

## The Habitat of the Snail Host of *Schistosoma japonicum* in the Philippines

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The wartime interest in schistosomiasis makes it timely to set forth some field observations on the habits and habitats of the intermediate host. In 1913 an investigator in Japan (1) incriminated a snail as the intermediate host of *Schistosoma japonicum*. A fresh-water form, at present designated as *Schistosomophora quadrasi* (Mollendorff), was reported by Tubangui (2) to be the intermediate host of the causative agent of schistosomiasis in the Philippine archipelago. With an increased amount of material available for examination, Bartsch (unpublished material) has shown *Schistosomophora hydrobiopsis*, often considered as a host in the central Philippines, to be synonymous with *S. quadrasi*.

*S. quadrasi* has been reported from eastern Leyte (Alangalong to Abuyog, inland to Dagami), eastern Mindoro, northeastern Mindanao, and all of Samar. There have been no reports of the species from Luzon, Panay, Negros, or Cebu. Observations reported herein were made primarily on southern Samar and around Palo, Leyte, during the early part of 1945.

Although the species is amphibious, its periods of terrestrial existence are not as prolonged as a review of the literature would indicate. The preference for an aquatic environment apparently is proportional to the temperature. These mollusks were found on the stems of emergent vegetation, particularly reeds, often as much as four inches above the water surface. However, this was true only in the early morning and in the cooler part of the evening. During the hotter part of the day they migrated beneath the water surface and were especially abundant in the shade of overhanging trees and shrubs. Collecting from emergent vegetation was not very profitable in the early afternoon. No observations were made as to their nocturnal locations. However, when placed in artificial containers indoors, the majority remained submerged and made little effort to leave the water.

Under natural conditions these snails were most frequently found in grassy ponds or slowly moving water. They do not normally live in swiftly flowing water, although floods may transport the debris to which they are attached great distances and into unnatural environments. They were abundant in the brown algal scum in the slowly flowing seepages from

the banks of ponds and ditches. They seemed particularly to prefer, and were easily collected from, floating dead coconut fronds and partially submerged coconut husks. They apparently did not migrate into deep water, but could occasionally be collected from bottom debris and the surface of the mud in shallow bodies of water. No specimens were taken from wells. Contrary to expectations, rice paddies were not heavily populated by these snails.

The water in most of these habitats was found to have a pH of about 6.0 when tested with nitrazine indicator paper. The great amount of pollution and dead vegetation probably aids in maintaining this acidity. Some concept of the degree of pollution with human wastes might be obtained from the fact that in one area 36 per cent of the *S. quadrasi* examined contained developmental stages of human schistosomes.

Associated in the same habitats were *Melanoides turriculus* (Lee), *Physastra hungerfordiana* (Nevill), *Fossaria philippinensis* (Nevill), *Gyraulus quadrasi* (Mollendorff), and *Helicorbis mearnsi* (Bartsch). Determinations of all specimens were made by Dr. Paul Bartsch, of the Smithsonian Institution.

In general, it may be said that in the Philippines *S. quadrasi* occurs in shallow, quiet, or slowly flowing, polluted, acid water that contains an abundance of decayed organic matter, particularly coconut fronds. In such habitats they may be very abundant.

### References

1. NIYAIRI, K. *Tokyo med. Weekly*, 1913, No. 1839.
2. TUBANGUI, M. A. *Philip. J. Sci.*, 1932, 49, 295.

## Systolic Effect by Sulfhydryl Reagents<sup>1</sup>

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Considerable attention has been given in the past to the phenomenon of systolic standstill in the isolated frog heart which can be obtained with such diverse groups of substances as the cardiac glycosides, the veratrum alkaloids, ascorbic acid, the angelicalactones, and other oxidizing agents.

It has been demonstrated by the author (3) that cysteine and glutathione prevent the systolic standstill of the isolated frog heart caused by the oxidizing agents  $\alpha$ - $\beta$  and  $\beta$ - $\gamma$  angelicalactone and *t*-butyl hydrogen peroxide. On the assumption that the -SH groups contained in cysteine and glutathione are responsible for this action, it was thought that specific

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