TREATMENT OF Ancylostoides vistulensis MONOGENEAN INFESTATIONS OF THE EUROPEAN CATFISH (Silurus glanis)

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Introduction
Monogenean infestation caused by Ancylostoides vistulensis is the most important parasitic disease of cultured catfish, Silurus glanis, (Molnár, 1968). For a long time, short exposure to a solution containing NH₄OH and K₂Cr₂O₇ has been used for treating the disease in Hungary (Antalfi, 1958). Since the excellent efficacy of organophosphates against monogeneans was recognized (Sárig et al., 1965), trichlorfon treatment in farm ponds has become a common practice. However, organophosphate treatment of ancylostoidosis has fallen short of expectations, and ammonium hydroxide - potassium bichromate combination has not provided complete freedom from these parasites. Therefore, the aim of the present study was to test some other anthelmintics for efficacy against Ancylostoides.


With praziquantel, Schmahl and Mehlhorn (1985) achieved success against Dactylogyrus and Diplozoon spp., while Schlotfeldt et al. (1988) found this drug effective against monogenean infestation of the European catfish.

Schmahl and Tarachewski (1987) reported the efficacy of levamisole hydrochloride against the species Gyrodac- tylus aculeatus and Diplozoon paradoxum.

Although mebendazole sulfoxide is widely used against helminthoses of warm-blooded animals in Hungary, its efficacy against monogeneans has not yet been tested.


The purpose of the experiments presented here was to obtain data on the efficacy of mebendazole, praziquantel, levamisole, albendazole sulfoxide, toltrazuril and the two components of Jaczó's solution, given separately, against ancylostoidosis.

Material and Methods
Catfish fingerlings (3-4 cm), experimentally infected with A. vistulensis oncomiracidia, were used. The oncomirac-idia were obtained as follows. Eggs produced by monogeneans of catfish from farm ponds in a 5-day period were incubated in aquaria. Subsequently, 350 catfish fingerlings were placed in the aquaria for 2 hours. As a result, several hundred oncomiracidia parasitized each fish. Three days after the experimental infection this uniformly infected stock was divided into 3 groups of 20 fish each. The groups were bathed in different doses of the compounds for different times (see Table 1) in 10 1 aquaria. Treatments were evaluated 3-4 days later, after killing the fish, by stereomicros- copic examination of entire gill filaments. Deaths during and after the treatments were recorded.

Results
Before treatment the prevalence of infection was 100%. Both the 4-hour and the 26-hour exposure to mebendazole solution of 10 mg/l concentration markedly reduced the intensity of infestation (to 8-20 and 5-20 parasites per fish, respectively) but failed to completely erad-
icate the parasites. The fish poorly tolerated the 26-hour exposure, which resulted in some degeneration (loosening and whitening) of the skin epithelium. A 1.5-hour treatment in mebendazole solution of 100 mg/l was less effective. Two fish died after this treatment.

Exposure to praziquantel at 10 mg/l for 5 hours eradicated all parasites from some fish (3 out of 20) and markedly reduced the intensity of infestation (8-10 parasites per fish) in those remaining infested. Exposure to praziquantel at 100 mg/l markedly stressed the fish without improving treatment.

Levamisole was toxic to fish and had little effect on the parasites. Albendazole sulfoxide and toltrazuril were ineffective.

One-minute exposure of Jaczó’s solution (100 mg/l \(K_2Cr_2O_7\) + 62.5 mg/l \(NH_4OH\)) markedly reduced both the prevalence and the intensity of infestation. However, \(K_2Cr_2O_7\), when used alone was without effect. On the other hand, \(NH_4OH\) solution gave high efficacy similar to that shown by Jaczó’s solution.

Untreated control fish specimens were infested by several hundred parasites at the time of evaluation.

**Discussion**

Only three of the drugs tested in this study proved suitable for controlling gill-parasitic monogeneans of catfish. None of the drugs exerted complete parasitocidal effect.

The experiments reported here show that a 26-hour exposure to a mebendazole solution of 10 mg/l concentration is effective against ancylostoecoidosis, but this efficacy is inferior to the complete efficacy it shows against gill-parasitic monogeneans in eel and common carp (Székey and Molnár, 1987, 1988). Catfish fingerlings poorly tolerated even short exposure (1.5 h) to a mebendazole solution of 100 mg/l concentration, and the intensity of infestation only slightly decreased following that treatment.

A 5-hour exposure to praziquantel so-
lution of 10 mg/l concentration markedly reduced the intensity of infestation. This finding is consistent with the results reported by Schlofelfeld et al. (1988). Exposure to praziquantel solution of 100 mg/l concentration, however, was not tolerated by catfish fingerlings even for a short time (18 minutes).

Schmahl and Taraschecki (1987) reported that levamisole hydrochloride in a concentration of 20–50 mg/l for 120 minutes was efficacious against Gyrodactylus aculeatus infestation of Gasterosteus aculeatus and Diplozoon paradoxum infestation of Abramis brama, and that at the above concentration it was not toxic to the host fish. In contrast, in this experiment we found that levamisole solution of 20 mg/l concentration killed all the 20 catfish fingerlings exposed to it in 18 minutes, and that after a 10-min exposure to levamisole solution of 50 mg/l concentration 2 fish died and the surviving 18 remained infested by several hundred parasites per fish.

The efficacy of albendazole sulfoxide against monogeneans has fallen short of our expectations. Several variations of dose and duration were tested but none of them reduced the intensity of infestation appreciably.

Schmahl and Melhorn (1988) suggested that toltrazuril in a concentration of 10 μg ml⁻¹ for 4 hours was effective against Gyrodactylus spp., Dactylogyrus vastator, D. extensus, D. cornu and Pseudodactylogrus bini. Their results were, however, obtained by electronmicroscopic study of drug action on the parasites' tegument, and they failed to state whether the treatment actually reduced the number of monogeneans infesting the fish. The results of our trials against A. vestulensis do not support Schmahl and Melhorn's (1988) data, as we found no improvement whatsoever in the intensity of infestation. In our experiment the actual parasitological status of the fish was evaluated after the treatment.

The components of Jaczo's solution, a preparation used in Hungary against ancylostoscoiosis, were tested separately. K₃Cr₂O₇ had no parasitocidal effect whatsoever even in a concentration as high as 1000 mg/l for 1 hour. At the same time, NH₄OH (62.5 mg/l-1 min), when used alone, showed good efficacy. However, complete eradication of the parasites could not be achieved with this treatment either, and the risk of reinfection was not eliminated.

To sum up: one-min exposure to NH₄OH solution of 62.5 mg/l concentration was the most efficacious treatment. Due to the toxicity of the drug, strict observance of the specified exposure time is essential.

Mebendazole and praziquantel markedly reduced the intensity of infestation but as they are much more expensive than NH₄OH, their use cannot be justified. Therefore, further investigations are needed to find an effective alternative treatment.

Summary

Of the compounds tested for efficacy against Ancylostoscoiosis vestulensis monogenean infestation of the European catfish (Silurus glanis), exposure to NH₄OH in the form of water bath treatment proved to be the most efficacious. Exposure to solutions of mebendazole and praziquantel decreased the intensity of infestation, while water bath treatment with solutions of albendazole sulfoxide, levamisole, toltrazuril and potassium bichromate was without effect.

References


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