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Seasonal Variation in Infection Rates of *Melanopsis praemorsa* (L. 1785) (Thiaridae) Snails with Larval Trematodes in Azraq Oasis, Jordan

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Abstract

Five different types of cercariae were recovered from *Melanopsis praemorsa* snails collected from North and South Azraq during July 1983 to June 1984: a tailless cercaria, two pleurolophocercous cercariae, a gymnocephalous cercaria, and a xiphidiocercaria. The overall infection rate of *M. praemorsa* with these cercariae was 16.0%. Overall infection rates varied seasonally at both North and South Azraq. The level of infection was highest during February 1984 at North and South Azraq (39.2% and 42.2%, respectively). The lowest infection rate at North Azraq was 1.4% during May 1984, while it was 4.5% at South Azraq during July 1983. Out of 684 infected *M. praemorsa,* 650 were infected with the tailless cercaria. Thus, the seasonality of the tailless cercaria affected the seasonality of the overall infection. This cercaria was generally found in large snails measuring 13–18 mm long.

Key words: *Melanopsis praemora,* Azraq Oasis, Jordan, Cercariae

Introduction

Melanopsis praemorsa (L. 1758) is a common prosobranch snail in freshwater bodies of Jordan (Schutt, 1983). Ismail *et al.* (1983) reported the occurrence of a tailless cercaria and a pleurolophocercous cercaria in *M. praemorsa* snails collected from Azraq Oasis. Later, Ismail and Abdel-Hafez (1984) described additional two new types of cercariae from *M. praemorsa* in Azraq: a gymnocephalous cercaria (*Cercaria melanopsi* VIII) and a xiphidiocercaria (*C. melanopsi* IX). Moreover, Ismail and Abdel-Hafez (1983) have described seven new types of cercariae (*C. melanopsi* I through VII) recovered from *M. praemorsa* snails collected from Yarmouk River. Other workers (Ullman, 1954; Lengy and Stark, 1971; Tareen, 1976) reported the occurrence of larval trematodes in *M. praemorsa.* This paper presents the seasonal variation in infection rates of *M. praemorsa* snails from Azraq Oasis with larval trematodes.

Materials and Methods

Azraq Oasis is a semi-desert area in the East Jordanian Desert. It is composed of two villages five km apart, North Azraq and South Azraq. The permanent water of Azraq is supplied by two main springs with five pools, three at South Azraq and two at North Azraq (Nelson, 1973). For more description of the Azraq Oasis see Ismail and Abdel-Hafez (submitted for publication).

A total of 2,448 and 1,720 *Melanopsis praemorsa* snails were collected from the water pools at North and South Azraq, respectively, during the period from July 1983 to June 1984. The snails were collected randomly and examined for larval trematodes every month. Examination of the snails was carried out as described by Saliba *et al.* (1978). The length of infected snails was measured, using a caliper, to the nearest millimeter. Studies on larval trematodes recovered from *M. praemorsa* were made as described by Ismail and Abdel-Hafez (1983).

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Results

A total of 4,268 *M. praemorsa* snails were collected from North and South Azraq. Of these, 684 (16.0%) were found infected with larval trematodes. Five different types of cercariae, which were previously described by Ismail *et al.* (1983) and Ismail and Abdel-Hafez (1983), were recovered from this snail in the present study: a tailless cercaria, two pleurolophocercous cercaria (*Cercaria melanopsi* VI and VII), a gymnocephalous cercaria (*C. melanopsi* VIII), and a xiphidiocercaria (*C. melanopsi* IV). The overall infection rate of *M. praemorsa* with these cercariae was significantly higher ($P < 0.01$) at South Azraq (22.5%) than North Azraq (11.7%). The highest infection rate at North Azraq was 39.2% during February 1984, but ranged between 1.4–17.9% during the rest of the sampling periods (Fig. 1). The highest infection rate (42.2%) at South Azraq was also during February 1984. However, it was higher than 17.9% during September, October, December 1983, and January, April, June 1984. The lowest infection rate at North Azraq was 1.4% during May 1984, while it was 4.5% at South Azraq during July 1983 (Fig. 1).

Of the 297 infected *M. praemorsa* snails at North Azraq, 293 were found infected with the tailless cercaria, 2 with *C. melanopsi* VII, and 2 with *C. melanopsi* VIII. Thus, the seasonal variation in infection rates of *M. praemorsa* at North Azraq with the tailless cercaria (Fig. 2) was approximately corresponding to the seaonal variation in overall infection rates. Similarly, of the 387 infected snails at South Azraq 357 were harboured with the tailless cercaria, 1 with *C. melanopsi* VIII, 2 with *C. melanopsi* IX, 7 with *C. melanopsi* VI, and 20 with *C. melanopsi* VII. Thus, the seasonal variation in infection rates of *M. praemorsa* with the tailless cercaria at South Azraq (Fig. 2) resembled the seasonal variation in the overall infection rates. The highest infection rate (8.5%) of *M. praemorsa* with the pleurolophocercous cercaria (*C. melanopsi* VI and VII) was during June 1984 (Fig. 3). This was followed by 2.8% and 2.1% during October 1983 and April 1984, respectively. On the other hand, none of the snails collected during July to September 1983 were found infected

