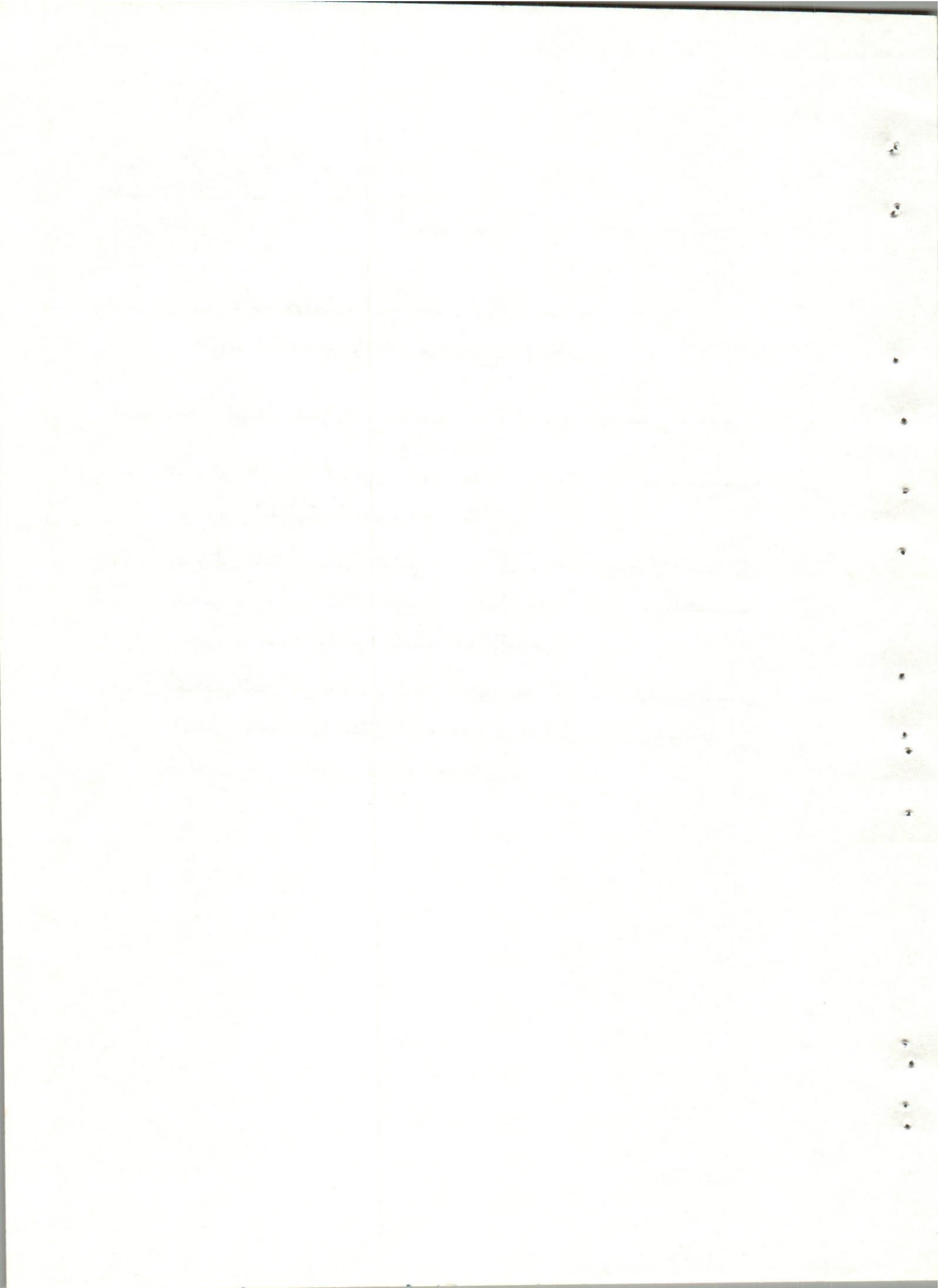


قسم : الأمراض الباطنه والمعدية .  
كلية : الطب البيطرى - جامعة القاهرة .  
رئيس القسم : أ . د . / أحمد عبد الحميد بسيونى .

