

A study on *Paramphistomum microbotbrium* in Khuzistan S.W. Iran

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Introduction

Epizootics in ruminants caused by trematods belonging to the genus *Paramphistomum* are reported from different parts of the world. Each geographical region has one or several species of this genus which are apparently adapted to local conditions.

During surveys made on Bilharziasis in Khuzistan, we found that in some areas specimens of *Bulinus truncatus*, the intermediate host of *Schistosoma haematobium* and *Sch. bovis*, were infected with cercariae which shortly after the emergence from *Bulinus* attached themselves to vegetation inside the water or on the surface of the jar, and were very similar to those of *Paramphistomum* spp. (fig. 1). The present study was undertaken on this subject in order to confirm and determine :

1. The existence of *Paramphistomum* spp. in Khuzistan and its species.
2. The incidence of infection among ruminants in the Bilharziasis control pilot project area, located in Dezful, northern part of Khuzistan, S. W. Iran.

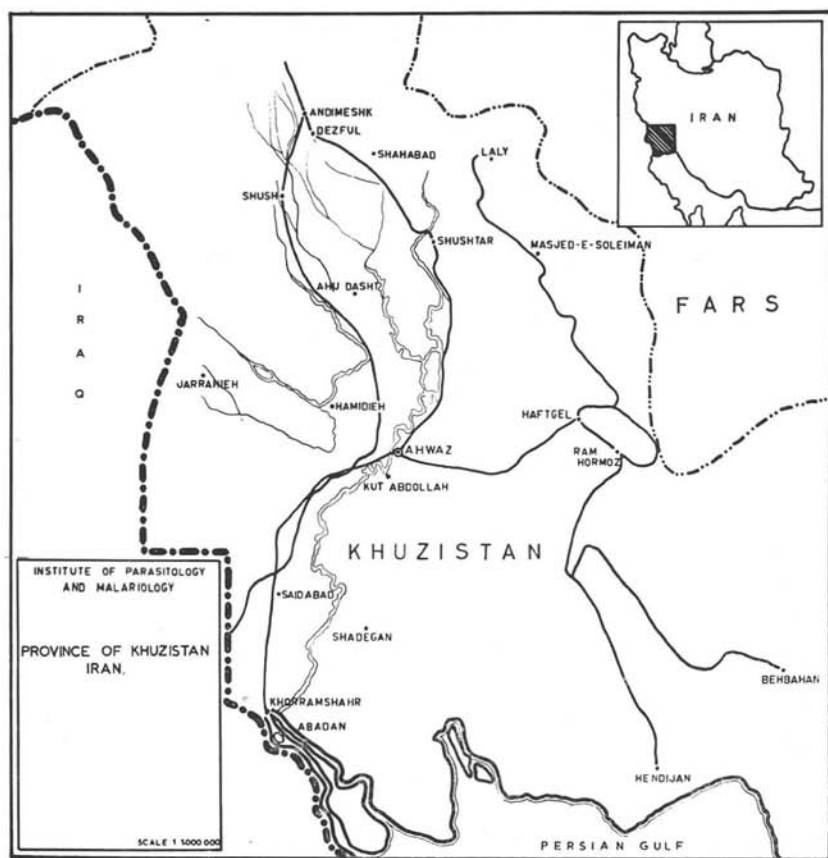
Laboratory studies

On November 30, 1960, infected *Bulinus* snails collected from a canal (Nahre Bahman) situated south of Dezful (see attached map) were transferred

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to the Headquarters in Teheran at the Bilharziasis Laboratory of the Institute of Parasitology and Malariology to produce the experimental infection of animals and obtain the adult worms.



Polyethylene bags were used for this experiment in order to keep the metacercariae alive for a period of 20 days. The procedure was as follows:

Polyethylene bags were placed in a jar and filled with water, then infected *Bulinus* snails were put in the water. Pieces of green paper were put in the jar outside of the bag.

Soon hatched cercariae encysted on the inner surface of the polyethylene bag, in the proximity of the green paper. Metacercariae were kept for a period of 20 days in the water. Then polyethylene bags were cut into very small pieces, each with some metacercariae attached to it. The number of metacercariae was then counted and the pieces of polyethylene were put inside the leaves of lettuce and fed to a sheep which was 3 months of age when the first feeding was made (18th December, 1960).

The total number of metacercariae fed to the animal was 460 up to December 26, 1960.

The lamb was kept in a shed and given regular dry food and water without being taken to the pasture.

The stool of the animal was examined repeatedly and regularly by different methods (floatation, M.I.F.C., glycerine sedimentation) and only eggs of *Trichuris* spp. and *Strongyloides* spp. were found. The lamb started passing eggs of *Paramphistomum* in the feces on February 26, 1961, i.e., 69 days after the first infection with metacercariae.

