Indian Journal of Ecology (2021) 48 Special Issue (15): 131-134

Manuscript Number: S-611
NAAS Rating: 5.79

Invertebrates Associated with Snail *Radix auricularia* (Linnaeus, 1758) from Water Sites in Basrah Governorate, Iraq

Noor Al-Huda Walled Abdel-Redha[1] and Mortatha Yousif Al-Abbad[2]

[1]*Department of Biology, College of Education in Al-Qurna, University of Basrah, Iraq*
[2]*Department of Biology, College of Education for Pure Sciences, University of Basrah, Iraq*
**E-mail: nooralhuda.waleed@gamil.com*

Abstract: Samples of snails Radix auricularia (Linnaeus, 1758) were collected monthly from two water sites in Basrah Governorate (Al-Assafiyah and Al-Suwayb rivers) for a period of six months from October 2017 to March 2018. Four species of Oligochaeta: *Pristina proboscidea, P. aequiseta, P. longiseta, P. macrochaeta* were associated externally with the snails which collected from the Al-Assafiyah river. In Al-Suwayb River, four species of Oligochaeta were recorded: *P. proboscidea, P. aequiseta, P. longiseta, Aeolosoma leidyi* and infestation snails with *Chaetogaster limnaei*. The aquatic insect larvae of Chironomidae were associated externally with snails collected from the Al-Assafiyah river while were not isolated from Al-Suwayb snails. Al-Suwayb snails were internally infected with three types of larvae belonging to *Ornithobilharzia turkestanicum, Monostome cerc*ariae and *Cecariaeum*. In Al- Assafiyah River, the infection was limited to two kinds belonging to *O. turkestanicum* and *Monostome*.

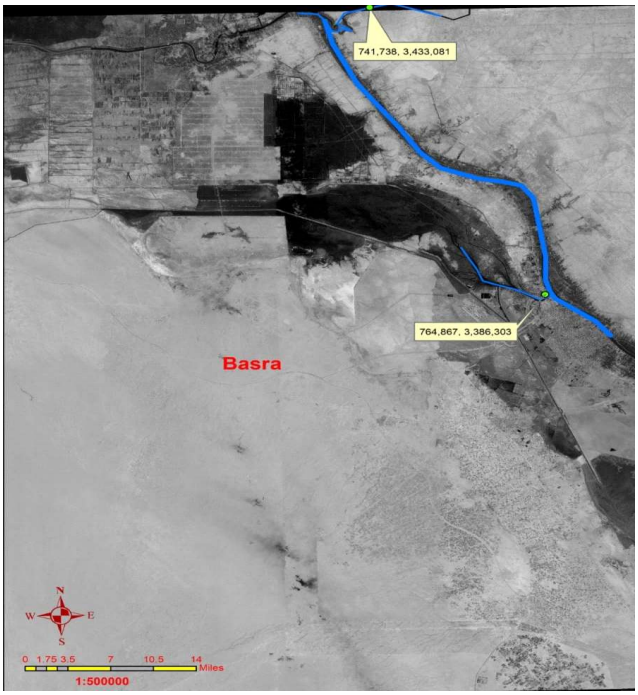
Keywords: Invertebrate, Oligochaeta, *Radex auricularia*, Trematoda

The *Radix auricularia* (Linnaeus, 1758) has synonyms names, and the most important one is *Lymnaea auricularia*. It belongs to the mollusca, class Gastropoda, subclass Pulmonata, and the order Basmonatophora. The snails *L. auricularia* spread in many freshwater bodies and typically have conical shaped shell. *L. auricularia* are infected with various trematodes that belong to Digenea parasites (Hussein 1997). Freshwaters are considered a suitable habitat to many Oligochaeta worms (Liang and Wang 2000) as these worms are the most diverse compared with other benthic invertebrates in freshwater environments, both small and large rivers, as well as marshes, ponds, lakes, springs, and groundwater (Wetzel et al 2000). The majority are free-living, few are parasitic Oligochaeta can spread in soft sediments and can also be associated with large aquatic plants and sponge and carried on Odonta larvae (Corbi et al 2005). Alabbad (2009) observed that species *Chaetogaster limnaei* infest the snail *L. auricularia* in Al-Suwayb and Al-Madinah in Basrah Governorate, southern Iraq, while Conn (1995) observed that the zebra mussels(*Dreissena polymorpha* and *D. bugensis)* are infected by *Oligochaeta chaptogaster* sp. *gorni*. Alves (2006) mentioned that *Pomacea bridgesii*, naidid Oligochaetes is associated with molluscs, belong to the family Amplullaridae and the class Gastropoda. In Iraq, Al-Abbad and Al-Mayah (2010) recorded two species of Oligochaeta belonging to the Naididae family from Al-Assafiyah River branch of Shatt Al-Arab River northern of Basrah, which were identified as *Pristna longiseta* and *P. macrochaeta*. In Al-Garmah region northern of Basrah species recorded were *P. aequiseta* and *P. proboscidea*. The snail *R. auricularia* lives in freshwater bodies, where many invertebrates and their larvae can exist, and these can be associated with snail by different types of relationships, in addition to the fact that this snail is considered as an intermediate host for a number of parasites that infect humans and a number of animals. The present study aimed at the role of this snail in accommodating different invertebrates, identifying the species and studies the infection percent in two other stations in Basrah Governorate.

