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A Retrospective Epidemiological Study on Bovine Haemorrhagic Septicaemia in Andhra Pradesh

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Abstract: A retrospective study was conducted on Bovine Haemorrhagic Septicaemia in Andhra Pradesh state with outbreak data available over half decade with an aim to focus on factors responsible for outbreaks even after regular implementation of biannual strategic vaccination programme. Since 2017, a total number of 29 outbreaks were confirmed by Isolation and Identification, biochemical tests and Polymerase chain reaction targeting KTT72 and KTSP61 genes of *Pasturella multocida* type B. Our epidemiological retrospective study showed Buffaloes are more susceptible than Cattle; Mortality rate was high when first time outbreak recorded; temporally incidence was reported more in December to February montHaemorrhagic Septicaemia due to reverse monsoon (South west) effect in Kadapa, Kurnool, Chittoor and Nellore districts of Andhra Pradesh.

Keywords: Haemorrhagic Septicaemia, Bovine, Epidemiology, Retrospective study.

Haemorrhagic septicaemia is acute, fatal and septicaemic disease of cattle and buffaloes caused by *Pasteurella multocida* in tropical regions of the world, especially in African and Asian countries. It is ranked as most important animal health hazard because affected animals usually dies within a very short period of time (Ali *et al*., 2006) and Haemorrhagic septicaemia accounts for 46–55% of all bovine deaths in India causing economic losses of greater than $800 million USD (Singh *et al*., 2014).

The incidence of Haemorrhagic Septicaemia was common in adverse climatic conditions like rainy weather, high humidity and some stress factors like animal transportation and failure of vaccination showing low herd immune status. The best method to Prevent and control the disease is through vaccination programs and the search for protective and safe vaccines with long lasting immunity is still need to be developed instead of traditional vaccines available in the market (Almoheer *et al*., 2022).

Materials and Methods

Veterinary Biological and Research Institute, Andhra Pradesh is recognised as state level diagnostic institute for laboratory confirmation of outbreaks before declaration of disease in Animal disease surveillance system in India.

From 29 outbreaks recorded, ante mortem and post mortem samples like smears, blood, nasal swabs, exudates, heart and lung tissues were received for laboratory confirmation of Haemorrhagic Septicaemia. The blood and impression smears were stained with Giemsa staining for bipolar organisms;

isolation was done in 5 % Sheep Blood agar plates (Himedia) for presence of non haemolytic colonies, further streaking was done on BHI agar for dew drop colonies, the pure isolates were tested with biochemical tests like indole, TSI, oxidase and urease tests as described by Hajikolaei *et al*. (2008). In addition to cultural tests, Polymerase chain reaction targeting *KTT72* and *KTSP61* genes of *Pasturella multocida* type B as described by Ara et al. (2016) with PCR composition of PCR buffer (with 1.5mM $Mgcl_2$) - 2 µl, dNTPs (2.5mM each) - 2 µl, Primers (20 Picomolar) - 2 µl, Taq DNA polymerase (1.5 U) - 0.5 µl, template- 5 µl, nuclease free water- 13.5 µl. PCR conditions are Initial denaturation 95^0 C for 5 min, 35 cycles of denaturation at 95^0 C for 1 min, annealing at 55^0C for 1 min, extenstion at 72^0 C for 1 min, followed by final extension at 72^0 C for 7min and hold at 4^0C yielding 620 bp product in 1.5% agarose.

Results and Discussion

Annual animal health calendar was prepared by Andhra Pradesh Animal Husbandry Department for regular vaccinations and implements strictly with an objective to prevent diseases. Table 1 is showing district wise bovine Population and Vaccinations conducted from past five years. Thus Haemorrhagic Septicaemia strategic vaccination programme is implemented biannual in the months of May and October every year and in the seat of outbreaks whenever necessary without fail.

Table 1. Bovine Population, Haemorrhagic Septicaemia Vaccinations conducted from past five years (2017-18 to 2021-22) in Andhra Pradesh

	Population (in lakhs)		**Vaccinations (in lakh doses) in Bovines**				
District	**Cattle**	**Buffaloes**	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**2021-22**
Srikakulam	5.7	0.5	1.1	1.1	1.0	1.2	2.6
Vizianagaram	4.9	1.4	1.0	0.9	0.8	1.7	1.6
Visakhapatnam	6.5	3.2	1.4	1.4	1.2	1.3	2.6
East Godavari	4.0	5.9	4.9	5.5	5.0	9.3	5.1
West Godavari	2.0	6.3	4.9	4.7	5.2	6.4	6.8
Krishna	0.8	6.7	8.3	5.9	5.5	8.1	5.4
Guntur	0.9	8.8	7.8	6.0	5.4	5.6	5.2
Prakasham	0.7	9.3	5.8	3.1	3.9	7.0	5.1
Nellore	1.1	7.5	3.6	2.9	3.8	3.9	6.1
Chittoor	9.5	0.9	1.8	1.4	1.1	1.8	2.0
Ananthapur	5.0	2.9	1.6	0.6	1.5	1.7	5.2
YSR Kadapa	1.4	4.9	4.6	3.8	2.6	2.4	5.6
Kurnool	3.6	4.2	2.7	5.3	3.6	4.5	3.6
Total	**46**	**63**	**49.5**	**42.6**	**40.6**	**54.9**	**56.9**

The outbreak data detailed in Table 2 shows Buffaloes are more susceptible than Cattle; High Mortality was recorded in East Godavari, Vizianagaram, Ananthapur, Chittoor when first time outbreak

reported compared to repeated outbreaks in YSR Kadapa, Kurnool and SPS Nellore, similar observations was noticed by Benkirane and Alwis (2002).

