

1. Hofmann, H. J., *Lethaia*, 1981, 14, 303.
2. Sisodiya D. S., *Curr. Sci.*, 1985, 55, 70.
3. Maithy, P. K. and Shukla, M., *Geophytology*, 1984, 14, 212.

LENGTH-WEIGHT RELATIONSHIP OF THE CRAB, *POTAMON MAGNUM MAGNUM* PRETZMAN

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THE crab, *Potamon magnum magnum*, one of the most abundant crustacean species in the freshwaters of Iraq, has been little studied in laboratory experiments. Spawning occurs some time between November and early January in Mosul suburbs. As part of a broad ecological study, we present information on the length-weight relationship of this species. The work described here is essentially exploratory. However, it is hoped that the data may encourage increased utilization of this crab for more studies. Its survival in swift springs and extreme temperature conditions and its easy acclimation to aquarium life offer considerable opportunities to experimental biologists.

Male and female specimens of *Potamon magnum magnum* were collected from Nawaran spring, north of Mosul, Iraq, during February-April, 1976. The crabs were transferred to plastic containers containing spring water, and transported to the laboratory. The specimens were reared for 8-12 hr in fibreglass aquaria and provided with oxygenated freshwater. During investigation, the crabs were removed from the aquaria and blotted dry with filter towelling. The total length and weight were recorded. The number of crabs used in this study was 155 (82 males and 73 females). Sex of the crabs was determined by the marked sexual dimorphism exhibited by this species.

The length-weight relationships were determined using the standard regression equation:

$$\log W = \log C + n \log L,$$

where, W was the weight of the crab in mg, L was the length of the crab in mm, $\log C$ was the intercept

and n was the slope of the regression line. $\log C$ and n were calculated by least squares method¹. The data for the two sexes were processed separately on IBM 1130 computer.

The relationships between the lengths and weights of male and female specimens of *Potamon magnum magnum* derived by fitting straight lines to the logarithms of the two variables, were expressed by the equations:

$$\log W = -1.1954 + 3.2055 \log L \text{ (for males),}$$

$$\log W = -0.4876 + 2.7875 \log L \text{ (for females)}$$

The coefficients of correlation, r (0.9808 for males and 0.9841 for females) for the above relationships were significant ($P < 0.001$).

The length-weight relationships for the two sexes are shown in figure 1. It is evident that for a given length, males were slightly heavier than females. The exponent (n) values of 3.2055 and 2.7875 for the

