Nigerian Veterinary Journal Vol. 23 (1) 16-21

A STUDY ON THE VALUE OF ANTIMYCOPLASMAL PROGRAMMES UNDER CONDITIONS OF MYCOPLASMOSIS ENDEMICITY IN LAYING CHICKENS

OLADELE, O. A. AND ADENE, D. F.

Department of Veterinary Medicine, University of Ibadan
Ibadan, Nigeria

SUMMARY

The comparative efficacy of 3 antimycoplasmals-Tiamutin®, Rovamycin®, and Tylan® in the control of Mycoplasmosis in 3 identical groups of laying chickens, under open-sided tropical housing conditions was investigated during 20 weeks of egg production. The results showed that, egg production was superior in the medicated groups, especially the Tiamutin® group A which showed consistent superiority to the untreated control group D in the examined parameters. Thus, the total eggs produced were 43,680, 42,150, 21,360 and 17060 for the 3 treated groups A, B, C and untreated group D respectively. Similarly, hen-day percentage production at peak were 82.4%, 80.9%, 78.7% and 78.6%. The gross benefits margin from eggs were ₦19.70, ₦3.03, ₦4.14 and ₦0.00, for A, B, C and D respectively. Immunological response in terms of Newcastle disease-heamagglutination inhibition mean geometric titers averaged 6.0, 5.7, 5.6 and 5.5 for A, B, C and D respectively. These findings are therefore indicative of the potential value of a preventive antimycoplasmal programme in laying chickens.

KEY WORDS: Antimycoplasmal, prophylaxis, egg production.

INTRODUCTION

Chronic respiratory disease (CRD) is endemic under conventional poultry production practices in Nigeria (Salami and Umoh, 1996a; Ohore *et al.*, 1998). Subclinical CRD is generally recognised as a major contributor to suboptimal egg production, especially in Nigeria, where the humid tropical environment predisposes flocks to stress and respiratory infections. According to Glisson, (1996), mycoplasma infected flock may lay 10-25 eggs/hen less than non-infected flocks. Endemicity of CRD has made therapeutic control to be very difficult or ineffective mainly due to frequent bouts of re-infection through horizontally transmitted mycoplasmosis. This study was therefore designed to investigate the efficacy and cost related benefits in the application of 3 commonly available antimycoplasmals, Tiamutin®, Rovamycin® and Tylan® respectively, in laying chickens on a preventive basis.

MATERIALS AND METHODS

Experimental Stock

A poultry farm with over 10 poultry houses, each containing about 4000 layers of Nera-Hypeco breed (strain) was

adopted for this trial. The chickens were obtained as day-old, reared ® to about fourteen weeks of age on deep liter, before transferred into laying cages on the site mentioned above.

One of the units on the site containing four rows of cages was selected for this trial. Before the inception of trial, the chickens had been duly vaccinated against major diseases of poultry in Nigeria including Newcastle disease, Infectious bursal disease and Fowl Pox. They had also completed the range of programmes for the control of coccidiosis, helminthiasis and bacterial diseases.

Feed supply

Feed supply was based on approximate group requirement in standard 25kg packs of layers mash milled directly on site. Groups A and B with populations of 430 and 432 chickens respectively, were each supplied 2 x 25kg feed daily, group C with 216 chickens was supplied 1 x 25kg feed while group D with 175 chickens was supplied a bag of 20.3kg feed daily.

Antimycoplasmals/Antibiotics

Three popular prorietrary brands of antimycoplasmals namely, Tiamutin® (tiamulin fumarate), Tylan® (tylosin) and Rovamycin® (spiramycin) were employed in this trial. The sizes of flock under each of the three regimens of treatment, the treatment factors used for the calculation of dosages and other details of treatment regimen are shown in Table IA. The dosages and calculations were derived from manufacturers recommendations for adult chickens.

Experimental design and groups

A group of chickens in a row of cages were assigned to each of 3 respective drugs, Tiamutin®, Rovamycin® and Tylan®. A fourth group served as the untreated control there were thus a total of four groups: A (Tiamutin®), B (Rovamycin®), C (Tylan®) and D (Control) containing 430, 432, 416 and 175 layers respectively. The birds were initially given curative dosage of the respective drugs in water for 3 days. Each group was subsequently placed on 7 consecutive days per month in-feed medication (Table IB). Treatment and observation of flocks for experimental data continued for 20 weeks. All data pertaining to feed, mortalities and egg production were collated and analysed.

Test for immunologic response to Newcastle Disease (ND) vaccination

Blood samples were collected from randomly selected chickens in each of the 4 groups at weeks 30, 40 and 48 of age. Sera separated from clotted blood within 24 hours of blood sampling, were subjected to haemagglutination inhibition (HI) test (Durojaiye and Adene, 1988) for antibody to ND which is a major disease problem of layers in Nigeria. Titres obtained from each group were analysed to determine mean geometric titres (MGT) and modal titres as parameters of immune responsiveness in the flocks.

