

A New Record of Two Species of Hydra in Iraq: An Ecological and Histological Study

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Abstract

Hydras are freshwater cnidarians. They are found on all the continents except Antarctica, and they are also found on Continental Island but are apparently absent from oceanic island. The two species of brown hydra, *Hydra vulgaris* (Pallas, 1766) and *Hydra oligactis* (Pallas, 1766) were recorded for the first time in Iraq from samples collected from two ponds in Erbil province Northern part of Iraq during May 2013. Some physical and chemical properties of water were studied among them; water temperature reached to 22.5 °C, with neutral pH value most of other studied parameters indicated that water is clean, cool and not polluted.

Keywords: Cnidarian, Brown Hydra, fresh water, Iraq.

1. Introduction

Cnidarians are mostly marine animals; but they can be found in nearly all types of freshwater (i.e., streams, rivers, ponds and lakes), and occur mainly in mesotrophic to eutrophic habitats (Jankowski et al., 2008). Hydra, a freshwater polyp belonging to phylum Cnidaria and class Hydrozoa, is globally distributed except in the Antarctic region and Oceanic islands (Campbell, 1987).

Many previous studies were carried out on the hydra in different parts of the world. The first record of *Hydra caudiculata* was published by Hyman (1938) in which he reported the distributional notes of many other species especially *Hydra littoralis* in North America. Campbell (1999) recorded for the first time three species of hydra in Madagascar, which were *Hydra viridissima*, *H. madagascarensis* and *Hydra* sp. On the other hand, the first record of brown hydra, *Hydra oligactis* in Turkey was carried out by Şaşı and Balik (2002) in Topçam reservoir. Their study included a study of some ecological factors of reservoir water as temperature, dissolved oxygen, pH, transparency and conductivity. Reddy et al. (2011) conducted a study on the description and phylogenetic characterization of common hydra from India. While the presence of *Hydra vulgaris* for the first time in Los Padres Lagoon reservoir in Argentina was reported by Deserti and Zamponi (2011). Also, Deserti et al. (2011) published an investigation on *Hydra* genus in Argentina; the study included the main taxonomic characters of the four groups of hydra.

In Iraq, during the two last decades, many studies have been published on the different groups of invertebrates. However, there are no published information and no zoogeographic studies on cnidaria in Iraq. It is noteworthy that the present study records two species of *Hydra* for the first time in Iraqi inland water and gives their morphological description and key characteristics.

2. Materials and Methods

The study was made at two sites the one of small pond at Greater Zab River near Geaitly village and the other in a pond near Piran village, Erbil Governorate. At the study sites, the water depth varied from 15 cm near the banks to more than 2 m near the center, depending on local rainfall and water feeding from the river. The bottom was muddy and often filled with litter from overhanging trees (Fig. 1). Samples were taken on May (2013) in which *Ceratophyllum demersum* (Ceratophyllaceae) and attached submerged parts of *Typha angustifolia* L. macrophytes were taken out of from the bottom of the pond. The samples were stored in a package that contained water from the site and were transported to the laboratory. In the laboratory, the samples were placed in a glass aquarium that was 20 cm in diameter, with an aerator.

At the same time the samples were made, the main limnological parameters: water temperature, pH and electrical conductivity were taken in the field. In addition, the following analyses were done in the laboratory: dissolved oxygen, biochemical oxygen demand, chemical

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oxygen demand, orthophosphate, nitrate, nitrite and ammonium as described in (APHA 1998) (Table 1). Brown hydra was separated from the plant parts and was readily collected with a Pasteur pipette. Twice per week water was added from the pond. During this week, and under these conditions, measurements of the extended hydras were made using a micrometer under a microscope. The samples were identified according to Thorpe and Covich (2001) and Schuchert (2010).

