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DERMESTES MACULATUS DE GEER, 1774 (COLEOPTERA, DERMESTIDAE) AS POTENTIAL DISTRIBUTOR OF TAENIA SAGINATA GOEZE, 1782 EGGS

The transmission of eggs and larvae of helminths through the digestive tract of insects is much more important than the transmission from the body surface. The germs of parasites in the digestive tract of beetles are protected from dessication and unfavourable weather conditions. After Prokopič and Bílý (Studie ČSAV, in press, 1980) *Dermestes maculatus* De Geer, 1774 is known to be intermediate host of 8 species of parasitic worms, including cestodes. In field experiments with the species *Dermestes laniarius* Illiger, 1802 Arkhipova (Byul. VIGIS 16: 10—12, 1975) studied viable eggs of the cestode *Taenia saginata* in all investigated beetles and their larvae. We therefore tried to feed the eggs of this cestode species to *D. maculatus*.

MATERIAL AND METHODS

283 larvae of different age and 187 adults of *Dermestes maculatus* reared in laboratory conditions were used in the experiment. The eggs from mature proglottides of *T. saginata*, squeezed out in distilled water, were washed several times and by pipette applied to the feed (dried

pork stomachs) offered to hide beetles and their larvae starving for 12 hours. These eggs were devoured by them in the matter of several hours. Starting from two hours after ingestion until day 7 the beetles and larvae were gradually washed and dissected under magnifying glass. The cestode eggs found in their digestive tract were examined under microscope, counted and their viability was verified after Silverman (Ann. Trop. et Parasitol. 49: 429—435, 1955). Those larvae of hide beetles (83), that formed cocoons within 48 hours after feeding on cestode eggs, were kept at 22 °C until hatching of the beetles in 21—24 days.

RESULTS

The beetles *D. maculatus* and primarily their larvae readily feed on *T. saginata* eggs which pass through their digestive tract intact and viable. Out of 283 larvae of *D. maculatus* which had been fed the eggs, 200 were dissected at intervals of 2 hours to 7 days and 194 (97 %) were found to be positive. The remaining 83 specimens were dissected after metamorphosis and 67 (80.7 %) of them were found to be positive. One larva contained 2 to 768 eggs, a total of 10,300 eggs, i.e. on the average 53.0 eggs per positive specimen. It should be noted that after 24 hours the number of eggs in larvae and adult beetles was decreasing. The eggs of the cestode were found intact in the feces of larvae and adult beetles. Negative results in specimens examined, as a rule, were obtained after 48 hours and later. Three to 76 eggs, a total of 4,279 eggs, i.e. on the average 63.9 eggs per positive specimen were found in beetles hatched from the infected larvae. Out of 187 adult *D. maculatus*, fed on *T. saginata* eggs, 142 beetles i.e. 75.9 % contained the eggs. One to 274 eggs were found per one beetle, a total of 3,953 eggs, i.e. on the average 27.8 eggs per positive specimen. Negative results might be due to the fact that the beetles either did not devour any eggs or they were already released intact with excrements prior to examination.

DISCUSSION

Bejšovec (Čs. parasitol. 9: 95—109, 1962) pointed out that eggs of *Fasciola hepatica*, *Ascaris suum*, *Toxocara mystax* and *Ascaridia galli* can pass undamaged through the digestive tract of the beetle *Geotrupes stercorosus* Scriba. Bílý and Prokopič (3rd Int. Symp., 12—15 Oct. 1976 Tatranská Lomnica, Theses of Rep.) emphasize the significance of beetles as passive carriers of helminth germs because helminth eggs persist intact in them longer than 24 hours and during that time the beetles may fly over great distances. Arkhipova (1975) demonstrated during field experiments that *T. saginata* eggs planted in experimental sites disappeared within 2—3 sunny days. When cestode proglottides were placed in an experimental site, they dessicated during a dry season and soon disappeared, too. Throughout a rainy season both the proglottides and eggs of the cestode did not disappear. It became evident that apart from other invertebrates larvae and imagoes of the species *D. laniarius* contained a great number of *T. saginata* eggs. In comparison with the species *Carabus granulatus*, when only 9 out of 200 specimens contained occasional eggs (1—7), *D. maculatus* appears as a potential and important distributor of *T. saginata* eggs in nature (Bílý S., Prokopič J., Folia parasit. (Praha) 24: 343—345, 1977). Great numbers (as many as 768) of eggs of this cestode species survive in the intestine of beetles longer than 24 hours and may be transported over long distances.

Dermestes maculatus is a current species with almost cosmopolitan distribution. In Europe it produces 1—2 generations in nature (Mroczkowski M., Fauna Polski 4, 161 pp., 1975). According to our results and published data (Kalík V., Sb. Přír. kl. Pardub. 30: 1—13, 1948) its occurrence is scattered in Czechoslovakia. being abundant in store-houses of dried bovine stomachs at abattoirs, store-houses of raw hides etc. It has a tendency to synanthropy, resulting in importation of cestode eggs in the surroundings of man, in the vicinity of settlements and large-scale livestock units. The laboratory experiment described proves the possible passaging of cestode eggs by hide beetles in the conditions of Czechoslovakia.

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