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## THE ROLE OF ENVIRONMENT IN THE OCCURRENCE OF CLOSTRIDIAL INFECTION AMONG FOWL.

(With 3 Tables)

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دور البيئة المحيطة في نقل عدوى الكولسترديا بين الدجاج

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التليف المعوي عند الدجاج من الأمراض نادرة الحدوث بين القطعان ولحدوث هذا المرض لا بد من توفر الميكروب في بيئة الدجاج وكذلك توفر بعض العوامل المساعدة لاختراق الميكروب جدار الأمعاء مثل الإصابة بالكوكسيديا أو حدوث خدش على جدار الأمعاء نتيجة لخشونة الفرشة أو العليقة. وهذا المرض من الأمراض التي تسبب وفيات بنسب عالية بين القطعان. هذا البحث أجرى في إحدى محطات البيض بمحافظة أسيوط (العوامر). وقوة هذه المحطة ٢٠ ألف طائر تتراوح أعمارها بين ١٠ - ٢٢ أسبوع. تم جمع ٥٠ طائر نافق وأخذت منها عينات من الكبد والطحال وجدار الأمعاء ومحتويات الأمعاء وكذلك فحصت البيئة المحيطة بالدجاج لمعرفة مصدر العدوى بهذا المرض. فتم فحص العلائق ومياه الشرب وفرشة وزرق الطيور وقد وجد من الفحص البكتريولوجي أن ميكروب كوكسيديا برفرنجنز قد تم عزله من ٤٦ كبد، ٢٠ طحال، ٤٤ أمعاء، ٤٢ محتويات أمعاء كما تم عزله من المركزرت الموجودة بالعلائق وكذلك تم عزله من الساقى والفرشة وزرق الطيور. من نتائج هذا البحث يتضح أن المصدر الرئيسي للعدوى من هذا القطيع تتمثل في تلوث العلائق بالميكروب. وافراز الميكروب في زرق الطيور المصابة قد يلوث مياه الشرب وكذلك الفرشة لذلك تصبح البيئة المحيطة مصدر هام لتكاثر ونقل هذا الميكروب بين الدجاج مما لا يعطل الاستجابة للعقاقير المستخدمة في العلاج.

### SUMMARY

Necrotic enteritis was consistently produced when fowl fed ration contaminated with clostridium perfringens. Microbiological examination of 50 dead birds with a history of necrotic enteritis revealed the recovery of clostridium perfringens from a sum of 46 liver, 30 spleen, 44 intestine and 42 intestinal contents. The organism was also recovered from the ration consumed by birds (concentrates) as well as from litter, water and droppings.

Contaminated ration was found to be the main source of infection and litter producing another focus of infection.

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## INTRODUCTION

The high mortality that occurs annually in the chicks and adult flocks is considered as one of the outstanding drawbacks of the entire poultry industry.

Clostridia are part of the etiology of gangrenous dermatitis and necrotic enteritis of chicken and turkeys. Clostridium perfringens can be transmitted under field condition by rearing broilers in facilities where the disease had previously occurred.

The incidence of infection by clostridium perfringens among poultry is low and probably depend on the hygienic measures and type of management inside the farm. PARISH (1961) succeeded in isolating clostridium perfringens type c from cases of necrotic enteritis. This condition was reproduced following an oral administration of clostridium perfringens type C to the birds. NAIRN and BAMFORD (1967) described a condition of necrotic enteritis in a bird receiving specific lot of feed containing clostridium perfringens type c. WIJEWANTA and SENCIVRATNA (1971) traced the fatal infection of 4-10 day old chicks with clostridium perfringens to contaminated fish meal and mash. AL SHENIKHY and AL SAIAG (1979) stated that necrotic enteritis caused by clostridium perfringens could be produced after a mild infection with Emerica acervulina or E.necatrix.

In laying hen houses with a history of necrotic enteritis a trial was made to investigate the role of environment in spreading of this disease among flock.

## MATERIAL and METHODS

### 1 - Source of specimens:

A sudden onset of necrotic enteritis was occurred with high mortality rate (22%) among birds within one week in one of the poultry houses which located at El-Awamer and contained 20,000 Arber Acers birds. The birds were between 10-22 weeks old and all of them were housed in standard type of litter and fed according to the accepted chicken grow out plane.

### 2 - Collection of the specimens:

200 samples were obtained from the internal organs of 50 freshly dead birds including intestine, intestinal content liver and spleen.

65 samples were also collected from litter, droppings, water trough and the original water supply as well as from ration and ration constituents (bran-soya bean, crushed maize and concentrates).

