قســـــم : طب الحيوان وامراض الدواجن - كلية الطب البيطرى - جامعة أسيوط.

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دراســات من درجة اصابة بيض قرادة (. البوفيلاس) المصاب بطفيل البابيزيا

طــه أحمد العلاوى

اثبتت هذه الدراسة وجود نسبة عالية من اصابة بعض القراد لطفيل البابيزيا عندما كانـــت درجة اصابة هيموليمف الحشرة عاليا بينما قلت نسبيا هذه الاصابة فى بيض القراد عندما كانـــت درجة اصابة هيموليمف الحشرة قليلا نسبيا .

كما اتضح ان القراد المصاب اصابة عالية ينتج كمية من البيض أقل من القراد ذات الأقـــل

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A STUDY ON THE INFECTION RATE OF BOOPHILUS ANNULATUS TICK EGGS INFECTED WITH BABESIA BIGEMINA

(With 4 Tables and 6 Figures)

By

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SUMMARY

A study of the infection rate of Boophilus annulatus eggs infected with Babesia bigemina resulted in a higher percentage of infected eggs in crushed egg smears when haemolymph was highly infected than in lighter infections. The number of eggs laid by heavily infected ticks was less than withslightly infected ones.

INTRODUCTION

DENNIS (1932) observed the different stages of Babesia bigemina in the intestine and ova of engorged female Boophilus annulatus and LI (1958) reported a quantitative infection rate of the ovaries of Rhipicephalus bursa of sheep infected with Babesia ovis. RIEK (1964) reported haemolymph infection 72 hours after infestation of Boophilus annulatus by the alimentary route.

MUANGYAI (1974) studied the infection rate of Boophilus microplus eggs infected with Babesia bigemina and reported that the egg infection rate of heavily haemolymph infected ticks was higher than that of slightly infected ones. EL-ALLAWY, FRIEDHOFF, and BUSCHER (1975) mentioned that the grade of infection of Rhipicephalus bursa eggs infected with Babesia ovis was higher than in both alimentary and alimentary transovarialy infected ticks.

In an earlier part of the present investigation on the diagnosis of Babesia bigemina in Boophilus annulatus ticks, it was observed that the 6th day of tick egg incubation is the optimal time for tick egg examination for Babesia bigemina infection (EL-ALLAWY, 1977).

The aim of the present study was to determine the infection rate in Boophilus annulatus eggs infected with Babesia bigemina since this point has not been fully studied in Egypt, and also to study the development and multiplication of merozoites in the tick vectors, since they are important for diagnosis and control of bovine piroplasmosis.

MATERIAL and METHODS

Materials

Adult engorged female Boophilus annulatus were collected from a cow naturally infected with Babesia bigmina. in Assiut province. Four female ticks were selected for the experiment according to the following results of haemolymph examination:

2 ticks with (1+) haemolymph and 2 with (3+[§]) haemolymph infections

Methods

Ticks were placed in a plastic tube stoppered with gouze and incubated at 28 C° (relative humidity about 90%) to encourage egglaying.

Every 24 hours ticks were transferred to another tube until egg-laying ceased in order to determine the number of eggs laid every day each tick seprately.

(1+) 1-5 merozoites of Babesia bigemina in haemolymph.
(2+[§]) 6-49 merozoites in haemolymph.
(3+[§]) 50 or more merozoites in haemolymph. (EL-ALLAWY, 1977).

The eggs laid each day were kept for 6 days in the incubator and then crushed egg smears were prepared using glass slides divided into 50 squares (5 transevers in 10 longitudinal lines). The smears were air-dried, fixed in methanol and stained with Giemsa stain (1:5) for 30 mintues and examined under low and high magnifications.

The total number fo eggs were counted, the number of positive and negative and the percentage of positive eggs were recorded.

RESULTS

Resutls are summarized in tables 1-4 and Figures 1-4.

DISCUSSION

Tables (1-4) show the number of eggs laid the numbers of positive and negative and the percentage of positive eggs. Ticks No. 1 and 2 with haemolymph 1+, produced 1633 and 941 eggs with infection rates of 26.76% and 34.33%, respectively (Tables 1 and 2). Ticks No. 3 and 4 with haemolymph 3+ produced 666 and 723 eggs with rates of infection of 38.44% and 57.68%, respectively.

