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STUDIES ON THE PREVALENCE OF ANTIBODIES TO PESTE DES PETITS RUMINANTS VIRUS (PPRV) AMONG GOATS IN BAUCHI STATE

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SUMMARY

Monoclonal antibody-based competitive enzyme linked immunosorbent assay (C-ELISA) have been used for the specific detection of antibodies to peste des petits ruminants virus (PPRV) in goats Examination of 227 serum samples from goats in five local government areas of Bauchi State revealed a point prevalence rate of 24.7%. Gamawa LGA had the highest prevalence rate of 43.1% while Boggoru had the least at 10.3%.The prevalence rate of antibodies to PPRV in males (8.2%) was significantly different from that of the females (36.9%). Males aged 0 6 months had an age specific prevalence rate of (2.9%), whereas females belonging to the same age group had a rate of 17.5%. Similarly, males and females aged between 7 and 12 months had age specific prevalence rates of 8.7% and 28.6% respectively. A statistically significant difference in the age sex specific rates exists. These findings further support previous observations indicating the presence of the disease in Bauchi State although the rates varied throughout the local government areas where sera were collected.

KEYWORDS: PPRV, Antibodies, monoclonal antibody, ELISA, Bauchi

INTRODUCTION

Peste des petits ruminants (PPR) is one of the major disease affecting small ruminants and causes heavy losses for livestock producers. The disease is highly fatal rinderpest like disease of small ruminants, having a tremendous capacity to spread, thereby rendering it a perpetual threat to intensive rearing of small ruminants (Akerejola et al, 1979; Obi et al, 1983a, Furley et al, 1987).

The etiologic agent is a ribonucleic acid (RNA) virus belonging to the genus morbillivirus in the family paramyxoviridae (Gibbs et al, 1979; Mathews, 1982; Abdulkadir, 1989). Antigenic relationship has been shown to exist between PPRV and members in the genus such as rinderpest, measles and canine distemper viruses (Gibbs et al, 1979). In Nigeria, the disease is widespread, occurring all year round with peaks in the wet months of June August (Obi et al, 1983a). PPR can be disseminated among and between sheep and goats through contact. Movement of infected animal may be the major contributing factor to the spread of the disease. Obi et al (1983a) showed that associations exist between the appearance of the disease and the introduction of new stock. Serological surveys carried out for neutralizing antibodies in Nigeria showed a rate of 52.5% in sheep and 53.7% in goats from the southern part (Obi et al, 1983a) and 57.3% in sheep and 43.7% in goats from the northern part (Taylor, 1979). Although a rate of 62.6% for clinical disease was once reported in Bauchi state (Abdullahi et al, 1999). This finding was not supported by laboratory diagnosis. Hence in this communication, we detailed the results of our diagnosis and offer some suggestions for the effective control of the disease.

MATERIALS AND METHODS

Five (5) local Government areas(LGAS) from Bauchi state were randomly selected for sampling goat sera. The local Governments selected and the samples collected from each were Gamawa 58, Shira 46, Dass 44, Boggoru 39 and Toro 40.

Serum collection

Blood was collected by jugular vein puncture using vacutainer tubes. The blood was left overnight to clot in cold boxes. Serum was decanted into sterile tubes and kept on ice for transportation to the laboratory. In the laboratory, the serum was further centrifuged to remove the remaining red blood cells before being transferred to 2ml Nalgene cryovials and stored at 200C until used. Two hundred and twenty seven serum samples were collected and tested.

Competitive enzyme linked immunosorbent assay (C-ELISA)

The reagents for the C ELISA were supplied in a kit form from the FAO/IAEA, and a detailed protocol ensures uniformity in the testing procedure. Throughout the assays, Nunc Immuno 1 maxisorp ELISA plates were used. Briefly, 50ìl of pretitrated antigen in coating buffer (phosphate buffered saline (PBS), PH 7.4) were dispensed to all the 96 wells of an ELISA microplate and incubated

at 370C for 1 hour on an orbital shaker. Thereafter the plates were washed three times by flooding them in wash buffer (1/5 PBS supplemented with 0.05% v/v Tween 20) then emptying. Test and PPRVcontrol sera were dispensed at a dilution of 1:5 in blocking buffer (PBS supplemented with 0.1% v/v Tween 20 and 0.3% v/v negative lamb serum pH 7.4) and immediately followed by the addition of the mouse anti-PPR monoclonal antibody (at a pretitrated dilution). Following incubation at 370C on an orbital shaker for 1 hour, plates were gain washed as described previously and rabbit anti mouse immunoglobulin conjugated to horseradish peroxidase (HRPO) was added (at a dilution previously established). After the final incubation for 1 hour on an incubator shaker, substrate (hydrogen peroxide 3% w/v) / chromogen (orthophenylene diamine (OPD) was added and the colour allowed to develop for 10 minutes. Plates were read at a filter of 492nm on a Titertek Multiskan Plus ELISA reader linked to a computer accessing the FAO/IAEA software programme EDI (version 2.3.1) for the calculation of results.

Each plate allows for the testing of 40 field sera in duplicates in conjunction with strong and weak PPRV positive control sera, PPRV negative control sera, a monoclonal antibody control and a conjugate control. Except for the conjugate control and the negative control, all the rest of the control is tested in quadruplicate and the computer program runs a series of calculations on the controls. Each control has a predetermined upper and lower limit and if the value for a control falls outside these limits, the plate is recommended for rejection and vice versa. A 50% threshold is used to determine seronegativity and seropositivity.

Statistical analysis of data:

The data generated in this study was statistically analyzed using WIN EPISCOPE 2.0 software (Thrushfield et al, 2001) and Odds ratio (OR) as described by Thrushfield and Hinxman (1981).