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### 3 - Bacteriological examination of the specimens

Part from litter, dropping, ration and ration constituents were suspended in sterile normal saline before the bacteriological examination.

The bacteriological examination was carried out according to MERCHANT and PACKER 1961, CRUICKSHANK, et al. 1974 and TANERVARES WILLIAMS, 1977 and entailed the following:

#### A) Microscopical examination

Smears from liver, spleen, intestine were prepared, stained by Giemsa stain and examined microscopically.

#### B) Culture procedures

Parts of livers, spleens and intestine were crushed with saline and sterile sand. The obtained suspensions as well as specimens from water, litter and droppings were inoculated in this glucolate broth and incubated at 37°C for 48 hrs. The inoculated broth was subcultured on Neomycin glucose blood agar and incubated anaerobically at 46-47°C for 48 hrs. The suspected colonies were identified biochemically and biologically by inoculation in white mice.

## RESULTS

Results in table 1, 2, 3.

## DISCUSSION

A sum of 158 isolates were recovered from the internal organs of 50 examined chicks. The higher percentage of organism was from liver (92%) followed by intestine (80%) and intestinal content (84%) and lastly spleen (60%).

It is clearly evident from table (2) that *Clostridium perfringens* was recovered from litters (90%), water trough (75%) and dropping (60%) of the examined poultry house. On the other hand this organism failed detection in any of five samples of the original water supply examined. This indicates that the environmental pollution of the poultry farm was occurred from the droppings of the infected birds.

It is clearly evident from our results and from the history of the disease in the farm that the ration especially the concentrates constituted the main focus of clostridial infection among these birds. This was indicated by the increasing mortality rate once again after the use of the necrotic enteritis chemotherapy course and the gradual decreasing of such rate after the change of the ration used especially the concentrates.

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However, sufficient number of *Cl.perfringens* in poultry environment and slight intestinal damage due to destructive effect of coccidiosis, rough litter or any others are the major predisposing factors required for production of the disease under field condition (AL-SHEIHLY and TRUSCOTT, 1976). Excretion of these organisms in dropping of infected birds contaminate the poultry environment (Litter and water) with a consequent facilitation of the spreading of the infection among flock.

It can be concluded that the presence of *Cl.perfringens* in poultry environment (feed-litter and water) will establish an outbreak of disease without successful response to necrotic enteritis drug therapy. The first step for treating such case among poultry is to investigate the main source of infection. However, disease control is complicated by improved methods of feeding and management. The essential points of sanitation plan for prevention of such infection and contamination in poultry houses entailed the following:

All feeds must be delivered in bulk and elevated to bins in the feed house, so that neither the truck nor the driver is ever in the plant. If its impossible the truck is washed before leaving the mil and the driver makes no intermediate deliveries before reaching the laboratories. In addition the use of feeders which reduce waste to minimum and prevent contamination of feed by the chickens is preferable. Also spoilage of feed must be avoided in order to prevent wild birds and rodents.

The litter used in the laying and brooding pens must be chosen from materials subjected to high temperature during manufacturing process.

All refuse litter, faeces and other such matter must go to compost pile in a remote corner of the plant. This composted material must be removed way of back entrance.

The pens and equipment must be cleaned regularly and thoroughly and steam sterilized after each cleaning is preferable.

The plant must has its own water supply from deep well or enclosed water tower.

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Table (1): *Clostridium perfringens* recovered from the internal organs of examined birds

Samples	No. of sample	<i>Clostridium perfringens</i>	
		No.	%
Intistine	50	40	80
Intestinal content	50	42	84
Liver	50	46	92
Spleen	50	30	60
Total	200	158	79

Table (2): Percentage distribution of *Cl. perfringens* as a contaminant in litters, water trough and ration

Type of specimens	No. of specimen	<i>Clostridium perfringens</i>	
		No.	%
Litter	20	18	90
Droppings	20	12	60
Ration	20	16	80
Ration constituent:			
a- maiz	10	0	-
b- bran	10	0	-
c- soya bean	10	0	-
d- concentrates	10	9	90
Water trough	20	15	75
Original water supply	5	0	0

Table (3): The percentage distribution of Cl.perfringens recovered from collected specimens.

Obtained results	dead birds				Ration				Other Specimens				
	Intstine content	ntistinal content	Liver	Spleen	Ration	Ration constituent Maiz Soya bran Conc.			Litter	Dropping	Water supply	Water trough	
Positive %	80	84	92	60	80	0	0	0	90	90	60	0	75
Negative %	20	16	8	40	20	100	100	100	10	10	40	100	25