

BIOCHEMICAL STUDY: CHARACTERIZATION OF THE DISTINCT PROTEINIC FRACTIONS OF THE MALE AND FEMALE BOVICOLA CAPRAE (GURLT, 1843) (MALLOPHAGA: INSECTA)

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Abstract. A biochemical study of the species *Bovicola caprae* (Gurlt, 1843) applying SDS-PAGE techniques has been realized. The distinct protein bands separated have been characterized through the values of R (mb), Rx and Rf. A parallel study has been made of the Pm of each band. Total proteins are characterized in this extract.

In the past few years studying the species *Bovicola caprae*, the authors have based their works on distinct aspects: morphological (Guevara et al. 1981, Benítez et al. 1985a, Soler et al. 1987), ultrastructural (Soler et al. 1985), biological (Benítez et al. 1985b) and histological (Soler et al. 1988). Recently and following the new orientations that other authors like Wittaker et al. (1962), Warren et al. (1969), Towson (1969) and Lunt (1979), amongst others who studied phylum Arthropoda groups, SDS-PAGE techniques were applied for the separation of total proteins of this species. The obtained data were completed by the results achieved during the morphological studies by optic and electron microscope.

MATERIALS AND METHODS

The authors determined the male and female *B. caprae* and stored them separated by sex in individual containers maintained at 4 °C.

A quantity of total proteins was obtained from 90 µg and 65 µg for female and male, respectively, from the 65 and 60 lice that weighed 13,000 µg and 4,900 µg. In both cases the quantity of sample applied was 5 µg.

The methodology applied and the criteria for the characterization of distinct protein bands are presented in the work by Muñoz et al. (1988).

For the characterisation of distinct protein bands, the following criteria were used: R (mb) = or absolute mobility of each fraction. % R (mb) = or relative mobility. R — % R (mb) = or relation of relative mobility (Igbokwe 1978). Rx or Me = electrophoretic mobility (Warren 1969). Rf (Revanasiddaiah et al. 1982). Pm = obtained in function of the molecular weight of the patron protein.

RESULTS

In the case of females, a total of 14 bands were obtained (Table 1, Fig. 1).

The R (mb) oscilated between 2.5 mm and 84 mm. The Rf oscilated between 0.02 mm for the first band and 0.78 mm for the last.

For the males, a total of 13 bands were obtained (Table 2, Fig. 1).

The R (mb) of these oscilated between 16.5 mm for the first band and 90 mm for the last. The Rf between 0.15 mm for band No. 1 and 0.83 mm for the band No. 13.

Table 1. Analysis of electromobility of distinct proteinic fractions of females of *Bovicola caprae* (Gurlt, 1843) (Mallophaga)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
R (mb)	2.5	5.0	11.0	16.5	20.0	23.0	27.0	37.0	40.0	42.0	61.0	63.0	81.0	84.0
% R (mb)	3.0	6.0	13.1	19.6	23.8	27.4	32.1	44.0	47.6	50.0	72.6	75.0	96.4	100.0
R—%R (mb)	1.0	2.0	4.4	6.6	8.0	9.2	10.8	14.8	16.0	16.8	24.4	25.2	32.4	33.6
Rx**	0.16	0.31	0.69	1.03	1.25	1.44	1.69	2.31	2.50	2.63	3.81	3.94	5.06	5.25
Rx*	0.03	0.06	0.13	0.20	0.24	0.27	0.32	0.44	0.48	0.50	0.73	0.75	0.96	1.00
Rf	0.02	0.05	0.10	0.15	0.19	0.21	0.25	0.34	0.37	0.39	0.56	0.58	0.75	0.78
Pm	← 66,000 → ← 66,000—45,000 → ← 45,000—24,000 → ← 24,000—14,300 → 14,300													

Rx** Taking as reference bovine albumin.
Rx* Taking as reference lysozyme.