MATERIAL AND METHODS

During the study, 200 individuals from snails' *R. auricularia* were randomly collected from two stations (Al-Assafiyah River and Al-Suwayb Marshes) for six months, from October 2017 to March 2018. The first station (Al-Assafiyah River) is located on the west bank of Al-Assafiyah river, one of the branches of the Shatt Al-Arab river in the Garma region, and the second station (Al-Suwayb) is located on the eastern side of Shatt Al-Arab in the Al-Suwayb area in Basra Governorate.

Examination of samples: The samples were divided into three sizes: small (5-9 mm), medium (10-14 mm), and large (15-19 mm, by the length of 5 mm for each category. First, the samples were examined under an anatomical microscope. The associated invertebrates were removed from the outer surface of the snail's shell; also, the invertebrates that may be



associated in the inner surface of the snail shell or on its body were removed after beak the shell of the snails. Then the anatomical examination for the snail was conducted. The invertebrates removed from snail *R. auricularia* were fixed at 4% formalin and subsequently examined by standard optical microscopy. Sometimes glycerin was used for clearing the key of Brinkhurst and Jamieson (1971) was used for identification of worms, while that of James (1959) was for identification of insects and Husseini (2000) for trematode parasites.

RESULTS AND DISCUSSION

Infection Percentage

Oligochaeta*:* At Al-Assafiyah station, the highest rate of annelids infestation was in the snails of the large size class, which was 59% compared to the medium size class, (31.8 %). The species of worms observed in this station were *Pristina proboscidea, P. aequiseta, P. longiseta*, and *P. macrochaeta* (Fig. 1). In Al-Suwayb Station, 4.7% of the median size class snails were infested with Oligochaeta compared to 13% for the large size class and the infestation was mixed between the species: *Pristina proboscidea, P. aequiseta, P. longiseta, Chaetogaster limnaei* and *Aeolosoma leidyi* (Fig. 2) (Table 1).

Aquatic insects: At Al-Assafiyah station, the highest incidence of infestation was in the medium size class (81.8%.) compared to in the large size (59%.) The insects were the larvae of the Chironomidae family (Fig. 1). Snail infestations with aquatic insects was not recorded at the Al-Suwayb station (Fig. 2) (Table 1).

Trematoda larvae: At Al-Assafiyah station, 5% of examining snails were infected with different larvae of trematodes (Fig. 1). The infection was by two types of Trematoda larvae, the first belonging to species and the second to Monostome group. The highest incidence of infection by annelids, insects and trematode larvae was 18.5% in the Assafiyah station (Fig. 3). At Al-Suwayb Station, 81% of the large class snails were infected by three types of trematode larva *O. turkestanicum, Monostome* and *Cercariaeum*. The infection percent was 52 in median size class snails, and all parasites belonged to Monostome larvae. The total percent of infection was 69 and these. The percent infection was 13% with *O. turkestanicum*, 3.4% by *Cercariaeum* larvae and 86.6% *Monostome* larvae. Only 3% of studied snails were infected

