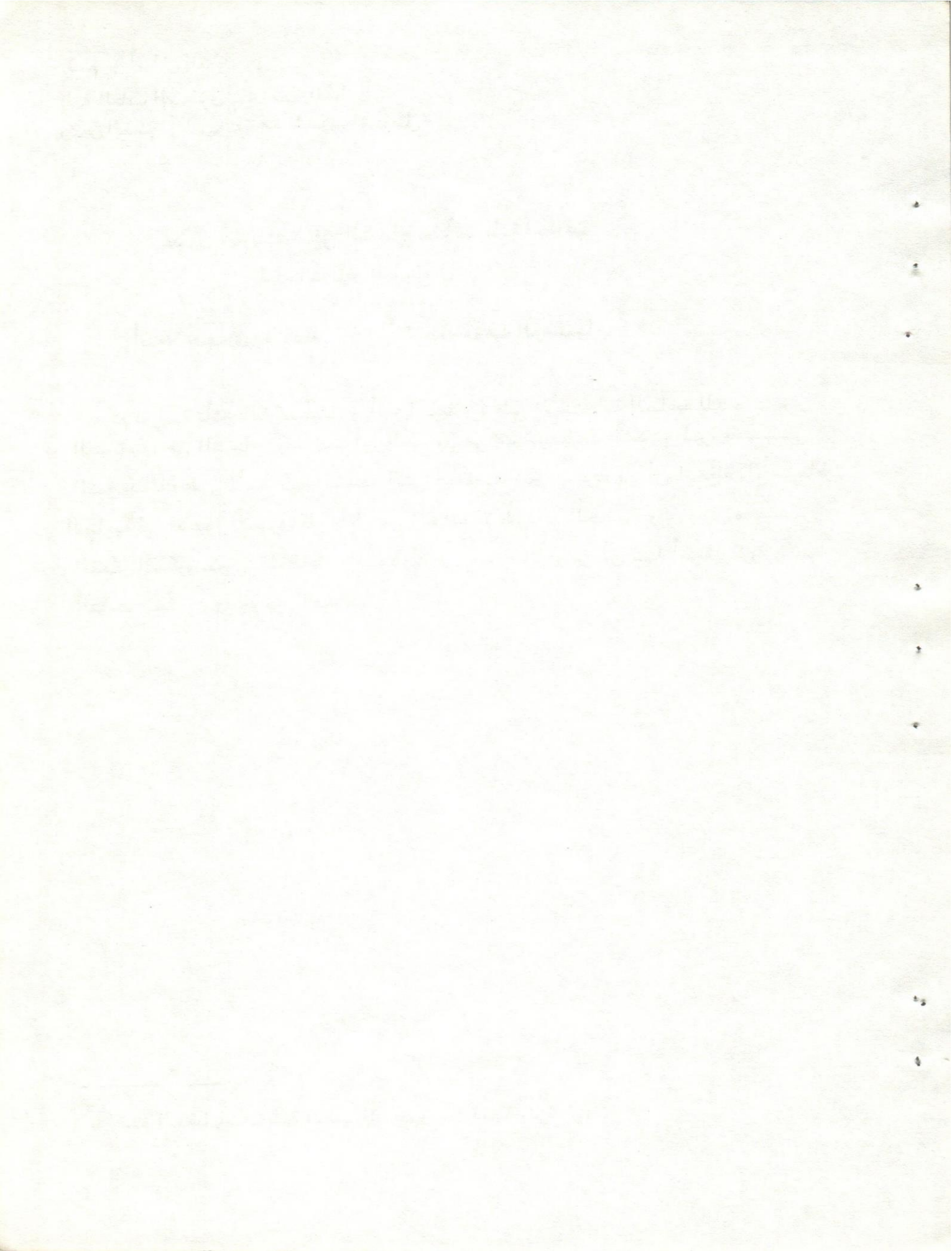


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عدوى أميريانتيليا فى الدجاج والأستجابة المناعية
للقاحات مرض النيوكاسل

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تم دراسة تأثير الكوكسيديا (أميريا تنيلا) على الأستجابة المناعية للقاحات مرض النيوكاسل فى الدجاج وقد ثبت أن العدوى فى عمر يوم واحد أشد خطورة على النمو وكذلك على الأستجابة المناعية التى أنخفضت كثيرا بالرغم من أن انخفاض الأستجابة المناعية فى الأعمار الأخرى كان أقل من الحالة الأولى فى الخطورة وقد وجد من الفحص الميكروسكوبى للقطاعات النسيجية من جدر الأعورين أن بها أنزقة ونكرزة ولكنها ألتئمت بعد ٢٤ يوم من العدوى .