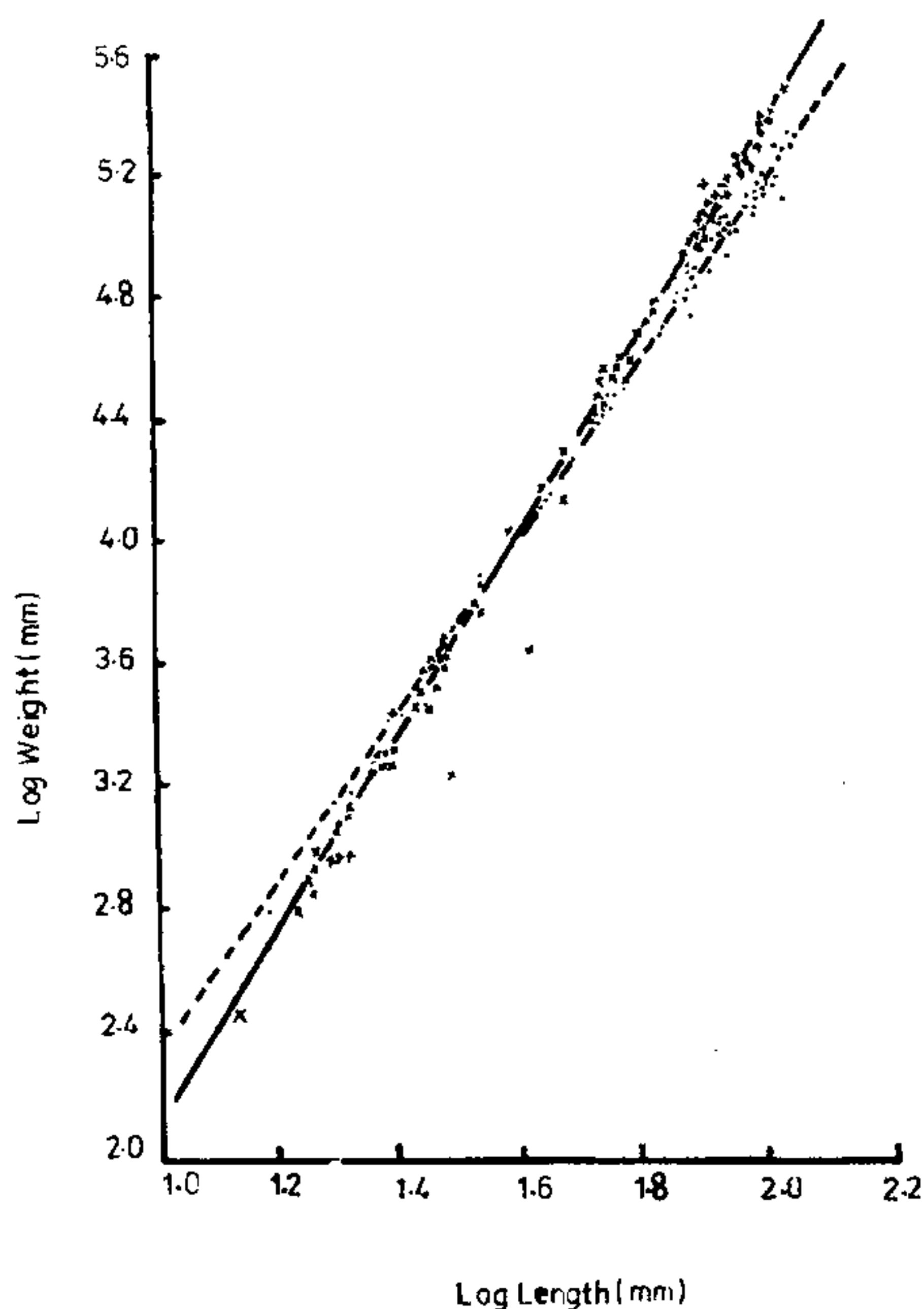


Figure 1. Length-weight relationship of male (— x — x —) and female (-----) specimens of *Potamon magnum magnum* Pretzman.

male and female specimens respectively indicate that the body weight of the males grew slightly faster than the cube of the length, while in females, this growth in body weight was less than the length cube. This difference in exponent values during the premature phase of the crab implied a sex-related differential in allometry. The fact that the length-weight relationships are considerably influenced by the degree of allometry is evident from the observations of Haefner² on the sand shrimp, *Grangon septemspinosa*. Further, the efficiency of the conservation of food into flesh may be higher in the male than in the female.

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1. Snedecor, G. W., *Statistical Methods*, Iowa, Iowa State College Press, 1955.
2. Haefner, P. A., *Length-weight relationship of the sand shrimp, Grangon septemspinosa*, Chesapeake Science, 14, 1973, p. 141.

CELL SURFACE DIFFERENCES IN PROMASTIGOTES OF VIRULENT AND AVIRULENT ISOLATES OF *LEISHMANIA DONOVANI*

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SEVERAL parasitic protozoans have been shown to possess cell surface properties responsible for lectin-induced agglutination *in vitro* which correlates with their *in vivo* pathogenicity for the respective hosts¹⁻⁴. The pathogenic strains of *Entamoeba* and *Acanthamoeba* differ from the nonpathogenic strains in their susceptibility to agglutination with concanavalin A^{1,2}. The pathogenic trypanosomes have been shown to agglutinate better when incubated with lectins, as compared to nonpathogenic strains. Among the *Leishmania* sp., *Leishmania braziliensis* was found to agglutinate in the presence of concanavalin A and *Ricinus communis* agglutinin^{4,5}. In the present communication pathogenicity of three *L. donovani* strains has been characterized using two lectins namely *Ricinus communis*

(Sugar specificity: D-galactose; N-acetyl-D-galactosamine) and pea nut (Sugar specificity D-galactose; D-galactose β -(1-3)-N-acetyl D-galactosamine).

Three different strains of *L. donovani* namely K-15 (isolated from a KA patient of Calcutta obtained from School of Tropical Medicine), Dd₁ (isolated from a KA patient of Bihar and obtained from NICD, Delhi), and Dd₁₅ (isolated from a KA patient of Bangladesh and obtained from NICD, Delhi), have been used during the present study.

In vitro cultures of promastigotes of all the three strains were maintained in NNN medium. To check the *in vivo* pathogenicity of these strains for hamsters, 1×10^7 promastigotes from each of the cultures were intracardially inoculated into 25 hamsters, each weighing 40 g. Four to five hamsters were sacrificed for each strain on days 15, 30, 60, 120 and 150 post inoculation and the contact smears of the spleen were microscopically observed for the presence of LD bodies. A part of spleen from each hamster was also incubated *in vitro* in NNN medium. These cultures were observed for the presence or absence of promastigotes till day 15.

Two lectins pea nut agglutinin (Sigma) and *Ricinus communis* (Sigma) were used for the agglutination experiment by the method of Dawidowicz *et al*⁴ with a slight modification. The serial dilutions of both the lectins PNA and RCA were carried out in microtitre plates, and 2×10^8 promastigotes of all the three *L. donovani* strains at late log phase (~132 hr) i.e. 5-day-old cultures were incubated (V/V) at $25 \pm 1^\circ\text{C}$ for 30-40 min. The agglutination of promastigotes was checked microscopically and was scored from nil (no agglutination) to ++++ (virtually complete agglutination) depending upon the number of the promastigotes/clump and the size of cell aggregate.

On day 15 when hamsters were sacrificed and examined, no LD bodies were observed in the smears of spleen, nor they produced promastigotes in NNN medium with any of the Leishmanial strains. Up to day 150 the hamsters infected with strain Dd₁ and Dd₁₅ did not show LD bodies in spleen, neither the cultures of spleen were found positive in NNN medium; but in the case of K-15 infected hamsters +infection, ++infection and ++++infection in the spleen were observed on days 60, 120 and 150 respectively, and the cultures of such spleens also produced promastigotes in NNN medium (tables 1 and 2).

The agglutination of promastigotes with PNA and RCA showed better agglutination, with strain K-15