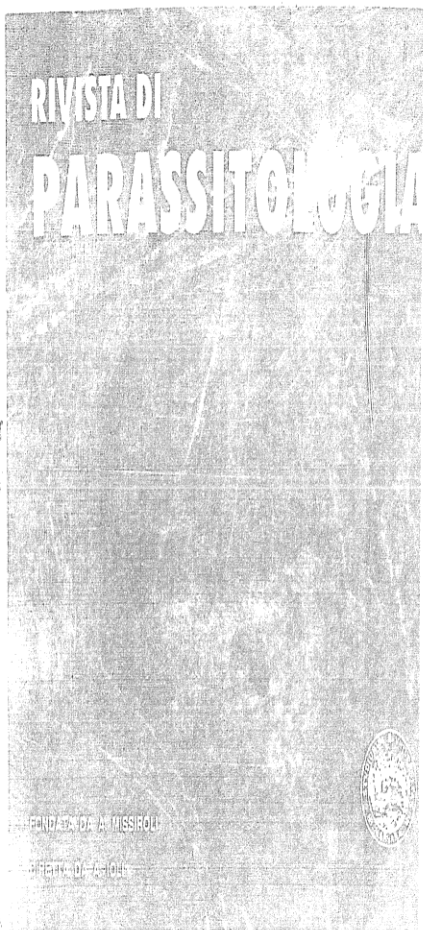


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A NOTE ON THE NATURAL POPULATION LEVELS OF SHORT-NOSED
CATTLE LOUSE, *LINOGNATHUS VITULI* (LINNE, 1758)

B.S. RAWAT A.K. SAXENA

The natural population levels of short-nosed cattle louse, *Linognathus vituli*, on three cattles belonging to Dehradun (India) were assessed by hair parting method, during different months of the year 1989. Infestation indices were found significantly higher during winter days. The distribution of lice on host body and the reasons relating to population variation are also discussed.

INTRODUCTION

There seems to be no clear cut agreement among the workers regarding the degree of economic harmfulness of different kinds of cattle lice but it is generally believed that they cause physical discomfort by continuous irritation and may be responsible for retarded growth rates, lowered vitality and reduced productivity of infested hosts. Workers like Lamson (1818) Craufurd - Benson (1941), Babcock and Cushing (1942), Matthyse (1946) and Lancaster (1957) have provided valuable information regarding the bio-ecology of cattle lice. Scharff (1962), Piotrowski (1967), Manuel (1984) and Gibney *et al.* (1985) have given further information regarding certain ecological aspects of short-nosed cattle louse, *Linognathus vituli* (Linne, 1758). Lewis *et al.* (1967) made several studies relating to changes in populations of *L. vituli* and cattle biting louse, *Bovicola bovis* and also demonstrated the influence of hosts grooming behaviour on their population. However, any report relating to population levels of *L. vituli* on the cattles belonging to any Indian locality is still wanting. The present paper furnishes information regarding the natural population levels of this louse on three cattles belonging to Dehradun (India), during different months of the year 1989. Further, an attempt has been made to record the population levels of this louse by releasing known numbers of lice upon an uninfested calf.

MATERIALS AND METHOD

One heifer, one steer and a cow belonging to Dehradun (India) were subjected to fortnightly examination during different months of the year 1989. Louse population was estimated by counting the lice/cm² (hair parting method) at 30 anatomical sites normally inhabited by *L. vituli*. The total number of lice recorded at all the sites was divided by 30 to get the infestation index (Lice index). Since it is often difficult to differentiate between nymphal instars and adults in vivo studies, both have been included in the count. The data based on such counts also allowed the study relating to spread of lice on host body during different months of the year. Furthermore, in another 24 week study, 100 fresh adult lice were released on an uninfested calf and the infestation index was recorded (by the above said method) to obtain the data relating to trend of population increase.

RESULTS

On the steer, the infestation index (based on 30 sites) was found to be 1.86 in the month of January, 90. It decreased slightly in February (1.7) and then exhibited sharp decline in March and April (0.9 and 0.36 respectively). A trend of very slight but regular decrease in population levels was observed in succeeding months till it reached its lowest level in August (0.33, 0.3, 0.26 and 0.23 respectively). Thereafter infestation index started rising and the trend continued till December, 89 (0.4, 0.66, 0.86 and 1.06 respectively) (Fig. 1).

