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IN VITRO BIOLOGY OF GOAT BITING LOUSE, *BOVICOLA CAPRAE* GURLT (PHTHIRAPTERA : ISCHNOCERA)

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ABSTRACT : The incubation period of eggs of goat biting louse *Bovicola caprae* Gurlt has been found to be 6.9 ±0.78 days. The duration of first, second and third nymphal instars has been recorded as 8.6± 0.63, 7.7 ± 0.69 and 7.83 ± 0.74 day respectively, at 35 ± 1°C, 75% RH and goatskin diet.

Key words **:** *In vitro* biology, goat biting louse, Phthiraptera, Mallophaga, *Bovicola caprae.*

In vitro rearing has provided most of information available on the biology of Mallophaga (Sens. Lat. Phthiraptera). Certain workers like Martin (1934); Wilson (1934, 39); Arora and Chopra (1959); Agarwal (1959); Stockdale and Raun (1965); Nelson and Murray (1971); Saxena and Agarwal (1983) and Saxena *et al.* (1991) have performed studies on *In vitro* biology of avian louse. On the other hand Matthysse (1946); Scott (1952), Murray (1957), Hopkins and Chamberlain (1969 and 72), Hopkins (1970); Rodriguez *et al.* (1985a b, 1986, 87) and Cruz *et al.* (1987) have performed experimentation on different *Bovicola* sp., occurring on mammals. The present study furnishes information on the incubation period and duration of different nymphal instars of a goat biting louse, *Bovicola caprae* on the basis of *in vitro* experimentation.

The lice or their nits were reared in glass vials placed in desiccators containing saturated solution of salt (for maintaining R.H.). The food was prepared from freshly purchased goatskin scrappings (Hopkins and Chamberlain, 1969; Rodriguez *et al.*, 1986 and Cruz *et al.*, 1987).

Three sets of eggs (consisting of 10,26, 50 eggs respectively) were incubated in order to obtain the data relating to incubation period and the duration of nymphal instars of *B. caprae*. All such eggs were fresh and were taken alongwith hairs. Three eggs of colony 'A' hatched on 6th day, 4 on 7th day and 2 on 8th day. Likewise in colony 'B' 8 eggs hatched on 6th day, 7 on 7th day and 6 on 8th day. Similar results were obtained in set 'C' consisting of 50 eggs. Thus out of 86 eggs, 72 (83.7%) hatched at 35 ± 1°C and 75% R.H. The average incubation period of these eggs was found to be 6.9 ± 0.78 days (range 6-8). The nymphs obtained on three different days were separated in each set and reared till maturity.

An examination of table – 1 indicates that 73.61% of the 72 eggs could reach the second instar stage. Two nymphs took 7 days, 20 nymphs required 8 days, 29 nymphs took 9 days and 2 nymphs consumed 10 days to reach the second instar stage. Thus, the average time required for first instar nymph was found to be 8.60 ± 0.63 days (range 7-10). Six nymphs were obtained from colony 'A' and 17 from 'B' and 30 from colony 'C'.

As many as 33 third instar nymphs were obtained from 53 second instar indicating 62.3% viability. Of these, 12 nymphs took 7 days time, 17 required 8 days and 4 consumed 9 days to reach the third instar stage (at 35 ± 1°C and 75% R.H.). The overall duration of second instar was thus found to be 7.70 ± 0.69 days (range 7-9) in the present studies (Table – 1). As many as 37.73% second instars could not reach third instar stage in the present conditions.

Only one adult (F) was obtained from colony 'A' which took 33 days time (from egg to adulthood). 3 adults were obtained from colony "B' (of these 2 adults were obtained after 29 days and one after 32 days). Likewise, six lice reached adult hood in colony "C' (One after 29th day, one after 30th day, one after 31st day and three after 32 days). Thus, a total of 10 adults were obtained from 33 third instars (indicating 30.3% success) in the process at 35 ± 1°C and 75% R.H. It appears that 3 adults took 7 days, 5 tooks 8 days while 2 required 9 days to complete the development. Thus, the average duration of third nymphal instar seems to be 7.83 ± 0.74 days (range 7-9) at 35 ± 1°C and 75% R.H. As many as 69.7% third instar nymphs failed to reach the adulthood.