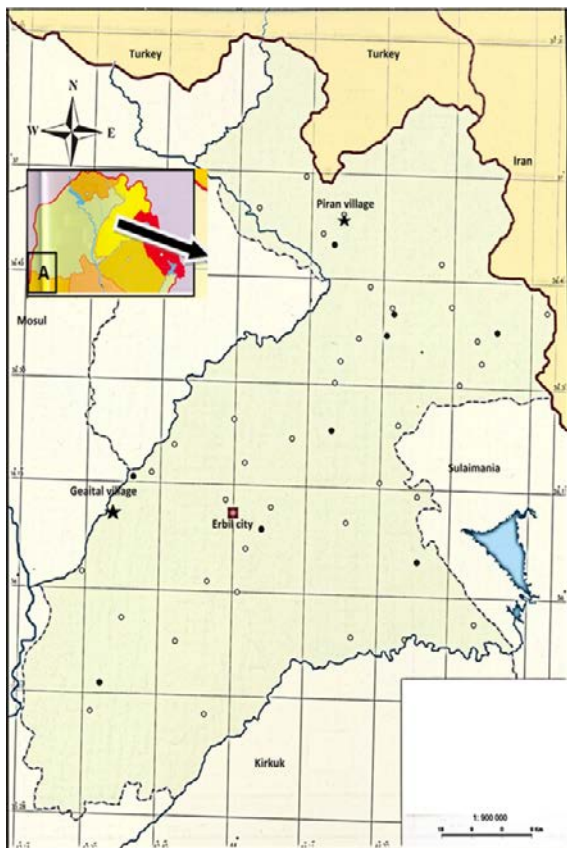


Figure 1. Map of Northern part of Iraq shows studied sites

3. Results and Discussion

3.1. Ecological factors

Brown hydra was observed in two locations, Geaital village (about 30 km west of Erbil city) in a pond where our samples were collected and in Piran village (about 80 km north of Erbil city); both sites are characterized by clean water type. Water properties of the studied sites are found in (Table 1), water temperature reached to 22.5 °C, with neutral pH value most of other studied parameters indicated that water is clean, cool and not polluted, and cleaner than others. Deserti and Zamponi (2011) and Campbell (1999) stated that the most consistent type of water in which hydra could be found is, for one reason or another, excluded from most human activities.

Table 1. Some physico- chemical water quality parameters of studied sites.

Ponds	Water Temp.	pH	EC ($\mu\text{S cm}^{-1}$)	DO ppm	BOD ₅ ppm	COD ppm	PO ₄ ($\mu\text{g l}^{-1}$)	Hg NO ₂ -N (μl^{-1})	NO ₂	mg NO ₃ -N (μl^{-1})	Hg NH ₄ -N (μl^{-1})
1	22.5	7.45	440	5.9	3.4	27	0.85	0.68		0.76	9.36
2	18.5	7.71	450	6.5	2.3	18	0.35	0.34		2.53	5.20

3.2. Description of *Hydra Vulgaris Pallas, 1766*

Polyps were brown in color, without a distinct stalk, the length of the column ranged from 1.97 to 9.88 mm and the width from 0.3 to 0.8 mm. The number of tentacles per polyp is 5-7, it was transparent and moniliform. Tentacles are shorter than body column reached up to 3/4 of the column. Hypostome was brown color and conical shape (Fig. 2).

3.2.1. Asexual Reproduction

Only one specimen displayed two buds at different development stages, they are located underneath the half of the column and they were brown in color. Tentacles emerged asynchronously (discontinuous) on buds, two tentacles emerged first, opposite each other, followed by two more perpendicular to the first pair, whereas the fifth on appeared randomly (Fig. 3). Buds has 5-7 tentacles.

3.2.2. Sexual Reproduction

They were not found.

3.3. Description of *Hydra oligactis Pallas, 1766*

Polyps were pale translucent brown in color, the length the column ranged from 15 to 25 mm with the base distinctly narrowed to form a stalk or foot, the number of tentacles per polyp is 6-9, it was transparent and moniliform. Tentacles are very long, which may extend to 5 cm or more when relaxed (Fig. 4). *Hydra oligactis* is dioecious, with males and females occurring as separate individuals.

3.3.1. Asexual Reproduction

Only one specimen displayed three buds at different development stages, they are located underneath the half of the column and they were translucent brown. Two lateral tentacles arising before the others on buds. Buds has 5-6 tentacles.

4. Nematocysts

The four characteristic nematocyst types were observed in both recorded species (Fig. 5).

Stenoteles are pear-shaped (pyriform), they were found in tentacles and in column. Its length $9.7 \pm 1.35 \mu\text{m}$ and width $7.72 \pm 1.12 \mu\text{m}$.

The atrichous isorhiza were less abundant, and were present only in the tentacles. They are cylindrical in shape, $8 \pm 0.7 \mu\text{m}$ length and $3.53 \pm 0.3 \mu\text{m}$ width.

