NATURAL AND EXPERIMENTAL INFECTION OF THE BEETLE, ALPHITOBIIUS DIEAPERINUS (COLEOPTERA: Tenebrionidae) WITH CHOANOTAENIA INFUNDIBULUM AND OTHER CHICKEN TAPEWORMS

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ABSTRACT


Naturally occurring cysticercoids of Choanotaenia infundibulum were recovered by dissection from 78 adult beetles out of a total of 542 adults collected from two poultry farms in Khartoum. Larval beetles were also found naturally infected but at the low rate of 0.75%. Experimental infection of clean adult beetles confirmed the suitability of Alphitobius diaperinus as an intermediate host for C. infundibulum but four other species of poultry tapeworms failed to develop in this host. This constitutes the first record of A. diaperinus as an intermediate host for this tapeworm.

INTRODUCTION

A. diaperinus, a cosmopolitan mycophagus beetle, is common in small poultry farms in Khartoum. This beetle, which feeds on mouldy and damaged food products, was encountered in large numbers during a survey for poultry tapeworms in two farms in the Khartoum area; these two farms were found to have a high prevalence of infection of C. infundibulum and Raillietina tetragona. Raillietina cesticillus, Hymenolepis carioca and Cotugnia digonopora, although encountered elsewhere during this survey, were not present in the two farms from which the beetles employed in this study were collected (Elowni, 1977).

The purpose of this paper is to report the results of a search for cysticercoids in both wild-caught and laboratory-reared, experimentally infected A. diaperinus.
Adult and larval A. diaperinus were hand collected from beneath laying jars
and in the corners of poultry houses.

Cysticercoid-free beetles were reared in the laboratory in the following manner.
Wild-caught beetles were kept in the laboratory at room temperature and maintained
on ordinary poultry mash containing 2% brewer's yeast. Beetles were kept in
wide-mouthed glass jars and, after 3 weeks, the contents of the jars were sifted
and all adult beetles were removed and discarded, leaving only their larval
progeny. In the following weeks the contents were repeatedly sifted and adults
removed to a clean jar.

Food was withheld for 5 to 6 days and the starved beetles were then fed finely
shredded gravid tapeworm segments on moist filter paper. The beetles were left
to feed for 8 hours. Tapeworm species used, with the numbers of beetles, in
brackets, exposed to each were: R. oesticillus (39), R. tetragona (15),
C. digonopora (12), H. carioca (13) and C. infundibulum (11).

Beetles were killed by decapitation and placed in physiological saline in
glass petri dishes. The exoskeleton was torn into small pieces under a stereo-
scopic dissecting microscope, each piece being agitated with dissecting needles
to dislodge any adhering cysticercoids. Experimentally-infected beetles were
dissected 14 days following infection.

RESULTS

Natural infection

A total of 542 wild-caught A. diaperinus adult beetles were dissected to
determine whether they harboured tapeworm cysticercoids; the results are shown
in Table 1. The majority of cysticercoids were mature.

Experimental infection

The only cysticercoids recovered from experimentally-infected A. diaperinus
were those of C. infundibulum. Oncospheres of all other tapeworm species failed
to develop in this beetle. Cysticercoids of C. infundibulum were recovered
from only 2 of the 11 beetles exposed to infection with this species, 4 cysti-
cercoids being recovered from one and 5 from the other. All were mature.

DISCUSSION AND CONCLUSIONS

Adult and larval A. diaperinus were naturally infected with C. infundibulum
at the rates of 14.1% and 0.75% respectively. The rate of larval infection is
probably so low as to preclude an important role for larvae in the transmission
of this tapeworm.