MARINA MESOPOTAMICA 20(1):1-6 2005

CERCARIAL PRODUCTION OF *Lymnaea auricularia* EXPERIMENTALLY INFECTED WITH DIFFERENT NUMBERS OF *Fasciola gigantica* MIRACIDIA

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ABSTRACT

In the present study three groups of *Lymnaea auricularia* snails A, B and C were infected with 1,5 and 10 *Fasciola gigantica* miracidia respectively and their cercarial production was observed. The first emergence of Cercariae was delayed with increase of miracidial dose, but it was not correlated with the number of miracidia inoculated. Group A had three peaks of cercarial output at 6^{th}, 11^{th} and 15^{th} weeks, group B had two peaks at 7^{th} and 10^{th} weeks and group C had one peak at 7^{th} week after the first cercarial emergence. The daily number of emergent Cercariae of the three groups was irregular. The number of cercariae shed by snails was not correlated with the number of miracidia inoculated into the snails.

INTRODUCTION

Fascioliasis causes considerable economic loss to the live stokes industry (Lee, 1993, Lee *et al.*, 1995, Chauvin *et al.*, 1995; Moreau *et al.*, 1998). It occasionally occurred in human, after utilizing the contaminated watercress or other aquatic vegetables (Hillyer *et al.*, 1996; Narian *et al.*, 1997).

It is well known in southern and middle part of Iraq that *F. gigantica* is transmitted by the snail *L. Auricularia*, which is suitable intermediate host of this parasite. Knowledge of the output of cercaria from infected snails is important in the control measurements, because the level of infection of the domestic animals will be related to the number of free cercaria, which emerged from infected snails (Hodasi, 1972). The lonely study, which dealing with the dynamic of cercaria production of *F. gigantica* in their snails host is that of (Al-Habbib and Al-Zako, 1981). The present study deals with the production and emergence of *Fasciola* cercaria from *L. auricularia,* which were exposed to different numbers of miracidia.

MATERIALS AND METHODS

F. gigantica eggs were obtained from the gall bladder of infected buffalo at Basrah abattoir. The bile was washed several times with tap water. The eggs were collected and incubated in darkness at 25°C (±1) to become embryonated. Mass hatching was induced 17 days later by exposure to light. Laboratory reared *L. auricularia* were selected from culture vessels and randomly divided into three groups (A, B and C) with fifty snails in each group. Each snail from group A was exposed to single miracidium group B and C were exposed to five and ten miracidia, respectively. All the infected snails were brought back to culture vessels and maintained at laboratory temperature.

The snails were examined for the larval flukes through the transparent shell under a stereomicroscope 28 days after exposure.

Thirty-five, 27 and 31 snails of the groups A, B and C were selected, respectively and individually distributed into small cases to observe the emergence of cercaria, as described by Itagaki *et al.* (1992). The water in the cases was changed every day by fresh water. Metacercaria, encysted on the inner surface of cases, were counted every day at definite clock time from day 33 after exposure to the day of snails death.

Comparisons between groups were made by analysis of variance (ANOVA) and regression by using the statistical package SPSS (James, 1999).

RESULTS

The present study showed that the snails initiated cercarial shedding at the period between 33-38 days post infection (35.5 days on average) in snails of group A, at the days 38-42 (day 40) in group B, and at 38-44 (day 41) in snails of group C.

Average of daily production of cercariae in each group is show in Figures (1-3). In group A, a peak is fairly distinctive on weeks 6, 11, 15 after the first cercarial emergence. In groups, B and C the output pattern was almost the same as that of the group A. The weekly cumulative number of cercarial per snail of group A was 3 peaks at 3, 11 and 15 weeks after the first cercarial emergence, of group B was 2 peaks at the 7^{th} weeks (Fig. 4).

The number of infected snails was reduced with duration of infection and all the snails of the groups A, B and C died at days 109,75 and 82 after the first cercarial emergence, respectively.

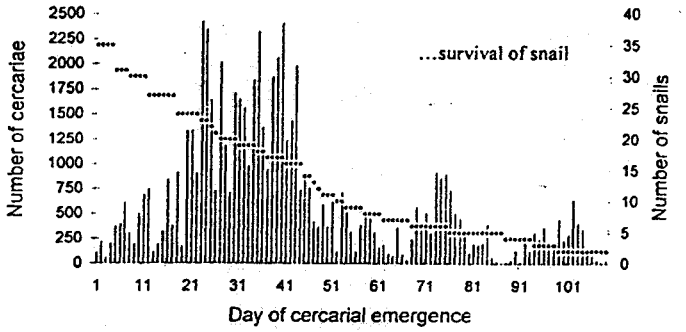

Fig. (1) Daily total number of cercariae shed by ***L. auricularia*** snails infected with a single miracidium of ***F. gigantica*** and survival of infected snails

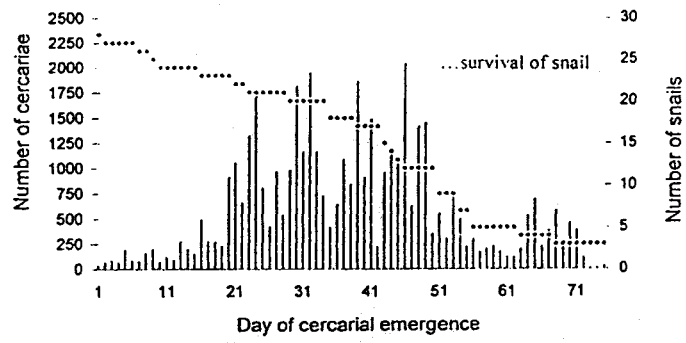

Fig. (2) Daily total number of cercariae shed by ***L. auricularia*** snails infected with a 5 miracidium of ***F. gigantica*** and survival of infected snails