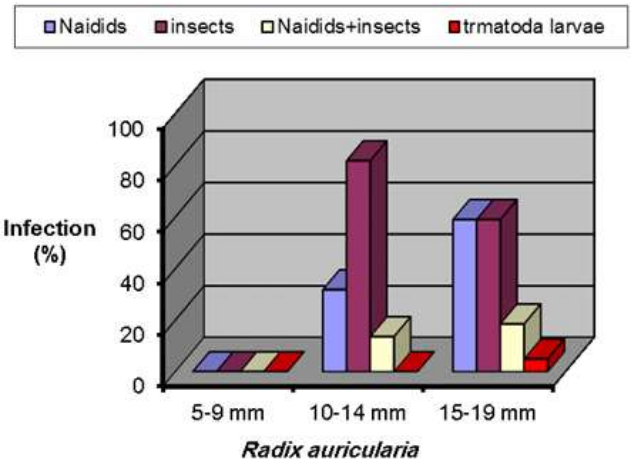


Fig. 1. Percent of infection of snail *Radex auricularia* with different invertebrates at Al-Assafiyah station

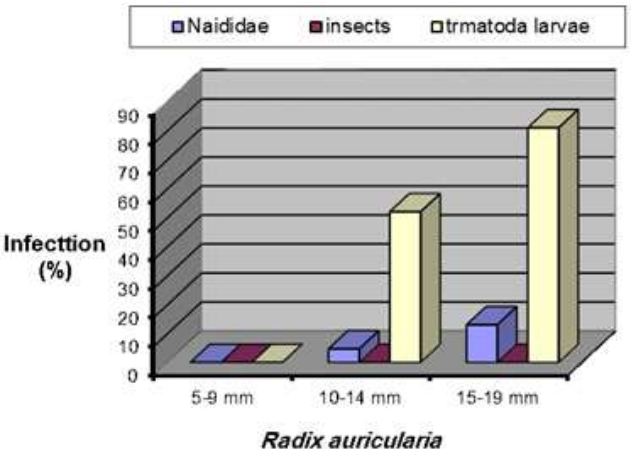


Fig. 2. Percent of infection of snail *Radex auricularia* with different invertebrates at Al-Suwayb station

with two larvae simultaneously (*O. turkestanicum* and *O. monosorbent*). There was no infection in the snails of small size class (Fig. 4).

Intensity of infection: At Al-Assafiyah station, the highest intensity of infestation with annelids was 2.5 percent in the snails of the large size class, while was 1.57 percent in the snails of the medium size class, and the total intensity of infection was 2.2. The intensity of insect infestation was 1.5 percent in the large-sized f snails and 1 in the medium class snails. Therefore, the total intensity of infestation with insect was 1.2 percent. The intensity of the total infestation with different invertebrate animals (worms and insects) was 1.95 percent (Fig. 5). At Al-Suwayb station, the highest value of the intensity of infestation with annelids was 1.6 percent in the snails of large size class, while it was 1 percent in the medium size class of snails. The total intensity of infection was 1.5 percent (Fig. 6).

Several invertebrates were associated with snail's *R. auricularia*, and were not previously associated the species of Oligochaeta species such as *P. proboscidea, P. aequiseta, P. longiseta, P. macrochaeta, A. leidyi*, and larvae of Chironomidae family with a snail's *R. auricularia*. However, there are no studies on the association of Oligochaeta with this snail except those that recorded in *C. limnaei* from England (Ibrahim 2007) and Iraq (Alabbad 2009. This association may relate to many benefits for these invertebrates, such as obtaining shelter, protection, and transportation. This was confirmed by Alabbad (2009) in his study on the species *C. limnaei*. Moreover, many species belonging to the Naididae family can be associated with animals that provide them with many benefits such as food continuity and stability, increased movement, and avoiding discomfort and the risk of predators (Gorni and Alves 2007). The size of the host provides a suitable space for movement (Abbad 2009). The associated worms with snails *R. auricularia* during the current study were previously recorded by Al-Abbad (2010) and Al-Abbad and Al-Mayah (2010) from the aquatic environment. They live free or associated with filamentous algae and some aquatic plants. This indicates that these species do not specialize in its living with the host snails. Many of the worms belonging to the Naididae family are free-swimming have the movement ability. But others don't have the ability to the active swimming, such as *C.limnaei*. However, can crawl on other bodies using their interior and posterior setae (Abbad 2009). The species *C. limnaei* is present in Al-Assafiyah area only and may be due to the region's conditions, which are characterized by being located away from the sources of organic pollutants and this was confirmed by Al-Abbad (2009). The Al-Suwayb area is directly affected by the tidal operations that could contribute