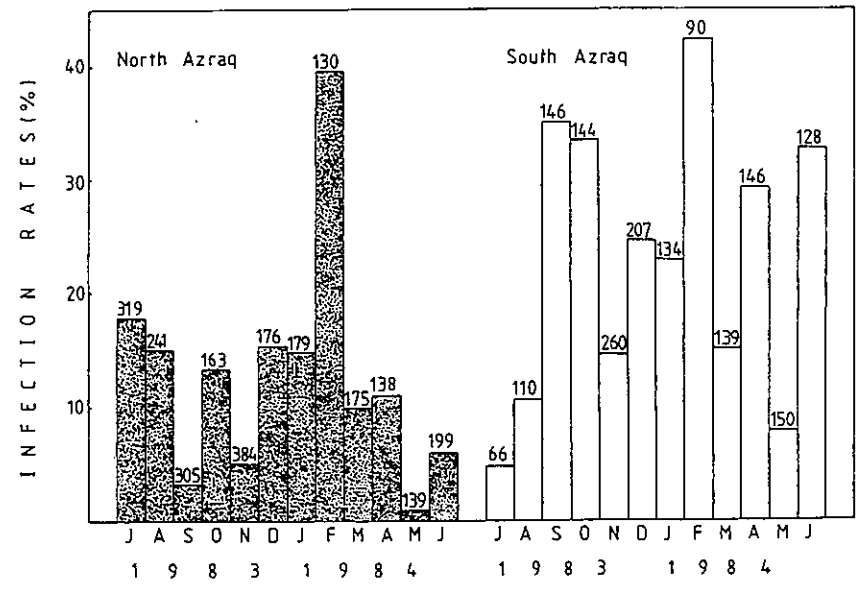

Fig. 1 Infection rates of *Melanopsis praemorsa* snails with larval trematodes in Azraq during July 1983 to June 1984. The number on the top of each bar represents the number of snails examined.

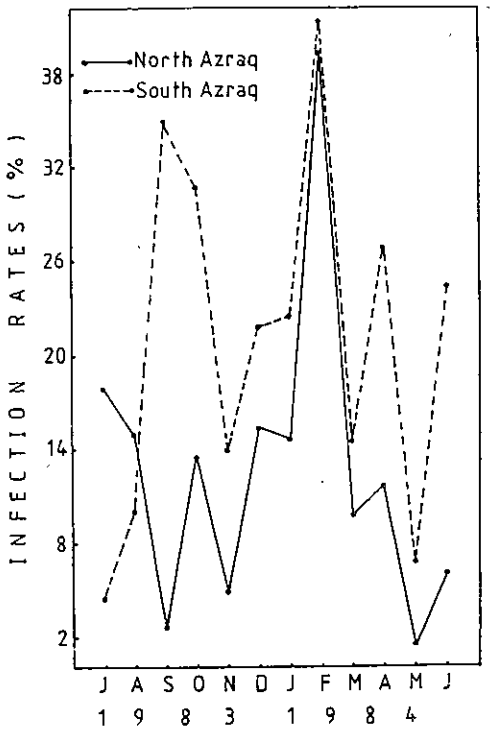

Fig. 2 Seasonal variation in infection rates of *Melanopsis praemorsa* snails with the tailless cercaria in Azraq during July 1983 to June 1984.

with these pleurolophocercous cercariae.

The *M. praemorsa* snails infected with the larval trematodes at both North and South Azraq measured 9–22 mm long (Fig. 4). However, 82.9% and 86.9% of these infected snails at South and North Azraq, respectively, measured 13–18 mm long.

Discussion

Five different types of cercariae have been found in *M. praemorsa* snails from Azraq Oasis: a tailless cercaria and *Cercaria melanopsi* VI to IX. Ismail and Abdel-Hafez (1983) reported the occurrence of nine different types of cercariae in *M. praemorsa* snails from Yarmouk River: *C. melanopsi* I to VII, a tailless cercaria, and the furcocercous cercaria (Cercaria Levantina 5) described by Lengy and Stark (1971). Thus, the tailless cercaria and *C. melanopsi* VI and VII, were the only 3 types of cercariae

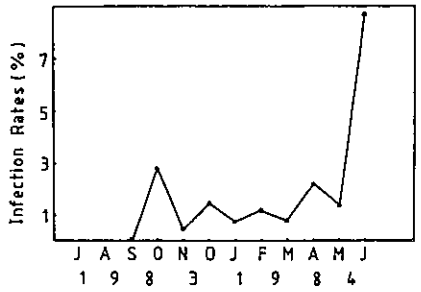

Fig. 3 Seasonal variation in infection rates of *Melanopsis praemorsa* snails with the pleurolophocercous cercariae in South Azraq during July 1983 to June 1984.

