

Research Note

The Influence of Shadowing on Emergence
of *Schistosoma haematobium* Cercariae during Daytime

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There is little information on cercarial contamination in natural water. It is well known that the emergence of *Schistosoma haematobium* cercariae from the intermediate host snails is diurnal, and some workers reported that it is regulated by light conditions (McClelland, 1967; Webbe and James, 1972; Nojima and Sato, 1978; Nojima *et al.*, 1981; Nojima and Sato, 1982). Nojima and Sato (1978) showed that the interjection of a period of darkness, the duration of which could be as short as 5 seconds during the photoperiod, stimulated *S. haematobium* cercarial shedding immediately, but not *S. mansoni* cercariae. The present study was designed to clarify how the interjection of darkness affects the density of *S. haematobium* cercariae released by *Bullinus globosus* in natural water during the daytime.

The observations were performed at Kinango Dam, located Kwale District in Kenya and

inhabited by *B. globosus* transmitting *S. haematobium*. The area of Kinango Dam was about 2,500m², flow of water was not seen, and infection rate of snails was about 5%. Water samples containing cercariae were collected at neighboring two sites near the bank, one of which was covered by black vinyl sheet (5 × 4.5 m) for one hour during the daytime (08:30 hr–09:30 hr). The water samples were examined for cercariae at intervals of 45 minutes or one hour (i.e., 08:30, 09:30, 10:15, 11:00, 12:00, 13:00, 14:00, 15:00, 16:00, 17:00 hr). Five or 10 liters of natural water were poured into a bucket by a small graduated pail, filtered through 1mm steel mesh to remove larger debris like chips and leaves. After formalin-fixing (0.5%), the water was treated by the filtration system (modified apparatus; Prentice, 1984) with nylon filament filter (9 × 9 cm, a pore size of 30 μm). The cercariae, stained with 0.01% Light Green-2% acetic acid solution, on filter were counted under a stereoscopic microscope.

The observations were carried out for two days, as shown in Fig. 1. The first experiment was done on fine day, and water temperature was 24.5–29.4°C (A). The second experiment was done on a day which was cloudy and bright with sunny intervals, and water temperature was 25.0–30.9°C (B). The peak of cercarial density was found in the experiments at uncovered site (control) at 13:00 hr (A) or 12:00 hr (B), while that was observed in the experi-

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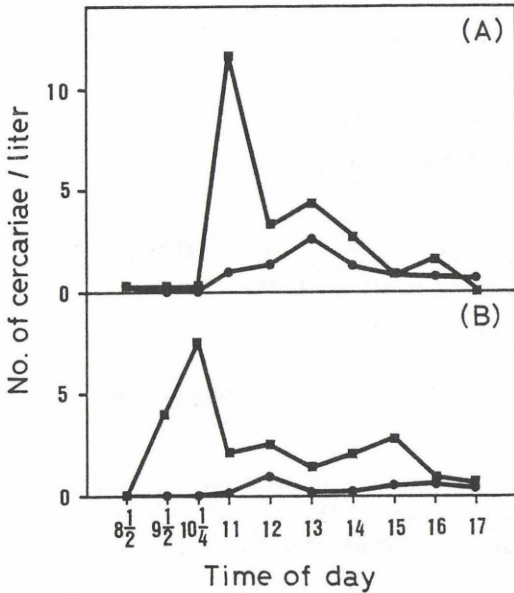


Fig. 1 The density of *S. haematobium* cercariae. The observations were carried out at neighboring two sites, experimental site (■—■) and control site (●—●), for two days (A, B). The experimental site was covered by black vinyl sheet during the period from 08:30 hr to 09:30 hr.

ment at covered site at 11:00 hr (A) or 10:15 hr (B). It was clear that the peak observed at the covered site occurred immediately after the injection of one hour period of darkness. Further, total numbers of cercariae were much larger at covered site than at uncovered site for both of 2 days.

Cercariometry is now of importance in measurement of the transmission potential at natural water. To our knowledge, very little is known on the distribution of *S. haematobium* cercariae in the field. The distribution of cercariae may be affected by light conditions, water velocity, water volume and cercarial activity. In this study, light conditions were changed experimentally, water velocity was negligible, and volume were constant. As for cercarial activity, we did not have any way to check. Within these conditions, this study elucidates the eccentric effect of darkness on diurnal emergence of *S. haematobium* cercariae, resulting in a shifted peak and a big number of

cercariae. This fact suggests that human activity making shadow or rapid change of light conditions (from fine to dark cloudy weather) may stimulate the emergence of *S. haematobium* cercariae from snails and raise the risk of infection. Our observations almost coincided with results from Nojima and Sato (1978), which showed that peak occurred during the interjection of one hour period of darkness and total number of cercariae in experiment with darkness interjection was twice as much as that in control.

Since many factors may affect the distribution of cercariae, further studies on cercarial density and activity seem to be warranted.

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ビルハルツ住血吸虫セルカリアの遊出に及ぼす光遮断の影響

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ビルハルツ住血吸虫セルカリアの遊出に及ぼす光遮断の影響を調べるために、ケニア国クワレ地区の水系で隣接する2地点を選び、1地点は朝1時間黒いビニールで覆い、両地点から水を採取し、水に含まれるセルカリアをフィルター濾過法により検出した。自然条

件ではセルカリア遊出のピークは昼頃に見られたが、黒いビニールで覆った地点では暗黒にした45分～1.5時間後にセルカリア遊出のピークが見られ、検出されたセルカリアの総数も増加した。