RESULTS

The results of the prevalence of antibodies to PPRV among goats in 5 local government areas of Bauchi state are summarized on table 1. From a total of 227 sera tested, 56 (24,7%)had antibodies to PPR virus representing an antibody prevalence of 24.7%. Antibodies to PPRV in goats were detected from all the 5 local government areas surveyed, although rates vary from one LGA to another. Gamawa LGA had the highest prevalence rate of 43.1% while Boggoru had the least at 10.3%. A statistically significant difference exists in the prevalence rates of antibodies to PRRV between Gamawa and Boggoru LGAS.Prevalence is significantly higher in Gamawa LGA than in Boggoru LGA (11.55 at 3.36,36.80 level of confidence) as shown in table 1.

An examination of the antibody prevalence by sex is shown on table II. The sex specific prevalence rate for the females (36.9%) significantly differs

from that of males (8.2%). Females were 6.5 times more likely to have antibodies to PPR virus than males as shown in table II.

The age sex distribution of antibodies to PPRV in the study area is shown on table III. All the age groups had antibodies to PPRV ranging between 2.9% and 65.4%. The difference between the age sex specific rates is statistically significant. The age groups greater than 1 year were 5.03 times more likely of having antibodies to PPRV than the 0 6 months age group (OR 5.03, 2.17 11.69) as shown in table III.

TABLE I: The overall seroprevalence of PPR amongst goats in 5 l.g.as of Bauchi state

LGA	Number Of Goats Examined	Number Of Goats Positive	Number Of Goats Negative	% Positive	95% Confidence Interval On OR	Level of confidence
Boggoru	39	4	35	10.3	1.00	
Dass	44	8	36	18.2	1.94	0.54,7.05
Gamawa	58	25	33	43.1	4.55	3.63,36.80
Shira	46	10	36	21.7	2.43	0.70,8.50
Toro	40	9	31	22.5	2.54	0.71,9.07
TOTAL	**227**	**56**	**171**	**24.7**		

TABLE II : Sex distribution of antibodies to PPR virus in goats from Bauchi state

Sex	Total Number Tested	Number +Ve For PPRV Antibodies	% Positive (Sex Specific Rate)	No Negative	OR	95% Confidence Interval
Females	130	48	36.9	82	6.5	2.9, 14.6
Males	97	8	8.2	89	1.0	
TOTAL	**227**	**56**	**24.7**	**171**		

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TABLE III: Age Sex distribution of PPR c ELISA results from goats in Bauchi state

Age	Males			Females			OR	Confidence Interval
	Total No Tested	No Positive For PPR Antibodies	% Positive (Age Specific Rate)	Total No Tested	No Positive For PPR Antibodies	% Positive (Age Specific Rate)		
0-6 months	34	1	2.9	40	7	17.5		
7 months 1 year	23	2	8.7	35	10	28.6	2.75	1.03-7.35
Greater than 1 year (>1yr)	40	5	12.5	55	31	56.4	5.03	2.17-11.69
TOTAL	**97**	**8**	**8.2**	**130**	**48**	**36.9**		

DISCUSSION

In overall terms, the point prevalence of antibodies to PPR virus in 5 local government areas of Bauchi State as determined by the monoclonal antibody based competitive enzyme linked immunosorbent assay was 24.7%. A surprisingly higher prevalence rate of 62.26% was once reported in Bauchi state (Abdullahi *et al*, 1999). This higher value was obtained solely on the basis of clinical signs and post mortem lesions, and not supported by confirmatory laboratory test. Since PPR is clinically indistinguishable from other respiratory diseases of small ruminants, it was probable that most of the animals regarded as having clinical disease were not actually due to PPR.

Antibodies to PPR virus were detected in all the local government areas currently surveyed with Gamawa LGA having the highest prevalence rate of 43.1% and Boggoru had the least at 10.3%. This suggests that PPR is widely distributed throughout the state.

In the present study, the sex specific rate for females was significantly higher than that of males. Females have higher risk of acquiring infection than males (OR 6.5, at 2.9, 14.6 confidence interval) females were 6.5 times more likely to have antibodies to PPR virus than males. It therefore implies that bucks may be less susceptible than does. This observation corroborates previous findings by Pumov (1984), who similarly recorded a high prevalence rate amongst females. This could be related to the number of females being kept and sampled during the study and also the husbandry practices involved. Usually, the males are weaned at between 4 6 months of age where they are likely to be sold off. However, the females remain in the breeding flock. This will normally give rise to a flock population dominated by females, thereby giving them a higher exposure experience than males.

The relationship between age and antibody frequency was very illuminating. Goats greater than 1 year seemed to have higher antibody frequency than the other age groups. The results agree with previous findings by Obi *et al* (1983b), who reported a higher antibody frequency rate in goats between 1 2 years. The animals that were less than 1 year old had a lower frequency of antibodies to PPR virus, indicating that they could be more susceptible than the other age group.

It was of interest to observe that females above 1 year of age have higher chances of having antibodies to PPR virus than their males in the same age group. A statistically significant difference exists in the age sex specific rates. Those females greater than 1 year of age were 5.03 times more likely of having antibodies to PPRV than the 0 - 6 months age groups (OR 5.03 at 2.17 11.69 confidence level). This finding appears to be the first documented report on the age-sex relationship of PPR among goats.

There is no doubt that PPR is of great economic significance in Nigeria. Nevertheless, very little has been done to control the disease, except for the homologous vaccine produced in Vom which is not sufficient to cover all the states of the Federation.

Further studies of distribution and movement of goats and tracing of outbreaks with active disease and sero survey may more clearly elucidate the epidemiology of PPR in this country.

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