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Seroprevalence of Active and Passive Immunity Against Egg Drop Syndrome 1976 (EDS'76) in Village Poultry in Nigeria

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Abstract: The prevalence of Egg Drop Syndrome 1976 (EDS'76) virus antibody among various species of village poultry in north-eastern Nigeria was determined using Haemagglutination Inhibition (HI) test. These species included: chickens, ducks, guinea-fowls, turkeys and quails. The birds had no history of vaccination against the EDS'76. The results of the antibody survey showed that active and passive HI antibodies to EDS'76 viruses were prevalent in the sera and embryonated eggs of the different species of village poultry. Antibody prevalence against the virus was noted as follows: chicken sera (1.4%), chicken embryonated eggs (17.7%), guinea fowl sera (22%), guinea fowl embryonated eggs (25.2%), duck sera (42%), duck embryonated eggs (78%), turkey sera (85.7%) and quails sera (3.7%) none of the quails embryonated eggs had antibody to EDS'76. Of the 376 sera and 328 embryonated eggs tested an overall prevalence of 52/323 (16%) and 75/328 (23%) were recorded respectively. Majority of the positive sera and embryonated eggs tested 37/52 (77%) and 44/75 (57%) reacted to high titres $\geq 1:20$ and $\geq 1:4$, respectively indicating considerable activity of the virus among village poultry in the study area. It is suggested that in apparent infections with the virus could be one of the factors responsible for the low egg production usually observed in village poultry.

Key words: Seroprevalence, egg drop syndrome (EDS'76), village poultry, Nigeria

INTRODUCTION

The rural poultry which comprises chicken (*Gallus domesticus*), guinea fowl (*Numida Meleagris galeata* Pallas), duck (*Anas platyrhynchos*), turkey (*Meleagris gallopavo*) and geese (*Anser anser domestica*) etc are raised as family poultry with household flock size ranging between 3-97, are characterized by such survival traits as small body size, slow growth rate, late maturity, poor production ability and high degree of adaptability to prevailing climatic conditions (El-Yuguda *et al.*, 2005; Dipeolu *et al.*, 1998; Sonaiya *et al.*, 1999; Okoye *et al.*, 1992; Abubakar *et al.*, 2007), however, they provide an important source of high quality protein, reserved for times of celebrities, religious and other socio-cultural as well as major source of income all with little or no capital investment (Jagne *et al.*, 1991). Rural poultry production constitutes an extreme case of extensive management system, whereby the birds are exposed to a variety of disease agents such EDS-76 (Dipeolu *et al.*, 1998; Sonaiya *et al.*, 1999; Okoye *et al.*, 1992), against which vaccination is rarely carried out.

EDS-76 is a disease of laying bird probably introduced to Nigeria via contaminated vaccines (Baba *et al.*, 1998). The disease also poses a potential threat to the Nigerian poultry industry (Nawathe and Abegunde, 1980). The disease causes a great loss as a result of the production of unpigmented thin shelled, soft-shellless eggs usually accompanied by a 10-30% drop in egg production (Castro and Heuschelle, 1992).

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This study presents a serological evidence of EDS-76 virus infections in different poultry species via demonstration of both active and passive antibodies in Borno and Yobe State, Nigeria.

Present results confirm the high incidence of inapparent infections of the rural poultry with the EDS-76 virus in the two States.

MATERIALS AND METHODS

Study Area

The study was carried out in the year 2000-2001 in two States (Borno and Yobe) of the semi-arid zone of the North-Eastern parts of Nigeria, characterized by shrubs and thorny trees with grasses on the lowland areas. The areas are sparsely populated and the inhabitants are predominantly farmers. The areas have average temperatures of 39°C.

Serum and Embryonated Eggs Samples

Blood sample were collected from 376 scavenging/slaughter rural poultry in Maiduguri and Damaturu, Nigeria and 328 embryonated eggs were also obtained. The chicken had no history of vaccination against EDS-76. Blood was collected in vacutainer tubes from every fifth chicken slaughtered in poultry dressing stalls and also backyard poultry were randomly bled between June- December, 2001. Embryonated eggs were purchased from various village poultry markets within the study areas. Sera were separated immediately after centrifugation at 1,000 rpm for 5 min and stored in sterile bijou bottle at -20°C until tested.