These results show that slightly infected ticks produced more eggs than heavily infected ones. On the other hand the infection rate in the heavily infected ticks (38.44% and 57.68%) was higher than in the slightly infected ones (26.76% and 34.33%).

In a similar experiment by MUANGYAI (1974) on Boophilus microplus slightly infected ticks produced nearly twice as many of eggs as heavily infected ones, while EL-ALLAWY et al. (1976) reported that slightly infected Rhipicephalus bursa from sheep infected with Babesia ovis produced 4433 eggs during 17 days with percentage of infection 58.24, while heavily infected ones produced 2803 with percentage of infection 48.78. Our results and those of others show that lightly infected ticks 1+ produced about twice as many eggs as heavily infected ones. While the percentage infected is lower than in heavily infected ones. The explanation may be damage to the ovary in heavy infections with Babesia (merozoites), which results in decreased egg production and a high rate of infection.

Another interesting result observed here, is that the infection rate in the first 2 or 3 days of oviposition for tick No. 1 and 2 with haemolymph 1+ was zero, then increased gradually to reach peak in the middle period of oviposition, then decreased gradually. On the other hand, in case of heavily infected ticks No. 3 and 4, the infection rate increased gradually and reached its peak (90-100%) in the last days of egg-laying. The increase in the infection rate in heavily infected ticks may be due to decreased egg production and also due to highly infected haemolymph 3+. So, for the epidemiological studies of piroplasmosis it is recommended to examine the ticks using both haemolymph and egg smears after suitable time of egg incubation according to strain of ticks. However, the present study pays the attention to the great role of Boophilus annulatus ticks which is prevalent in Assiut in transmition of piroplasmosis and also the great number of infected eggs produced.

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Table (1): Boophilus annulatus tick No. 1 haemolymph (1+)
Oviposition 4 days post repletion.

Days of oviposition	No. of laid eggs	+ve eggs	-ve eggs	% of +ve eggs
1	7	0	7	0
2	116	0	116	0
3	123	4	119	3.25
4	151	83	68	54.96
5	202	81	121	40.1
6	194	71	120	38.14
7	173	53	120	30.64
8	176	44	132	25.0
9	156	36	120	23.08
10	188	33	155	17.55
11	112	23	89	20.54
12	31	6	25	19.35
13	4	0	4	0

Table (2): Boophilus annulatus tick No. 2 haemolymph (1+)
Oviposition 3 days post repletion.