The holotrichous isorhiza were the least abundant nematocyst. They are paramecium-like and some cylindrical, $10 \pm 0.45 \mu\text{m}$ length and $4.19 \pm 0.29 \mu\text{m}$ width.

Desmonemes were the most abundant nematocysts. They were present in the tentacles only, and were pyriform in shape. Its length $6.26 \pm 0.47 \mu\text{m}$ and width $4.43 \pm 0.35 \mu\text{m}$.

This group of hydra (brown hydra) was studied previously by different researcher in different parts of the world (Schulze, 1917; Campbell, 1989; Deserti and Zamponi, 2011; among others). However, in Iraq, there are no previous studies on this group; the present study is regarded the first one to record the two species of hydra in Iraq, particularly in Erbil province Northern part of Iraq. The description and measurements of the present specimens are nearly close to those reported by Thorp and Covich (2001) and Deserti *et al.* (2011).



Figure 2. Photographs of *Hydra vulgaris*, A. *H. vulgaris* with buds. B. Moniliform tentacles. C. Hypostome



Figure 3. The discontinuous growth of tentacles (10X)

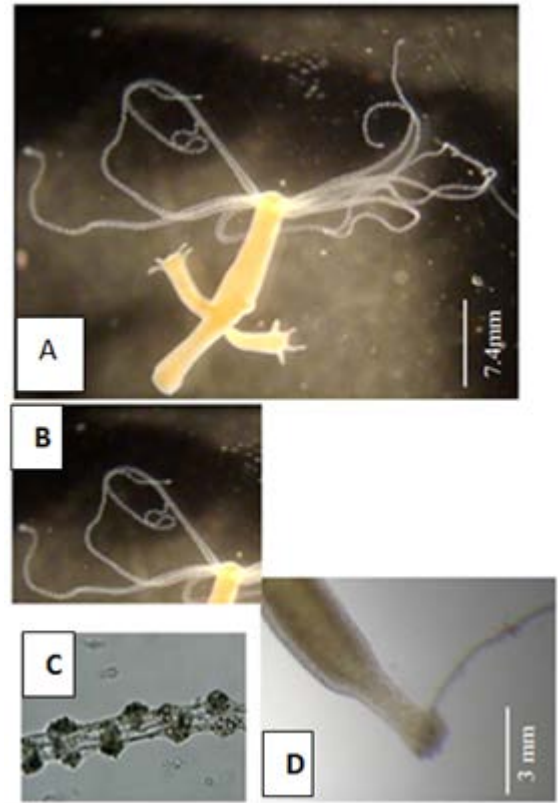


Figure 4. Photographs of *Hydra vulgaris*, A. *H. oligactis* with buds. B,C. Moniliform tentacles. D. Stalk (Foot).

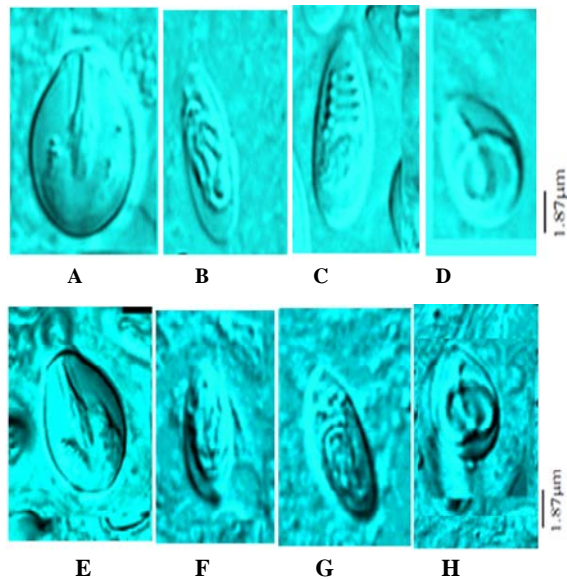


Figure 5. Type of Nematocysts: A-D *Hydra vulgaris*; A. Stenoteles, B. Atrichous isorhizas, C. Holotrichous isorhizas, D. Desmonemes. E-H *Hydra oligactis*; E. Stenoteles, F. Atrichous isorhizas, G. Holotrichous isorhizas, H. Desmonemes

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