

Serological evidence of egg drop syndrome'1976 (EDS'76) in free-range chickens at chicken market sites in Jos, Nigeria

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Abstract: Serological evidence of EDS'76 virus in free-range chickens at the various chicken markets (Kasuwan kaji, New market, Gada biyu, and Kugiya) located in Jos and its environs was investigated through antibody detection. The serum samples randomly collected from chickens were assayed for antibodies against EDS'76 virus by haemagglutination-inhibition (HI) test. It was observed that 292 (15.2%) of the 1920 sera tested were positive for EDS'76 antibodies with HI titres ranging between log₂2 and log₂128 and geometric mean titre (GMT) between 4.9 and 13.1. Of this number of positive sera, 150 (51.4%) were from Kasuwan kaji, 90 (30.8%) from Kugiya, 30 (10.3%) from Gada biyu, and 22 (7.5%) from New market. This finding indicates activities EDS 76 virus among the free-range chickens in the study area.

Key words: Serology, EDS'76, free-range chickens

Free-range chicken, also called village chickens, are among the many local assets of people living in rural areas (1). They are kept by over 90% of rural households, providing an important source of high quality protein and reserved for times of celebrities, religious and other socio-cultural, as well as a major source of income for the families (2). This group of chickens is however faced with all kinds of hardships, such as poor management, lack of external input for production, and poor disease control. This has

contributed to low productivity and high mortality rates (1,3). The poor management systems, whereby the chickens are left to roam about unrestricted, tend to expose them to a number of infectious and non-infectious diseases. Among the infectious diseases, EDS'76 is the one posing a serious threat to the layer industry (4).

Since its initial description, EDS'76 has become a major cause of loss of egg production throughout the world (5). The disease causes a great loss as a result of

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production of unpigmented, thin-shelled, soft-shelled, and sometimes shell-less egg accompanied by a 10%-30% drop in egg production (6). The syndrome was first recognised in 1976 and is caused by an adenovirus that is widely distributed in wild and domestic geese and ducks. Organic and free-ranging flocks may be at a greater risk than conventional ones, as there is likely to be more contact with wild-fowl and geese or duck carriers (7).

This paper reports on serological evidence of EDS'76 among free-range chickens at various chicken markets located in and around Jos, Plateau state, Nigeria. Jos is the capital of plateau state located in northern part of the state. It is the main commercial centre of the state and consists of 4 chicken markets, namely Amingo junction (Kasuwan kaji) market, Kwarafa or New market, and Gada biyu, all located in Jos North Local Government Area (LGA), and Kugiya market located in Jos South LGA. These markets serve as selling points for chickens and other birds as well as slaughter slabs.

To carry out this investigation, apparently healthy free-range chickens from these chicken markets were randomly bled and blood samples processed as previously described (2). Sera were separated and stored at 4 °C until tested.

Sera were assayed by HI test (8,9) using standard EDS'76 antigen and antiserum kindly provided by Dr T.M. Joannis of Viral Vaccine Research Division, N.V.R.I Vom, Nigeria.

Serial 2-fold dilutions of the test sera were made in 25 µL volumes across the plate of a 96-well V-bottomed plastic microtitre plate, using phosphate-buffered saline (PBS) pH 7.2 as diluent. This was followed by addition of 25 µL EDS 76 antigen containing 4 haemagglutinating units (HAU) in each well. The constituent was well mixed using a Titertek multishaker and plates incubated for 15 min at room temperature. Equal volume of 0.8% chicken red blood cells (RBC) was added to every well. The same assay procedure was carried out on the control sera. The RBC control wells contained only RBC and PBS in equal volumes of 25 µL each. After gently mixing, the RBC was allowed to settle to a distinct button at room temperature for about 40 min. Test was assessed by tilting the plates. Wells in which the RBC streamed at the same rate as the RBC control wells were considered as showing inhibition. The highest dilution of serum causing complete inhibition of 4 HAU antigens was considered as the HI titre. Egg drop syndrome'76 virus antibody was detected in 15.2% of the total number of chickens sampled with Kasuwan kaji market having the highest prevalence of 7.8% while New market had the lowest prevalence of 1.1% (Table 1). HI antibody titre ranging between log₂ 2 and log₂ 128 and GMT between 4.9 and 13.0 (Table 2) were observed. The differences in prevalence between the chicken markets were found to be statistically significant (P < 0.05) by Chi square test.

Table 1. Seroprevalence of EDS'76 virus in free-ranging chickens from various chicken markets in Jos and environs.

Chicken market	Total No. of sera tested	Total No. of sera positive	% Positivity	Overall % positive
Kasuwan kaji	804	150	18.7	7.8
Kugiya	593	90	15.2	4.7
Gada biyu	215	30	13.9	1.6
New market	308	22	7.1	1.1
Total	1920	292		15.2

Table 2. EDS'76 HI antibody titre of sera from chicken markets.

Chicken market	Reciprocal of HI antibody titre distribution						GMT	
	2	4	8	16	32	64		128
Kasuwan kaji	50	29	40	14	10	6	1	5.7
Kugiya	28	25	25	5	7	-	-	4.9
Gada biyu	-	6	8	10	4	1	1	12.1
New market	-	-	11	7	3	1	-	13.0

The demonstration of EDS'76 virus antibodies in 15.2% of the free-ranging chickens sampled is an evidence of considerable activities of the virus among this group of birds in Jos and its suburbs. This finding is in consonance with those of previous authors (2,10-14). As the category of birds tested had no history of vaccination against EDS'76, the detection of EDS'76 HI antibody as observed in this study is as result of natural infections of the birds with the virus (2). The high prevalence of this active antibody could be attributed to the free range rearing. This as suggested by previous authors could allow for uncontrollable spread of the virus among village poultry (10), although lateral spread can be slow and intermittent taking several weeks to be achieved (14).

Although the source of this infection is not established in this study, these chickens may have been infected with the virus through contact with wild fowl and geese and duck carriers either via direct contact or indirectly through drinking water. Studies have shown that geese and ducks are natural hosts for

the EDS'76 virus (15-17) and previous authors have reported on the evidence of EDS'76 infection in free-range flocks that had contact with ducks (13,18).

This group of scavenging birds serve as reservoirs of the virus to commercial poultry farms (12,19,20). They could pose a threat to poultry industry in Plateau State and Nigeria at large hence it is needed to introduce routine vaccination programme for scavenging village chickens against EDS'76 virus infection.

Further studies are however necessary to establish the endemicity of this disease among the various species of poultry in Nigeria and the mode of transmission between them.

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