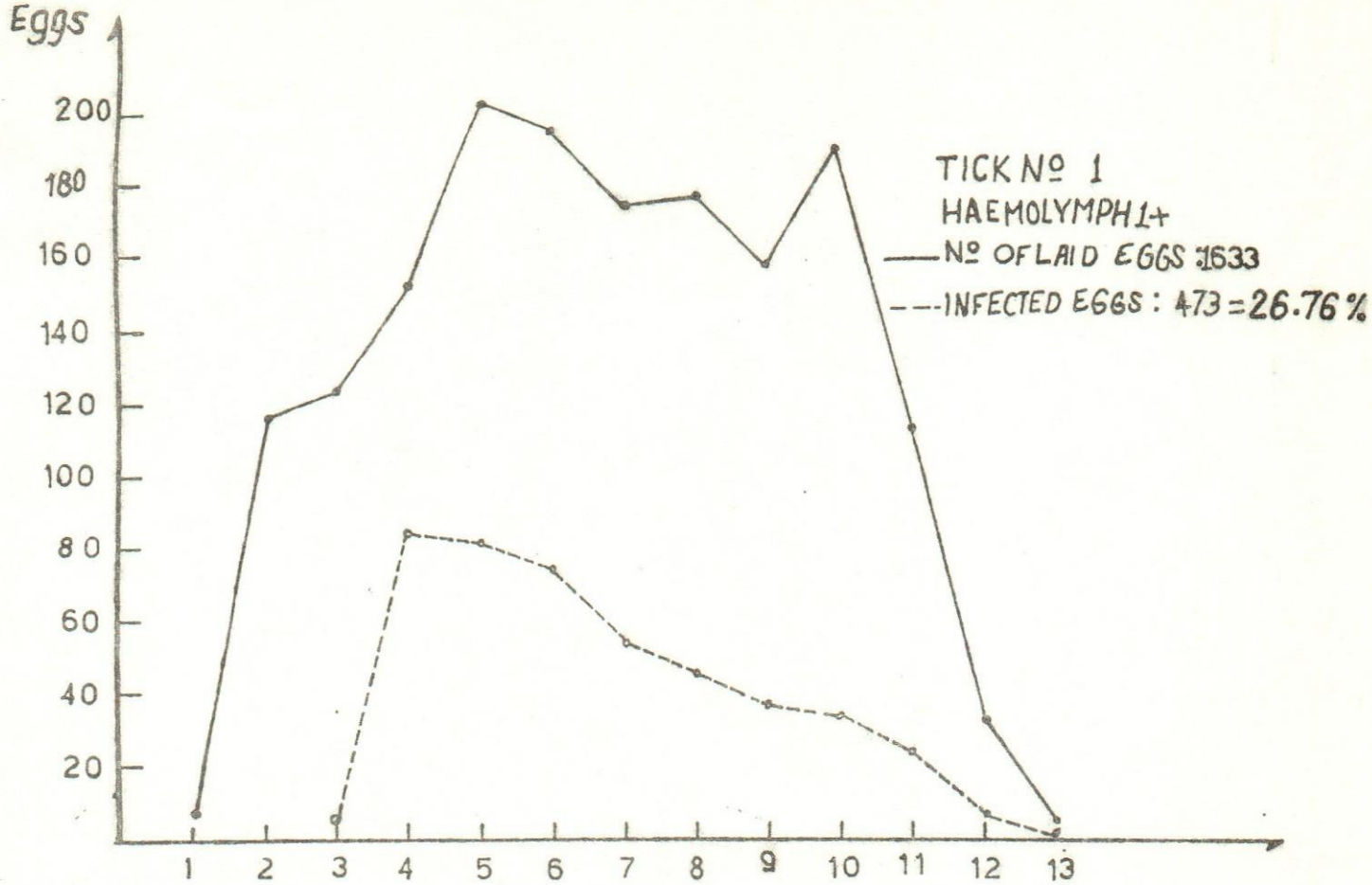
Days of oviposition	No. of laid eggs	+ve eggs	-ve eggs	% of +ve eggs
1	4	0	0	0
2	88	0	88	0
3	118	14	104	11.86
4	92	23	69	25.0
5	128	89	39	34.48
6	116	40	76	69.53
7	162	79	83	48.77
8	145	53	92	36.55
9	81	24	57	29.63
10	7	1	6	14.29

Table (3): Boophilus annulatus tick No. 3 haemolymph (3+)
Oviposition 4 days post repletion.

