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EFFECT OF MUKTESWAR AND KOMAROV STRAINS OF NEWCASTLE DISEASE VACCINES ON EGG PRODUCTION

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ABSTRACT

Effect of live mesogenic strains of Mukteswar and Komarov ND vaccines was studied on the egg production of laying birds. The results showed that pullets vaccinated with Mukteswar ND vaccine produced more eggs than the Komarov vaccinated or non vaccinated birds. The peak egg production was noted at the age of 29 weeks in these birds and this latter decreased. When birds were re-vaccinated with the same vaccine and mute, at the age of 32 weeks, the egg production again increased to 81%.

Intra muscular vaccination with Komarov ND vaccine demonstrated 11% less egg production than the birds vaccinated with Mukteswar ND vaccine. In all the experiments, birds were found to be severely affected by the hot weather resulting in a drop of egg production.

Introduction

The continuing presence of viscerotropic velogenic new castle disease (VVND) in many areas of the world has given high priority to the need for improved new castle disease vaccines. Vaccines containing live virus are most extensively used in the world. They generally protect chicks adequately against the endemic field strains of virus and unlike inactivated vaccines, they are easily administered with inexpensive mass application techniques. Nevertheless, experience has shown that live virus vaccines, unlike inactivated vaccines, frequently produce adverse reactions such as mild respiratory disease and drop in egg production, constitute the major disadvantage of live virus vaccines (Hanson, 1972; Rehmani et al., 1988).

In an earlier study, Gasanova et al., (1977) has reported a comparative efficacy of various types of ND vaccines in laying birds. The results showed resistance to challenge at sixty weeks of age in the birds vaccinated through ocular route with LaSota strain while the other group vaccinated intramuscularly with killed vaccine, inactivated with formalin. A significant drop in egg production was recorded during challenge period, but significantly lower in the group vaccinated intramuscularly with killed ND vaccine inactivated with beta propiolactone, although the HI titres were highest in this group.

In Pakistan, the birds are generally vaccinated initially with a mild virus LaSota or Mukteswar and then by individual application of the Mukteswar or Komarov strain. These mild or attenuated live virus vaccines can still induce a mild respiratory disease which can, in some instances, be complicated by secondary infection so their use does not constitute the ideal form of control (Eissa, 1976).

Mostly, out breaks of ND occur during winter season and effect the productivity of the birds. In this season, the farmers vaccinate their laying birds as precautionary measure with Mukteswar or Komarov strain of ND vaccine in order to meet the great demand of eggs and to earn mom profit. The present project was therefore, designed to study the effect of two types of live mesogenic strains of ND vaccine on the productivity of laying birds.

Materials and Methods

1. Birds:

Four hundred pullets of Star Cross 288 of 16 weeks of age were purchased from a local poultry farm. They were kept in clean and disinfected cages and identified with numbered leg bands. The birds were accommodated in three groups A, B and C and their feed consumption and light adjustment was the same in all the treatments to avoid any experimental error. The flock was previously vaccinated intraocularly with Mukteswar ND vaccine at 10 days of age and then revaccinated at 4 weeks of age with the same ND vaccine but through intramuscular route.

2. Vaccines:

a) *"Mukteswar" ND Vaccine:* The mesogenic strain of Mukteswar ND vaccine was prepared at the Poultry Vaccine Production Centre, Karachi, Pakistan. The ELD_{50} was calculated and it was found to be $10^{8.2}$ per ml when used at 16 weeks of age and $10^{9.2}$ per ml when used at 32 weeks of age.

b) *"Komarov" ND* Vaccine: The mesogenic strain of Komarov ND vaccine was also prepared at Poultry Vaccine Production Centre, Karachi, Pakistan. Its ELD_{50} was calculated to be $10^{8.4}$ per ml when used at 16 weeks of age and $10^{8.4}$ per ml when used at 32 weeks of age for vaccination.

3. Vaccination:

The birds were vaccinated intramuscularly first at the age of 16 weeks and then re-vaccinated at 32 weeks of age as follows:

a) *Group "A":* One hundred fifty birds were vaccinated with "Mukteswar" ND vaccine containing $10^{6.7}$ $ELD_{10.7}$ per ml/bird at 32 weeks of age.

b) *Group "B":* One hundred fifty birds were vaccinated with "Komarov" ND vaccine containing 10" ELD_{so} per ml/bird at 16 weeks and $10^{7.7}$ per ml/bird at 32 weeks of age.

c) *Group "C":* One hundred birds were kept without vaccination and were treated as controls.

4. Egg Collection:

The eggs *were* collected three times a day, i.e. 9 hours, 12 hours and 14 hours and were marked as "Mukteswar" for group A, "Komarov" for group B, and C for control group and recorded. The daily performance record of birds was also kept to show the opening and closing balance of eggs, mortality, diagnosis, treatment and feed consumption. The weekly egg production has been represented as percent of controls taking an average of 40 weeks of age.

