

# *Cloacotaenia megalops* (Nitzsch in Creplin, 1829) (Cestoda, Hymenolepididae) in wild ducks in Western Pomerania, Poland\*

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**ABSTRACT.** *Cloacotaenia megalops* (Nitzsch in Creplin, 1892) is a polyxenic and cosmopolitan tapeworm from the family Hymenolepididae. Its generic name derives from their typical location (cloaca), and the typical final hosts which are birds typically associated with water and marsh environments: Anseriformes, Galliformes and Gruiformes. In Poland, the presence of *C. megalops* has been observed so far in 16 species of ducks from the Baltic coast, the Mazurian Lake District, Wielkopolsko-Kujawska Lowland, Mazovian Lowland, and Podlasie Lowland. In Western Pomerania, quantitative structure analyses were only carried out on *Anas platyrhynchos*, and therefore the aim of this study was the detailed analysis of environmental populations of *C. megalops* in wild ducks. The examined tapeworms were isolated from the digestive tract of 1005 wild ducks representing 17 species belonging to three different eco-tribes: Anatini (n=225), Aythyini (n=413) and Mergini (n=367), from northwestern Poland. During the study 187 *C. megalops* were found in 89 birds (8.8% of examined ducks) belonging to 7 species: *Anas crecca* (common teal), *A. querquedula* (garganey), *A. platyrhynchos* (mallard) (Anatini); *Aythya ferina* (pochard), *A. fuligula* (tufted duck), *A. marila* (greater scaup) (Aythyini) and *Bucephala clangula* (goldeneye) (Mergini). The results show the differences in the quantitative structure of *C. megalops* among the examined species of ducks. The highest prevalence was found in mallard (18.6%) and the lowest in greater scaup (3.2%). The highest mean intensity was observed in greater scaup (4.0), and the lowest in garganey and common teal (1.0). Relative density was at a similar level in the tested birds. Based on the ratio of dominance, it was found that *C. megalops* is a rare species in the cestodofauna in the examined birds.

## Introduction

*Cloacotaenia megalops* (Nitzsch in Creplin, 1892) is a tapeworm, distributed all over the world, from the family Hymenolepididae [1]. Its generic name is derived from the typical location in the cloaca of final hosts, birds associated with water and marsh environment, i.e. in Anseriformes and much less frequently in Galliformes and Gruiformes [1]. Over the past several dozen years, reports have used several names of this parasite species, with the best known: *Hymenolepis megalops* (Creplin, 1829), *Orlovilepis megalops* (Creplin, Nitzsch et al., 1829)

and *Taenia megalops* (Creplin, Nitzsch et al., 1829). The natural intermediate host of this tapeworm is an ostracod *Cypris pubera* [2] though cysticercoids have been experimentally obtained from both *C. pubera* [3] and *Heterocypris incongruens* [4].

In Poland, the presence of *C. megalops* has been reported in 16 species of ducks from the Baltic coast, the Mazury Lake District, the Wielkopolska-Kujawy Lowland, Mazovia Lowland and Podlasie [5]. In Western Pomerania quantitative analysis of cestodofauna has been carried out only in *Anas platyrhynchos* [6], therefore the aim of this study was a wider ecological analysis of *C. megalops*

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populations involving 17 species of free-living Anatinae ducks in northwestern Poland.

## Materials and methods

Material consisted of tapeworms isolated from the digestive tracts of 1005 wild ducks representing 17 species belonging to three different ecological tribes: Anatini (n=225), Aythyini (n=413) and Mergini (n=367). The studies were conducted in the years 1999–2009 and included game ducks in Poland (mallard, teal, tufted duck, and pochard, a total of 471 individuals) and also protected species (the remaining duck species, including 534 birds). All birds (except wild game mallard) were obtained dead from fishing nets in the consecutive autumn and winter seasons. Ducks from the tribes Aythyini and Anatini came from freshwater bodies, while Mergini (except goldeneye) from coastal areas. Isolated tapeworms were fixed and stored in 70% ethanol. Selected specimens were used for preparations stained with acetocarmine [7] in our own modification, or using the Hoyer liquid [8].