Thus, out of 86 eggs used in the present experiment only 10 could reach the adult stage in the given condition. The average time required from egg to adult-hood has been found to be 30.9 days (range 29-33). Out of 10 adults, 7 were females while 3 males. Thus, male, female ratio in F_1 generation has been found to be 1:2.3 in the given condition.

It has been noted that the mortality increased at every stage during the present studies. For instance, only 16.27% eggs failed to hatch but the mortality became 26.38% at first instar stage. The mortality rate again showed slight increase (37.73%) at second instar stage but nearly doubled at third instar stage (69.7%) (Table – 2).

The biology of *B. caprae* does not exhibit any remarkable feature. The incubation period and the duration of first, second and third nymphal instars of *B. caprae* resembles to that of cattle biting louse, *B. ovis* (8.0, 7.0, 5.5 and 6.0 days, Matthysse, 1946), sheep biting louse, *B. ovis* (9.1, 7.1, 5.9 and 7.2 days, Hopkins and Chamberlain, 1972), *B. crassipes* (10.1, 7.6, 6.7 and 8.2 days, Hopkins and Chamberlain,1969 while 8.1, 7.5, 7.5 and 7.7 days noted by Rodriguez *et al.*;1986). Rodriguez *et al.* (1987) and Cruz *et al.* (1987) have provided information about the influence of different factors on the biology of *B. limbata*.

Table–1. Showing duration of egg stage, first, second, and third nymphal instars in 3 colonies maintained at 35 ± 1°C, 75% R.H. and goatskin diet.

Stage	Colony – A No. of eggs	Colony – A Incubation period (days)	Colony – B No. of eggs	Colony – B Incubation period (days)	Colony – C No. of eggs	Colony – C Incubation period (days)	Overall results
	3	6	8	6	13	6	
Egg	4	7	7	7	17	7	
	2	8	6	8	12	8	
Mean	–	6.88	–	6.90	–	6.97	6.90
S.D.	–	0.86	–	0.83	–	0.78	0.78
Range	–	6–8	–	6–8	–	6–8	6–8
	2	7	3	8	6	8	
	1	9	4	9	4	9	
First instar	2	10	6	9	12	9	
	1	9	3	8	8	8	
	–	–	1	9	–	–	
Mean	–	8.6	–	8.64	–	8.53	8.60
S.D.	–	1.06	–	0.51	–	0.50	0.63
Range	–	7–10	–	8–9	–	8–9	7–10

Table 1. Contd.

Stage	Colony – A No. of eggs	Incubation period (days)	Colony – B No. of eggs	Incubation period (days)	Colony – C No. of eggs	Incubation period (days)	Overall results
	1	7	2	7	3	8	
Second instar	1	8	2	8	3	9	
	2	8	2	7	7	7	
	1	8	2	8	5	8	
	–	–	1	8	–	–	
	–	–	1	9	–	–	
Mean	–	7.80	–	7.7	–	7.7	7.70
S.D.	–	0.55	–	0.74	–	0.76	0.69
Range	–	7–8	–	7–9	–	7–9	7–9
	1	8	2	7	1	7	
Third instar	–	–	1	8	2	8	
	–	–	–	–	2	9	
	–	–	–	–	1	8	
Mean	–	8.00	–	7.33	–	8.16	7.83
S.D.	–	–	–	0.61	–	0.77	0.74
Range	–	–	–	7–8	–	7–9	7–9

Table—2. Showing mortality record in three colonies at different stage of development

Stage	Colony—A	Colony—B	Colony—C	Overall mortality
Egg	10.0	19.23	16.0	16.27
First instar	33.3	19.04	28.57	26.38
Second instar	16.6	41.17	40.0	37.73
Third instar	80.0	70.0	66.6	69.69

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