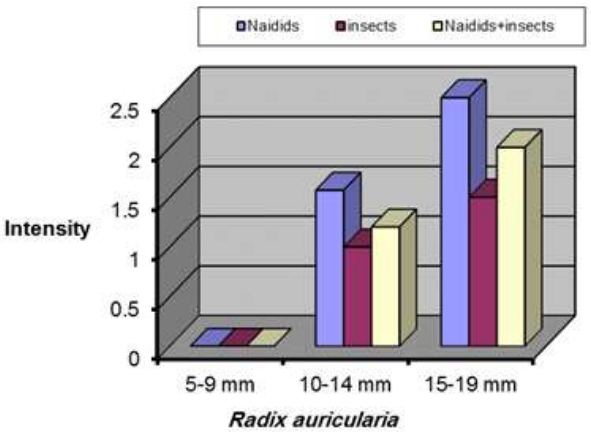


Fig. 3. Intensity of infection of snail *Radex auricularia* with different invertebrates at Al-Suwayb station

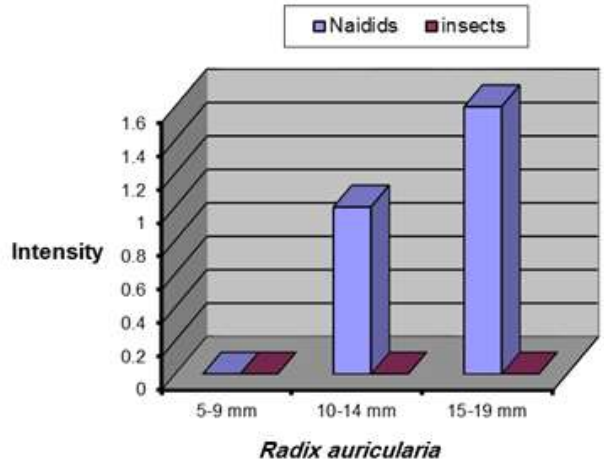


Fig. 4. Intensity of infection of snail *Radex auricularia* with different invertebrates at Al-Suwayb station

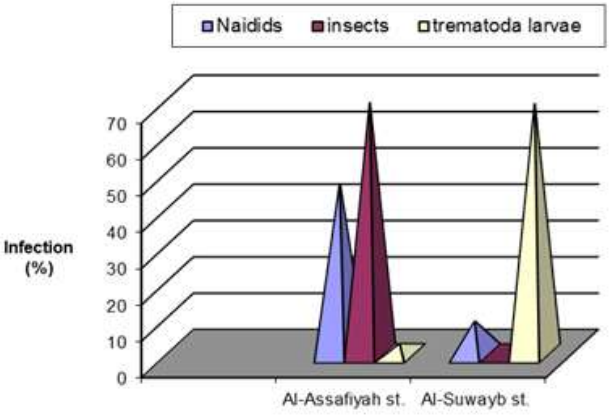


Fig. 5. Total intensity of infection of the snail's *Radex auricularia* with various invertebrates

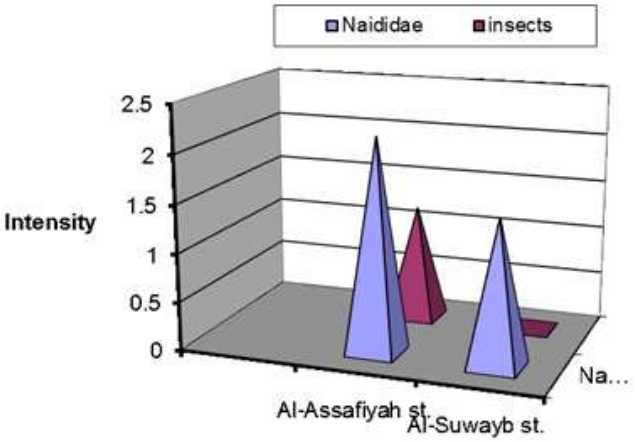


Fig. 6. Total infection percent of the snail's *Radex auricularia* with various invertebrates

to less pollution. The species of the genus *Chaetogaster* are less tolerant to pollutants. The presence of Oligochaeta and their distribution in aqueous environments depends on many factors, including the substrate and the changes in physical and chemical properties, which are essential and have a direct effect on the distribution of Oligochaeta (Alves et al 2006). Moreover, contamination with heavy materials and hydrocarbon sediments, organic matter, predation, and competition can interfere negatively with the numerical density of an Oligochaeta (Martins et al 2008).