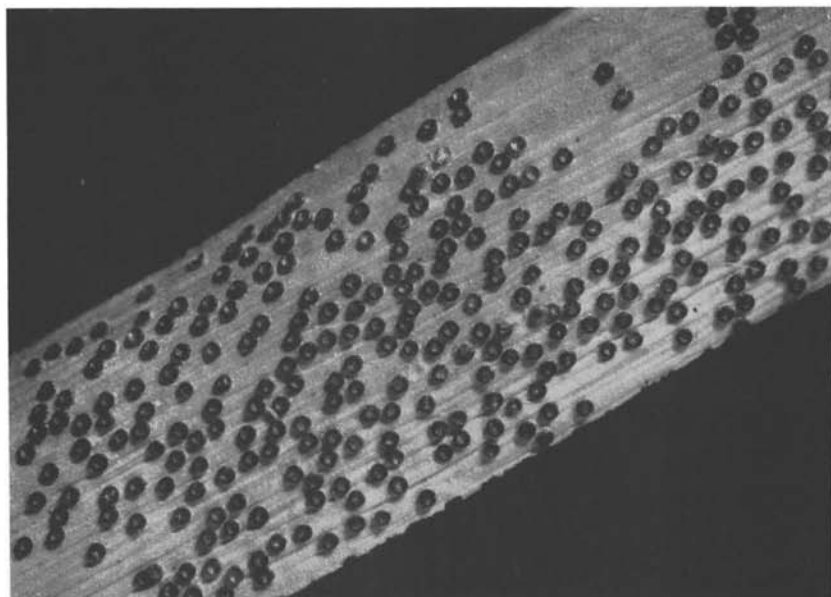


FIG. 1. — Metacercariae of *Paramphistomum* on the surface of vegetation. (Photographed by Dr. Razavi, Audio-visual Section, Institute of Parasitology and Malariology, Téhéran).

The animal was sacrificed on August 15, and its viscera were examined. A total of 50 mature worms were recovered from its rumen and reticulum. The majority of the worms were attached to the mucosa of the rumen (fig. 2 and 3).

The worms had an average length of 4.7 mm. and a diameter of and were identified as *P. microbothrium*. From 460 metacercariae fed to the animal, 50 worms were found. It means that 10.8 % of metacercariae reached maturity.

For confirmation of the identification of *Paramphistomum* found, ten of the specimens were sent to the East African Veterinary Research Organization in Kikuya, through the courtesy of Dr. N. Ansari, Division of Communicable Diseases, WHO, Geneva.

These specimens were kindly identified by J. A. Dinnik as *Paramphistomum microbothrium* Fiscoeder, 1901.

Field studies

Studies were undertaken in order to find the rate of infection among ruminants in the Bilharziasis Project area in Dezful (see map).

Among 36 sheep, 10 cows and two buffaloes so far examined in the Bilharziasis Research Station, specimens of the genus *Paramphistomum* were recovered from 12 sheep (33.3 %), two cows (20 %) and one buffalo; some of the sheep were infected with *Paramphistomum* spp., *Sch. bovis* and *Fasciola hepatica* at the same time.

Natural infection of *Bulinus truncatus*.

The rate of infection of wild *Bulinus truncatus* with the cercariae of *Paramphistomum* spp. was also studied. 142 infected *Bulinus* were found among 3071 *Bulinus* collected in different months of the year.

Infection usually occurs among *Bulinus* collected in late summer and autumn. The average rate of infection was about 5 % but in few cases it reached up to 11 % (maximum so far observed). It seems that besides *Bulinus* there are other snail intermediate hosts for *Paramphistomum* species in Iran.

Discussion and conclusion

Paramphistomum microbothrium occurs among ruminants in Khuzistan. The intermediate host known and confirmed up to now in this area is *Bulinus truncatus*, which is also the host of *Sch. haematobium* and *Sch. bovis*.

It should be noted that some species of *Paramphistomum* have been found among cattle in the slaughter-house of Teheran (N. Bagheri, 1961); however the origin of these cattle and the species of the parasites had not been determined.

It is expected that the rate of infection with *Paramphistomum* among ruminants will considerably diminish as the result of snail control programme of the Anti-Bilharziasis campaign in Khuzistan. A programme is already underway in order to indicate the prevalence and incidence of infection with this parasite among ruminants of the Bilharziasis Control Pilot Project area, and to evaluate the effect of snail control programme in the reduction of this infection.