**EIMERIA TENELLA INFECTION IN CHICKENS AND
IMMUNE RESPONSE TO NEWCASTLE DISEASE VACCINES**
(With 1 Table & 4 Figs.)

By
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SUMMARY

Suppression of immune response to Newcastle disease vaccines is the main result in this investigation with Eimeria tenella infection especially one day old. Some coccidial stages were also seen in the bursal duct connecting the bursa with the cloaca. Histopathological sections from bursa Fabrici appear free from coccidial stages. On the other hand sections from the cecal wall revealed haemorrhages and necrosis but end with healing and recovery in chicks infected one day old.

Relation between Newcastle disease haemagglutinating inhibiting (HI) antibody titres and cecal coccidiosis were also discussed.

INTRODUCTION

Eimeria tenella infection is a highly destructive disease affecting chicks.

MORSE (1908) stated that young chicks are far more, susceptible to coccidiosis than adults, very young fowl chicks up to 8 days old die in a few days after infection.

EDGAR (1955) mentioned that these minute parasites destroy the mucous membrane of the intestine of the host, there by setting up enteritis which is accompanied by diarrhoea and has a fatal effect upon young birds.

ANDERSON, et al. (1976) stated that chickens infected only with Eimeria tenella had developing parasites in the lining epithelium of bursa fabrici, whereas chickens infected with both infectious bursal disease virus and Eimeria tenella had gametocytes also in the epithelial cells surrounding numerous degenerating bursal cysts.

In a previous study MOHAMMED (1980) reported that subclinical infection with the coccidial parasite Eimeria tenella had a depressive effect on the immune response of chicks vaccinated with the lentogenic vaccine "F" of Newcastle disease. Also, MOHAMMED (1982) stated that Eimeria tenella infection leads to obvious decrease of GMT of ND HI - antibodies in chicken post-vaccination with Komarov ND vaccine.

The present study was done to throw light on the picture of immune response to ND vaccines (Hitchner BI and La Sota strains) post and during Eimeria tenella infection in baby chicks, in addition to clarify the severity of Eimeria tenella infection post vaccination.

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MATERIAL and METHODS

Ceca of the heavily infected chickens with cecal coccidiosis were the materials of the present study. A thin layer of cecal mucosal scraping of fresh dissected infected chickens and samples of cecal contents were placed in petri dishes containing 2.5% potassium bichromate solution at 2 mm depth. Then the petri dishes were incubated at 26°C to allow complete sporulation. The concentration floatation technique (using sugar solution 150 gm/100 ml water and centrifuge at 1500 rpm) was used and the sporulated oocysts were collected.

Fifty one day old broiler chicks were divided into five groups 10 chicks in each group.

- (1) In this group, birds were infected when one day old with 10,000 sporulated oocysts, where 6 days old were vaccinated with Hitchner B ND strain in drinking water. Blood samples were collected and sera were separated on the 15th day old. Sera were tested in the HI test and the results were recorded (Table 1).

Histological csections from cecal wall were made and stained with hematoxylin and eosin at 7, 14 and 24 days old post. Eimeria tenella infection, figure 1, 2, 3, 4.

- (2) Birds in this group were vaccinated with Hitchner B ND vaccinal strain per os on 6 days, on 10 days old were infected with 10,000 sporulated oocysts. Blood samples were collected and sera were separated and tested in HI test. The results were recorded (Table 1).
- (3) In this group birds were vaccinated on the 6th day and 17th day in drinking water with Hitchner B La Sota ND vaccinal strains respectively. Birds were infected with 10,000 sporulated oocysts/bird when 15 days old, blood samples were taken and sera were tested in the HI test, and the results were recorded (Table 1).
- (4) Birds in this group were infected nonvaccinated but infected with 10,000 sporulated oocysts/ bird when 15 days old, and the results were recorded (Table 1).
- (5) Birds in this group, vaccinated noninfected, vaccinated on 6th and 7th days with Hitchner BI and Lasota ND vaccinal strains. Blood samples were taken and sera were tested in the HI test, and the results were recorded (Table 1).