The quantitative analysis of the *C. megalops* population included prevalence, intensity, relative density and dominance index [9–11]. The significance of the obtained differences was verified using Statistica 6.0, with the Kruskal-Wallis test.

## Results

Out of the 35364 tapeworms isolated from digestive tracts in the examined ducks, only 187 (0.53%) were identified as *C. megalops*. The prevalence of the parasite in the studied group of birds was 13.5%. Hosts were the representatives of the following species: *Anas crecca*, *A. querquedula*, *A. platyrhynchos* (Anatini); *Aythya ferina*, *A. fuligula*, *A. marila* (Aythyini) and *Bucephala clangula* (Mergini). In the case of *A. marila* and *B. clangula* we observed new parasite-host systems in the context of the national fauna. We observed no pathological changes in infected hosts' cloacae.

Out of the 7 species, the highest prevalence of the parasite was reported in *A. platyrhynchos* (18.6%), and the lowest in *A. marila* (3.2%) (Table 1). The tapeworm was also found in *A. querquedula*, but a too small number of ducks surveyed (n=1) makes it impossible to draw any conclusions on the position of *C. megalops* cestodofauna in this host. The parasite was reported in three specimens of *B. clangula*, the only infected hosts from the tribe

Mergini. No *C. megalops* was observed in other Mergini ducks. The average intensity of infection remained at similar levels in all the species of ducks: its highest value was observed in *A. marila* (an average of 4 parasites in an infected duck), and lowest in *A. querquedula* and *A. crecca* (average 1). The greatest range of intensity of infection (from 1 to even 13 individuals) was observed in *A. platyrhynchos*. The analysis of the dominance index indicates that *C. megalops* is a rare parasite in wild duck cestodofauna in Western Pomerania (WD = 0.0381). The results showed differences in the quantitative structure of *C. megalops* in various species of ducks, but they were not statistically significant.

## Discussion

Polish and international literature includes a dozen or so reports on the ecology of *C. megalops* in wild birds [1,12–21]. According to information provided by Pojmańska et al. [5], up to 2007 *C. megalops* were recorded in Poland in 16 host species belonging to five genera: *Cygnus*, *Anser*, *Alopochen*, *Anas* and *Aythya*. In this study, the material included only birds from the subfamily Anatinae, and the presence of the parasite was found in genera *Anas*, *Aythya* and *Bucephala*.

The results obtained by different authors [1,12–21], including the authors of this paper, reveal great differences in the prevalence indexes with regard to *C. megalops*. This may be due to the time of the year in which the research was conducted and the place where material was obtained. The high prevalence of *C. megalops* was recorded for ducks from the tribe Anatini [1,14–16]. The highest prevalence (63.8%) was observed for *C. megalops* found in *A. crecca* in Texas [15]. In our study, the prevalence of the parasite in this host was several times lower (only 9.0%). The greatest fluctuation in the prevalence of the parasite, from 2.0% to 35.2%, was reported in *A. platyrhynchos* [12–14,16–19]. The lowest prevalence was observed in *Branta bernicla* (0.2%) [20], *A. ferina* (3.8%) [13], and in *A. marila* in this study in (3.2%). The average intensity of occurrence of *C. megalops* described in the literature, from 1 to 13 individuals in one infected bird [1,12–21], is similar to values observed in our study. The highest values of average intensity of *C. megalops* occurred in Brazil in *Amazonetta brasiliensis* (average 5.1) [1], while the lowest in ducks from the Masurian Land in Poland

Table 1. Ecological characteristic of population *Cloacotaenia megalops* in investigated ducks

