

قسم أمراض الدواجن
كلية الطب البيطري - جامعة أسيوط
رئيس القسم : د/ مصطفى عبدالمطلب شحاته

دور الطيور الطليقة في نقل بعض أمراض الدواجن
١ - فيروس مرض النيوكاسل

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تم تجميع ٢١٣ طائر حي بالاضافة الى ٨٧ طائر ميت يمثلون ستة أنواع مسن
الطيور الطليقة من منطقة أسيوط (العصافير ، اليمام ، أبوفصاده ، اليوم ، الهدهد
وبعض الطيور المائية) أمكن التثبت من وجود أجسام مضادة لفيروس النيوكاسل بنسب
متفاوتة في مصل الطيور الحية • كذلك أمكن عزل ستة عترات لفيروس النيوكاسل مسن
الطيور الحية والميتة وبتصنيفها اعتمادا على ضراوتها لأجنة بيض الدجاج ، كتاكيث عمر
يوم بدارى عمر ستة أسابيع ، زغاليل الحمام ثبت أن أربعة منها ضعيفة الضراوة وواحدة
متوسطة في حين كانت احداها شديدة الضراوة •

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**THE ROLE PLAYED BY FREE FLYING BIRDS
IN THE TRANSMISSION OF AVIAN PATHOGENS
I. NEWCASTLE DISEASE VIRUS**
(With 5 Tables)

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SUMMARY

213 serum samples from free flying birds representing 5 species showed varying levels of haemagglutination inhibiting antibodies to Newcastle disease virus. A total of 213 living and 87 dead birds representing 6 species of wild birds were subjected to isolation of Newcastle disease virus. 6 strains were recovered from both living and dead birds. In vivo characterization of the isolates revealed that 4 of them were of low pathogenicity, one of moderate pathogenicity and one was highly pathogenic as measured by pathogenicity to chicken embryos, day old chicks, 6-week-old chicks and pigeon squabs.

INTRODUCTION

The susceptibility of the wild and free flying birds to Newcastle disease was investigated in order to find out their role in transmission and spread of the disease to domestic fowls, (DELAY, et al. 1948; GALLESPIE, et al. 1950; REUSS, 1961 and MOUSA, et al. 1982).

The disease was reported in free living water fowls, (BRADSHAW and TRAINER, 1966; PALMER and TRAINER, 1970; and ROSENBERGER, et al. 1974), in Starling, GALLESPIE, et al. 1950, in sparrows, GUSTAFSON and MOSES, 1953, in pigeon, HANSON and SINHA, 1952, in owls, INGALLS, et al. 1951, and partridges, PERNAIK and DIXIT, 1953.

Susceptibility to the disease was evidenced either by detection of specific antibodies (BRANDSHOW and TRAINER, 1966; PALMER and TRAINER, 1970 and MAGID, et al. 1965), experimental infection, KRANEVILD and MANSJOER, 1950 and REUSS, 1961, or isolation of the virus from natural infections, ROSENBERGER, et al. 1974.

In this study, isolation of Newcastle disease virus was tried from captured free living and migratory birds in upper Egypt. Detection of specific Newcastle disease virus (NDV) haemagglutination inhibition (HI) antibodies was attempted in sera of some of these birds. Isolated viruses were subjected to characterization and further pathotyping.

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MATERIAL and METHODS**Free living birds:**

213 living free flying birds and 87 dead birds representing 6 species were captured from different localities in Assiut governorate.

Chicken embryos:

9-10-day-old chicken embryos were supplied by the farm of Faculty of Agriculture, Assiut and used for virus titration and propagation.

Reference virus:

Lasota strain was used as reference virus. The virus was propagated in chicken embryos, titrated ($10^{8.8}$ EID₅₀/ml) and frozen at -20c till used.

Reference serum:

A locally prepared ND hyperimmune serum was used.

Haemagglutination (HA) test:

HA character of isolated viruses was tested after, ANNON, 1971.

Haemagglutination inhibition (HI) test:

The microtechnique was carried out after ALLAN and GOUCH, 1974 using 4 HA units.

Isolation and identification of NDV:

Bacteria-free suspensions from internal organs of free living birds (liver, spleen, kidney, lung, brain) were inoculated into the allantoic sac of chicken embryos. Isolates were identified by rapid HA test using 10% chicken red blood cells (RBCs), slow HA test using 0.5 -1% RBCs, and HI test.

Post mortem examination and virus reisolation:

The infected birds as well as the dead birds were carefully examined. Samples from internal organs of infected birds were suspended in normal saline, centrifuged, antibiotics were added and inoculated in embryonated eggs. Embryonic fluids were subjected to HA and HI test.