RESULTS

The summary of egg production performance is presented in Table II. Best hen-day percentage production was highest for group A (82.4%) and lowest for control group D (78.6%).

The age at best hen-day production was 31

weeks for groups A and B, but 42 weeks in group C and 44 weeks in group D which implied delays of 1 week in groups A and B but 12 weeks in group C and 14 weeks in group D.

Antimycoplasmas:Cost/Benefit

The cumulative amount of each of the drugs required for in-feed (inclusion) medication, and the cost of medication are shown in the Table III.

The total cost of medication was lowest in group C, due to the small size of stock treated in that group. However, the actual cost of treatment per bird for over twenty weeks was ₦4.88, ₦3.54 and ₦4.28 in the 3 treated groups A, B, and C respectively. Similarly the cost of medication per dozen eggs produced was ₦0.58, ₦0.44 and ₦0.52 in the 3 groups respectively.

Immunologic response to ND vaccination

At week 30, the modal HI titres were 32, 16, 16 and 32 for groups A, B, C and D respectively, while the corresponding MGTs were 4.4, 4.4, 3.8 and 4.8. The average MGTs for the 3 sampling periods were 6.0, 5.7, 5.6 and 5.5 in groups A, B, C and D respectively (Figure 1).

Final cost/benefits per bird

Table IV shows that the cost analysis in terms of value of egg produced per bird after the cost of antimycoplasmals have been deducted were, ₦604.61, ₦581.88, ₦589.05 in A, B, C and D respectively. The margin of gross benefits of treated groups over the untreated group were, ₦19.70, ₦3.03, ₦4.14 and ₦ 0.00 in groups A, B, C and D respectively, while the margin of gross benefits between treated groups were ₦22.73, ₦0.00 and ₦7.17 in groups A, B and C respectively (Table IV).

DISCUSSION

CRD Symptoms were not detected in any of the 4 groups during this trial, despite the endemicity and history of previous CRD mortalities on the site. In which case, it could be inferred that CRD was either absent or subclinical during this trial. However, the antimycoplasmosis programme adopted in this trial was realistic in terms of cost which amounted to between ₦3.54 and ₦4.88 per bird, during 20 weeks. Improvement in egg production occurred in the medicated groups in terms of the major criteria of egg production and especially total egg produced, timely peak and best hen-day percentage production. In addition, the cost benefit analysis showed that the profit margin was higher in the medicated groups A and C i.e. the Tiamutin® and Tylan® groups. The advantage of such a preventive antimycoplamal programme was further manifested in the superior antibody response to ND vaccination in the 3 medicated groups over the untreated control. In conclusion, the results from this trial indicated the benefits derivable from a preventive antimycoplasmal programme, which in contrast to a curative programme can be sustained for a longer period and at a lower cost.

REFERENCES

GLISSON, J. R. (1996). Avian mycoplasmosis. *ZOOTECHNICA.*

OHORE, O. G., AKPAVIE, S. O. and ADENE, D. F. (1998). Plate Enzyme-linked Imunosorbent Assay in the detection of antibodies to avian mycoplasmosis in Nigeria. *Trop. Vet.* **16**: 131-134.

SALAMI, J. O and UMOH, J. U. (1996a). Cultural Survey for *Mycoplasma gallisepticum* and *M. synoviae* from chickens in Kaduna and Kano States of Nigeria. *Nig. Vet. J.* **1**: 103-105.

TABLE IA: Primary dosage regimen in water

Group/Drug	Tiamutin®	Rovamycin®	Tylan®
Recommended (g/1000 birds)	80	110	125
Treatment factor	1	1.37	1.56
Flock size	430	432	216
Drug/day (g)	35	48	27
Curative dose regimen (days)	3	3	3

TABLE IB: Maintenance (preventive) dosage regimen in feed

Group/Drug	Tiamutin®	Rovamycin®	Tylan®
Recommended (g/1000 birds)	430	432	216
Treatment factor	50	50	25
Flock size	50	70	80
Drug/day (g)	2.5	3.5	2
Curative dose regimen (days)	1	7	7

TABLE II: Egg production: week 25-weeks 45

Parameter	A	B	C	D
Best Hen Day %	82.40	80.90	78.70	78.60
Best Hen Day (wks)	31.00	31.00	42	44
Delay in peak production (wks) (Optimal=30wks approx)	1	1	12	14
Total egg (x. 000)	43.68	42.15	21.36	17.06
Egg value (x ₦,0000)	262.08	252.9	128.16	102.36
Stock population	430	432	216	175
Egg value/bird (₦)	609.49	585.42	593.33	584.91

