REPRODUCTIVE STRATEGIES IN FRESHWATER LEECH ERPDOBDELLA OCTOCULATA  
(EUHIRUDINEA; ACANTHOBDELLIDA)

Sherwan T. Ahmed and Zohair I. F. Rahemo*
Department of Biology, College of Science, University of Salahaddin, Erbil, Iraq.
*(Corresponding author: Zohair I. F. Rahemo Email: zohair rahemo@yahoo.com)

ABSTRACT

Erpobdella octoculata which is a worm leech is widely distributed in study area with (2-2.5)cm in length, they are good swimmers, macrophagous predators. Gonopores are located in furrow, male gonopore large; the female gonopore is minute and located two annuli posterior to it. Erpobdella octoculata has two reproductive periods in a year, attach their cocoons to understones, the juveniles resemble their parents and they don't take any parental cares.

KEY WORDS: cocoon, Erpobdella, leech, lifecycle.

INTRODUCTION

All Euhirudinea are hermaphrodites and reproductive structures are important characters for delineating families, genera and species. The male and female gonopores are visible in reproductively mature leeches near the midline on the ventral surface of somites XI and XII respectively, and are separated by an often species-specific number of annuli. In mature specimens the anterior male gonopore is typically larger and more obvious than the posterior female gonopore and may be raised or surrounded by papillae (Kutschera and Wirtz, 2001). Euhirudinea do not have true testes or ovaries but have paired testisacs and ovisacs, thin walled sacs derived from specialized coelomic sacs producing either spermatozoa or ova from a germinal epithelial layer lining the sac. Gametes are stored within the liquid filled sacs, where they develop and mature (Swiatek, 2008). Reproduction in leeches begins when two individuals attaching to each other at the clitellar region for fertilizing each other. After several weeks the leeches lay their eggs inside the cocoons which are produced by secretion of special substances formed in the clitellum by glandular cells in the epidermis (Sayer et al., 2009).

The cocoons attached mainly to understones or any other substances or in some ectoparasitic leeches attached to the body surface of their hosts. Several weeks later juveniles hatched from the egg which are similar to their parents (with no larval stage). Some Glossiphonid leeches take care to their offsprings till they can depend on themselves (Miller, 1997; Murphy and Learner, 2006).

MATERIALS AND METHODS

Twenty-one lotic and lentic freshwater sources in Erbil governorate were surveyed for leech detection during March 2007 to October 2008. The latitude and longitude of the collecting sites were recorded according to Atlas of Erbil, Sulaimanya and Duhok govern- orates, prepared by Joint Humanitarian Information Center, (2004). Leeches were collected by hands from beneath submerged rocks, plants, logs, and vegetation, and by dip-net along shorelines of small lakes, streams and springs (Siddall and Borda, 2004, Agapow and Nadobnik 2006), many crabs, frogs, fishes and turtles also had examined for detecting leeches (figure 4).

Leeches when collected were placed in glass or plastic jars, they covered with a smooth minute porous cloth to prevent escape of leeches then they were transferred to glass aquaria in the laboratory each with capacity of(40x30x30)cm (Govedich, 2001). Cocoons of only one species had observed, they were observed attached mainly to understones, cans or debris, many samples had collected and transferred to the aquaria for watching and recording the time of hatching. Photo-documentation of leeches was done by using a SONY DSC-W120 digital camera.

RESULTS

In this hermaphrodite worm the complete male and female reproductive systems are present in each individual. The copulatory organs, both male and female, are clear and occupy the area of segments10-8 (figure 1). Male: Most of the male organs are paired and situated in the middle line of the body, in the post-clitellar region lie beneath the crop or stomach. Testisacs are small, spherical, numerous and arranged in grape-like clusters lying on either side of the ventral nerve cord next to the crop. Thin short vasa efferentia connect the testisacs to two thick, long and convoluted...
vasa deferentia on each side of the body, which then run anteriorly to form epididymis or sperm-reservoir (sperm-vesicle) which is generally much coiled and separated from the terminal part of the atrium by a restriction.