Standard haemagglutination test (HA test):

HA test was used to determine the virus dilution which contains 4 HA units, HEGAZY (1979).

Haemagglutination inhibition test (HI test):

HI test was used to determine HI antibody titers in sera collected from all groups of birds. Serum was diluted in serial two fold dilution, and constant ND virus containing 4 HA units was used, CUNNINGHAM (1966).

RESULTS

First group:

The oocysts of Eimeria tenella were observed in each sample of each infected individual at 6 to 7 days post-infection and the mortality rate was 70%. The birds showed inappetance, diarrhoea and were estunted in growth.

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Histopathology:

7 days post-infection revealed extensive infection of the mucosa of the caecum with developmental stages (trophozoites, schizonts, microgametocytes and macrogametocytes) and appearance of necrosis, at 14 days post-infection revealed degeneration of the developmental stages and their disappearance and the areas were occupied by extensive necrosis with large numbers of macrophages, at 24 days post-infection, healing of tissue become predominant with persistence of inactive form of developmental stages of *Eimeria tenella* trophozoites only. The average HI antibody titers of examined sera 8 days post-infection was 1/20 (GMT, 16) but in control sera was 1/160 (GMT, 107). (Table 1 and Figs. 1, 2, 3, 4).

Second group:

Vaccinated at 6 days and infected with *Eimeria tenella* on the 10th day, oocysts were observed in faecal examination 6 to 7 days post-infection and the symptoms were as in the first group but the mortality was 60%. The average HI antibody titers was 1/40 (GMT, 23) compared with 1/160 (GMT, 107) in the control group (Table 1).

Third group:

Vaccinated at 6 days with Hitchner B and on 17th day with LaSota, but infection with *Eimeria tenella* on the 15th day, also the oocysts appeared at 6 days post-infection however no symptoms appeared. Mortality was 40%. The average HI antibody titers was 1/40 (GMT, 23) but in the control group was 1/160 (GMT, 107), (Table 1).

Fourth group:

Infected with *Eimeria tenella* oocysts on the 15th day and non-vaccinated, the oocysts appeared in faecal samples on 6 days post-infection, the symptoms were mild and no mortality had occurred (Table 1).

Fifth group:

Birds were non-infected and vaccinated at 6 days with Hitchner B and on the 17th day with LaSota. The average HI antibody titers was 1/160 (GMT, 107), (Table 1).

DISCUSSION

Infected chickens revealed high mortality and morbidity as well as severe symptoms especially those infected when one day old. The symptoms were in the form of inappetance, ruffled feathers, diarrhoea and stunted growth ending with death. Our results agreed with that recorded by MORSE (1908) who stated that young chicks are far more susceptible to coccidiosis than adult. Also our result, agreed with the results of ANDERSON, *et al.* (1976) that the parasitized chickens suffered from mortality and severe morbidity. In the first group mortality was 70% with low HI antibody titers 1/20 (GMT, 16) in comparison with 1/160 (GMT, 107) in control group.

In the second group the symptoms were similar to those in the first group, mortality was also high reached 60% and HI antibody titers was 1/40 (GMT, 23) compared with the control chickens 1/160 (GMT, 107).

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In the third group no symptoms were observed as the infection was at 15 days of age, but mortality was 40% and the immune response was lower than the control group. HI antibody titers in infected birds was 1/40 (GMT, 23) and 1/160 (GMT, 107): in control group. These result agreed with those recorded by MOHAMMED (1980, 1982) who stated that when coccidial infection took place shortly before, with or shortly after the process of vaccination a significant reduction of the HI antibody titers was obtained.

Histopathological sections from the cecal wall showed complete destruction of the mucosa, with variable sized areas of hemorrhage and necrosis in the submucosa. These findings agreed the results of ANDERSON, *et al.* (1976).

On the other hand sections taken at 24 days of age in the first group infected at one day old revealed, healing of the cecal mucosal layer, and recovery takes place, (Figures, 1, 2, 3, 4) and this needs further studies to determine the causes of this observation.

