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STUDIES ON SEROPREVALENCE OF BRUCELLOSIS AND IBR IN CATTLE IN JALPAIGURI DIS TRICT OF WEST BENGAL

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'Brucellosis' also known as Bang's Disease or Contagious Abortion, is an acute or chronic infectious and contagious disease of domestic animals, that causes placentitis and abortion Whereas, Infectious Bovine Rhinotracheitis (IBR) which is also known as Infectious Pustular Vulvovaginitis(IPV) or Red Nose, is an acute contagious viral disease (Herpes virus) of cattle characterized by high rise of temperature, rhinitis, dyspnoea, meningoencephalitis, keratoconjunctivitis, pustular vulvovaginitis and abortion. Studies on seroprevalence of Brucellosis and IBR in cattle in Jalpaiguri district (Doors region of West Bengal, India) revealed that IBR is more prevalent (15.4%) than Brucellosis(1.1%).

Key word : Brucellosis, Infectious Bovine Rhinotracheitis (IBR), abortion, serological tests, prevalence.

INTRODUCTION

'Brucellosis' also known as Bang's Disease or Contagious Abortion, is an acute or chronic infectious and contagious disease of domestic animals, that causes placentitis and abortion. Brucellosis thereby posses a great threat to cattle economy. It has been estimated that brucellosis in cattle and buffalo cause an annual economic loss of Rs. 240 millions (Chakraborty, 1994). *Brucella abortus*, *B. melitensis*, *B. suis*, *B. ovis* and *B. canis*. *B. abortus* are the common organism that causes disease in cattle including buffaloes.

The disease is transmitted through ingestion of feed and water contaminated with discharges of aborted foetal content or foetal membranes. Occasionally, the organisms may enter into the hosts through inhalation. Sometime, the organisms may pierce the intact or abraded skin or conjunctiva. Congenital infection is also possible (Chakraborty, 1994). The organisms are shed in great concentrations with the infected foetus, foetal membranes and genetalia for several days before and after abortion. Such cows are potential threat to her susceptible associates. There is high risk of contracting infection in herds where the owner makes frequent purchase of cattle (Chakraborty, 1994). The other ways of dissemination includes semen of infected bulls (Radostits *et al.*, 2000), if the bull is suffering from orchitis or epididymitis. The organism can also localize in other organs like lymphnodes, spleen, liver, joints, tendons, sheath and bones, mammary glands, testes. The organism causes abortion in animals in late gestation (6 to 9 months).

Infectious Bovine Rhinotracheitis (IBR) which is also known as Infectious Pustular Vulvovaginitis (IPV) or Red Nose. It is an acute contagious viral disease (Herpes virus)

of cattle characterized by high rise of temperature, rhinitis, dyspnoea, meningoencephalitis, keratoconjunctivitis, pustular vulvovaginitis and abortion. In case of IBR abortion may supervene as 'Abortion Storm' where foetus used to die at 4 months of age (Hungerford, 1975). IBR is caused by Bovine Herpes Virus 1 (BHV 1) (Radostits *et al.*, 2000; OIE, 2001). Based on differences in DNA restriction enzyme analysis, BHV1 can be differentiated into subtypes1, 2a and 2b (Metzler *et al.*, 1985). Subtype 2b virus is less virulent than subtype 1 virus (Edwards *et al.*, 1991).There is, nevertheless, only one antigenic type of BHV1.

The virus is worldwide in distribution, paralleling the distribution of domestic cattle. Besides cattle, the disease has been traced in goat, swine and water buffalo (Chakraborty, 1994). Other ruminants may be infected with BHV1, but this probably has no influence on the spread of BHV1 among domestic cattle (OIE, 2001). The disease has also been identified in wild ruminants (Radostits *et al.*, 2000). This wild ruminants remain as reservoir of infection. Apart from ruminants, no other reservoir of BHV1 exists (OIE, 2001). The virus is transmitted through infected feed, water, occular, nasal and reproductive secretion and excretion of the cattle. Droplet infection is the important mode of transmission. Introduction of new animal may spread the disease in a herd. Venereal transmission and transmission through semen in artificial insemination is possible (OIE, 2001). Deep freezing method of semen preservation may keep the virus viable and thus help in the production of endometritis (Radostits *et al.*, 2000).

Both the diseases are important for farm animals, which causes enormous economic losses in dairy animals. The prevalence of these diseases is associated with demographic and geographical factors. Sandhu *et al.* (1999) reported high (9.68-18.32%) prevalence of Bovine Brucellosis in Punjub. Seroprevalence of Brucellosis in cattle (8.4%), buffaloes (4.9%) and goats (4.6%) in Uttaranchal was reported by Agrawal *et al.* (2007). Seroprevalence surveys in Canada on IBR have depict that 10-50% or even higher, of cattle are serologically positive to the virus depending on vaccination practices in individual herds, and the frequency of contact between infected and non-infected animals (Radostits *et al.*, 2000). In Great Britain in the 1960s, serological surveys by (Radostits *et al.*, 2000) indicated that less than 10% of cattle were positive.