TABLE III: Drugs-costs and benefits

	A	B	C	D
Antimycoplasmal	**Tiamutin®**	**Rovamycin®**	**Tylan®**	-
Stock Treated	430	432	216	175
Mnt. Level in-feed (ppm)	50	70	80	-
Total Mnt. level in-feed (gm)	52.5	73.5	42.0	-
Cost of Antimycoplasmal (₦)	2100.00	1528.80	924	-
Cost/bird-20 weeks (₦)	4.88	3.54	4.28	-
Cost/Dozen eggs (₦)	0.58	0.44	0.52	-
Value of dozen eggs (₦)	72	72	72	72

TABLE IV: Final cost/benefit in 20 weeks

		A	B	C	D
1	Cost of Antimyco/bird (₦)	4.88	3.54	4.28	-
2	Value of eggs/birds (₦)	6.9.49	585.42	593.33	584.91
3	Gross Benefit (₦/bird)	604.61	581.88	589.05	584.91
4	Margin Vs D/bird (₦) (2 – 1)	19.7	-3.03	4.14	0.00
5	A/C Vs B/bird (₦)	22.73	0.00	7.17	N/A

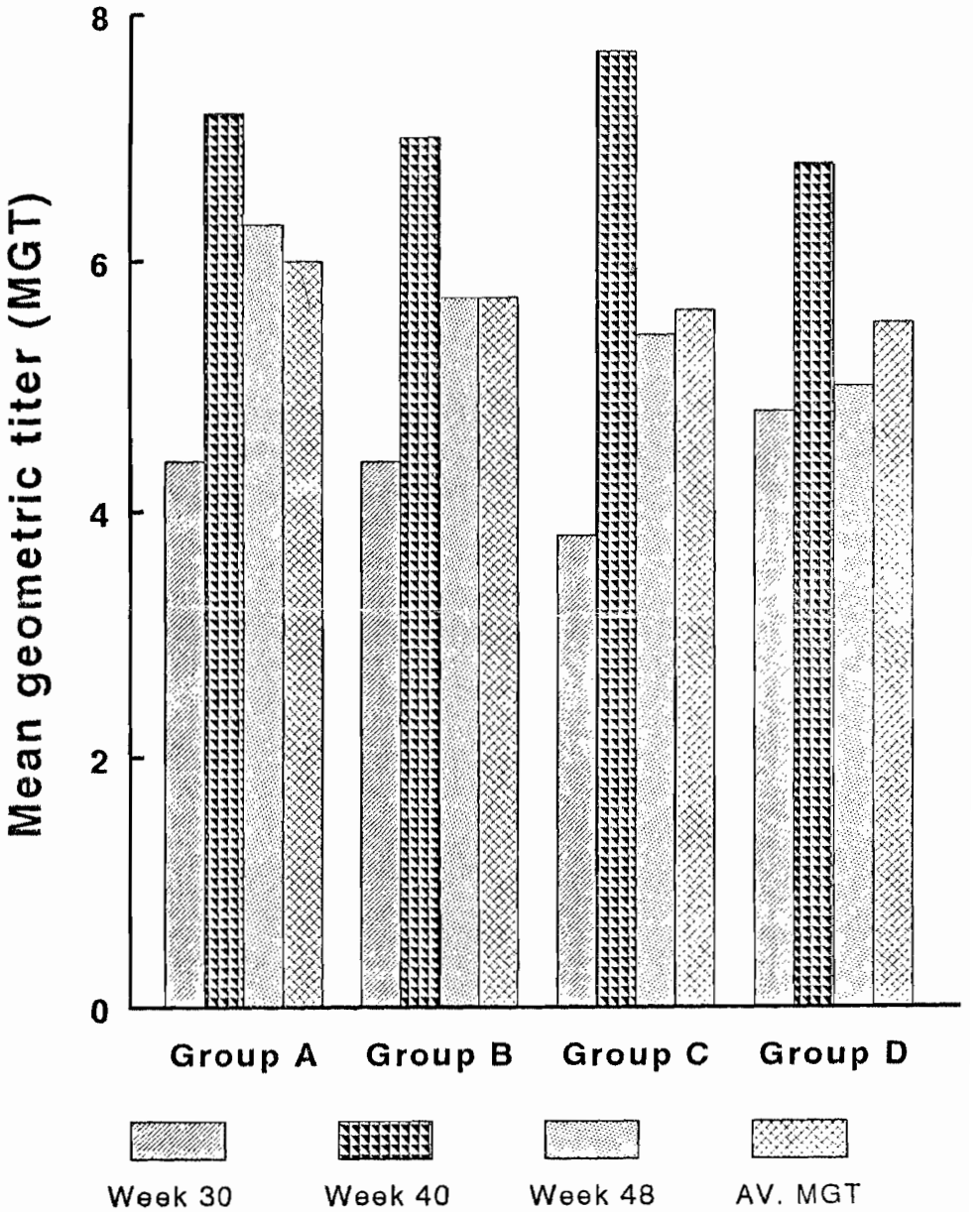

Figure 1: Immunologic response to Newcastle disease vaccination (Lod_2)