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With 1 table in the text.

An Assessment of Newcastle Vaccination Programmes in Three Farms in the Sudan

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SUMMARY

An evaluation of the efficacy of Newcastle disease vaccination in three farms using different programmes of vaccination was carried out. In the two farms using the drinking water method of vaccination with the LaSota and B1 strains the mean HI titres of birds sera at the point of lay were $\log_2$ 3.5 and $\log_2$ 3.04 respectively. In the third farm using the intranasal regime with the Komarov strain the mean HI titre was $\log_2$ 5.09.

In the two farms using the first method only 14.69 percent of 1852 birds and 25.92 percent of 3225 birds showed a HI titre of $\log_2$ 5 or above, while in the farm using the second method about 70 percent of 2481 birds showed a HI titre of $\log_2$ 5 or above.

INTRODUCTION

Control measure adopted for Newcastle disease differ from place to another Some countries prevent the disease by restricting or preventing the importation of birds(domestic or wild) and their products which might be contaminated by the virus (Aini, 1990). Others subject frozen carcasses to thorough examination before release for consumption (Lancaster, 1981). Briefly, the two main control measures are the stamping out policy which is a combination of quarantine and slaughter and the routine vaccination policy. The choice between the two measures depends on the economic situation of the country, importance of the poultry industry and ubiquity of the virulent strains of Newcastle disease virus (NDV) . While developed countries conduct the first type of control programme successfully, developing countries resort to the control by vaccination (Biggs, 1982).

The use of the Haemagglutination-Inhibition test (HIT) to moniter the immune status of the flocks before and after vaccination was recommended to assess the immunity situation of the flock and design a control programme (. (FAO, 1989)

In this study the efficacy of two programmes of ND vaccination adopted by three main poultry production enterprises in Khartoum area was assessed by measuring post vaccinal humoral immunity in birds at the point of lay.

MATERIALS AND METHODS

Farms investigated and vaccination strategies:

The three farms surveyed were designated SAr, Sku and Kgo. The first two adopted a drinking water programme of vaccination consisting of 3-4 doses during the first 16 weeks of life using BI and LaSota strains of ND vaccine respectively. The LaSota strain was acquired from Intervet International, Boxmeer -Holland and the BI from TAD pharmazeutisches werk GMBH, Heinz-Lohman Strasse, West Germany. Both vaccines were reconstituted and administered according to the recommendations of the manufacturers using tap water .The third farm used an intranasal programme consisting of an initial dose at four weeks followed by another dose at 16 weeks of age with a mesogenic strain (the Komarov strain).

Serum samples:-

Blood samples were collected from egg producing flocks at the point-of-lay (22-25 weeks of age).

Collected blood was centrifuged, sera separated and inactivated at 56°C for 30 minutes before testing.

Antigen :-

The antigen used for the HIT was the LaSota strain which had a haemagglutination (HA) titre of $\log_2$ 9.

Red blood cells (RBCs) :-

RBCs were obtained in Alsever's solution from young cockerels kept at the laboratory. They were then washed in four changes of normal saline and 1% suspension was prepared.

Method of HIT:

The titre of the antigen was checked by haemagglutination titration and a dilution containing four haemagglutinating units was prepared in normal saline. The microtitre technique was used for the titration of the antigen and testing of sera, using 0.025 ml quantities (Majiyagabe and Hitchner, 1977). The sera were tested in a serial two fold dilution to a maximum dilution of 1/1024 ($\log_2$ 10) and all the titres were taken as $\log_2$.

RESULTS

1. SAr. Farm:

A total of 1852 sera were tested by the HIT. Results showed that 38.39%, 33.86%, 13.01%, 6.75%, 5.89 and 2.05 of the sera had a titre of $\log_2$ 2, 3 ,4, 5, 6 and 7 respectively. Only 14.69% had a titre of 5 or above (Table 1).

2. Sku Farm:

A total of 3225 sera were tested. Results showed that 32.09%, 25.80%, 16.19%, 12.00%, 11.22%, 2.64% and 0.06% had titres of $\log_2$ 2, 3, 4, 5, 6, 7 and 8 respectively (Table 1). 25.92% of the sera had a titre of 5 or above.

3. Kgo Farm:

A total of 2481 sera were tested. Results (Table 1) show the percentage of chicks positive at each serum dilution. 70.59% of the flock showed a titre of 5 or above.

Table (1): Haemagglutination- Inhibition titres of sera from three poultry farms under different regimes of vaccination against Newcastle Disease.

log_2 Titres	No. of chickens positive		
	SAr. egg production stock	sku. egg production stock	kgo. egg production stock
2	711 *(38.39)	1035 (32.09)	84 (33.39)
3	627 (33.86)	832 (25.80)	157 (6.33)
4	241 (13.01)	522 (16.19)	489 (19.71)
5	125 (6.75)	387 (12.00)	801 (32.29)
6	109 (5.89)	362 (11.22)	715 (28.82)
7	38 (2.05)	85 (2.64)	152 (6.13)
8	1 (0.00)	2 (0.06)	54 (2.18)
9	0 (0.00)	0	23 (0.93)
10	0 (0.00)	0	6 (0.24)
Total chickens	1852	3225	2481
Mean titre	3.04	3.5	5.09
Percent positive at log_2 5 or above	14.69	25.92	70.59

* percentage

DISCUSSION

The field survey carried out on the three poultry enterprises showed that the intranasal regime recommended by the Sudanese authorities produced better protection according to the haemagglutination inhibition (HI) titres of the sera tested. When compared with drinking water regimes conducted by two other farms about 70% of the chickens had

a titre of $\log_2$ 5 or greater while in the other two farms the percentages were about 15 and 26. Data collected at the Central Veterinary Laboratory, Weybridge, England suggested that a titre of $\log_2$ 5 will protect against mortality from Newcastle and higher titres were required for protection against loss of eggs (Philips, 1973).

The mean titre for the intranasal regime was $\log_2$ 5.09 and for the drinking water regime was 3.04 and 3.5 for BI and LaSota strains respectively. Taking into consideration that only $\log_2$ 5 or above will Protect from death, both farms that used the drinking water regime were not protected. This will probably explain the occurrence of outbreaks leading to death of chickens in these farms from time to time in addition to loss in egg production. When the Komarov strain was either intranasal or drinking water routes, higher titres were obtained from the intranasal regime (Kheir, 1992).

The intranasal regime is laborious and more expensive as it involves manual handling of chickens but it gives a good protection without showing any serious reactions. The drinking water regime is easy to implement but it does not give a good protection. This low titre attained by the drinking water regime may be due to the following reasons

1. The high temperature and the strong sunlight which may lead to the lowering of the virus titre in the vaccine.
2. The secretions of the digestive tract may also affect the titre of the vaccine. Bile acids act as antiviral detergents eading to the death of a lot of virus particles (Lee and Hanson, 1975). A decrease in the viral titre was also observed when Newcastle disease virus strains were incubated with gastrointestinal secretions at a neutral pH (Shuaib *et. al.*,1985). These authors have also suggested that the acid pH, bile and proteolytic enzymes action may contribute to the decrease in virus available for immunization through the gut.

The intranasal regime is expensive to carry out and it will be required to do some cost-benefit analysis. Despite this, the results obtained raise no doubt about the fact that the intranasal programme is better for a protection scheme especially in countries like the Sudan where virulent strains of ND virus are ubiquitous. Countries with similar problems may be advised to adopt this regime especially in small-scale enterprises.

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