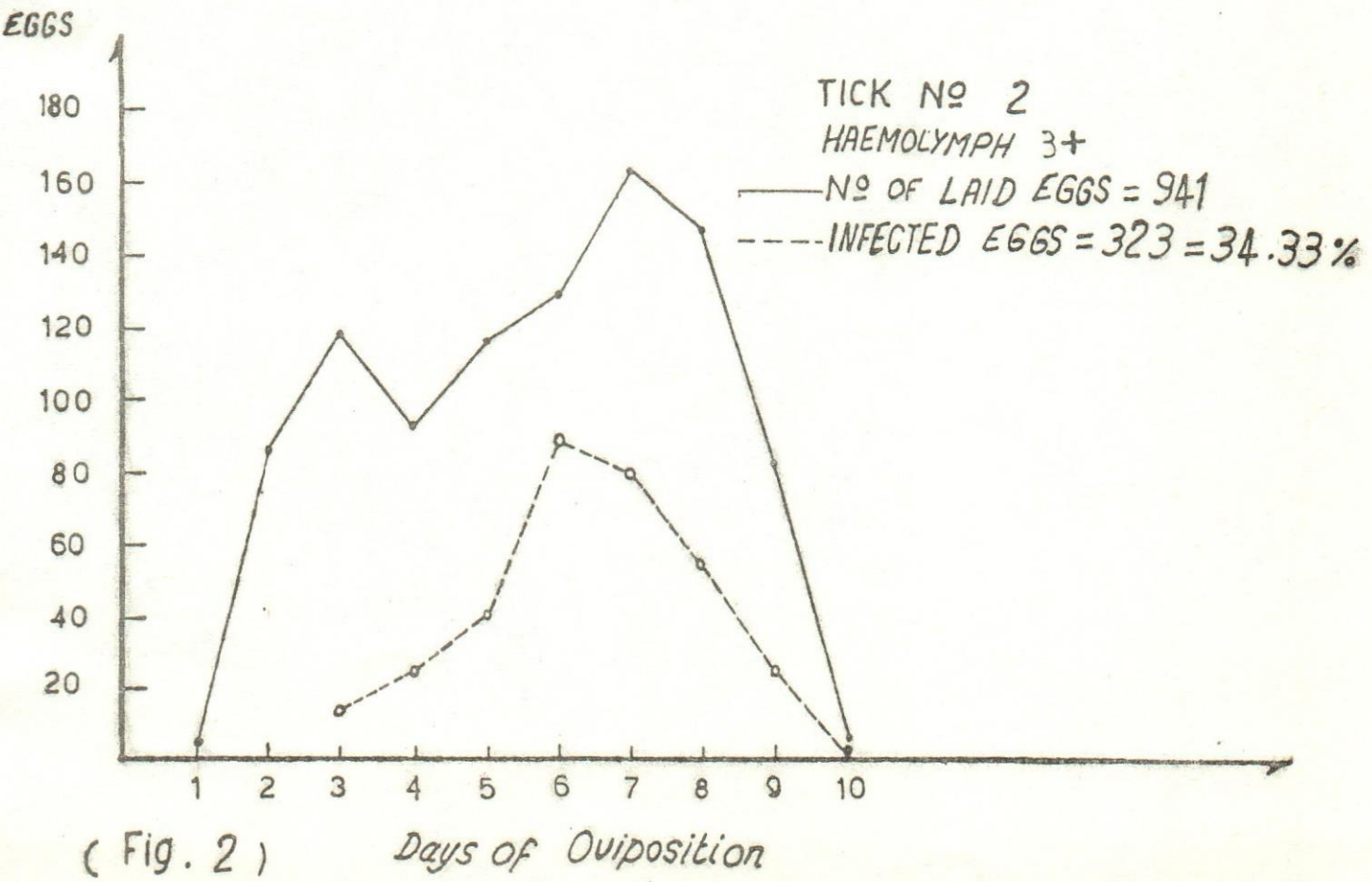
Days of oviposition	No. of laid eggs	+ve eggs	-ve eggs	% of +ve eggs
1	50	0	50	0
2	113	0	113	0
3	123	0	123	0
4	102	25	77	24.51
5	100	79	21	79.0
6	56	44	21	76.57
7	24	22	2	91.67
8	58	48	10	82.76
9	34	32	2	94.12
10	6	6	0	100.0

Table (4): Boophilus annulatus tick No. 4 haemolymph (3+)
Obiposition 5 days post repletion.