On the heifer too, maximum infestation index was recorded in January (1.46). It remained nearly at similar level in February (1.43) but decreased in March (1.03). A sharp decline was observed in April (0.47) which was followed by slight decrease in May (0.27). Thereafter, the infestation index remained more or less same from June to August (0.23, 0.2 and 0.26 respectively) but started rising afterwards and this trend continued till December (0.37, 0.5, 0.7 and 0.87 respectively) (Fig. 1).

More or less similar trend of population fluctuation was observed on the body of the cow. The infestation index remained nearly similar in January and February (1.07 and 1.03 respectively) but declined sharply in March (0.73). Thereafter, it showed only marginal decrease in next three months (0.7, 0.6 and 0.57) and remained at same level in July (0.57). Afterwards it exhibited a regular trend of slight increase in population level in succeeding five months (0.63, 0.7, 0.73, 0.8 and 0.87 respectively) (Fig. 1).

An attempt was made to analyse the degree of correlation between mean monthly infestation index, mean monthly temperature as well as R.H. The negative values of $r_{T,H}$ (partial correlation coefficient between infestation index and temperature by keeping the relative humidity effect silent) were quite significant while those of $r_{H,T}$ (partial correlation coefficient between infestation index and R.H., by keeping the temperature effect silent) were found to be insignificant.

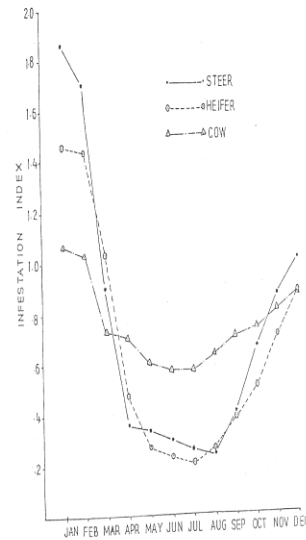


Fig. 1 - Monthly variations in the population of *Lingonathus vituli* on a steer, a heifer and a cow, during the year 1989.

About 50 fresh looking adult male and 50 females of *L. vituli* (Plate-1, 1-5) were released on different body parts (mainly sides of neck, brisket, dewlap, rump, topline and belly) of a noninfested calf (aged 5 months). The lice counts were made fortnightly at 30 sites (as indicated earlier). After 4 week infestation index was found to be 0.14/cm² which rose regularly till another 10 week. (I.I. 0.18, 0.25, 0.35, 0.5 and 0.7 respectively after 6th, 8th, 10th, 12th and 14th weeks). After 16th week, the I.I. rose to 1.1 but after that it suddenly declined to 0.3 at the end of 18th week and then remained more or less constant during next 6 weeks (0.26, 0.3 and 0.26 at the end of 20th, 22nd and 24th weeks). The experiment was terminated after 24th week.

It was further noted that the lice remained more or less uniformly distributed over different parts during winter days (incidentally the days of high infestation). However, they were comparatively more concentrated on brisket, perineum, top and sides of neck, topline, rump etc. However, during summer days these were more in numbers on the dewlap, sides of neck, perineum and belly. Any clear cut pattern of change in the distribution pattern on host body was not obvious.

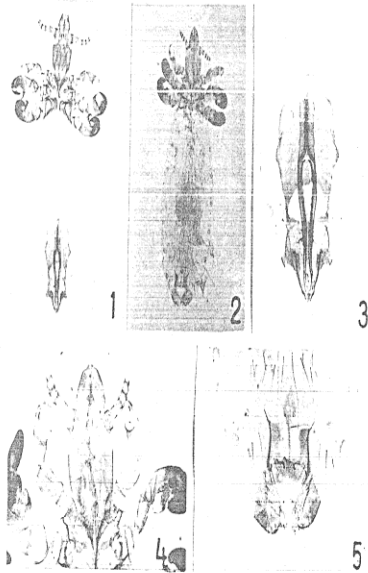


PLATE-1

1. Adult male, *L. vituli*, W.M. x 30 - 2. Adult female, *L. vituli*, W.M. x 30 - 3. Posterior abdominal segments of adult male *L. vituli* showing enlarged view of genitalia x 65. 4. Enlarged view of head of an adult *L. vituli* x 75 - 5. Posterior most segments of female *L. vituli* showing enlarged view of female genital aperture x 90.

DISCUSSION

The changes in the population of short-nosed cattle louse *L. vituli* were more evident on young cattles (steer and heifer) than the cow. The infestation index showed sharp decline in the month of March and April. It was further observed that the young cattles exhibited shedding of hair coat during these months. Thus, two factors (increasing temperature and shedding of hair coat) possibly acted upon louse population which could not rise till August (when temperature started decreasing, and also the sunlight).