Table 2. Bovine Haemorrhagic Septicaemia outbreaks from past five years (2017-18 to 2021-22)

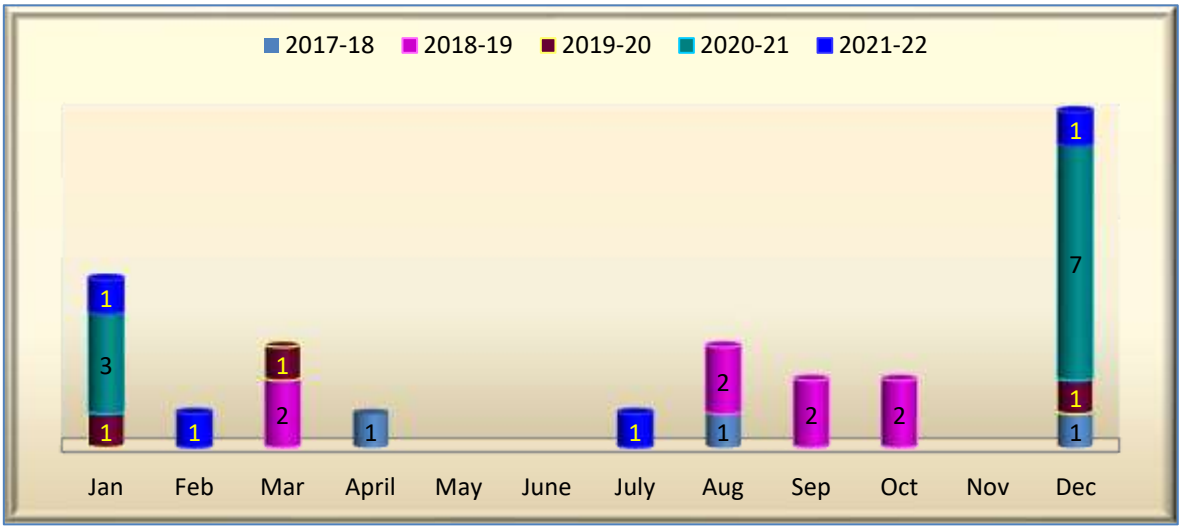
SL.No.	District	Month of outbreak	Species	No. of outbreaks	No. of attacks	No. of deatHaemorrhagic Septicaemia	Susceptible Population
1	East	April,	Buffaloe	1	8	8	288
2	Vizianagaram	August,	Buffaloe	1	5	4	299
3	SPS Nellore	December,	Buffaloe	1	2	1	857
4	Vizianagaram	March,	Buffaloe	1	5	5	1780
5	YSR Kadapa	March,	Cattle	1	136	25	356
6	YSR Kadapa	August,	Buffaloe	1	36	7	94
7	YSR Kadapa	August,	Cattle	1	40	1	57
8	YSR Kadapa	September,	Cattle	1	6	0	269
9	YSR Kadapa	September,	Buffaloe	1	4	1	32
10	YSR Kadapa	October,	Buffaloe	1	42	1	1076
11	Anantapur	October,	Cattle	1	4	3	300
12	SPS Nellore	December	Buffaloe	1	1	1	448
13	Chittoor	January	Cattle	1	7	6	766
14	YSR Kadapa	Febrauary	Buffaloe	1	25	7	3915
15	YSR Kadapa	December	Buffaloe	1	15	1	200
16	SPS Nellore	December	Buffaloe	1	16	9	308
17	SPS Nellore	December	Buffaloe	1	2	2	534
18	SPS Nellore	December	Buffaloe	1	13	9	1145
19	SPS Nellore	December	Buffaloe	1	83	12	754
20	SPS Nellore	December	Buffaloe	1	36	22	1209
21	SPS Nellore	December	Buffaloe	1	4	4	994
22	SPS Nellore	January	Buffaloe	1	20	6	410
23	SPS Nellore	January	Buffaloe	1	15	3	140
24	SPS Nellore	January	Buffaloe	1	14	4	556
25	East	July 2021	Buffaloe	1	26	6	3390
26	Kurnool	December	Buffaloe	1	2	1	470
27	Kurnool	January	Buffaloe	1	8	5	700
28	Kurnool	February	Buffaloe	1	30	15	680
29	Kurnool	February	Buffaloe	1	10	6	1600

Epidemiologically the disease was spatially distributed in YSR Kadapa, SPS Nellore, Kurnool, Ananthapur, Chittoor, East Godavari, Vizianagaram districts of Andhra Pradesh as shown in Image 1 and temporally during December, January which are similar to study conducted by Ali *et al*. (2006) and few

outbreaks were also reported during wet seasons from July to October as stated by Sheikh *et al*. (1996). Districts like Kadapa, Kurnool, Chittoor and Nellore have heavy rainfalls due to South west Monsoon (Reverse Monsoon) in winter months, which may be predicted as stress factor for incidence of Haemorrhagic Septicaemia in Kadapa, Kurnool, Chittoor and Nellore districts.

Image 1. Spatial distribution of Haemorrghic Septicaemia in bovines (2017-18 to 2021-22)

Image 2**.** Temporal distribution of Haemorraghic Septicaemia in bovines (2017-18 to 2021-22)



Conclusion

Prevention and Control of Haemorrhagic Septicaemia in bovines is mandatory due to acute nature of the disease. Prompt reporting, rapid and accurate diagnosis, measures to protect against adverse climatic conditions, preventing animal transportation stress and care during movement of animals from endemic areas helps in control of disease. Protective and safe field strain vaccines with long lasting immunity need to be developed in order to increase herd immunity.

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Conflict of interest

The authors declare that they have no Conflict of interest

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