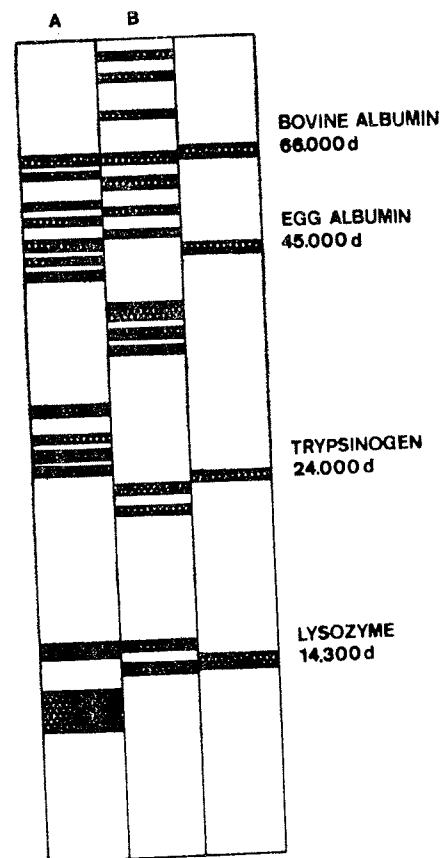


Fig. 1. Electrophoretograms of males and females of *B. caprae*. A — males; B — females.

Table 2. Analysis of electromobility of distinct proteinic fractions of males of *Bovicola caprae* (Gurlt, 1843) (Mallophaga)

	1	2	3	4	5	6	7	8	9	10	11	12	13
R (mb)	16.5	18.0	22.0	24.0	27.0	29.0	31.0	50.0	53.0	55.5	58.0	82.0	90.0
% R (mb)	18.3	20.0	24.0	26.6	30.0	32.2	34.4	55.5	58.9	61.6	64.4	91.1	100.0
R—%R (mb)	1.0	1.1	1.3	1.4	1.6	1.7	1.9	3.0	3.2	3.4	3.5	5.0	5.4
Rx**	1.03	1.13	1.38	1.50	1.69	1.81	1.94	3.13	3.31	3.47	3.63	5.13	5.63
Rx*	0.20	0.21	0.26	0.29	0.32	0.35	0.37	0.60	0.63	0.65	0.69	0.98	1.07
Rf	0.15	0.16	0.20	0.22	0.25	0.27	0.29	0.46	0.49	0.51	0.53	0.75	0.83
Pm	66,000 ← — 66,000—45,000 — → ← — 45,000—24,000 — → — 24,000—14,300 — → 14,300												

Rx** Taking as reference bovine albumin
Rx* Taking as reference lysozyme

Table 3. Percentage and number of protein bands in function of Pm in male and female of *Bovicola caprae* (Gurlt, 1843) (Mallophaga)

	Male	Female	No. of total bands
No. of bands with Pm superior to 66,000 daltons	1 (7.7 %)	4 (28.6 %)	5
No. of bands with Pm understood amongst 66,000—45,000 d.	4 (30.8 %)	3 (21.4 %)	7
No. of bands with Pm understood amongst 45,000—24,000 d.	6 (46.1 %)	3 (21.4 %)	9
No. of bands with Pm understood amongst 24,000—14,300 d.	1 (7.7 %)	3 (21.4 %)	4
No. of bands with Pm inferior to 14,300 daltons	1 (7.7 %)	1 (7.7 %)	2
TOTAL	13	14	27

In the study of the distribution of the number of bands in function of the Pm in the male and female of this species (Table 3) it is observed that on top of the 66,000 daltons the number of proteins is much more elevated for the last one. The largest number of proteins, in both sexes, is found in the interval 66,000—24,000 daltons, diminishing the number in the interval 24,000—14,300 daltons and being the number of total proteins of only two less than 14,300 daltons.

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БИОХИМИЧЕСКОЕ ИЗУЧЕНИЕ: ХАРАКТЕРИЗАЦИЯ БЕЛКОВЫХ ФРАКЦИЙ У САМЦОВ И САМОК *BOVICOLA CAPRAE* (GURLT, 1843) (MALLOPHAGA: INSECTA)

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Резюме. Изучали биохимию вида *Bovicola caprae* (Gurlt, 1843) с помощью метода SDS-PAGE. Отдельные полосы характеризовались по величинам R(mb), R_x и R_f. Одновременно изучали R_m каждой полосы характеризовали общие белки этого экстракта.

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