Strong negative correlation between infestation levels and environmental temperature also supports the idea. However, similar correlation between R.H. and infestation index was found insignificant under natural conditions. Since the temperature also indicates the state of sunlight during different months (in broad sense) and the latter possibly alters the microclimate of host hair coat, causing changes in louse population. However, such conclusion cannot be verified until the experiments are performed under extremely controlled conditions (relating to environmental factors).

The basic aim of present studies was to record the infestation levels under natural conditions. A number of factors reportedly affect the cattle lice population. These include host crowding, host skin secretions, hair condition, thickness of the hair coat, hair length and shedding, breed resistance, host nutrition, environmental humidity, rainfall, photoperiod sunlight and hosts grooming behaviour (Craufurd-Benson, 1941; Babcock and Cushing, 1942; Mathysse, 1946; Lancaster, 1957; Jensen and Roberts 1966; Lewis *et al.* 1967; Hoffman *et al.* 1969; Ely and Harvey 1969 and Gopmerac *et al.* 1959). Craufurd-Benson (1941) considers photoperiod and the thickness of host hair coat as significant factors causing variations in population of cattle lice in U.K. Mathysse (1946) considers the temperature conditions of the microclimate of hosts hair coat as the main factor. He demonstrated that the higher skin temperature induced by scorching sunlight during warmer months make the life difficult for *B. bovis* and thus resulting in elimination of its population during summers in U.S.A. Another factor hosts grooming behaviour is also regarded as an important factor in determining louse population build up. Lewis *et al.* (1967) have clearly demonstrated the impact of selfgrooming on louse population. He has shown that the infested hosts when allowed to selfgroom quickly reduced or entirely eliminated the population of lice.

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REFERENCES

- BABCOCK O.G., CUSHING E.C. (1942) - Cattle lice In: yearbook of Agriculture, U.S.D.A.: 631-635.
- CRAUFORD-BENSON H.J. (1941) - The cattle lice of Great Britain, Parts II. *Parasitol.* 33 (3): 343-358.
- ELY D.G., HARVEY T.L. (1969) - Relation of ration to short-nosed cattle louse infestation. *J. Econ. Entomol.* 62: 341-44.
- GIBNEY V.J., CAMPBELL J.G., BOULER D.J., CLANTON D.C., DEUTSCHER G.H. (1985) - Effect of various infestation levels of cattle lice (Mallophaga: Trichodectidae and Anoplura: Haematopitidae) of feed efficiency and weight gains of beef heifers. *J. Econ. Entomol.* 78 (6): 1304-7.
- GOMERAC W.L., DICKE R.J., ALLEN N.N. (1959) - Factors affecting the biology of cattle lice. *J. Econ. Entomol.* 52 (1): 79-82.
- HOFFMAN R.A., DRUMMOND R.O., GRAHAM O.H. (1969) - Insects affecting livestock and domestic animals, 87-89. In: *Survey methods of livestock insects, U.S.D.A. Res. Serv. Surv.*: 81-131.
- JENSEN R.R., ROBERTS J.E. (1966) - A model relating to microhabitat temperatures to seasonal changes in lime blue louse (*S. capillatus*) population. *Ga. Agric. Exp. Sta. Bull.* 55: 5-22.
- LAMBSON G.H. (1918) - Cattle lice and their control. *Connecticut (Storrs) Agric. Expt. Sta. Bull.* 97: 397-414.
- LANCASTER J.L. (1957) - Cattle lice. *Univ. Arkansas Agric. Exp. Sta. Bull.* 591: 3-14.
- LEWIS L.F., CHRISTENSON D.M., EDDY G.W. (1967) - Rearing of long-nosed cattle louse on host animals in Oregon. *J. Econ. Entomol.* 60: 755-57.
- MANUEL M.F. (1984) - Occurrence of *Limognathus vitali* Liane, 1758 and *Haematopinus quadripertusus* Farenholz, 1916 in cattle in the Philippines. *Phil. Jour. Vet. Med.* 23 (1 & 2): 115-125.
- MATTHYSSE J.G. (1946) - Cattle lice, their biology and control. *Cornell. Univ. Agric. Exp. Sta. Bull.* 832: 1-67.
- POTKOWSKI F. (1967) - Cattle lice in Poznan province (In Polish). *Wiad. Parazytol.* 13: 643-651.
- SCHARFF D.K. (1962) - An investigation of cattle lice problem. *J. Econ. Entomol.* 55: 684-8.