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THE EFFECT OF VARIATION IN MIRACIDIAL EXPOSURE DOSE ON EXPERIMENTAL INFECTIONS OF *FASCIOLA GIGANTICA* in *LYMNAEA GEDROSIANA*

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ABSTRACT

The laboratory infection of *Lymnaea gedrosiana* with 2,5 and 10 miracidia of *Fasciola gigantica* resulted in infection rates of 20%, 40% and 69%, respectively, with a prepatent Period of 66-88 days. There was a significant difference in infection rate between the snails infected with 2and those with 10 miracidia ($P < 0.05$). At 92 days post-infection there were 25% to 33.3% of live snails still harbouring immature stages of *F. gigantica* larvae. The mortality rate of the infected and non-infected control groups showed no marked differences.

INTRODUCTION

At the present time, our knowledge concerning the host-parasite relationship of *Lymnaea gedrosiana* and *Fasciola gigantica* is meagre. Such knowledge may be needed for effective control of the problem. The effect of exposure dose of miracidia on the biology of the snail host and the subsequent development of

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the larval stages of the parasite is an interesting subject in the host-parasite relationship of *L. gedrosiana* and *F. gigantica*. Previous studies include those on *Schistosoma japonicum*, (5) on *Schistosoma haematobium* (1) and on *Ornithobilharzia turkestanicum* (4).

MATERIAL AND METHODS

In this study laboratory bred 5-7 mm long *L.gedrosian* snails were used . The snails were divided into 4 groups, each groups consisting of 50 snails. The snails in group IV were used as non-infected controls. Each individual snail in groups I,II and III was exposed to 2,5 and 10 miracidia, respectively, the miracidia being counted carefully under a dissecting microscope and transferred with a fine pippete to a test tube containing 2 ml pond water . One snail was added to each test tube and left for at least 4 hours under artificial light, after which the snails in each group were maintained in separated glass tanks at 25-27 C.

The number of dead snails was recorded everyday. From 30 days after exposure the live snails in each group were maintained in a separate small container, a piece of polyethylene plastic sheath being floated on the surface of water. The emerged cercariae easily attached themselves on the surface of plastic sheath and became metacercariae. Each day the plastic sheath and the glass container were checked for metacercariae or cercariae. These observations were continued up to 92 days after exposure and prepatent period of cercarial shedding was determined.

On day 92 after exposure the non-cercarial shed snails were crushed between 2 glass slides and searched for any immature cercarial stages or redia under the dissecting microscope .

RESULTS

On the 13th day the *F. gigantica* eggs kept in plain water 23 C° developed miracidia which hatched immediately after exposure to light. Out of the 50

Lymnaea gedrosiana exposed to 2 miracidia (group 1) at the time of cercarial shedding 20 were alive, only 4 of them shedding cercariae, while out of those of group II exposed to 5miracidia,15 remained alive, only 6 of which were sheddi ng cercariae. Finally, in the case of group III, exposed to 10 miracidia, 13 were alive 9 of them shedding cercariae. The infection rates in groups I, II and III were 20% 40% and 69%, respectively, the prepatent period ranging between 81 and 88 days for group I and between 74 and 81 days for both groups II and III (Tables 1 and 2).

All the negative snails at 92 days after exposure were crushed between two slides and searched for cercariae under a dissecting microscope. There were 4 snails in group 1 (25%) and 2 in group II (33.3%) still containing immature stages of redia and cercariae. There were no marked differences between the different groups as regards the prepatent period, but there were significant differences between infection rates of group I and III ($P < 0.05$). At the end of the shortest cercarial prepatent period (74 days)the number of surviving snails in the control group was 16, white in groups. I ,II and it was 20, 15 and 13, respectiviely. The survival rates of snails in the experimental groups and non-infected control group were not different significantly (Table 3).

DISCUSSION

large Investigating the infection rate of snails exposd to different doses of ratesin" miracidia, (2) showed that *Biomphalaria glabrata* was 100% susceptible to numbers of *Schistosoma mansoni miracidia*,other investigators found 100% infection *B.truncatus* to 20 miracidia of *Schistosoma haematobium* (1) and others obtained the same rate in *L. gedrosiana* with 20 miracidia of *Ornithobilharzia turkestanicum* (4).We obtained only 69% infection rates with 10 miracidia of *F.gigantica*.

Snail mortality subsequent to infection was 78% in the group to 10 miracidia at 88 days post-infection, which showed no significant difference as compared to the non-infected control group (70%). High mortality rates have been demonstrated in *L.gedrosiana* infected with *O.turkestanicum* miracidia (4) as well as in *B. truncatus* infected with *Schistosoma bovis* (50%) (3).

Table 1: Effect of exposure dose of *F. gigantica* miracidia on infection rate of *L.gedrosiana*.

group	Infected snails		Non--infected snails		Total	
	Number	%	Number	%	Number	%
group I (2 miracidia)	4	20	16	80	20	100
group II (5 miracidia)	6	40	9	60	15	100
group III (10 miracidia)	9	69	4	31	13	100

Table 2: Effect of dosage of miracidia on the cercarial incubation period of *F.gigantica* in *L.gedrosiana*

Group	total number of cercarial shedding snails	Number of snails shedding cercariae for the first time on the days following exposure							length of incubation period in days (mean)
		66	74	78	79	81	86	88	
Group I 2 miracidia	4	0	0	0	0	2	1	1	81-88(84)
Group II 5 miracidia	6	0	2	0	2	2	0	0	74-81(78)
Group III 10 miracidia	9	3	1	3	1	1	0	0	66-81(74)

Table 3: Longeivity of non-infected and cercarial shedding *L.gedrosiana*

Time after exposure (days)	snails survival in group I (2 miracidia)		snails survival in group II (5 miracidia)		snails survival in group III (10 miracidia)		snails survival in in non-infected control group	
	No	%	No	%	No	%	No	%
0	50	100	50	100	50	100	50	100
28	42	84	43	86	47	94	44	88
19	41	82	36	72	43	86	41	82
10	37	74	31	62	37	74	35	70
36	33	66	29	58	28	56	27	54
45	29	58	26	52	26	52	25	50
55	25	50	24	48	21	42	24	48
64	20	40	19	38	14	28	20	40
74	20	40	15	30	13	26	16	32
78	20	40	13	26	11	22	16	32
84	20	40	13	26	11	22	15	30
88	20	40	12	24	11	22	15	30

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