Histopathological sections taken from bursa of Fabrici showed no developmental stages of *Eimeria tenella* in the bursal tissue, but trophozoites were seen in the duct connecting the bursa with the cloaca. On the other hand ANDERSON, *et al.* (1976) and RODRIGUEZ, *et al.* (1975) stated that examined sections of the bursae revealed macro and microgametes as well as oocysts located superficially and deep in the bursal epithelium.

Table (1)
The relation between *Eimeria tenella* infection and chicken
immune response against N.D. vaccines

Group No.	Age at time of infection	Age at time of vaccination		Oocyst recovery post-inf.	Symptoms	Average HI antibody Titers	GMT	Mortality %
		HB	La Sota					
1	One day	6 day	-	+	+	20	16	70%
2	10 days	6 day	-	+	+	40	23	60%
3	15 days	6 day	17 days	+	-	40	23	40%
4	15 days	-	-	+	-	-	-	-
5	-	6 day	17 day	-	-	160	107	-

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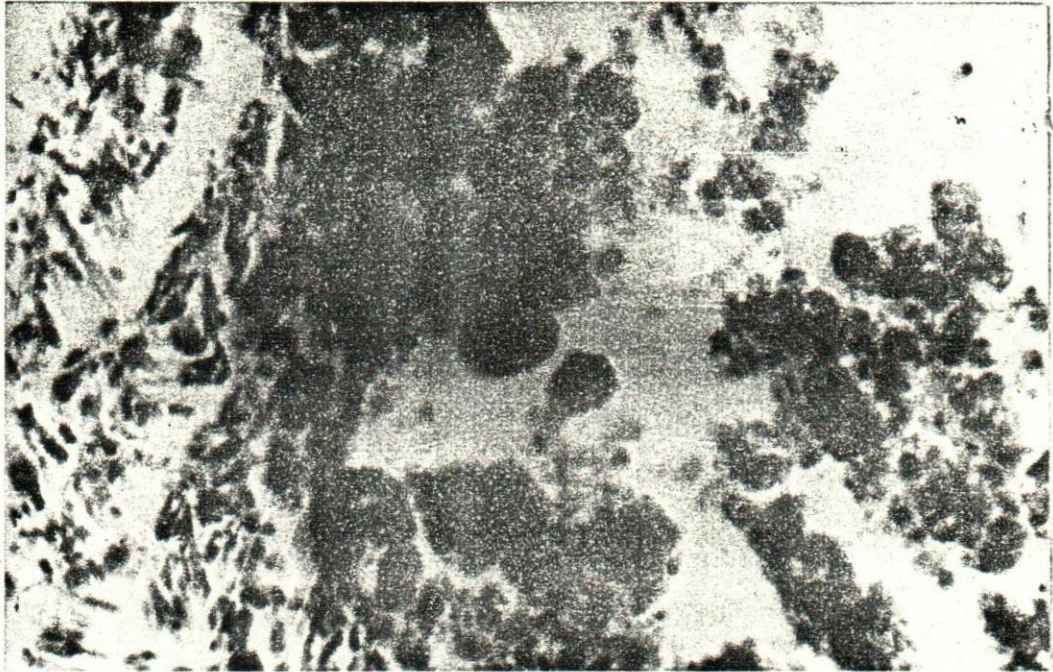


Fig. (1)

C.S. in caecum at 7 days old.