Results

The weekly egg production percentage was calculated as hen/day/hen house basis and is presented in Tables 1&2. The results showed that pullets vaccinated with Mukteswar or Komarov ND vaccine and the non-vaccinated controls started laying eggs at 21 weeks of age. The results indicated that pullets of Group A produced more eggs than the other two groups for upto 40 weeks of age. Moreover, the egg production of group A birds increased more rapidly than Groups B&C and was found to be 71.5% at 25 weeks of age as compared to Group B&C birds where egg production was 56.4% and 51.8% respectively (Table 1). Peak egg production (82.3%) was obtained at 29 weeks of age in Group A birds vaccinated with Mukteswar ND vaccine. This high percentage sustained for one week and then decreased rapidly (66%). At 32 weeks of age, the birds were re-vaccinated with the same dose and route. At two weeks post vaccination, the egg production again increased and reached to the level of 81% (Table 1). There after a great variation in egg production was observed for upto 40 weeks of age and this could have been due to heat stress (Table 1&2).

The pullets vaccinated intramuscularly with Komarov ND vaccine, although matured sexually and started laying eggs at the same age, produced less number of eggs than the Group A but more than Group C during a 20 weeks period (Table 1&2). The results in Table 1 showed that at 29 weeks of age, the egg production was 71%, i.e. 11% less than Group A. The egg production then decreased and reached 65% level at 32 weeks. Revaccination at 32 weeks of age resulted in an increase of 10% in the egg production within one weeks time. Peak egg production (77%) was recorded in this group at 34 and 35 weeks of age which rapidly decreased at 39 and 40 weeks, probably due to hot weather. The results (Table 1 & 2) showed that the pullets of Group C (non-vaccinated)

produced less number of eggs than the other two groups. The mean egg production recorded was highest (62%) in group A and only 55% and 52% in Group B and C respectively (Table 1). Similar findings can also be observed in Table 2 where highest egg production was 59% recorded in Group A, 52% in Group B and 49% in Group C.

Table 1: Weekly egg production (%) of the laying flock vaccinated intramuscularly with mesogenic strains of ND vaccine and the control group.

Age (Weeks)	Group A (Mukteswar NDV)	Group B (Komarov NDV)	Group C (Control)
20	–	–	–
21	1.7	1.6	0.6
22	13.3	7.7	6.8
23	31.2	17.2	17.3
24	43.9	29.2	26.3
25	74.5	56.4	51.8
26	71.5	61.5	62.8
27	73.8	64.5	58.4
28	80.1	66.4	65.0
29	82.3	71.0	68.7
30	81.3	69.6	69.5
31	73.9	68.9	65.6
32	65.9	65.9	62.8
33	76.8	75.5	67.6
34	81.5	77.0	70.8
35	72.4	77.2	66.3
36	64.1	71.4	62.5
37	75.1	74.6	65.6
38	68.9	69.9	64.2
39	52.6	42.5	41.0
40	48.1	38.1	45.9
Mean	62	55	52

Discussion

Our findings that birds vaccinated with live mesogenic strain of Mukteswar ND vaccine showed higher egg production than those treated with Komarov ND vaccine, is controversial since some local farmers reported a better egg production with Komarov strain while others are of the opinion that Mukteswar strain of ND vaccine was a better one. However, the findings of Hanson (1972) that live ND vaccine produced adverse reactions along with a drop in egg production, is contrary to our findings as our results (Table 1&2) showed an

Table 2: Weekly egg production (%) of the laying flock vaccinated intramuscularly with mesogenic strains of ND vaccine and control group.

Age (Weeks)	Group A (Mukteswar ND)	Group B (Komarov ND)	Group C (Control)
20	–	–	–
21	1.7	1.6	0.6
22	13.2	7.7	6.7
23	30.9	17.2	17.1
24	43.3	29.1	26.0
25	72.9	55.6	51.0
26	70.0	60.4	61.6
27	72.3	63.2	57.1
28	78.4	65.1	62.7
29	80.1	69.6	65.3
30	79.1	69.0	65.7
31	70.9	65.0	61.7
32	63.5	61.5	59.0
33	73.4	702	63.6
34	77.1	71.1	66.6
35	68.3	71.1	62.3
36	60.2	64.9	58.7
37	68.5	67.1	60.6
38	63.1	62.5	58.4
39	47.8	37.3	37.0
40	43.6	33.3	40.4
Mean	59	52	49

increase in egg production after vaccination. However, our results are in agreement with the findings of Robertson et al., (1976) who reported that mean $\log_2$ 7HI was necessary to maintain the egg production of laying birds. Our results of HI tests per-formed at 25 weeks of age, showed $\log_2$ 4.6 HI titre in Group C, $\log_2$ 5.5 in Group B and $\log_2$ 6.8 in Group A. In addition, our results of second HI test conducted at 38 weeks of age, showed that $\log_2$ HI antibody titre was 6.0 in Group A, 6.5 in Group B and 5.0 in Group C. These results of HI titre clearly demonstrated that the control bird had low titre and therefore, their egg production was the least amongst the three groups. At 39 and 40 weeks of age, a sudden drop in egg production recorded was probably due to a rise in the environmental temperature as the birds were severely affected by the hot weather. Further, the daily performance record also showed that percentage mortality was highest in control group while it was lowest in Group A, vaccinated with Mukteswar ND vaccine.

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