Atrium is a median chamber consists of three parts: a thin-walled eversible bursa, a thickened-walled glandular chamber, and a muscular median one, as well as a pair of lateral horns (atrial cornua) which is anteriorly directed with tendency toward the media(figure 2 A and B).

Figure 1: *Erpobdella octoculata*; A, adult(contracted).(c): B, adult(fully extended). C, clitellum region, dorsal view (arrow)(bar:1cm). D,clitellum region, ventral view with gonopores (bar:1mm).

Female: Female reproductive organs consist of a single pair of more or less elongated tubular sacs, each doubled on itself and extending from the female gonopore, within the ventral ceolomic space beneath the digestive tract, caudad for several somites, the greater part of this is a coelomic sac (ovisac) enclosing the ovary(figure 2 A and C). Their life cycles begins with the laying of fertilized eggs, the gravid leech place its clitellum over the substrate and secretes the cocoon (figure 3B).

The cocoons are flat, lemon-shaped capsules that are characterized by two terminal plugs (figure 3C&D). Just after deposition, the cocoon is a soft, translucent, colorless bag that contains on average 5-10 very small eggs that are embedded into a viscous nutrient solution (figure 4A). After deposition, the parent leaves the fresh cocoon after about fewminutes. Within a few hours the surface of the cocoon becomes hard, brown and almost opaque. Three to four weeks later the young hatches through the two holes, which are created after the plugs are broken off and the cocoon becomes shrinked(figure 4B), they are similar to their parents in their general features then they begin an independent life; with no parental cares(figure 4C and D).
Figure 2: *Erpobdella octoculata*, reproductive system (male and female); (a) atrium, (t) testisacs, (ah) atrial horn, (g) glandular chamber (v) vagina, (os) ovisacs, (od) oviduct, (ed) epididymis, (u) uterus.

Figure 3. *Erpobdella octoculata* (cocoon); A, before laying. B, newly laid and attached to understone. C, with two distinct terminal operculum (arrow). D, lateral view.
DISCUSSION

In the present specimens the testisacs are arranged in clusters in one segment, a criterion which is a most distinctive feature of the male reproductive system of this genus (Genoni and Fazzone, 2008), ejaculatory duct with a pre-atrial loop extending anteriorly to ganglion XI. Atrium simply curved but not spirally coiled (goat–horned) with U-shaped feature, the character of many Erpobdellidae, but here the horns show tendency toward the medial side gives a distinct appearance of this species (Sawyer, 1986; Govedich, 2001). Furthermore no protrusible penises occur so there is no penis sheath present which is observed in other Hirudiniformes. Anyhow, the female reproductive organs of this present specimen are typical to the family and with no differentiate organs or specific structures, except their minute female gonopore which is flattened with the body surface. The oval cocoon of Erpobdella octoculata identified in present study were observed attached to understones have a light brown translucent wall with two distinct deeply colored opercula in each terminal ends, in another study Calow and Riley (1982) described the cocoon of some species of Erpobdellid with similar fetures.

Life cycle also of the present worm like other members of Erpobdellidae (McLoughlin et al., 1999) , have two generations, the juvenile when existing from the cocoon (which may contain 4-10 eggs) resembles their parents, and may survive to the next reproductive season, they found don’t take any care from their parents.In their study on parental care in three different species Kutschera and Wirtz (2001) found similar conditions concerning the life cycle of Erpobdella testisaca and Erpobdella punctata. Thirty two adult individuals brought to the aquaria and maintained for two seasons but no distinction of clitellar region had been seen, however the mature adult specimens collected in their original habitats possess a very distinct and swollen clitellar region which is a good remarks for maturation and reproduction of leeches (Davies et al., 1977, Singhal and Davies 1985, Sayers et al., 2009), and also no cocoons had laid in the aquarium, this may be due to the unsuitable environmental or nutritional requirements had been found.
inside the aquariums ecosystem which are necessary for growth and maturation of these animals. Similar conclusions were given in other studies such as Siddall et al. (2005), Kutschera and Wirtz (2001).

REFERENCES