### تأثير فيروسات النيوكاسل والرعاش الوبائي على نسبة الخصوبه والفقس في البيض وطرق مقاومته

- أحمد الملا ، ابتسام الغزاوى ، طه محمود ، روف رزق ، مصطفى بسطامى ،  
فتحي سعد
- ١- تأكد من الدراسة أن فيروسات النيوكاسل والرعاش الوبائي تقلل نسبة الخصوبه والفقس في البيض المخصوب .
  - ٢- وضح أن تغطيس بيض التفريخ في محلول ١٠٪ ايزوبروبيل الكحول يحمى البيض من انتقال فيروس النيوكاسل خلال القشره ، وكذلك يحسن من نسبة الخصوبه وكذلك نسبة الفقس .
  - ٣- تغطيس البيض في ٢٪ من محلول الفورمالين أو ١٠٪ ايزوبروبيل الكحول يقلل نسبة انتقال فيروس الرعاش الوبائي خلال القشرة وبالتالي يحسن نسبة الخصوبه والفقس .



Dept. of Medicine & Infectious Disease,  
Faculty of Vet. Med., Cairo University,  
Head of Dept. Prof. Dr. A.A. Bassioni.

**EFFECT OF NEWCASTLE DISEASE AND AVIAN  
ENCEPHALOMYELITIS VIRUSES ON FERTILITY  
AND HATCHABILITY OF EGGS AND ITS CONTROL**  
(With 4 Tables)

By  
**A. ELMOLLA. E.F. ELGHAZZAWI; T.H. MAHMOUD; R.E. RIZK;  
M.A. BASTAMI\* and F.E. SAAD**  
(Received at 9/1/1985)

**SUMMARY**

Newcastle disease, and avian encephalomyelitis viruses decreased the fertility and hatchability percentages.

Dipping eggs in 10% isopropyl alcohol increase protection against virus transmission through egg shell, and also improved fertility and hatchability percent.

Dipping eggs in 2% formalin, or 10% isopropyl alcohol, increase protection against transmission of avian encephalomyelitis virus through egg shell, and also improved fertility and hatchability percentages.

**INTRODUCTION**

Newcastle disease virus was isolated from a high percentage of dead embryos and from infertile eggs (HOFSTAD, 1949 and ELAY 1947).

Newcastle disease virus reduced the fertility and hatchability of eggs (HANSON, 1978).

Avian encephalomyelitis virus cause great economic losses, decrease in egg production, lowered fertility and hatchability in poults (DESHMUKH, *et al*, 1973).

The aim of this work to study the effect of Newcastle disease and avian encephalomyelitis viruses on fertility and hatchability and trial to its control by dipping eggs in effective disinfectants.

**MATERIAL and METHODS**

**1) Embryonated chicken eggs:-**

Three thousands, three hundreds and sixteen embryonated chicken eggs were used in these studies.

**2) Virus strains:-**

(a) A velogenic viscerotropic strain of Newcastle disease virus obtained from the Animal Health Research Institute. Cairo (SHEBLE and REDA, 1976).

(b) An egg adapted standard avian encephalomyelitis virus strain was obtained from Institute für Geflügel, Hannover, West Germany.

\* : Animal Production Research Institute.

A. ELMOLLA, *et al.*

### 3) Disinfectants:

Formalin, phenolic acid, acriflavin, isopropyl alcohol, iodine plus potassium iodide and chloramin T, were used in this study.

## EXPERIMENTS

**Exp. 1:** Was designed to study the possibility of isolation of Newcastle disease and avian encephalomyelitis viruses from dead in shell embryos from experimentally infected eggs, and treated with disinfectants or fumigation.

One thousand and two hundred eggs were used in this experiment, the eggs were infected firstly by the tested virus by dipping in suspension of the virus for 4 minutes at 4°C then dipped in one of the effective disinfectants then re-incubated. On the 18<sup>th</sup> day old, the eggs were candled, dead embryos were subjected for virus re-isolation.

**Exp. 2:** Was planned to study the effect of dipping egg in disinfectants before infection with Newcastle disease or avian encephalomyelitis viruses on percentages of fertility and hatchability. Nine hundred and nineteen embryonated chicken eggs were used in this experiment, the eggs were dipped in the suitable concentration of the effective disinfectants for 4 minutes at 4°C then infected with one of the used viruses by dipping. A group of eggs dipped in suspension of the used viruses only as control, another group fumigated by formalin and potassium permanganate then incubated in isolated incubator.