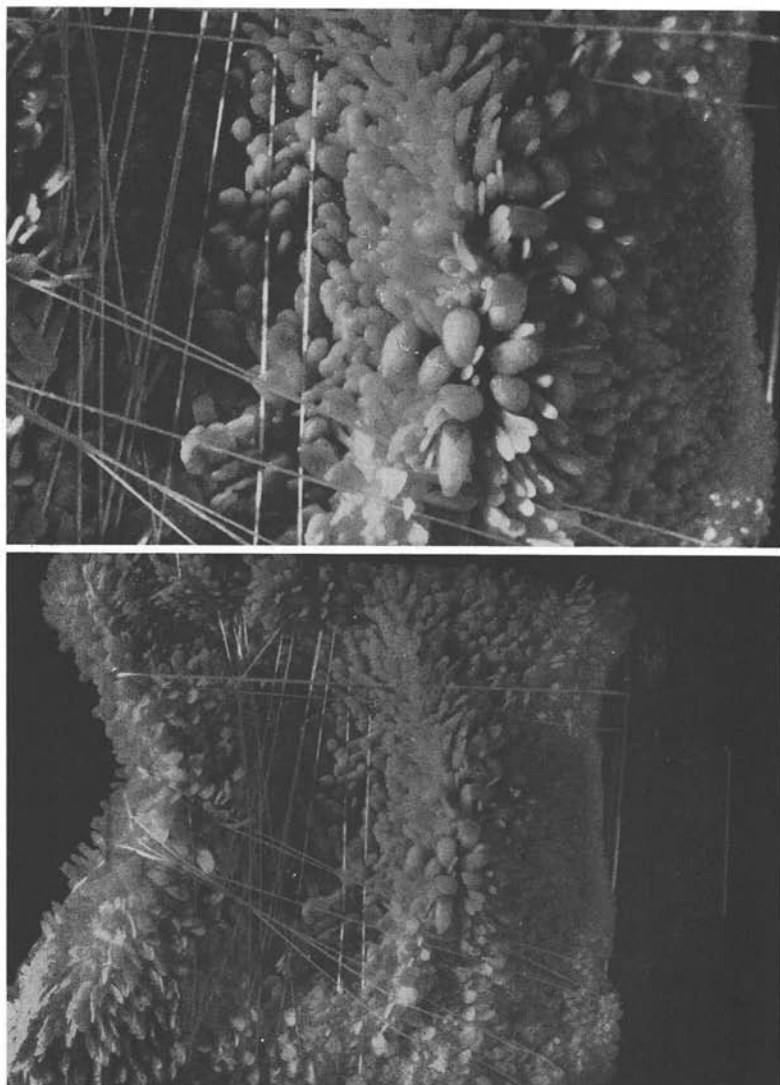


FIG. 2 and 3. — Adult worms of *Paramphistomum* attached to the mucosae of experimentally infected sheep. (Photographed by Dr. Razavi, Audio-visual Section, Institute of Parasitology and Malariology, Téhéran).

Summary

The presence of *Paramphistomum microbothrium* among sheep in Khuzistan, Iran, and the methods and results of experimental infection of lamb in the laboratory are described.

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Résumé

Etude de *Paramphistomum microbothrium* au Khouzistan (S.-O. de l'Iran)

Paramphistomum microbothrium est présent chez les Ruminants au Khouzistan.

Sur 36 moutons, 10 vaches et 2 buffles, examinés à la Station de Recherches sur les bilharzioses de Dezful (voir carte), 12 moutons (soit 33,5 %), 2 vaches (20 %) et un buffle ont été trouvés porteurs de Paramphistomes. Certains moutons étaient également infestés par *Schistosoma bovis* et *Fasciola hepatica*.

L'hôte intermédiaire est *Bulinus truncatus*. L'infestation apparaît à la fin de l'été et en automne. Sur 3.071 Bulins récoltés au cours de l'année, 142 étaient parasités. Les taux moyens d'infestation naturelle sont de 5 % ; ils peuvent atteindre 11 %.

L'infestation expérimentale d'un agneau de trois mois a été pratiquée au laboratoire des bilharzioses de l'Institut de Parasitologie de Téhéran avec des Bulins infestés provenant du canal « Nahre Bahman », au Sud de Dezful (récolte du 30 novembre 1960).

Technique de l'infestation : Des sacs en polyéthylène sont placés dans un bocal et remplis d'eau. Les mollusques infestés y sont déposés, tandis que des fragments de papier vert sont glissés entre ces sacs et la paroi du bocal. Les cercaires écloses s'enkystent à la surface des sacs au niveau des papiers verts, et ces métacercaires mûrissent dans l'eau pendant 20 jours. Les sacs sont ensuite débités en petits morceaux, supportant chacun quelques métacercaires, faciles à dénombrer avant l'infestation. Ces morceaux, mélangés aux feuilles de laitue, sont ensuite avalés par l'animal.

Un total de 460 métacercaires a été ainsi ingéré par le jeune agneau en l'espace de huit jours (18-28 décembre 1960). L'animal, sacrifié le 15 août 1961, soit environ huit mois après l'infestation, a présenté, après examen des viscères, 50 vers adultes appendus à la muqueuse de la panse (fig. 2 et 3).

Ces vers ont été identifiés comme *Paramphistomum microbothrium* Fiscoeder 1901 par J. A. Dinnik.

N. Bagheri (1961) a signalé également la présence de certaines espèces de Paramphistomes parmi le bétail aux abattoirs de Téhéran, mais sans préciser l'origine des animaux infestés, ni la nature des espèces incriminées.

La campagne anti-bilharzienne entreprise au Khouzistan, et les efforts déployés par les organismes de contrôle pour détruire les mollusques hôtes intermédiaires des bilharzies, auront vraisemblablement une incidence favorable sur la fréquence de la paramphistomose chez les Ruminants dans cette province.

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