Host	Prevalence		Intensity		Relative density	Dominance index
	n	%	range	mean		
<b>Anatini</b>						
<i>Anas crecca</i> , n=11	2	18.2	1	1.0	0.18	0.0331
<i>A. querquedula</i> , n=1	1	100.0	1	1.0	1.00	1.0000
<i>A. platyrhynchos</i> , n=204	38	18.6	1-13	2.7	0.50	0.0965
<b>Aythiini</b>						
<i>Aythya ferina</i> , n=20	1	5.0	1	1.0	0.05	0.0025
<i>A. fuligula</i> , n=236	38	16.1	1-5	1.3	0.22	0.0348
<i>A. marila</i> , n=157	5	3.2	1-11	4.0	0.13	0.0041
<b>Mergini</b>						
<i>Bucephala clangula</i> , n=32	3	9.4	1-5	3.0	0.28	0.0264
<b>Anatinae</b> , n=661	89	13.5	1-13	2.1	0.28	0.0381

(1.0) [12]. On the basis of the ratio of dominance (WD=0.01), Macko and Birová [21] described *C. megalops* as a rare species in cestodofauna of wild ducks, which is consistent with our results.

Differences in the occurrence indexes of *C. megalops* between different species of hosts may be explained by a diverse diet of the tested birds. Ducks proper prefer plants and small invertebrates, diving ducks dive in search for small invertebrates and aquatic plants, and the merganser ducks dive at great depths to find molluscs, crustaceans and other invertebrates, and also fish [22]. Different diets and the presence of ducks in freshwater bodies at different times of the year, results in a different probability of contact with the intermediate host of *C. megalops*, as *Cypris pubera* activity is limited to spring and early summer [2]. Accordingly, as our observations were made in autumn-winter season, when the prevalence of adult *C. megalops* in tested birds was the highest, our results on *C. megalops* prevalence were significantly higher than those obtained by Czaplinski [18] who examined ducks in spring.

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## ***Cloacotaenia megalops* (Nitzsch in Creplin, 1829) (Cestoda, Hymenolepididae) u dzikich kaczek Pomorza Zachodniego**

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*Cloacotaenia megalops* (Nitzsch in Creplin, 1892) jest poliksenicznym i kosmopolitycznym tasiecem z rodziny Hymenolepididae. Nazwa rodzajowa wywodzi się z ich typowej lokalizacji (kloaka), zaś żywicielami ostatecznymi są ptaki związane ze środowiskiem wodno-błotnym: Anseriformes, Galliformes i Gruiformes. W Polsce występowanie *C. megalops* stwierdzono dotychczas u 16 gatunków kaczek z Pobrzeża Bałtyku, Pojezierza Mazurskiego, Niziny Wielkopolsko-Kujawskiej, Niziny Mazowieckiej oraz Podlasia. Na Pomorzu Zachodnim analizę struktury ilościowej przeprowadzono jedynie u *Anas platyrhynchos*, dlatego celem niniejszej pracy była szczegółowa analiza ekologiczna populacji *C. megalops* u dzikich kaczek.

Materiał do badań stanowiły tasiecmce wyizolowane z przewodów pokarmowych 1005 dzikich kaczek, reprezentujących 17 gatunków, należących do trzech różnych ekologicznie plemion: Anatini (n=225), Aythyini (n=413) i Mergini (n=367), pochodzących z terenów północno-zachodniej Polski. W badanym materiale stwierdzono obecność 187 osobników tasiecmców u 89 ptaków (8,8% zbadanych kaczek) należących do 7 gatunków: *Anas crecca*, *A. querquedula*, *A. platyrhynchos* (Anatini); *Aythya ferina*, *A. fuligula*, *A. marila* (Aythyini) oraz *Bucephala clangula* (Mergini). Otrzymane wyniki wskazują na różnice w strukturze ilościowej *C. megalops* u poszczególnych gatunków kaczek. Najwyższą przewalencję stwierdzono u krzyżówki (18,6%), najmniejszą zaś u ogorzałki (3,2%). W przypadku średniej intensywności najwyższą jej wartość zaobserwowano u ogorzałki (4,0), natomiast najniższą u cyranki i cyraneczki (1,0). Wartość względnego zagęszczenia kształtowała się na podobnym poziomie u badanych ptaków. Na podstawie wskaźnika dominacji stwierdzono, że *C. megalops* jest gatunkiem rzadkim w cestodofaunie badanych ptaków.

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