Pathotyping of NNDV isolates:

- a) Embryo mean death time induced by each virus preparation was calculated for the highest dilution in which all embryos died, HANSON, 1975.
- b) Intracerebral pathogenicity of NDV isolates for susceptible pigeon squabs was determined. The pathogenicity of each isolate was expressed as the intracerebral pathogenicity index (ICPI), giving death numerical value of 4, illness 2, and no effect zero, according to method described OLAH and PALATKA, 1965.
- c) Intramuscular pathogenicity of NDV isolates for susceptible 6-week-old chickens and intracerebral pathogenicity for baby chicks, free from detectable HI antibodies, was determined giving death a numerical value of 3, paralysis 2, symptoms 1, and no ill effect zero. The intramuscular pathogenicity index (IMPI) and ICPI were calculated after ANNON, 1971.

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RESULTS

Out of 203 examined sera of apparently healthy wild birds, including six species, 46 samples showed HI antibodies to NDV, table 1.

Results of isolation revealed that out of 59 pooled samples representing 390 cases, six samples were identified as NDV isolates by HA and HI tests. These isolates were recovered in the first egg passage, table 2.

Characterization of NDV isolates showed that isolates 1, 2, 4 and 6 resulted in death of chicken embryos after more than 100 hrs., while isolates 3 and 5 were lethal to embryos after 60 and 52 hrs. respectively, table 3.

Results of experimental infection of day-old chicks, 6-week-old chicks and pigeon squabs showed that isolates 1, 2, 4 and 6 were of low pathogenicity isolate 3 of moderate pathogenicity, while isolate 5 was highly pathogenic and lethal to inoculated birds, table 4 and 5, with birds showing typical respiratory signs and septicaemic lesions of ND.

DISCUSSION

The present investigation had dealt with the susceptibility and role played by free living birds in the transmission of NDV. Results of HI test pointed out that free living birds exposed to NDV under field conditions undergo a symptomless infection with some birds developing detectable antibodies, DEVOS, 1972.

Six isolates of NDV were identified depending on results of HA and HI tests. According to the criteria of pathogenicity of chicken embryos, HANSON and BRANDLY, 1955, together with the results of pathogenicity to day-old and 6-week-old chicken and pigeon squabs, the six isolates revealed variable results. Four isolates showed mean death time more than 100 hrs. These isolates were of low pathogenicity to experimental birds and could be classified as lentogenic strains. Although, two isolates 3, 5 had mean death time of less than 60 hrs., one of them showed moderate pathogenicity 3 and could be classified as mesogenic strain. Isolate no. 5 was of marked high pathogenicity to experimental birds and could be classified as velogenic strain.

Isolation of NDV from the living birds points out the role played in transmission of the disease by such obligatory visitors to poultry farms and to unhygienically stored rations.

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Table (1)
Results of screening of sera for HI antibody titers

Birds	No.	HI antibody titers							
		0	1:2	1:4	1:8	1:16	1:32	1:64	1:128
<i>Passer domesticus</i>	120	90	8	4		6	8	4	
<i>Turtur senegalensis</i>	60	48		2	4	6			
<i>Strix flammea</i>	5	3		1					1
<i>Upupa epops</i>	6	6							
<i>Motacilla flava</i>	12	10	1	1					

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Table (2)
Results of isolation of NDV isolates from living birds

Birds	No.			Samples [§]	NDV	isolates (serial no.)
	living	dead	total			
<i>Passer domesticus</i>	120	--	120	24	2	(1&2)
<i>Turtur senegalensis</i>	60	10	70	14	1	(3)
<i>Strix flammea</i>	5	--	5	1	1	(4)
<i>Upupa epops</i>	6	11	17	4	1	(5)
<i>Motacilla flava</i>	12	11	23	5	-	
<i>Anas crecca</i>		25	25	5	1	(6)
<i>Gallinula choropus</i>		15	15	3	-	
<i>Fulica arta arta</i>		15	15	3	-	

§ Pooled samples each of five.

Table (3)
Identification of NDV isolates

Isolate	MDT/MLD	Titer [§]	HA	HI
1	122	8.8	1/ 80	+
2	108	7.9	1/160	+
3	60	6.5	1/ 80	+
4	102	7.6	1/160	+
5	52	6.3	1/ 80	+
6	124	7.67	1/ 80	+
Lasota	110	8.8	1/320	+

§ Lef 10

ELD 50

Table (4)
Results of Pathogenicity fo the NDV isolates

Birds	Route	No. of Birds	Pathogenicity Index						
			1	2	3	4	5	6	Lasota
Day-old chicks	1/C	10	0.3	0.2	1.4	0.1	2.6	0.2	0.1
6-week-old chicks	1/M	10	0.2	0.1	1.7	0.3	2.8	0.1	0.1
Pigeon Squabs	1/C	10	0.2	0.4	1.8	0.3	3.3	0.2	0.3

Table (5)
Isolation of NDV from 6-week-old chickens
at 1 & 2 weeks post-inoculation

Virus isolates	1 week Post-inocul.		2 weeks Post-inoc.	
	Cloacal	Tracheal	Cloacal	Tracheal
1	0/10	0/10	0/10	0/10
2	0/10	2/10	2/10	0/10
3	10/10	10/10	9/10	0/10
4	0/10	2/10	0/10	0/10
5	4/10	10/10	2/10	0/10
6	0/10	0/10	9/10	0/10
LaSota	2/10	10/10	6/10	0/10