The current study recorded infection of a snails *R. auricularia* with three types of internal parasites in Al-Assafiyah and Al-Suwayb stations, compared to nine types of cercariae belonging to parasitoid trematodes which recorded earlier.

REFERENCES

Al-Abbad MY 2009. *Identification and biological study of oligochaete Chaetogaster limnaei (Von Bear 1827) from some Basrah marshes in the south of Iraq.* Ph.D. Dissertation, collage of education. Basrah University, Iraq.

AL-Abbad MY 2010. New records of Pristina proboscidea and P. aequiseta (Oligochaeta: Naididae) from Iraq. *Marsh Bullettin* **5**(2): 132-141.

AL-Abbad MY and Al-Mayah SH 2010. New records of two species of Oligochaetes (Naididae): Pristina longiseta and P. macrochaeta from Iraq with notes on their Morphology and reproduction. *Mesopotamian Journal of Marine Science* **25**(2): 166-175.

Al-Abbad MYM 2009. *Diagnosis and life of the species Chaetogaster limnaei von Baer 1827 (Oligochaeta: Naididae) isolated from some types of Basra marsh snails in southern Iraq.* Ph.D. Dissertation, College of Education, Basra University, Iraq.

Alves RG, Marchese MR and Escarpinati SC 2006. Oligochaeta (Annelida, Clitellata) in lotic environments in the state of Sao Paulo. Brazil. *Série Zoologia* **96**(4): 431-435.

Brinkhurst RO and Jamieson BGM 1971. *Aquatic Oligochaeta of the world*. University of Toronto Press. Toronto. pp. 860.

Conn DB, Ricciardi A, Babapulle MN, Klein KA and Rosen DA 1995. Chaetogaster limnaei (Annelida: Oligochaeta) as a Parasite of the *Zebra mussel dreissena* polymorpha, and the *Quagga mussel dreissena bugensis* (Mollusca: Bivalvia). *Parasitology Research* **82**(1): 1-7.

Corbi JJ, Trivinho–Strixino S and Alves RG 2005. Records of Oligochaetes in freshwater sponges, on bryozoans and colonial hydrozoans from Brazil. *Brazilian Journal of Biology* **65**(1): 187-188.

Gorni GR and Alves RG 2006. Naididae (Annelida: Oligochaeta) associated with Pomacea bridgesii (Reeve) (Gastropoda: Ampullaridae). *Revista Brasileira de Zoologia* **23**(4): 1059-1061.

Gorni GR and Alves RG 2007. Naididae (Annelida: Oligochaeta) associated with Briophytes in Brotas, State of Sao Paulo, Brazil. *Revista Brasileira de Zoologia* **24**(2): 518-519.

Ibrahim MM 2007. Population dynamics of Chaetogaster limnaei (Oligochaeta: Naididae) in the field populations of freshwater snail and its implication as a potential regulator of trematode larvae community. Parasitology research. *Founded as Zeitschrift fur Parasitenkunde*, pp: 1-12.

James MT 1959. *Diptera. In Freshwater Biology*. Edmondson, W. T. (ed.) 2nd ed., USA: 1057-1079.

Liang YL and Wang HZ 2000. *Annelida, Oligochaeta, Microdrile Oligochaetes*. Pictorial Keys to Soil Animals of China. Science Press, Beijing: 90-98.

Mackie GL 1998. *Applied Aquatic ecosystem concepts*. University of Guelph Custom Coursepack. 12 Chapters.

Martins RT, Stephan NNC and Alves RG 2008. Tubificidae (Annelida: Oligochaeta) as an indicator of water quality in an urban stream in southeast Brazil. *Acta Limnologica Brasiliensia* **20**(3): 221-226.

Rabie AKA 1986. *Ecology of two types of pulmonary snails and Physa acuta Draparnand in Shatt al-Arab*. MS Dissertation, College of Science, Basra University, Iraq.

Ruppert EE and Barnes RD 1994. *Invertebrate zoology*. Saunders college publishing, 6th ed., 1056p.

Wetzel MJ, Kathman RD, Fend S and Coates KA 2000. *Taxonomy, Systematics and Ecology of freshwater Oligochaeta*. Workbook prepared for North America Benthological Society Technical information workshop, Paper 48: p120.

Received 23 March, 2021; Accepted 28 May, 2021