is known in Pakistan and U.P., M.P. and Bihar in India. The present author got this material from Howrah (W. Bengal) and Karnal (Haryana), indicating that it has a wider range. However, the bug is not distributed in South India[1].

Another significant factor is its present outbreak in late summer. In North India, its eggs are hatched and the bug appeared during winter (Nov. to Jan.) and remained active till April, when reportedly the adult females descended down and entered the soil for egg laying[2]. Subsequently, while the female died, the eggs underwent diapause which breaks in winter. Hence, the present incidence of this bug in July-August is interesting. Perhaps it is related with the showers in July in these arid areas since the humidity of soil has been suggested as a factor for hatching of eggs[3].

Drosicha is a major pest of mango, and affects more than a dozen other fruit-plants including litchi, guava, citrus, apple, ber, grapevine etc. It was earlier reported[4] on 44 host-plants to which the present record on *Prosopis juliflora* (Sw.) DC. (Mimosaceae) is an addition.

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A CASE OF LERNEOSIS AND ITS CONTROL IN AN AIR-BREATHING FISH CULTURE SYSTEM

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LERNAEA CYPRINACEA L, a parasitic copepod (Crustacea), commonly known as anchorworm, is one of the most detrimental ectoparasites in aquaculture owing to its widespread distribution and ability to infect a variety of economically important fresh water fishes.

During the course of culture experiments on the striped murrel, *Channa striata* (Bloch), lerneosis was noticed in one of the farm ponds in March 1984. In about a month's time nearly 50 % of the murrels in that pond were found to be affected.

Treatment: The pond was dewatered and all the cultured *C. striata* were retrieved and given a 250 ppm (25 ml/100 l) formalin bath in plastic pools for 15 min, and then immediately released into another pond to which lime (at the rate of 250 kg/ha) was added the previous day. No mortality occurred during the treatment.

Fifteen days after the treatment, sample-netting revealed that the infection had subsided. Two months later, when the murrels were harvested, there was no visible trace of infection. The average weight of 9.3 g, at the time of stocking, had steadily increased to 133 g in six months. But, while the weight increment per month went upto 28.9 g prior to the infection, the same had fallen to 16.4 g after the infection. Survival over the six months' culture period was 85 %. It is thus evident that lerneosis, although not immediately fatal, could adversely affect normal growth and the resultant production.

Lerneosis, affecting a variety of cultured fishes, has been reported from divergent habitats, and the measures of control adopted or suggested vary widely[1-9]. Available literature indicates that lerneosis in the striped murrel *C. striata* has not been reported from India. Considering the pollution that would be caused by the application of organophosphate pesticides, formalin and lime treatment was adopted, and it appears that this is the first instance of controlling anchorworm infection using this procedure.

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VOLUME INDEX FOR DETERMINING THE NATURE OF ANAEMIA CAUSED BY HELMINTHIASIS IN POULTRY

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VOLUME index (VI) indicates the proportion of corpuscular volume to the percentage of red cells. The normal VI in man is 1 ranging from 0.85 to 1.5. If the VI is higher than the normal value, the resultant anaemia is macrocytic and if it is lower than the normal value, the resultant anaemia is microcytic. All aspects of the blood of the domestic fowl have been studied in the past[1] but no reference is available on VI in either sex, both in healthy and diseased conditions.

In the present study the effect of helminthiasis on VI of domestic fowl was assessed. The total erythrocyte count (TEC), and the haematocrit values were estimated in 400 birds, which include both healthy (uninfected) and helminthic infected fowls. From these values, VI of erythrocytes was calculated using the formula VI = % corpuscular volume/% red cells. The percentage of corpuscular volume was calculated by taking 45 ml of corpuscles per 100 ml of blood as 100%. The percentage of red cells was also calculated taking a count of 5 millions of red cells per mm^3 of the blood as 100%. The results are given in table 1.

(a) *Healthy fowls*: In the domestic fowl, VI is comparatively higher than that of the human beings. This confirm the fact that the avian red blood corpuscles are oval, biconvex, and larger than that of mammals. VI is significantly higher in pullets than in cockerels.

(b) *Diseased fowls:* (i) *In cockerels*: Infections with *Raillietina tetragona* and *Choanotaenia infundibulum* did not cause any significant variation in VI and suggests that there is no anaemia due to these infections. Infections with *Raillietina echinobothrida*, *Hymenolepis carioca* and *Ascaridia galli* show an increased VI value, the maximum increase being in *R. echinobothrida* infection indicating that these infections cause macrocytic anaemia in the fowl. In *R. cesticillus* infection, VI shows a significant drop in the value suggesting microcytic anaemia.

Table 1 *Volume index values of erythrocytes in the healthy (uninfected) and helminthic infected (natural infection) domestic fowl, Gallus domesticus, of 3–4 months age.*

Nature of infection	* Volume index	
	In cockerels	In pullets
None	1.28 ± 0.22	1.65 ± 0.48
Single infection[1] with		
Raillietina tetragona	1.30 ± 0.33	1.41 ± 0.57
Raillietina echinobothrida	1.95 ± 0.88	1.67 ± 1.00
Raillietina cesticillus	1.05 ± 0.17	1.44 ± 0.07
Choanotaenia infundibulum	1.24 ± 0.02	–
Hymenolepis carioca	1.37 ± 0.10	–
Ascaridia galli	1.65 ± 0.54	1.73 ± 1.52
Double infection[2]		
Group I	1.64 ± 0.10	1.89 ± 1.13
Group II	1.48 ± 0.35	1.35 ± 0.10
Triple infection[3]		
Group I	1.85 ± 0.72	1.35 ± 0.17
Group II	1.34 ± 0.05	1.30 ± 0.17
Quadruple infection[4]		
Group I	1.28 ± 0.13	1.30 ± 0.17
Group II	2.28 ± 1.43	–

* The data includes an average of 15–20 samples. Infection with 1. single species; 2. two different species; 3. three different species; 4. four different species. Group I infections resulting in Leucopenia. Group II infections resulting in Leucocytosis.

In Group I of quadruple infection, VI is normal suggesting no anaemia due to this infection. In the remaining multiple infections, VI shows a significant range except in group II of triple infection, where the increase is only marginal. Hence macrocytic anaemia results from these infections.

(ii) *Pullets:* Infections with *R. tetragona* and *R. cesticillus* resulted in microcytic anaemia, since VI registers a significant drop in the value. Although no significant difference was observed VI values obtained in the *R. echinobothrida* and *A. galli* infections and group I of double infection and the value obtained in the uninfected group, the standard deviation of VI values in these infections is high suggesting a high variation among VI values in the individual sample birds. This is due to abnormal values in one or two individual sample birds.

To summarize, helminthiasis results in macrocytic anaemia of cockerels and microcytic anaemia in pullets.

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