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THERAPY OF MAJOR ECTOPARASITOSES IN GRASSCARP (CTENOPHARYNGODON IDELLA) FRY AND FINGERLINGS

J. WILLOMITZER

Veterinary Research Institute, 621 32 Brno

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Abstract

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Dipping, short-term and long-term baths in solutions of common substances (potassium permanganate, formaline, common salt) currently recommended for the control of ectoparasites of the genera *Chilodonella*, *Trichodinella* and *Dactylogyrus* in grasscarp fry and fingerlings were tested under laboratory conditions. Dipping into a 1 : 1000 diluted potassium permanganate bath for 45 seconds was 100 per cent effective against *Trichodinella* spp. Short-term baths in a 1 : 2500 formaline solution for 60 minutes was 100 per cent effective against *Chilodonella* spp., *Trichodinella* spp. and *Dactylogyrus* spp., but 23.3 per cent of the treated fish died. The best results in the control of *Chilodonella* spp. and *Trichodinella* spp. in grasscarp fingerlings from the 3rd week after hatching were obtained with long-term baths in a 0.7 per cent solution of common salt for 21 to 24 hours.

Chilodonellosis, trichodinellosis, dactylogyrosis, intensity of infection, formaline bath, salt bath.

During our previous studies on parasitic diseases of herbivorous fish it became clear that grasscarp *(Ctenopharyngodon idella)* fry and fingerlings in Czechoslovakia were infected mainly with *Chilodonella* spp., *Trichodinella* spp. and *Trichodina* spp. These parasites attack the fry as early as 1 to 3 weeks after hatching and cause an impairment of the hosts. These infestations are followed by infection with *Dactylogyrus* spp. (Willomitzer 1980).

Antiparasitic dipping baths recommended for the control of the aforementioned parasites were tested on a small number of grasscarp by Tesarčík and Ehl (1968). They found that dipping into a 1 : 1000 diluted permanganate bath for 30 to 45 seconds at 10.5 °C water temperature, pH 6.15, was well tolerated by grasscarp. The same applied to dipping into a 1 : 1000 diluted ammonia or trypaflavine bath for 2.5 minutes at 13 °C water temperature.

According to Musselius (1962) short-term salt baths for 5 minutes in 5 per cent NaCl can be used at a water temperature up to 15 °C, but are a hazard for herbivorous fish at higher temperatures. Tesarčík and Ehl (1968), in their exploratory experiments with salt baths, recorded an increased respiratory rate and excitation of the experimental fish. They reported good experience with short-term baths in malachite green at the concentration of 1 : 150 000 for 1.5 hours at 12.5 °C water temperature.

Bauer et al. (1963) controlled ectoparasites by long-term baths in 0.6 per cent NaCl for 18 hours. Ljubimov (1975) developed a method of exact chlorine dosing for the control of chilodonellosis, trichodinosis and costiasis in wintering ponds.

The finding in our country of increasing infection of grasscarp fry and fingerlings with ectoparasites of the genera *Chilodonella*, *Trichodinella* and *Dactylogyrus* at the State Fishery, Pohořelice in 1978–1979 prompted us to evaluate under laboratory conditions some of the treatments recommended for the control of these parasites.

Materials and Methods

The experiments were carried out on grasscarp fry and fingerlings kept in all-glass 19.9 litre aquariums, 9—35 fish to an aquarium. The effectiveness of the baths was evaluated in terms of extensive effectiveness, i.e. the percentage of parasite-free fry and fingerlings in treated aquariums relative to the number of parasitized fry and fingerlings in control aquariums. At each therapeutic bath measurements were made of water temperature and pH. The intensity of infection with protozoa was evaluated on the basis of the parasite number seen in the microscopic field, using a + to + + + scale where +, + + and + + + indicate solitary protozoa, more than 10 protozoa and more than 100 protozoa, respectively. The intensity of infection with monogenetic trematodes was evaluated according to the number of parasitized fry and fingerlings and on the basis of total trematode number found on the left and right gills of experimental fish.

The baths tested were as follows: dipping potassium permanganate baths, short-term formaline baths and long-term salt baths.

Results

Dipping into a 1 : 1000 diluted potassium permanganate bath was 100 per cent effective against *Trichodinella* spp., less effective (78 per cent) against *Chilodonella* spp. and little effective (25 per cent) against *Dactylogyrus* spp.

Short-term baths in a 1 : 5000 formaline solution for 15 minutes were ineffective against *Dactylogyrus* spp. and were not evaluated as to their efficiency against *Chilodonella* spp. and *Trichodinella* spp. Only after formaline concentration was increased to 1 : 2500 and exposure extended to 60 seconds, the bath became 100 per cent effective against *Dactylogyrus* spp., *Chilodonella* spp. and *Trichodinella* spp., but 23.3 per cent of the treated fish died.

Long-term baths in a 0.7 per cent solution of common salt for 21 to 24 hours were 100 per cent effective against *Chilodonella* spp. and *Trichodinella* spp., but were inefficient against *Dactylogyrus* spp. in grasscarp fry 0.1 to 6.6 g in body mass (Table 1).