The percentage of fertility was calculated after eighteen days in the incubator as the percentage of fertile eggs by the total number of eggs used multiplied by 100. The percentage of the hatchability was calculated after twenty-one days as the percentage of sound chicks that hatched from proven fertile eggs.

**Exp. 3:** Was conducted to study the effect of dipping eggs in disinfectants after infection with Newcastle disease or avian encephalomyelitis viruses on percentages of fertility and hatchability. Nine hundred and ninety seven embryonated eggs were used in this exp. A group of eggs was infected only by dipping in suspension of the used viruses for 4 minutes at 4°C, other groups were infected by the used virus then dipped in a proper concentration of each disinfectant. The percentages of fertility and hatchability were calculated in each group.

## RESULTS

In spite of treating eggs with disinfectants or fumigation Newcastle disease, or avian encephalomyelitis viruses were detected in all experimentally infected eggs, but not in the control groups. Newcastle disease and avian encephalomyelitis viruses infection reduced macroscopic fertility and hatchability by about 3.32%, 3.54% and 5%, 11.6% respectively.

Treating eggs with disinfectants or fumigation improved macroscopic fertility and hatchability compared to the infected non treated control, as well as percentage of dead embryos, non hatched chicks and weak chicks were adversely affected by infection with Newcastle disease and avian encephalomyelitis viruses, and were improved by treatment with disinfectants.

## DISCUSSION

Data obtained from the present study indicated that both macroscopic fertility and hatchability were affected in case of infection with Newcastle disease, and avian encephalomyelitis

viruses by about 3.32, 4.68% and 5% and 11.6% respectively. Treating eggs with certain disinfectants improved macroscopic fertility and hatchability percentages, of infected eggs with Newcastle disease virus. Percentages of dead embryos, non hatched chicks and weak chicks were higher in infected eggs with Newcastle disease virus than infected treated eggs by about 1.77% and 2.62% respectively. Previous investigators reported that, contamination with Newcastle disease virus decreased fertility and hatchability percentages. ZARGER and POMEROY (1950) observed that microscopic fertility was not adversely affected, however HANSON (1978) reported that both egg fertility and hatchability were reduced after infection. The results of present studies agreed with DELY (1947) who obtained Newcastle disease virus from embryos died on the, 15<sup>th</sup>, and 17<sup>th</sup> day of incubation, also HOFSTALD (1949) observed high percentages of dead embryos after decline of Newcastle disease outbreak.

Avian encephalomyelitis virus infection decreased macroscopic fertility and hatchability by about 5% and 11.61% compared to control group. Treating eggs with 10% isopropyl alcohol either before or after infection, both macroscopic fertility and hatchability were improved compared to control infected eggs. TAYLOR *et al.*, (1955) observed decrease of hatchability percentage during the period of infection with avian encephalomyelitis virus. CALNEK *et al.* (1960) showed that transmission of avian encephalomyelitis virus took place in incubator from infected eggs to contact chicks during hatching that lead to decrease of hatchability percentage. JUNGHERR and MINARD (1942), and OLTISKY and VAN ROCKEL (1952), reported that hatchability was not affected with avian encephalomyelitis virus infection.

Results obtained from the present study emphasize the necessity of utilizing isopropyl alcohol as disinfectant in case of contamination, and also improve both fertility and hatchability percentages.