The present investigation is done to find out the seroprevalence of those diseases in Jalpaiguri district of West Bengal.

MATERIALS AND METHODS

Laboratory tests were performed in between 2002 and 2007 to investigate the seroprevalence of brucellosis and IBR. Altogether seven hundred and twenty (720) serum samples were collected randomly from selected villages of different blocks of Jalpaiguri District in West Bengal and stored at -20^{0}C until used. The serum samples were collected from the cattle showing primary symptom *i.e.* abortion along with one or more symptoms like endometritis, placentitis, vaginitis, fever and rhinitis. The serum samples were transported to the laboratory in ice packed condition in day carrier.

Among 720 sera samples collected, 523 were tested for Brucellosis depending on the suspected symptoms. The samples were subjected to three serological tests *viz.* Rose Bengal Plate Test (RBPT), Standard Tube Agglutination Test (STAT) and Avidin-Biotin-Elisa (A - B ELISA). After thawing the sera were tested for presence of Brucella

Agglutinins using Rose Bengal Plate Test (RBPT) (Agrawal *et al.*, 2007). The results were graded +,++,+++ and ++++ according to the intensity and clarity of agglutination. The antibody titre was determined by Standard Tube Agglutination Test (STAT) (Alton *et.al.*, 1975). The titres of antibody 40IU per ml. or above were evaluated as positive. The standard protocol of the Avidin Biotin ELISA (A-B ELISA) kits (PD-ADMAS) provided by the developers was strictly followed. The tests were repeated thrice to confirm the results.

Among 720 sera samples collected 197 were subjected to test for IBR considering the suspected symptoms. For detecting antibodies against BHV1 in serum, Virus Neutralization Test (VNT) was done by following standard protocol where test serum results are expressed as the reciprocal of the dilution of serum that neutralized the virus in 50% of the wells (*i.e.* well of flat bottomed cell culture grade microtitre plate). Any neutralization at a titre of 1 or above was considered as positive (OIE, 2001).

RESULTS AND DISCUSSION

Serological tests of the serum sample indicate the presence of organisms causing Brucellosis and IBR in the population. Out of the 523 samples tested for Brucellosis 21 tests showed positive results (4.02%), while out of 197 samples tested for IBR 63 showed positive results (31.98 %) (Table I).

Maximum positive samples for Brucellosis were observed in the year 2003 (16.67 %), while the least in the year 2007 (1.08%). The results of the serological tests indicate low rate of the disease except for the year 2003 (Table I; Fig. 1). The sudden rise in Brucellosis in the year 2003 could be due to the presence of infected bull in the population, because there is a practice of indiscriminate natural mating in rural areas of this district. In Doors region unplanned crossbreeding along with artificial insemination made animals more susceptible. High humidity and temperature indoors region leading to high susceptibility and stress can also not be ignored (Agrawal *et al.*, 2007). Among 21 positive cases 17 cases were female (80.95%) (Table I). In this study higher percentage of prevalence of the disease in female rather than male might be due to higher erythritol content of placentas (Agrawal *et al.*, 2007). Percentage of Brucellosis positivity is going towards lower level from the year 2004 to 2007. After year 2003 indigenous (Indian) high yielder breed were introduced for artificial insemination in planned way. Indigenous breed are comparatively resistant to the disease (Agrawal *et al.*, 2007). It may be the one

Table I : Result of Test on Brucellosis.

Year	No. of serum samples	Result		Result in percentage		Positive result		Negative result	
		+tive	-tive	+tive	-tive	Bull	Cow	Bull	Cow
2002	59	3	56	5.1	94.9	-	3	10	46
2003	60	10	50	16.7	83.3	3	7	5	45
2004	81	3	78	3.7	96.3	-	3	12	66
2005	156	2	154	1.3	98.7	1	1	14	140
2006	74	2	72	2.7	97.3	-	2	7	65
2007	93	1	92	1.1	98.9	-	1	5	87
Total	**523**	**21**	**502**	-	-	**4**	**17**	**53**	**449**

Table II : Result of Test on IBR.

Year	Number of Serum sample	Result		Result in percentage	
		Positive	Negative	Positive	Negative
2002	9	2	7	11.1	88.9
2003	6	1	4	33.3	66.7
2004	27	12	15	44.4	55.6
2005	22	2	20	9.1	90.9
2006	55	34	21	61.8	38.2
2007	78	12	66	15.4	84.6
Total	**197**	**63**	**133**	-	-

of the cause for gradual decrease of infection level. Awareness programme for adopting good management measures and hygienic practice for the cattle rearing taken by the Department and abiding these by the cattle owners helped in declining the incidence of the disease. It indicates that management exerts a major influence in the prevalence of the disease. Similar were the observations of Radostits *et al.* (1994) indicating that the differences in various factors like management, housing, population density, size of the farm, type of herd (self raised or purchased from different sources), sanitary condition and method of disposal of infected animals affected prevalence of disease.

