Epibiosis is a facultative association of two organisms: the epibiont and the basibiont. The term “epibiont” includes organisms that, during the sessile phase of their life cycle, are attached to the surface of a living substrate, while the basibiont lodges and constitutes a support for the epibiont (Wahl, 1989; Fernandez-Leborans and Tato-Porto, 2000).

Several ciliate protozoans live as epibionts on animals and plants, using them as substrate (Fenchel, 1987; Sleigh, 1988; Mayén-Estrada and Aladro-Lubel, 2001). Most ciliates of the genus Rhabdostyla Kent, 1880 (Peritrichia, Epistylidae) live as epibionts of freshwater invertebrates, such as rotifers, crustaceans (cladocerans, copepods), insects from the orders Ephemeroptera and Diptera (Chironomidae), and annelids (Oligochaeta and Polychaeta) (Kahl, 1935; Precht, 1935; Nenninger, 1948; Fernandez-Leborans and Tato-Porto, 2000; Regali-Seleighim and Godinho, 2004). Among species of the genus Rhabdostyla, only R. chironomi Kahl, 1933 has been reported on Chironomidae larvae. This species was found on the respiratory tubes of chironomids in a brackish water pond at Kiel, Germany (Kahl, 1935). Rhabdostyla sp. on metazooplankton organisms (rotifers, cladocerans and copepods), in a shallow eutrophic artificial reservoir, Monjolinho Reservoir (22° 01' S and 47° 53' W), São Carlos, São Paulo (Regali-Seleighim and Godinho, 2004).

In the present record, R. chironomi species were found on the ventral tubules of the chironomids (Figure 2), as reported in its description. The localization of these ciliates in ventral tubules may be related to the ventilation behavior shown by chironomids. These larvae are apneustics and breathe the oxygen diluted in water through the body surface, mainly through the ventral and anal tubules. Furthermore, they generate ventilation flows by moving their posterior end expansions (tubules) or through a swimming behavior, which are means that favor respiratory exchanges (Merritt and Cummins, 1984).

Another important aspect of the epibiotic relationship among ciliated protists and larvae of Chironomus is its possible use as organic pollution indicators. Representatives of the genus Chironomus as well as several peritrich ciliates present high abundance in organically enriched environments (Henebry and Ridgeway, 1979; Armitage et al., 1995). Rhabdostyla inclinans Roux, 1901 is the only species of the genus...
Figure 2. Schematic drawings of *Chironomus decorus* group larva showing the localization of the ventral (VT) and anal tubules (AT). The ciliates are living on the ventral tubules.

**Figure 1.** Photomicrographic images of *Rhabdostyla chironomi* on Chironomidae larvae observed in vivo through DIC (a, d) and bright field (e, h); a) Posterior region of *Chironomus decorus* group larva showing ciliates in the ventral tubules (arrows); b, c) detail of ventral tubules with ciliates; d) detail of *R. chironomi* showing the stalk (S) and the macronucleus (Ma); e-g) lateral view of *R. chironomi* showing the macronucleus; and h) superior view of *R. chironomi* showing the macronucleus. Bars (a, d) = 50 µm; and (e, h) = 25 µm.

*Rhabdostyla* present on Foissner and Berger’s list of indicator ciliates (1996), and it is an indicator species of the a-mesosaprobity zone, i.e., heavily polluted environments. The high abundance of *Chironomus* larvae in organically enriched environments increases the living substrate (basibiont) availability, favoring colonization by the ciliates of the species *R. chironomi* (epibiont).

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References


