

## FENBENDAZOLE TREATMENT AGAINST *BOTHRIOCEPHALUS ACHEILOGNATHI* IN CARP, *CYPRINUS CARPIO*

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### Abstract

Fenbendazole is the preferred treatment for control of *B. acheilognathi* in carp culture but at a higher (40 mg kg<sup>-1</sup> bwt) dosage given two times with 4-days step. In this study such application resulted in almost 100% fish recovery.

*Bothriocephalus acheilognathi* (Yamaguti 1934) syn *gowkongensis* (Yeh 1955) a large pseudophyllidean worm up to 200 mm in length is an important cestode parasite of carp (*Cyprinus carpio*). It was introduced into Europe from the Asia in the 1960s and 1970s. The first years after introduction there were heavy losses but during recent years no more significant losses have been reported but the parasite may still cause considerable problems in carp farming (Bauer and Hoffman, 1976). The parasites are often a cause of mass mortality in individual carp farms. The economic aspects of parasitic effects on fish involve not only mass mortality, but also weight loss, reduced fecundity of infected fish and increased fry mortality (Andrews *et al.* 1981). Heavily infected fish have a swollen abdomen, become sluggish, emaciated and cease of feed. *B. acheilognathi* infection causes blockage of the intestine in young carp resulting in loss of condition and some cases a haemorrhagic enteritis with destruction of the intestinal epithelium which may account for the changes in intestinal enzymes (Matskasi 1978, 1984; Kurowskaya and Kitisyna, 1986; Kurowskaya 1991). In addition, leucocytes (e.g. macrophages, lymphocytes and eosinophils) were found in the gut lumen adjacent to the parasite tegument (Hoole and Nisai, 1994). The presence of adult cestodes in the host's intestine may cause anaemia, emaciation and death. Carp cultures there are frequently sites of fatal epizootics caused by the *B. acheilognathi*.

Mass infection with *B. acheilognathi* was noted in a carp culture system. A 100% infestation was found and 11.6 parasites per host were found (SD=2.1). Thus, if a carp culture is to be successful, a method to combat the disease should be developed. Until now only few anthelmintics have been found to eradicate the intestine parasites pseudophyllideans from the carps. These are Davermin (Moinar, 1970), niclosamide (Körting, 1974, Zelazny, 1977), niclosamide with piperazine (Zelazny, 1980). Fenbendazole (FBZ) is an effective broad-spectrum anthelmintic belonging to the benzimidazole class of drugs. It is widely used in mammals and also in farmed salmon fish to treat tape-worm infections but is not registered for fish (Nordmo, 1993; Torrisen *et al.*, 1993).

The present paper reports the results from trials with fenbendazole (FenbesanPolfa) which was used experimentally at different concentrations to remove *B. acheilognathi* from carp intestine. Fish (weight = 25.4g, SD = 4.8) were obtained from a local commercial fish farm and maintained in aerated, flowing fresh water in tanks of 100 L capacity at 18°C. Carp were fed commercial pelleted dry feed. Totally, 150 fishes with clear cestode parasite disease were investigated. The prevalence at 10 carp chosen at random was 100%, and the abundance 10.7 (SD = 2.7). Fenbendazole efficiency towards *B. acheilognathi* was investigated after single medicine treatment (trial A) and the double one with 4-days step (trial B).

Each experimental group was divided into three sub-groups (each of 20 fish). Fish were treated with fenbendazole at 10 mg kg<sup>-1</sup> bwt (group 1), 20 mg kg<sup>-1</sup> bwt (group 2) and 40 mg kg<sup>-1</sup> bwt (group 3). There was estimated the fenbendazole efficiency on the ground of parasites number present in the alimentary canal 7 days after treatment (in trials A and B). Results obtained in the study served for calculation of invasion in-

#### Prevalence in the population

##### Extreme values of abundance

dex and abundance. The invasion index was expressed as a ratio:

Results of investigations obtained (Tables 1 and 2) point that single fenbendazole treatment of fish infected by *B. acheilognathi* in doses of 10, 20 and 40 mg kg/ bwt did not cause complete recovery. Although, the prevalence rates were less in group 1 (90%), group 2 (83%) and group 3 (38%) than in control (100%), only in individual fish the presence of parasites in alimentary canal was not found.

**Table 1.** Effect of fenbendazole on invasion index of *B. acheilognathi* infection of carp

Doses	Invasion index	
	Trial A	Trial B
Group 1 (10 mg kg <sup>-1</sup> )	90 1-8	68 0-11
Group 2 (20 mg kg <sup>-1</sup> )	83 0-6	25 0-8
Group 3 (40 mg kg <sup>-1</sup> )	38 1-4	0.5 0-3
Control	100 7-15	97 2-15

**Table 2.** Effect of fenbendazole on abundance of *B. acheilognathi* infection of carp.

Doses	Abundance / SD	
	Trial A	Trial B
Group 1 (10 mg kg <sup>-1</sup> )	5.9/2.3	5.3/3.7
Group 2 (20 mg kg <sup>-1</sup> )	3.5/2.0	1.1/1.7
Group 3, (40 mg kg <sup>-1</sup> )	1.4/1.6	0.2/0.3
Control	10.7/2.7	9.2/3.9

FBZ is used in intensive salmonid fish-culture systems against parasites at a dose rate of 5 - 8 mg kg<sup>-1</sup> bwt two times with 4-days step and is also the preferred treatment for *B. acheilognathi* in carp culture but at a higher (40 mg kg<sup>-1</sup> bwt) dosage given two times with 4-days step. In our investigations such way of application caused almost 100% fish recovery.

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