### REFERENCES

- Calnek, B.W., J. Patrichia, J. Taylor, and M. Sevoian (1960): Studies on avian encephalomyelitis. *Epizootology. Avian Dis.*, 4 : 325.
- Delay, P.D. (1947): Isolation of avian Pneumocephalitis (Newcastle disease) virus from the yolk sac of four day old chicks, embryos and infertile eggs *science*. 5 : 545.
- Deshnukh, D.R., C.T. Larsen, T.A. Rude and B.S. Pomeroy (1973): Evaluation of live virus vaccine against avian encephalomyelitis in turkey breeder hens. *Am. J. Vet. Res.*, 34 : 863.
- Hanson, R.P. (1978): Newcastle disease. In: *Disease of poultry*, ed. M.S. Hofstad *et al.*, 7<sup>th</sup> ed., pp. 513-535. Ames. Iowa: Iowa State University press.
- Hofstad, M.S. (1949): A study on epizootology of Newcastle disease (pneumoencephalitis). *Poultry Sci.*, 28 : 530.
- Jungherr, E. and E.L. Minard (1942): The present status of Avian Encephalomyelitis. *J. Am. Vet. Med. Ass.*, 100 : 38.
- Oltisky, P.K., and H. van Reckel (1952): *Diseases of poultry*. ed. by H.E. Biester and L.H. Schwarte 3<sup>rd</sup> ed: 619.
- Taylor, L.W., D.C. Lowry and L.G., Raggi (1955): Effect of an outbreak of Avian Encephalomyelitis (Epidemic Tremor) in a breeding flock. *Poultry Sci.*, 34 : 1036.
- Zargar, S.L. and B.S. Pomeroy (1950): The effects of commercial living Newcastle disease virus vaccines. *Am. J. Vet. Res.*, 11 : 272.

A. ELMOLLA, *et al.*

TABLE (1)

Effect of disinfectants on percentages of fertility and hatchability before and after infection with Newcastle disease virus.

Type treatment	No. of eggs.	% fertility		% hatchability	
		Before infection	After infection	Before infection	After infection
Infection	112+110	87.00	87.50	60.91	57.11
Isopropyl alcohol 10%	111+100	90.00	90.09	64.44	60.00
Phenolic acid 1%	112+100	89.09	88.39	62.24	48.58
Fumigation	111+96	85.41	89.18	60.97	59.59
Control	131+97	90.32	89.31	64.28	60.68

TABLE (2) Effect of disinfectants

TABLE (2)

Effect of disinfectants on % dead embryos, non hatched and weak chicks, before and after infection with N. D virus

Type of treatment	No. of	% fertility			% hatchability		
		% dead embryos	% non hatched chicks	% weak	% dead embryos	% non hatched	% weak chicks
Infection	112	11.49	17.24	17.24	9.19	21.42	9.18
Isopropyl alcohol 10%	111	8.88	17.77	8.88	10.00	21.00	9.00
Phenolic acid 1%	112	10.20	18.36	9.18	12.12	20.20	9.09
Fumigation	111	10.97	17.07	10.97	11.11	19.19	10.10
Control	131	10.71	15.47	8.33	11.11	18.80	9.40

\* No. of eggs for each treatment before and after infection.

TABLE (3)

Effect of disinfectants on percentages of fertility and hatchability, before and after infection with avian encephalomyelitis virus.

Type of treatment	No. of eggs	% Fertility		% hatchability	
		Before	After	Before	After
Infection	60+60	86.66	88.33	53.84	52.83
Isopropyl alcohol 10%	60+60	91.66	91.66	67.27	65.45
Phenolic acid 1%	60+60	88.33	90.00	56.60	55.55
Acridine 0.2%	60+60	86.60	86.66	53.84	53.84
Formalin 2%	60+60	88.33	88.33	54.71	60.37
Fumigation	60+60	88.33	88.33	54.71	60.37
Control	60+60	91.66	90.00	65.45	64.81

TABLE (4)

Effect of disinfectants on percentages of dead embryos, non-hatched, and weak chicks before and after infection with avian encephalomyelitis virus.

Type of treatment	No. of eggs	Before infection			After infection		
		% dead embryos	% non hatched	% weak chick	% dead embryos	% non hatched chicks	% weak chicks
Infection	60	11.52	15.38	17.30	11.32	16.98	18.85
Isopropyl Alcohol 10%	60	9.09	14.54	9.09	9.09	16.36	9.09
Phenolic acid 1%	60	11.32	16.98	15.09	9.25	18.51	16.66
Acridine 0.2%	60	11.53	17.30	17.30	11.53	17.30	17.30
Formaline 2%	60	9.09	21.81	9.09	7.27	18.18	14.54
Fumigation	60	11.32	18.86	13.20	9.43	16.98	13.20
Control	60	10.90	16.63	9.09	7.04	18.51	9.29

\* No. of eggs for each treatment, before and after infection.

