The genus *Hydra* from Argentina. II. *Hydra pseudoligactis* Hyman, 1931 (Cnidaria; Hydrozoa), a new record

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Abstract

This paper deals with *Hydra pseudoligactis* Hyman, 1931 found in “Nahuel Rucá” lagoon, Buenos Aires province. This record is new for Argentina, because the references about this species have only registered in North America. The specimens analyzed have in common with *pseudoligactis* sp. the following characteristics: brown coloration, long tentacles, moderated sizes column, dioecious condition and translucent stalk near to the foot. The measurements registered for their nematocysts are: 10-21(length) x 7-17 (width) µm for stenoteles, 6-9 x 4-6 µm for desmonemes, 6-11 x 3-6 µm for atrichous isorhiza and 8-14 x 3-6 µm for holotrichous isorhiza.

Key words: Cnidarians, *Hydra pseudoligactis*, Taxonomy

Resumen

El siguiente trabajo trata sobre *Hydra pseudoligactis* Hyman, 1931 hallada en la laguna “Nahuel Rucá” de la provincia de Buenos Aires. Esta cita es nueva para Argentina, ya que las referencias bibliográficas sólo registran dicha especie en América del Norte. Los especímenes analizados tienen en común con *pseudoligactis* sp. las siguientes características: coloración marrón, largos tentáculos, talla moderada de columna, condición sexual dioica y un translúcido pedúnculo cercano al pie. Las medidas registradas para sus nematocistos
son: 10-21(largo) \times 7-17 (ancho) \, \mu m \text{ para los estenoteles, 6-9 \times 4-6 \, \mu m para los desmonemes, 6-11 \times 3-6 \, \mu m para los atricos isorriza y 8-14 \times 3-6 \, \mu m para los holotricos isorriza.}

**Palabras clave**: Cnidarios, *Hydra pseudoligactis*, Taxonomía

**Introduction**

The hydras are a small freshwater cnidarians and are a group of ubiquitous predators of small invertebrates and larvae of fishes (Dumont, 1994; Elliott, et al. 1997; Jankowski, et al. 2005), and they modify the zooplanktonic freshwater communities when the population is abundant (Schwartz, et al. 1983).

This genus is well known for the European and North American continent; whatever the knowledge of this genus is scarce in South America, especially in Argentina; particularly, the specie *pseudoligactis* is not recorded for this country. A complete study about the diversity of this genus in Argentina is necessary because there is a great amount of freshwater bodies, like lagoon, lakes, rivers, ponds and streams of great extension. This territory has mainly shallow water permanent or temporary (Ringuelet, 1962; Dangavs, 2005) that let us forward multiple possibilities in taxonomy, ecology and biological studies. Therefore to do a research through the time we will find out taxonomic and biological news of this genus and associated species (Zamponi, 1991).

Recently, a new subspecies to the *vulgaris* group, *Hydra vulgaris pedunculata* found in “Los Padres”, a shallow lake from Buenos Aires province, has been described (Deserti et al., 2011).

This study deals with the species *Hydra pseudoligactis* Hyman, 1931, a new record found in “Nahuel Rucá” lagoon, Buenos Aires province, Argentina.

**Materials and Methods**

**Study area**

The study was made at the Nahuel Rucá lagoon (37° 40’ S, 57° 23’ O), a wetland area in the Pampas Region of Argentina.

**Sampling design**

Two samples were taken on 16 September 2009 and 11 December 2009. For each sample, twenty stems of bulrushes were taken out of the lagoon and the first 20 cm of the submerged portion of their stems were collected. Samples
were stored in a package that contained water from the site and were transported to the laboratory. At the same time the samples were made, the main limnological parameters (water temperature, depth and transparency) were determined in situ. In addition, water samples were taken for the following analyses: dissolved oxygen (DO); total alkalinity (TA), turbidity and pH analyses (Table 1). These analyses were made by the Laboratory of Waters belonging to Coast Geology and Quaternary Institute, National University of Mar del Plata, following the recommendations of the American Public Health Association (APHA) (1998).

Table 1. Limnological parameters from “Nahuel Rucá” lagoon (37° 40’ S, 57° 23’ O) (Buenos Aires province, Argentina).

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Water Temperature (°C)</td>
<td>15.55</td>
<td>22</td>
</tr>
<tr>
<td>Depth (m±sd)</td>
<td>0.52</td>
<td>0.25</td>
</tr>
<tr>
<td>Total Alkalinity (mg/l)</td>
<td>330.1</td>
<td>360.8</td>
</tr>
<tr>
<td>pH</td>
<td>7.79</td>
<td>7.8</td>
</tr>
<tr>
<td>Secchi (m±sd)</td>
<td>0.20</td>
<td>0.09</td>
</tr>
<tr>
<td>Turbidity (PTU)</td>
<td>71.3</td>
<td>107.5</td>
</tr>
<tr>
<td>Dissolved oxygen (mg/l)</td>
<td>4.83</td>
<td>4.6</td>
</tr>
</tbody>
</table>

Maintenance of samples and identification of hydras

Samples were placed in a circular aquarium that was 20 cm diameter, with an aerator to maintain the stems of the rushes (where the hydras adhered). Hydras were separated from the stems, using fine point tweezers for later observation. Twice a week the water was added from the “Nahuel Rucá” lagoon. The samples were kept at 20° ± 3°C with a photoperiod of 12 h light and 12 h dark for a week. During this week and under these conditions, measurements of the extended hydra were made using a micrometer under a stereomicroscope.

