RESEARCH REGARDING THE EXTERNAL ANATOMY OF SQUALIUS CEPHALUS SPERMATOZOA

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Abstract**:** *This paper presents data referring to the biometrical measurement of chub spermatozoa. The biological material under study has been made up by 70 masculs from the species Squalius cephalus, Cyprinidae Family that have been collected from the Nadrag river basin in the year 2013. The collection of samples for investigation has been done through an electric fishing device Tyo FEG 3000. The analyses of the biological material were made with Optika immersion microscope 100X 500X. R. The average of the long shaft head was of 3.51 ± 0.96 µm, and the average of short shaft head 3.01 ± 0.82 µm. The average length tail 28.18 ± 4.77 µm. The average of the total length of the spermatozoa 29.15 ± 5.36 µm. Squalius cephalus reaches sexual maturity at the age of 3-5 years at a length of more than 30 cm. In the existent literature, there is little information referring to theoretical prolificacy of the native fish species and for these reasons, knowing the following aspect is of paramount importance. Determination of fecundity and the development of sexual maturity are fundamental to fishery science. Due to the importance of these parameters in the dynamics of populations they must estimated for species of economic significance. The results of in-season and out-of-season spawning of chub were similar. There were no differences in the percentages of spermiation, as well as spermatozoa motility. In commercial fish farming has been more focused on the quality of eggs and larvae rather than that of sperm, even though the sperm quality of male broodstock also affects the production of healthy larvae. Sperm quality is a very important variable; it can influence the percentage of egg fertilization and thus the total production of viable eggs.*

INTRODUCTION

The **chub** (*Squalius cephalus*) is a European species of freshwater fish in the carp family Cyprinidae.

Most abundant in small rivers and large streams of barbel zone with riffles and pools. Also along shores of slow-flowing lowland rivers, even in very small mountain streams. Also in large lakes, undertaking spawning migrations to inflowing streams. Spawns in fast-flowing water above gravel bottom, rarely among submerged vegetation. (Freyhof si colab, 2012).

Juveniles are gregarious, adults more solitary. Lives up to 15 years, females longer than males.. Females spawn more than once during a season. Individual females spawn with several males. Males assemble at spawning grounds and follow ripe females, often with much splashing, to shallow riffles. Females deposit the sticky eggs into the gravel. Feeding larvae and juveniles inhabit very shallow shoreline habitats. Feeds on a wide variety of aquatic and terrestrial animal and plant material. Large individuals become predominantly piscivorous. (Freyhof si colab, 2012).

MATERIAL AND METHODS

The biological material under study has been made up by 70 masculs from the species *Squalius cephalus,* Cyprinidae Family that have been collected from the Nadrag river basin in the year 2013. The collection of samples for investigation has been done in the banned period through an electric fishing device Tyo FEG 3000. The analyses of the biological material were made with Optika immersion microscope 100X 500X.

RESULTS AND DICUSSIONS

At species *Squalius cephalus* can be observed that out of a total of 42 spermatozoao (table 1) the average of the long shaft head was of 3.51 ± 0.96 µm, and the average of short shaft head 3.01 ± 0.82 µm. The average length tail 28.18 ± 4.77 µm. (figu6re 2).

The average of the total length of the spermatozoa 29.15 ± 5.36 µm. (figure 1).

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Males reproduce for the first time at 2-4 years, females at 4-6. Maturity is influenced by environmental factors and individuals may mature much later. Spawns in May-August, when temperature rises above 12°C.

The advantage of using morphology criteria is that it can predict fertilization efficiency

Table 1

Squalius cephalus spermatozoa dimensions

Nb.	Long shaft head (µm)	Short shaft head (µm)	Length tail (µm)	Total length of the spermatozoa (µm)
1.	4,64	3,86	30,57	35,21
2.	4,52	3,11	22,77	27,29
3.	4,78	4,42	20,19	24,97
4.	4,45	3,49	31,28	35,73
5.	4,88	4,54	28,19	33,07
6.	4,96	4,80	33,69	38,65
7.	5,08	4,33	31,79	36,87
8.	5,19	3,81	32,22	37,41
9.	4,99	4,84	33,69	38,69
10.	3,84	2,72	28,92	32,76
11.	4,44	3,25	22,09	26,53
12.	4,25	2,95	31,22	35,47
13.	3,66	3,03	31,68	35,34
14.	3,99	3,60	20,55	24,54
15.	3,97	3,13	23,57	27,54
16	3,70	3,04	30,17	33,87
17.	4,39	4,34	30,95	35,34
18.	4,13	3,61	31,13	35,26
19.	3,24	2,20	20,89	24,13
20.	2,54	2,26	-	2,54
21.	2,44	2,85	-	2,44
22.	2,03	2,25	-	2,03
23.	1,89	1,68	-	1,89
24.	2,62	2,45	-	2,62
25.	2,54	2,28	-	2,54
26.	2,71	2,26	-	2,71
27.	2,69	2,41	-	2,69
28.	2,44	2,40	-	2,44
29.	2,69	2,68	-	2,69
30.	2,33	2,18	-	2,33
31.	2,50	2,21	-	2,50
32.	2,80	2,02	-	2,80
33.	2,71	2,38	-	2,71