Yolk Extracts

One milliliter of the egg yolk were used to prepare 1:2 dilution of egg yolk and normal saline, 2 mL of chloroform was added to the mixture, the final mixture is thoroughly mixed by shaking at regular interval for 1 h, then centrifuged at 1,500 rpm for 10 min. The clear supernatant is harvested and frozen at -20°C until tested the final dilution of the egg yolk extract is 1:2.

Antigen

An embryonated egg adapted EDS-76 virus obtained from National Veterinary Research Institute (NVRI) Vom, Nigeria was used for detection of both active and passive EDS-76 microhaemagglutination inhibition antibody.

Haemagglutination-Inhibition (HI) Test

The modified microhaemagglutination inhibition test previously described by Allan and Gough (1974) and modified by Baba *et al.* (1998) was performed on both the serum and yolk extract samples using 0.9% chicken RBC red blood cell as an indicator.

Data Analysis

The differences in prevalence rate between species were determined using analysis of variance (ANOVA) at 5% statistical level of significance.

RESULTS

A total of 376 serum samples from different poultry species including chickens, ducks, guinea fowl, turkey and quails were tested for the presence of HI active antibodies against EDS-76 virus antigen. One chickens (1.4%), 21 ducks (42%), 11 guinea fowls (22%), 12 turkeys (85.7%) and 7 quails

Table 1: Prevalence of antibodies to EDS'76 virus in sera of various species of village poultry

Bird	Total No. tested	Total No. (%) tested positive	Reciprocal of HI antibody titre distribution						
			10	20	40	80	160	320	640
Chicken	70	1 (1.43)	-	1 (100.00)	-	-	-	-	-
Duck	50	21 (42.00)	5 (23.81)	10 (47.62)	4 (19.05)	1 (4.76)	1 (4.76)	-	-
Guinea/fowl	50	11 (22.00)	7 (63.64)	2 (18.18)	1 (9.09)	1 (9.09)	-	-	-
Turkey	14	12 (85.71)	3 (25.00)	4 (33.33)	4 (41.67)	-	-	-	-
Quail	120	7 (3.70)	-	1 (14.30)	2 (28.60)	2 (28.60)	2 (28.60)	-	-

Table 2: Prevalence of HI antibody to EDS'76 virus in embryonated eggs from various species of village birds

Embryonated egg	Total No. tested	Total No. (%) tested positive	Reciprocal of haemagglutination inhibition titre distribution						
			2	4	8	16	32	64	128
Chicken	51	9 (17.65)	4 (44.44)	2 (22.22)	-	-	1 (11.11)	1 (11.11)	1 (11.11)
Guinea/fowl	107	27 (25.23)	23 (85.19)	2 (7.41)	-	-	1 (3.70)	-	1 (3.70)
Duck	50	39 (78.00)	4 (10.26)	11 (28.21)	10 (25.64)	3 (7.69)	4 (10.26)	2 (5.13)	5 (12.82)
Quail	120	0 (0.00)	-	-	-	-	-	-	-

(3.7%) were found to be positive for active immunity to EDS'76 virus antigen (Table 1) 328 egg yolk extracts from different poultry species including chickens, ducks, guinea fowl and quails were tested for the presence of HI passive antibodies against EDS'76 virus antigen. With 9 chickens (17.7%), 27 guinea fowls (25.3%), 39 ducks (78%) tested positive and none of the quails eggs tested positive for EDS'76.

There was significant difference ($p < 0.05$) in both active and passive antibody prevalence between species which was higher among turkeys and ducks, followed by guinea fowl, quails and chicken in that order. Analysis of end point titre revealed that most of the positive reactors, reacted to high titre ($\geq 1:20$), 37/52 (71.1%) among the serum samples and 44/75 (58.6%) of the egg yolk extract had ($\geq 1:4$) Table 2.

DISCUSSION

The result of this study indicates considerable activities of EDS'76 virus among village poultry in Borno and Yobe state of Nigeria. Of the 376 and 328 serum and egg yolk extracts samples tested 52 (16%) and 75 (23%) reacted positively. The poultry species tested had no previous history of vaccination against the disease since the practice is not routinely done among this poultry species in Nigeria. It is therefore inferred that the antibodies detected among this group of birds investigated were as a result of natural infections of the birds with the virus. This finding resonates with those of previous workers (Nawathe and Abegunde, 1980; Durojaiye and Adene, 1988; Baba *et al.*, 1998; Dhinakar Raj *et al.*, 2007). The high prevalence of passive and active antibodies in village poultry could be attributed to the free range rearing which as suggested by Nawathe and Abegunde (1980) could allow for unrestricted spread of the disease among village poultry. Although lateral spread is very slow and intermittent and may take up to several weeks to be achieved (Cook and Darbyshire, 1980; Dhinakar Raj *et al.*, 2007). Similarly infections of the village poultry with the virus could be responsible for the low egg production usually observed among poultry.