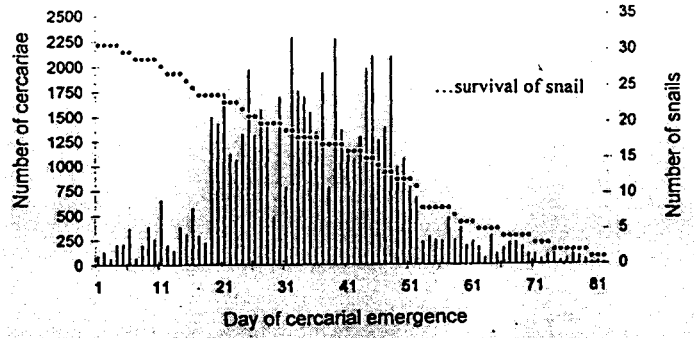

Fig. (3) Daily total number of cercariae shed by ***L. auricularia*** snails infected with a 10 miracidium of ***F. gigantica*** and survival of infected snails

DISCUSSION

The dynamic of cercarial shedding synchronized with cercariogenesis in snails (Theron, A. 1981; Itagaki *et al.*, 1992). More over, the cercarial was influenced by the size, growth, nutrition, and rearing condition of snail, such as temperature density and compatibility (Itagaki and Itagaki, 1989).

The delay in cercarial emergence observed in present study may be due to the difference in the age of snails of the experiment rather than to the number of meracidia penetrated into the snails. Similar conclusion has been suggested by Itagaki and Itagaki (1989) and Itagaki *et al.* (1992).

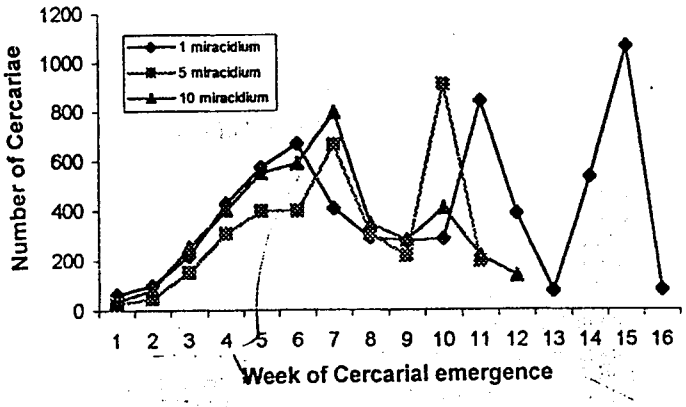

Fig.(4): Weekly average number of cercariae shed by *L.auricularia* individual snail infected with different number of miracidia of *F. gigantica*

Different number of cercaria was reported to be passed by a single snail infected with different dose of meracidia though out their life span. The emergence number was 629 in *Psudosuccinea columulla*, infected with a single of *F. hepatica* miracidium (Krull, 1941), 594 in *L. trunctula* exposed to 5 miracidia of *F. hepatica* (Hodasi, 1972), and 222.8 cercaria was emergent from *L. auricularia* exposed to 5 miracidia (Al-Habbib and Al-Zako, 1981). In comparison the present investigation showed that the total number of emergent cercariae throughout the life span of a single snail of groups A, B and C were 401.89, 330.2 and 330.8, respectively. Result exhibit that no significant correlation exists between the dose of miracidia and number of emergent cercaria and there is a little difference between the numbers of cercariae passed by the three groups of our experimental snails.

Similar results were reported by Itagaki and Itagaki (1989) in *L. ollua* inoculated by 1, 5 and 10 miracidia of *F. hepatica* and investigators explain that the results due to that the mother rediae, produced by sporocyst in the snails, which were infected with the highest number of miracidia, were too many to sufficiently nourished for development.

ACKNOWLEDGEMENT

The authors are very grateful to Dr. Assad Y. Ayied, College of Agriculture, Department of Animal Resources for his assistance in statistical test.

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إنتاجية المذنبات من قواقع *Lymnaea auricularia* المصابة تجريبيا بأعداد مختلفة من مهدبات *Fasciola gagintica*

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الخلاصة

تم خلال الدراسة الحالية إصابة ثلاثة مجاميع A و B و C من قواقع *Lymnaea auricularia* بمهدبة واحدة و 10 و 5 مهدبات لـدودة حلزون الكبد العملاقة *Fasciola gigantica* على التوالي و درست إنتاجيتها من المذنبات. و لوحظ بأن أول انطلاق للمذنبات قد تأخر مع زيادة جرعة المهدبات. كما وجد بان هناك ثلاث قمم للانطـلاق فـي قواقع المجموعة A عند الأسبوع السادس و الحادي عشر والخـامس عشر بعد أول إنطلاق للمذنبات، و قمتين في قواقع المجموعة B عند الأسبوع السابع و العاشر و قمة واحدة للإنطلاق عند الأسبوع السابع في قواقع المجموعة C. كما كان الإنطلاق اليومي للمـذنبات مـن مجاميع القواقع الثلاثة متذبذبا و غير منتظما و أن أعـداد المـذنبات المنطلقة من القواقع غير الرتبطة مع أعداد المهدبات المصيبة للقوقع.