Table 1

Survey of therapeutic treatments in grasscarp fry and fingerlings
(body mass 0.04—121.1 g; water temperature 23 °C; pH 6.0)

Dipping baths

Group	No. of fry or fingerlings	No. infected with			Drug	Concentration	Treatment duration	No. of deaths	Extensive effectiveness
		C*	T	D					
Treated	30	2	—	9	$KMnO_4$	1 : 1000	45 second	3	C 78
Control	30	9	25	12	—	—	—	—	T 100 D 25
Short-term baths									
Treated	35	—	—	8	formaline	1 : 5000	15 minutes	2	D 0
Treated	30	—	—	—	formaline	1 : 2500	60 minutes	7	D 100
Control	35	15	22	7	—	—	—	—	C 100 T 100
Long-term baths									
Treated	15	—	—	—	NaCl	0.7 %	21 hours	—	C 100
Control	18	1	4	—	—	—	—	—	D —

* C = Chilodonella spp., T = Trichodinella spp., D = Dactylogyrus spp.

The efficiency of long-term baths in a 0.7 per cent common salt solution against *Chilodonella* spp. and *Trichodinella* spp. was assessed in addition in relation to the intensity of infection (Table 2). The treatment proved 100 per cent effective even under conditions of the highest (+ + +) intensity of infection.

Table 2

Efficiency of 0.7 NaCl against protozoa in grasscarp fry
(body mass, 0.1—6.6 g, water temperature, 23 °C, pH 5.4)

Experiment No.	Group	No. of fry	No. infected with		Treatment duration (hours)	No. of deaths	Extensive effectiveness	Intensity of infection
			C*	T				
1	Treated	17	–	–	22	–	C 100	+
	Control	16	2	3	–	–	T 100	
2	Treated	9	–	–	21	–	C 100	+ + +
	Control	10	1	6	–		T 100	
3	Treated	23	–	–	24	–	C 100	+ + +
	Control	23	1	23	–	–	T 100	
4	Treated	12	–	–	21	–	C –	+ +
	Control	26	–	16	–	–	T 100	

* C = Chilodonella spp., T = Trichodinella spp.

Discussion

In the present study a number of common agents recommended in the literature for the control of fish ectoparasites were tested for efficiency against selected ectoparasites (*Chilodonella* spp., *Trichodinella* spp. and *Dactylogyrus* spp.) in grasscarp fry and fingerlings. In contrast to the observations of Tesařčík and Ehl (1968) who found that baths in 1 : 1000 diluted permanganate for 30 to 45 seconds were well tolerated by grasscarp, a degree of toxicity of this compound became apparent in our experiments where 3 out of 30 fry and fingerlings died. Another disadvantage of the permanganate baths was that though 100 per cent efficient against *Trichodinella* spp., it was ineffective against the other ectoparasites.

Formaline baths, traditionally recommended for the control of fish ectoparasites, were 100 per cent effective against the three major ectoparasites of grasscarp fry and fingerlings, namely *Chilodonella* spp., *Trichodinella* spp. and *Dactylogyrus* spp., but would be of no value in the field in view of the high mortality rate (23.3 per cent) among the treated grasscarp fry and fingerlings.

The results confirmed the usefulness of long-term common salt baths employed for the control of ectoparasites in grasscarp by Bauer et al. (1963). However, the successful therapy of chilodonellosis and trichodinellosis in the present study was obtained with a slightly higher (0.7 per cent) common salt concentration and longer duration (21—24 hours) of the bath.

Terapie závažných ektoparazitóz u plůdku amura bílého (Ctenopharyngodon idella)

Prověřovali jsme účinnost ponořovací lázně, krátkodobých a dlouhodobých koupelí při použití běžných prostředků (manganistan draselný, formalin, kuchyňská sůl) proti ektoparazitům rodu *Chilodonella*, *Trichodinella* a *Dactylogyrus* u plůdku

amura bílého. Ponořovací lázeň s manganistanem draselným v koncentraci 1 : 1000 při expozici 45 s měla vysokou účinnost (100 %) na *Trichodinella*. Krátkodobá koupel ve formalinu v koncentraci 1 : 2500 při expozici 60 min. měla vysokou účinnost proti *Chilodonella*, *Trichodinella* a *Dactylogyrus*, avšak působila nepříznivě na ryby (23,3% úhyn ryb). Nejlépe se osvědčily dlouhodobé koupele v 0,7% roztoku kuchyňské soli při expozici 21—24 hodin proti *Chilodonella* a *Trichodinella* u plůdku ve stáří od 3. týdne.

Терапия важных эктопаразитозов у мальков **Ctenopharyngodon idella**

Нами проверялась эффективность погружных ванн, кратковременных и длительных ванн с использованием обычных средств (перманганата калия, формалина, поваренной соли) против эктопаразитов рода *Chilodenella, Trichodinella* и *Dactylogyrus* у мальков *Ctenopharyngodon idella*. Ванна с манганатом калия с концентрацией 1:1000 при экспозиции 45 отличалась высокой эффективностью (100 %) по отношению к Триходинелла. Кратковременная ванна в формалине с концентрацией 1:2500 при экспозиции 60 минут отличалась высокой эффективностью по отношению к *Chilodonella, Trichodinella* и *Dactylogyrus*, однако, она оказывала неблагоприятное влияние на рыбы (отход рыб 23,3 %). Лучше всего оправдали себя длительные ванны в растворе поваренной соли 0,7 % с экспозицией 21—24 часа против *Chilodonella* и *Trichodinella* у мальков в возрасте с 3 недель.

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