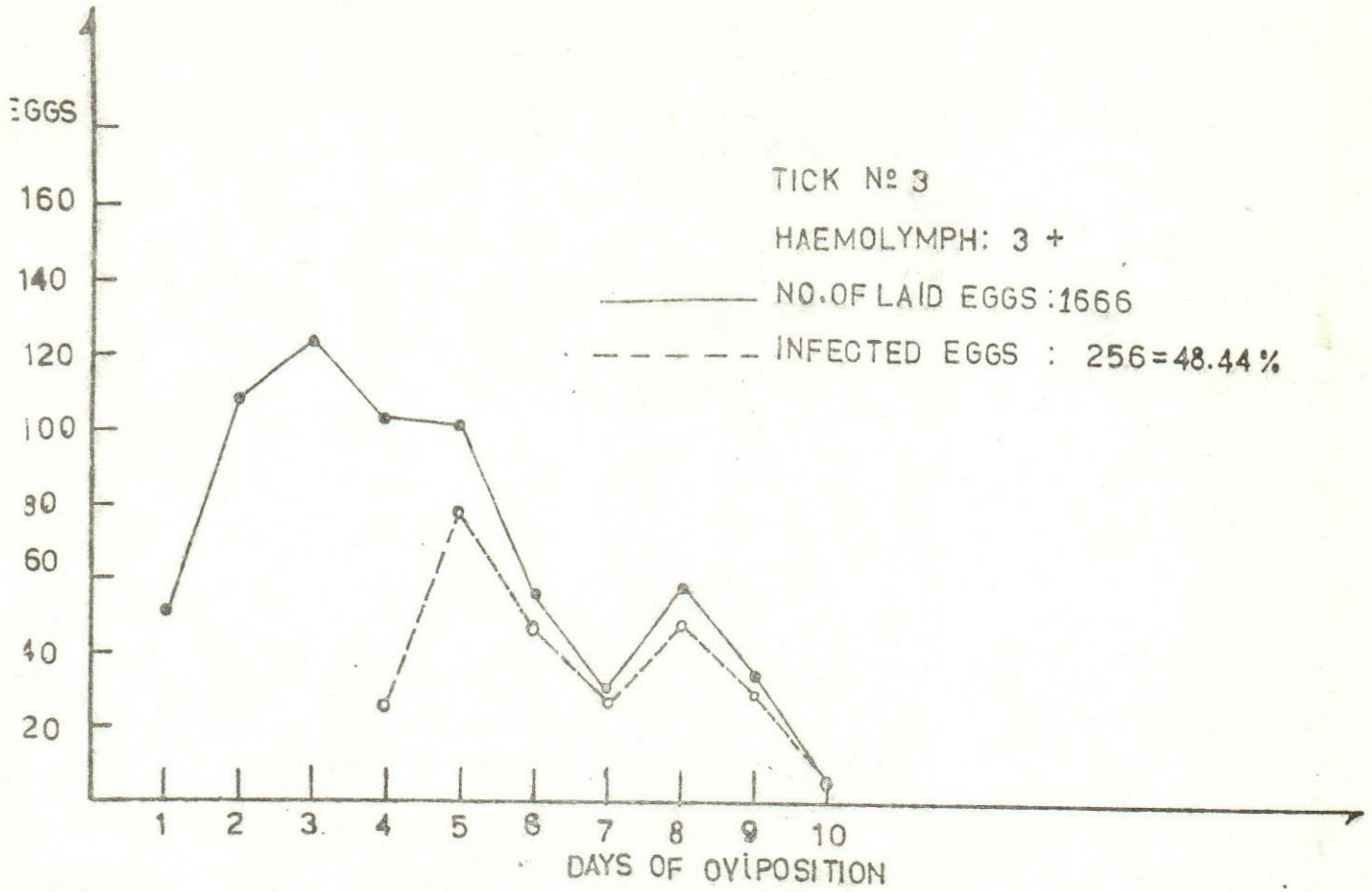
Days of oviposition	No. of laid eggs	+ve eggs	-ve eggs	% of +ve eggs
1	41	0	41	0
2	128	26	102	20.31
3	101	38	63	37.62
4	131	101	30	77.1
5	81	36	45	44.44
6	104	98	6	94.23
7	19	11	8	57.89
8	30	28	2	93.33
9	46	41	5	89.13
10	27	25	2	92.59
11	15	13	2	86.67


Eggs
200
180
160
140
120
100
80
60
40
20
1
2
3
4
5
6
7
8
9
10
11
12
13
TICK Nº 1
HAEMOLYMPH 1+
—— Nº OF LAID EGGS : 1633
--- INFECTED EGGS : 473 = 26.76 %
Days of Oviposition