34.	2,41	2,18	-	2,41
35.	2,44	2,32	-	2,44
36.	3,55	2,91	-	3,55
37.	3,63	3,15	-	3,63
38.	3,75	3,33	-	3,75
39	3,16	2,85	-	3,16
40	3,10	2,89	-	3,10
41	3,24	2,20	-	3,24
42	4,13	3,61	-	4,13
Average	3,51	3,01	28,18	29,15
Standard deviation (s)	0,96	0,82	4,77	5,35
(m) Min	1,89	1,68	20,19	1,89
(M) Max	5,19	4,80	33,69	38,69

It can be observed that out of a total of 42 spermatozoa 19 have tail and 23 don't have tail. Spermatozoa without tail are atypical cell and don't have capacity of fecundation are immobile cell. Abnormalities such as small head or a tail will affect sperm motility and complicate the sperm reaching the egg.

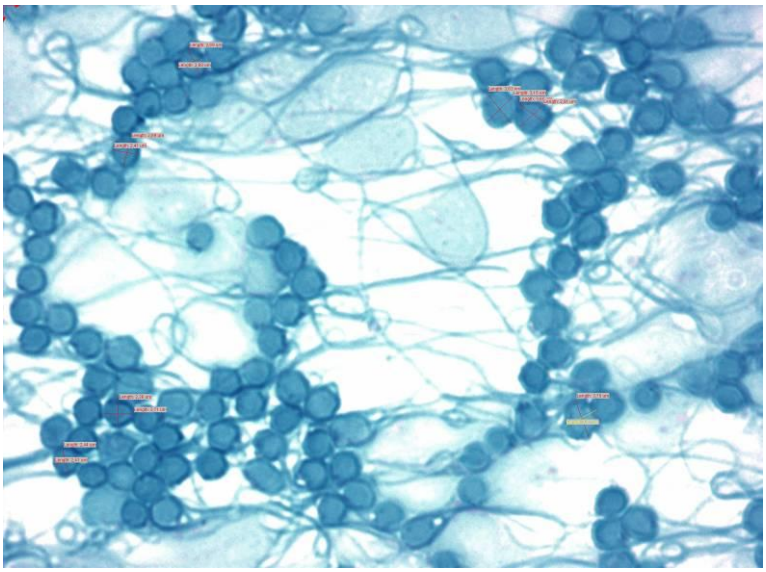

Figure 1: The length of spermatozoa at *Squalius cephalus*

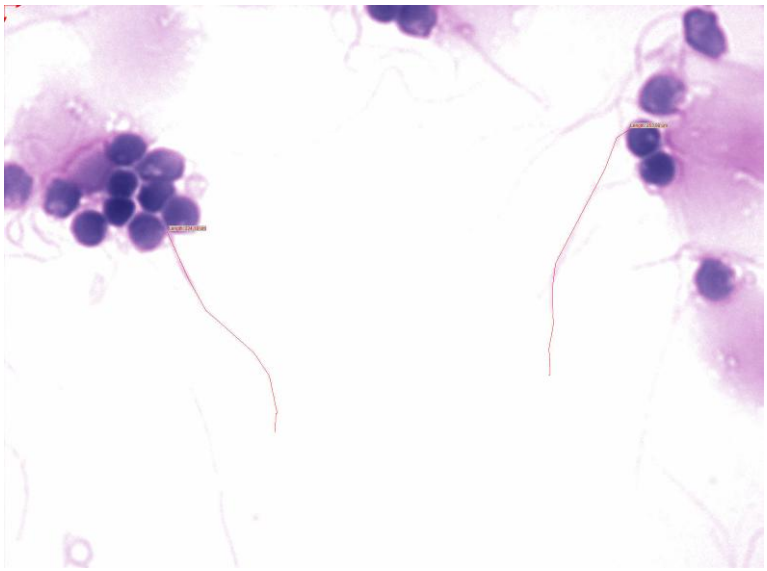

Figure 2: The spermatozoa tail at *Squalius cephalus*

CONCLUSIONS

At species *Squalius cephalus* the average of the long shaft head of spermatozoa was 3.51 ± 0.96 μm, and the average of short shaft head 3.01 ± 0.82 μm. The average length tail was 28.18 ± 4.77 μm. The average of the total length of the spermatozoa 29.15 ± 5.36 μm.

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