For Brucellosis, positive results of three types of tests are considered here and no comparative analysis of these tests was done. Because most of the tests commonly employed for the surveillance of Brucellosis do not reach such degree of reliability. A possible strategy of overcome the analytical limitation of individual tests could be the adoption of panel of complementary tests and a multiple testing scheme at herd/ flock level (Chowdhury, 2007).

The results indicate that IBR is a threat to the cattle population of the District. Maximum positive samples for IBR were observed in the year 2006 (61.82 %) while least in the year 2005 (9.09 %) (Table II; Fig. 2). High rate of disease incidence has been observed in the year 2003 (33.33 %) and 2004 (44.44 %) (Table II; Fig. 2). There was

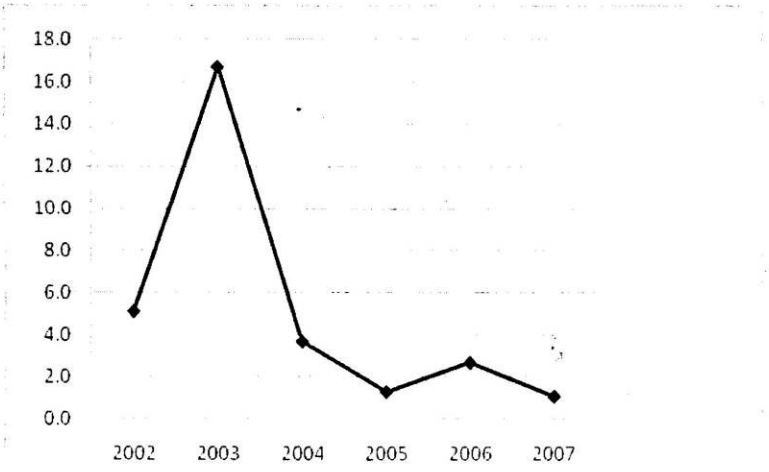

Fig. 1 : Percentage of positive Brucellosis serum samples

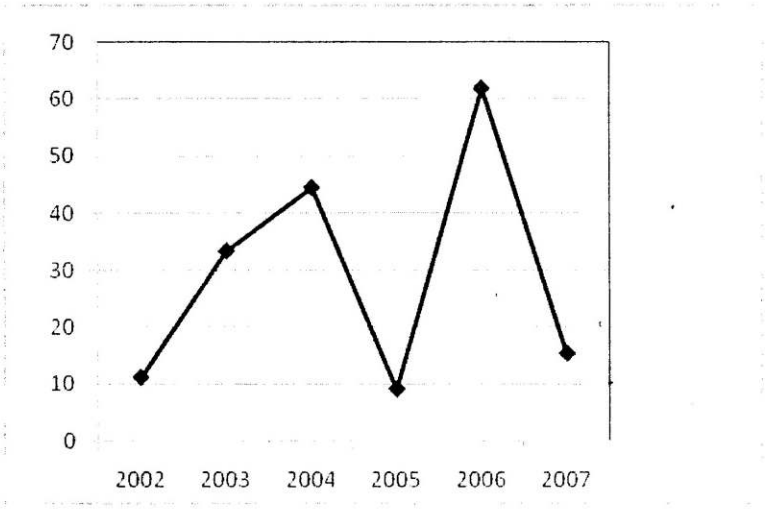

Fig. 2 : Percentage of positive IBR serum samples.

alternate rise and decline of the occurrence of this disease in the time period of this study. An infection normally elicits an antibody response and a cell-mediated immune response within 7-10days. However, the protective immunity after infection is not lifelong, cattle can be re-infected as well as it is the fact that Maternal Antibody transferred by colostrum also have their biological half life of about three (3) weeks (OIE, 2001). Probably, when there is lack of immunity then occurrence of disease become high. But, if maternal immunity or after infection till the protective immunity persist then there was low occurrence of infection. Again, when this protective immunity as well as maternal immunity declines bellow significant level gradually, then again there is gradual increase in occurrence of infection.

These studies suggest that IBR is comparatively a potential threat rather than Brucellosis because in last year (*i.e.*2007) of study it was found that IBR is more prevalent (15.4%) than Brucellosis(1.1%) in Jalpaiguri District.

Brucellosis & IBR though a potential threat to the bovine population can be controlled by the following measures :

- Hygienic disposal of uterine discharges, foetus, foetal membranes etc.
- All newly purchased animals are to be kept in strict isolation and tested twice at the interval of 30 days before introduction in a herd.
- Pregnant animals should not be purchased.
- Natural inseminations by stray bulls should be avoided.

Besides this, it is also concluded that panel of tests *i.e.* STAT,RBPT and A-B ELISA can be employed for Brucellosis eradication and VNT can be employed in IBR eradication campaigns in animals to avoid any unwanted killing or slaughter of animals detected only by screening test.

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