2018-2019	4	520	102	19	18.63	19.62	3.65

In the reporting year, numbers of reported incidences (4) remain same in respect of previous year. Case fatality rate (18.63%), mortality rate (3.65%) and morbidity rate (19.62 %) of the disease are also increased in comparison to previous year.

Incidence reported only from three (2) districts. Highest incidence (3) was reported from Howrah district followed by Birbhum district with one incidence. In the reporting year, two (2) incidences each were recorded in the months of April & March.

It has not been reported from some districts where outbreaks might have occurred in previous years. Field Veterinarians and Assistant Director, ARD (Disease Investigation) of each district should be alert about diagnosis as well as about disease reporting system in favour of their vaccine requirement.

T A B L E – II
DISTRICTWISE REPORTED INCIDENCE OF FOWL POX
IN WEST BENGAL FOR THE YEAR 2018-2019

District	No. of incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
Howrah	3	400	64	1	1.56	16.00	0.25
Birbhum	1	120	38	18	47.37	31.67	15.00
TOTAL	4	520	102	19	18.63	19.62	3.65

T A B L E – III
MONTHWISE REPORTED INCIDENCE OF FOWL POX IN WEST BENGAL
FOR THE YEAR 2018 – 2019

Month	No. of incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
April	2	300	24	0	0.00	8.00	0.00
May	0	0	0	0	0	0	0
June	0	0	0	0	0	0	0
July	0	0	0	0	0	0	0
August	0	0	0	0	0	0	0
September	0	0	0	0	0	0	0
October	0	0	0	0	0	0	0
November	0	0	0	0	0	0	0
December	0	0	0	0	0	0	0
January	0	0	0	0	0	0	0
February	0	0	0	0	0	0	0
March	2	220	78	19	24.36	35.45	8.64
TOTAL	4	520	102	19	18.63	19.62	3.65

FOWL CHOLERA (AVIAN PASTEURELLOSIS)

Fowl Cholera is a bacterial disease of poultry caused by *Pasteurella multocida*. In the peracute form of the disease caused by this organism is one of the most virulent and highly infectious diseases of poultry.

Among fowl, heavy breeds are more susceptible. Adult chickens of birds in the late growing stage are more frequently affected than younger stock. Sources of infection include carrier birds, clinically diseased poultry and their excretions and carcasses of birds that have died of the infection. Poultry may be infected by oral, nasal, and conjunctiva routes and through wounds.

Vaccination using a variety of strains of life and killed organisms is used, but better protection is often afforded with autogenous vaccine of inactivated organism.

T A B L E – I
EPIDEMIOLOGICAL OBSERVATION ON FOWL CHOLERA

Year	No. of incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
2013-2014	3	890	87	48	55.17	9.77	5.39
2014-2015	1	350	9	6	66.67	2.57	1.71
2015-2016	0	0	0	0	0.00	0.00	0.00
2016-2017	0	0	0	0	0.00	0.00	0.00
2017-2018	0	0	0	0	0.00	0.00	0.00
2018-2019	0	0	0	0	0.00	0.00	0.00

In the reporting year (2018-19) no outbreak was reported from any district out of twenty three districts of our State. Surveillance of all districts should be improved to give any reason for underreporting. Field Veterinarians and Assistant Director, ARD (Disease Investigation) of each district should be alert about diagnosis as well as about disease reporting system as well as in favour of their vaccine requirement.

T A B L E – II
DISTRICTWISE AND MONTHWISE INCIDENCE OF FOWL CHOLERA
REPORTED IN WEST BENGAL FOR THE YEAR 2018- 2019

Month	District	No of incidence	Population at risk	Attack	Death	Morbidity (%)	Mortality (%)	C.F.R (%)
NIL	NIL	0	0	0	0	0	0	0

SALMONELLASIS

Salmonellosis in poultry is also called as bacillary white diarrhoea caused by *Salmonella pullorum* and *Salmonella gallinaurum*, which are gram negative nonmotile bacteria and characterised by symptoms of chalky white diarrhoea and retention of unabsorbed yolk leading to high mortality in young chicks. In adults, the ova are cystic, deformed and pedunculated causing decreased egg production. The disease is transmitted through egg, contaminated water or pasture, faeces of carrier of infected birds. The organisms may gain entry into chicks through adult birds, carrier rats on the farm and also through fishmeal etc. Control programme of the pullorum disease is based on the identification and culling of reactor birds from the breeding stock. After removing reactors, premises should be disinfected. Recovered birds are also the carrier of the disease, which required to be eliminated.

T A B L E – I
EPIDEMIOLOGICAL OBSERVATION ON SALMONELLOSIS

Year	No. of incidence	Population at risk	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
2013-2014	3	400	87	48	55.17	9.77	5.39
2014-2015	1	300	9	6	66.67	2.57	1.71
2015-2016	0	0	0	0	0.00	0.00	0.00
2016-2017	0	0	0	0	0.00	0.00	0.00
2017-2018	0	0	0	0	0.00	0.00	0.00
2018-2019	0	0	0	0	0.00	0.00	0.00

During the year 2018-2019, no outbreak was reported from any district out of twenty three districts of our State. Surveillance of all districts should be improved to give any reason for underreporting. Field Veterinarians and Assistant Director, ARD (Disease Investigation) of each district should be alert about diagnosis as well as about disease reporting system.

T A B L E – II
DISTRICTWISE AND MONTHWISE INCIDENCE OF SALMONELLOSIS
REPORTED
IN WEST BENGAL FOR THE YEAR 2018- 2019

Month	District	No. of Incidence	Population at risk	Attack	Death	Morbidity (%)	Mortality (%)	C.F.R (%)
NIL	NIL	0	0	0	0	0.00	0.00	0.00



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