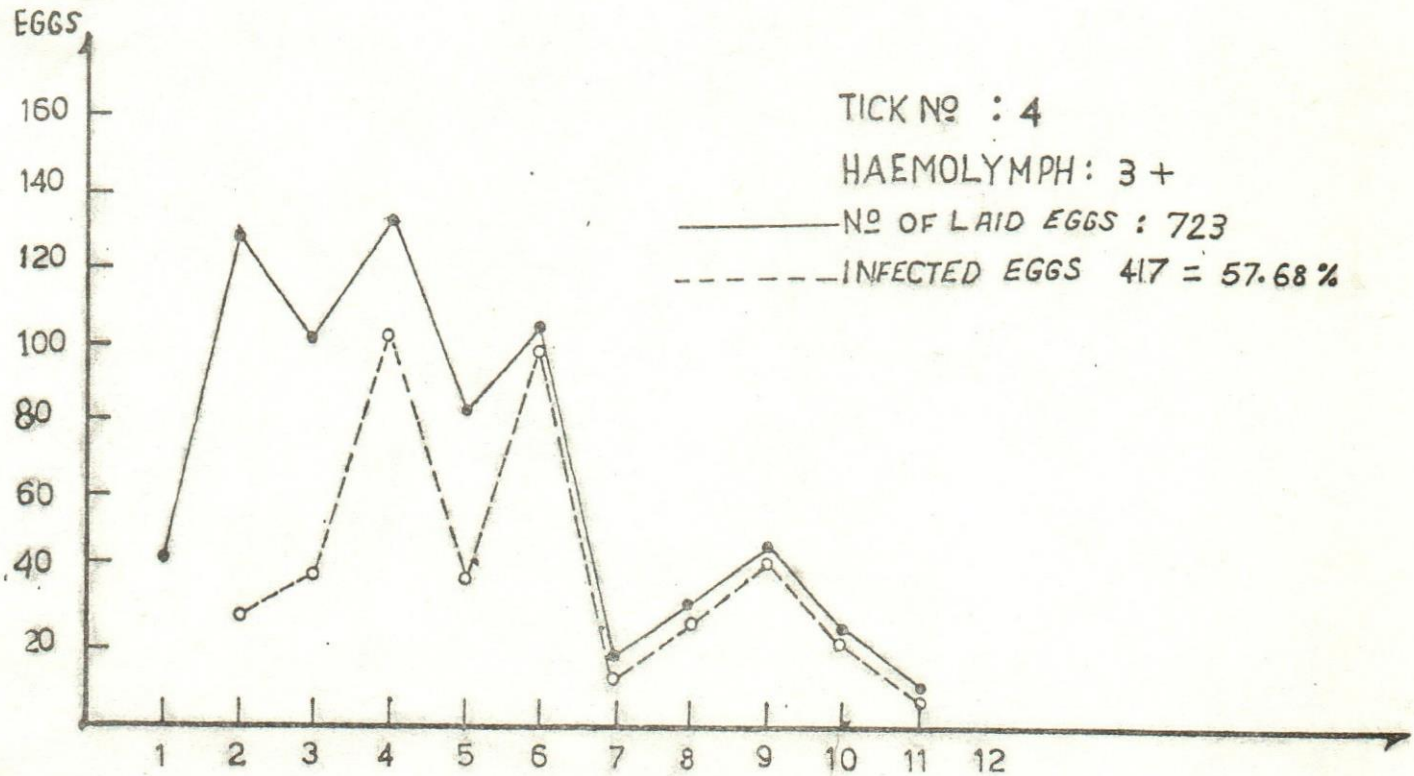
(Fig. 1)


EGGS
180
160
140
120
100
80
60
40
20
1
2
3
4
5
6
7
8
9
10
TICK Nº 2
HAEMOLYMPH 3+
—— Nº OF LAID EGGS = 941
---- INFECTED EGGS = 323 = 34.33 %
Days of Oviposition

(Fig. 2)



(Fig. 3)



(Fig. 4) *Days of Oviposition*

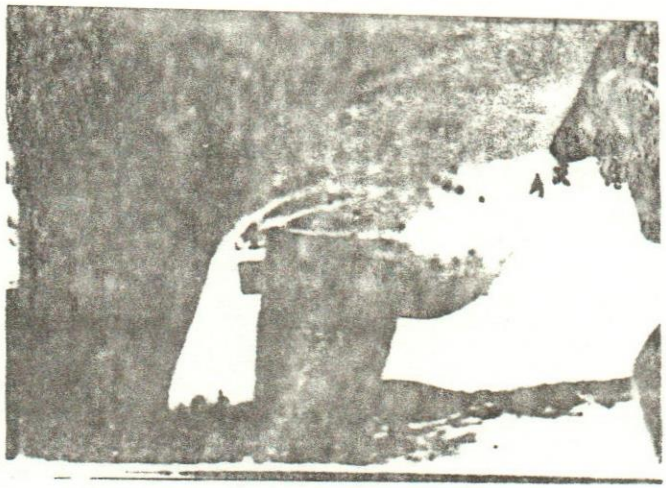
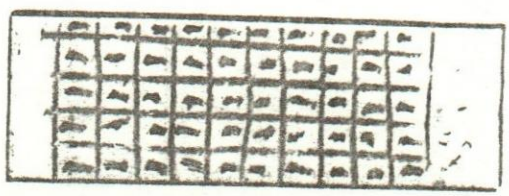


Fig. (5): A cow infested with boophilus annulatus ticks.



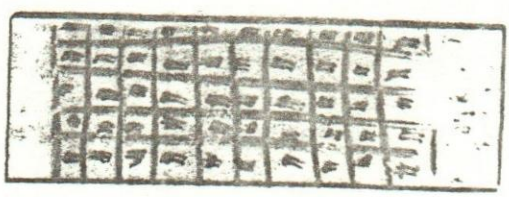


Fig. (6): Two glass slides each contains 50 crushed egg smears.