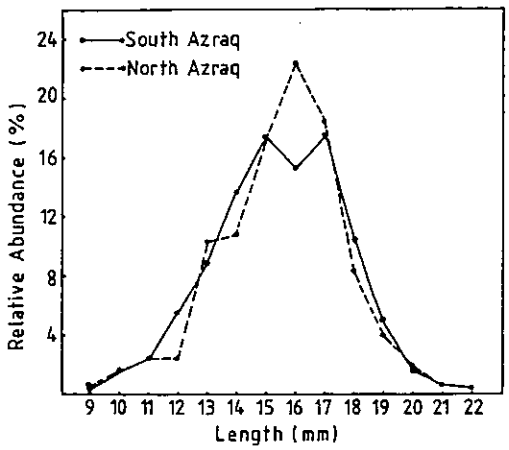

Fig. 4 Relative abundance of size classes of *Melanopsis praemorsa* snails infected with the tailless cercaria.

which were common for both Yarmouk River and Azraq waterbodies of Jordan.

The overall infection rate of *M. praemorsa* with larval trematodes in Azraq was generally high (16.0%) during July 1983 to June 1984. Ismail *et al.* (1983) reported that 3.0% of *M. praemorsa* snails were infected with larval trematodes during May–September 1981 in Azraq. The increase in the infection rate of *M. praemorsa* in the present study is probably due to the decrease in the water level in the pools of North and South Azraq. This resulted from the excessive pumping of water from Azraq to major cities in Jordan. In Yarmouk River, 3.7% of *M. praemorsa* were infected during May–October 1982 (Ismail and Abdel-Hafez, 1983). Lengy and Stark (1971) reported an overall

infection rate of 6.0% of *M. praemorsa* in Megiddo spring, Palestine. On the other hand, Tareen (1976) found that the infection rate of *M. praemorsa* with *C. orospinosa* in Savanda stream, Turkey, was 20.9%.

Of the 684 *M. praemorsa* infected snails, 650 (95.0%) were infected with the tailless cercaria. Thus, the seasonality of the tailless cercaria affected the seasonality in the overall infection rates. Recently, Ismail and Abdel-Hafez (In press) found that the tailless cercaria was the most abundant cercaria in *M. praemorsa* snails collected from Yarmouk River. However, infection rates with the tailless cercaria were higher in *M. praemorsa* from Azraq than those from Yarmouk River (0.0%–7.5% and 1.4%–41.0%, respectively). The highest infection rate with this cercaria was during February at both North and South Azraq.

The tailless cercaria was found mainly in medium sized snails measuring 13–18 mm long. Ullman (1954) and Tareen (1976) found that *C. orospinosa* was abundant in large *M. praemorsa* snails.

Acknowledgments

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References

1) Ismail, N. S. and Abdel-Hafez, S. K. (1983): Larval stages of digenetic trematodes of *Melanopsis praemorsa* (L. 1758, Buccinum) (Thiaridae) snails from Yarmouk River, Jordan. Z. Parasitenkd., 69, 613–626.
2) Ismail, N. S. and Abdel-Hafez, S. K. (1984): Two new cercariae from *Melanopsis praemorsa* (L. 1758) (Thiaridae) snails in Azraq Oasis, Jordan. Jpn. J. Parasit., 33, 353–359.
3) Ismail, N. S. and Abdel-Hafez, S. K. (In press): Population dynamics of *Melanopsis praemorsa* (L., 1758) (Thiaridae) snails in Yarmouk River, Jordan and its seasonal infection with larval trematodes. Arab Gulf J. Sci. Res.
4) Ismail, N. S., Saliba, E. K. and Tomo, M. (1983): Studies on larval stages of digenetic trematodes of *Melanopsis praemorsa* L. snails from Azraq Oasis, Jordan. Jpn. J. Parasit., 32, 517–523.
5) Lengy, J. and Stark, A. (1971): Studies on larval stages of digenetic trematodes in aquatic molluscs of Israel. 2. On three cercariae encountered in the freshwater snail *Melanopsis praemorsa* L. Israel J. Zool., 20, 41–51.
6) Nelson, B. (1973): Azraq, Desert Oasis. Cox and Wyman Ltd., London, 463 pp.
7) Saliba, E. K., Lufty, R. G. and Ismail, N. S. (1978): Fascioliasis in Azraq Oasis, Jordan. II. Infection of *Lymnaea auricularia* with *Fasciola gigantica* Cobb., 1895 cercariae. Acta Parasit. Pol., 25, 51–55.
8) Schutt, H. (1983): Die bisher aus Jordanien bekannten sußwasser- und land-bewohenende Mollusken anhand der Aufsammlungen von. Dr. Bandel 1978. Natur. und Mensch., pp. 49–64.
9) Tareen, I. U. (1976): *Cercaria orospinosa* encountered in the snail *Melanopsis praemorsa* L. from a mountain stream in Turkey. Int. Revue ges Hydrobiol., 61, 699–702.
10) Ullman, H. (1954): Observations on a new cercaria developing in *Melanopsis praemorsa* in Israel. Parasitology, 44, 1–15.