This group of scavenging birds may serve as reservoir of the virus for commercial poultry farms (Baba *et al.*, 1998; Spradbrow, 1987; Adu and Sokale, 1986; Abubakar *et al.*, 2007). It is suggested that EDSV infections is a possible problem hindering the village poultry production in Borno and Yobe State and perhaps in Nigeria as a whole.

We therefore recommend the introduction of routine vaccination of scavenging village poultry against Egg Drop Syndrome 1976.

REFERENCES

- Abubakar, M.B., A.G. Ambali and T. Tamdjo, 2007. Rural chicken production: Effects of gender on ownership and management responsibilities in some parts of Nigeria and Cameroon. *Int. J. Poult. Sci.*, 6 (6): 413-416.
- Adu, F.D.U. and B. Sokale, 1986. The immunological status of Nigerian local chickens. *Trop. Vet.*, 24 (4): 149-152.
- Allan, W.H. and R.F. Gough, 1974. A standard hemagglutination test for Newcastle disease. A comparison of macro method. *Vet. Rec.*, 95: 120-123.
- Baba, S.S., A.D. El-Yuguda and M.M. Baba, 1998. Serological evidence of mixed infections with Newcastle disease and egg drop syndrome 1976 viruses in village poultry in Borno State, Nigeria. *Trop. Vet.*, 16 (23): 137-141.
- Castro, A.E. and W.P. Heuschelle, 1992. *Veterinary Diagnostic Virology a Practitioners Guide*. 1st Edn. Mosby Year Book Inc. USA.
- Cook, J.K.A. and H. Darbyshire, 1980. Epidemiological studies with egg drop syndrome 1976 (EDS'76) virus. *Avian Pathol.*, 9: 437-443.
- Dhinakar Raj, G., V. Thragarajan and R. Nachimuthu, 2007. Detection of antibodies to EDS Virus in chicken serum using a field-based Immunofiltration (flow through) Test. *Avian diseases*, 51 (3): 788-790.
- Dipeolu, M.A., O.M. Karipe and Gbadamosi, 1998. Chick mortality in indigenous chickens under free range system in Abeokuta Nigeria. *Nig. Vet. J.*, 19: 5-11.
- Durojaiye, A.O. and D.F. Adene, 1988. Newcastle disease and egg drop syndrome 1976 in guinea fowls. *J. Vet. Med. B.*, 35: 162-164.
- El-Yuguda, A.D., U.M. Dokas and S.S. Baba, 2005. The effects of Newcastle disease and infectious bursal disease vaccines, climate and other factor on the village chicken population in North-Eastern Nigeria. *JEAE.*, 1: 55-57.
- Jagne, J., I. Aini, S.G. Schat, A. Fennel and O. Touray, 1991. Vaccination of village chickens in Gambia against Newcastle disease using resistant food pelleted V4 Vaccine. *Avian Pathol.*, 20: 721-724.
- Nawathe, D.R. and A. Abegunde, 1980. Egg drop syndrome 1976 in Nigeria: Serological evidence in commercial farms. *Vet. Rec.*, 107: 466-467.
- Okoye, J.O.A., I.J.E. Orajaka and C.J. Nwosu, 1992. Antibody Response of Local and Exotic Nigeria Chickens to Infectious Bursal Disease. *Book of Proceeding of Scientific Session of NVMA, Kaduna, Nigeria*, pp: 56-58.
- Sonaiya, E.B., R.D.S. Branckaert and E.F. Gueye, 1999. Research and development options for family poultry. First INFPD/FAO Electronic conference on family poultry. (<http://www.fao.org/ag/aga/agap/ipa/fampol/intropap.htm>).
- Spradbrow, P.B., 1987. Newcastle disease in poultry: A new feed pellet vaccine. *ACIAR.*, 5: 12-18.