From 25 studied specimens, the following data were obtained: length (from oral to the aboral region), width, in the middle region, and form of the column; colour and form of the hypostome; number, length relative to body, colour and form of the tentacles; number, position, tentacle formation, number of tentacles, length and width of each buds.

Type, length, width and frequency of appearance of nematocyst were obtained from squashes tissues of the column and tentacles.
Results

Taxonomy account: *Hydra pseudoligactis* Hyman, 1931

**Body form**

The column length ranged from 2.12 to 5.78 mm and 0.14 to 1.06 mm in width. The body displays a conspicuous stalk towards the foot between 0.07 – 0.46 mm in width in their narrower part. Hypostome is of brown colour and conical-shape. The number of tentacles ranged from six to nine; six tentacles in 16 specimens, seven tentacles in seven specimens, eight tentacles in one specimen and nine tentacles in one specimen. Tentacles were transparent and moniliform. Their relative length was more than a half of column length (Fig. 1). Hydras displayed a brown coloration that became translucent towards the foot.

![Figure 1. Photograph of tentacles (t), column (c), foot (p), stalk (pd) and hypostome (h). Scale bar: 1mm](image)

**Budding**

Eight specimens displayed buds; two specimens displayed two buds and six specimens one bud. They were located underneath half of the column of the parental organism and they had a brown coloration with transparent and moniliform tentacles. The number of tentacles for each bud was five to seven.
The growth of tentacles was difficult to be observed, whatever some of them, especially the first, second and third tentacles, they were opposite between them and showed an early development. It was not possible to determine if the third tentacle belongs to first one or second cycle of growth (Fig. 2). Columns measurements were 0.76–1.97 mm length and 0.22–0.46 mm width. In each bud the hypostome was observed conical and brown.

![Image of tentacles showing growth and measurement](image.png)

**Figure 2.** A: Diagram of tentacular growth showing the early appearance of lateral tentacles. B and C: Drawing and photographs of sequence of growing tentacles. Scale bar: 0.3 mm

**Sexual characters**

Two specimens display testes. These testes are mamiform, shown a thick conical nipple; these had white color and were placed on up quarter of the column, opposites between them and near to the zone were the tentacles grown. One specimen showed three testes with: 198, 278 and 297 µm width and 297, 455 and 693 µm length. The second specimen showed two testes with 233 and 265 µm width and 342 and 456 µm length. During microscopically analysis, the first specimen showed two spawning. Five days later, testes were reabsorbed and the specimen displayed two buds; these buds showed the similar characteristics as those described in the budding section.
Nematocysts

The four characteristic nematocysts types were observed (Fig. 3). Desmomes were the most abundant; they were present in tentacles, with almost spherical forms and the filament giving approximately one average return inside the capsule. Stenoteles were found in abundance in tentacles and column, with the usual pear-shaped form; they display major size with respect to the three remaining types. The shaft occupies 60% of the capsule and the filament is coiled against the wall in its half inferior. When the stenotele is discharged it reduces the measures of the capsule and the shaft displays three thorns of equal size.

The atrichous isorhiza were less abundant and were present in the tentacles. They had a seed-like shape and displayed a very fine filament that occupied all the interior part of the capsule.

The holotrichous isorhiza were the least abundant nematocyst. They were located in column as well as in tentacles and displayed a form similar to a paramecium or sole of a shoe. The zone where the filament originated was fine; they always showed three or four heavy turns, generally of oblique disposition and a mass of fine filament that formed dense groups (like a ball of yarn) in the lower portion of the capsule. The filament coiled of cross-sectional way to the main axis of the capsule. Table 2 summarizes the measurements of the four types.

Table 2: Minimum, maximum and mean for length and width of capsules to the four types of nematocysts

<table>
<thead>
<tr>
<th>Nematocysts Type</th>
<th>Length (μm)</th>
<th>Width (μm)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>min  max</td>
<td>min  max</td>
</tr>
<tr>
<td>Stenotele</td>
<td>10   21</td>
<td>7    17</td>
</tr>
<tr>
<td>Desmoneme</td>
<td>6    9</td>
<td>4    6</td>
</tr>
<tr>
<td>Atrichous isorhiza</td>
<td>6    11</td>
<td>3    6</td>
</tr>
<tr>
<td>Holotrichous isorhiza</td>
<td>8    14</td>
<td>3    6</td>
</tr>
</tbody>
</table>
Discussion

This study reveals that the analyzed specimens belongs to *oligactis* group because these have a conspicuous and translucent stalk, brown color, long tentacles, displaying the typical growth in the young buds (Campbell, 1983, 1987, 1989; Holstein, et al. 1990; Hyman, 1929). Furthermore, under conditions of laboratory they display a yellow-golden coloration characteristic of the species (Campbell, 1987). The presence of testes in one specimen show that this species is dioecious; this characteristic is coincident too with the sexual characters for this group (Campbell, 1983, 1987).

Figure 3: A: Atrichous isorhiza; B: Holotrichous isorhiza; C: Stenoteles; D: Desmonemes; E: Discharged stenotele showing the capsule (ca), shaft (e) and filament (f). Scale bar: 0.1mm (for all photographs).
The measurements of nematocysts can have a different range of sizes in relation to endogenous and exogenous abiotic factors (Weill, 1934; Hand, 1961). Considering that this record is the first for the region, it is possible that the differences found in nematocysts sizes, can be related to the physical and chemical parameters from the studied community. So the main characteristic of taxonomy value is the presence of stalk and the developed of tentacles.

Based on the dichotomous key by Campbell (1983) the specimens belong to *Hydra pseudoligactis* Hyman, 1931, because their holotrichous isorhiza display the filament coiled of cross-sectional way to the main axis of the capsule.

Acknowledgments

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