7 day post-infection showing development stages with extensive necrosis

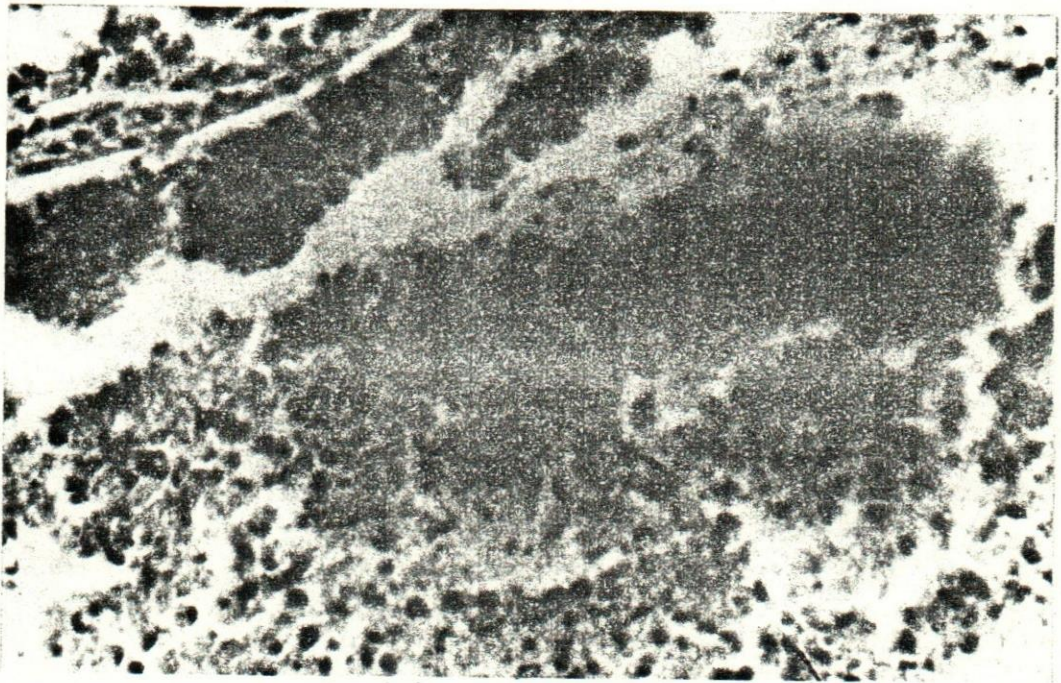


Fig. (2)

C.S. in caecum at 14 day

Extensive areas of necrosis with large number of macrophages with remnant of degenerated developmental stages

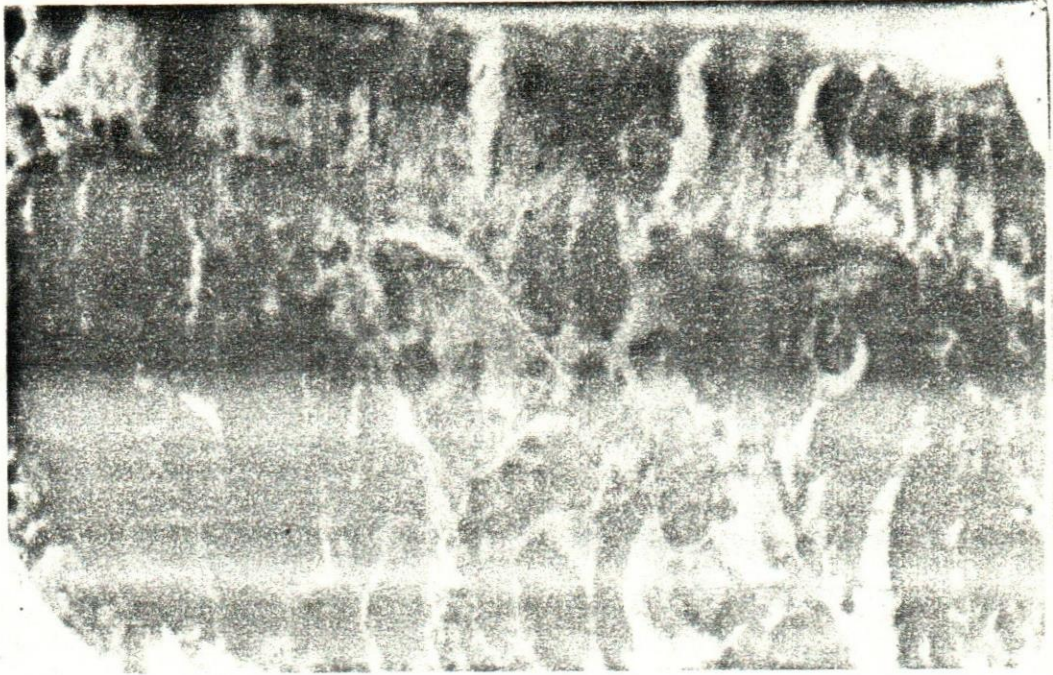


Fig. (3 & 4)

C.S. in caecum at 24 days

- show healthy tissue with one stage inactive form (trophozoite)
- Epithelization of epithelium occur
- area of necrosis
- developmental stages stoped

