

2.2

On feeding in Cottus gobio

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Our efforts to determine the biomass of *Cottus gobio* in the chosen research area of the Seebach were not very successful up to now. This is - opposite to the situation in certain British chalk streams, from where MANN et al. got sound values - because of the depth of the coarse gravel sediment inhabitable for these fish in Seebach. It became apparent that it is not possible (at least with the present equipment) to use liquid nitrogen for freezing a compartment of the sediment especially because of the heat-carrying water-flow through the interstitium. Direct interrupted current also cannot be applied very successfully because the species, lacking a swim-bladder and the ability of free-swimming (almost entirely) does not show the phase of "forced swimming" towards the anode (e.g. LAMARQUE 1967: 70). Therefore only fish very near to the surface of the substrate (sediment) show "desired" reactions. Others, in the gravel, jerk and jog, but do not come out, or are not reached by the influence of the current at all (small fish need higher voltage). If the current is applied for too long a time or too often in successive trials, the fish become damaged (by stress).

On February 2, 1979, we made three such trials in the Grid Compartments A6 & A22. For assistance I have to thank Mr. Erich L a n z e n b e r g e r and Dr. Günther S c h l o t t. The first trial was performed at about 10.00 a.m.; it consisted of two counts (see Table 1). The second (one count) started at 3.00 p.m. The resulting value of $0,6 \text{ g m}^{-1}$ seems to be very low, but this was expected because of the low efficiency of the method. All caught fish were photographed and then, if not moribund, released into the stream. Our experiments show that the pattern of the body surface colouration is constant (at least during two years, since this study was initiated), and I hope that the method of catch and recatch without tagging will be feasible.

Because we had no quantitative results on the food and feeding habits of *Cottus gobio* L. in Central Europe, A. B. ADAM and the author undertook some research in this direction. We collected in the River Ybbs near Lunz (above the Windhagerbrücke) in July and August 1978 170 specimens . We chosed this site instead of Seebach because it seemed favourable not to alter the natural Seebach population for this topic. Some of the results interesting for Project RITRODAT are given in Table 2. The aim of the study was to determine the diurnal feeding activity rhythm (ADAM & ADAMICKA, in prep.). Because it was possible to catch fish (by hand-net) with almost the same expenditure day after day on the same spot, we assume that *Cottus* is not strictly territorial but tends to a regular distribution over the area whatever available. This fact must be seen in connection with the strong dependence of the species upon this moving substrate.

T a b l e 1. *Cottus gobio*, Seebach 2 Feb. 1979. RITRODAT-Grid Compartments A 6 and A 22. Catches at 10 00, 10 30, and 15 00.

6.66 g	2.58	4.90	0.64
4.66	2.78	0.88	1.19
6.69	3.50	6.88	2.00
1.30	3.92	0.80	3.50
3.78	1.72	2.48	
0.93	0.65	0.62	

T a b l e 2. Food items in stomachs of *Cottus* caught in Ybbs River. Twelve fishes of each of the four columns of Table 3, four of small, four of medium, and four of big size were dissected and the gut contents analyzed. No fish had an empty stomach.

time of capture:	6 - 8	10 - 12	15 - 17	20 - 22
ephemer. nymphs	30	46	40	37
ephemer. adults	4	1		2
plecopt. nymphs	17	14	13	45
chironomoid larv.	53	92	123	260
simuliid larvae	37	9	34	3
tipuloid larvae	1	3		1
silveran pupae	2	4	2	1
trichopt. larvae	12	8	11	3
coleopteran ad.	1	2		
fish	1			
algae(indigestible)	3	14	5	
SUM	158 (792)	179 (880)	273 (851)	352 (1156)

Table 2 shows that the most food items are voraged in the evening time. An effort was made to compute the weight totals of these items (values in brackets). These values of course need discussion. One must take into account that fishes of different ages show different activity patterns (R. ABEL 1973); that the food species show presumably different circadian activity and (therefore) availability; and, further, that our catches were made not on one day. (We do not have data on the frequency of the food animals in the biotope during the year.)

Literature

R. ABEL (1973) The trophic ecology of *Cottus gobio*.
Oxford Univ. PhD. Thesis

P. LAMARQUE (1967) Electrophysiology of fish subject to the action of an electric field.- In: Fishing with electricity.
Ed.: R. Vibert. p. 65 - 92

R. H. K. MANN (1971) The populations, growth and reproduction of fish in four small streams in southern England
J. Anim. Ecol. 40, 155-190

Table 3. *Cottus gobio* L. Measurements of fish taken in Ybbs River. L_t : total length. W_{st} : weight of stomach with content. W_t : total weight.

Day-time: 6 00 - 8 00

Date: 12 and 14 July 1978

Average water temperature: 8,2°

10 00 - 12 00

15 July 1978

9,3°

L_t	W_t	sex	W_{st}	L_t	W_t	sex	W_{st}
6.3	3.60	m	0.08	8.2	5.70	f	0.10
9.0	12.13	m	0.25	8.3	9.00	f	0.30
8.5	9.45	m	0.18	5.4	1.50	f	0.05
7.2	4.58	f	0.15	8.3	6.30	f	0.25
6.7	4.58	m	0.07	7.1	3.60	f	0.08
4.5	1.15	m	0.02	6.9	3.00	f	0.10
7.6	5.95	m	0.10	4.7	1.00	f	0.02
4.6	1.25	m	0.01	4.9	1.20	f	0.02
7.4	5.90	m	0.09	4.3	0.85	f	0.01
6.2	3.35	m	0.05	6.0	2.10	f	0.02
5.7	2.60	f	0.12	4.0	0.65	f	0.01
5.1	1.73	f	0.02	5.2	1.40	f	0.02
4.4	1.00	f	0.01	10.9	17.05	m	0.50
4.2	0.88	f	0.005	9.5	8.80	m	0.40
4.6	1.22	m	0.01	4.4	1.00	f	0.01
4.0	0.67	m	0.005	4.6	1.00	f	0.01
4.0	0.75	f	0.01	4.4	0.90	f	0.02
4.8	1.50	m	0.02	3.2	0.30	m	0.01
11.8	25.15	m	0.85	4.3	0.85	f	0.01
9.1	12.00	m	0.19	4.0	0.60	f	0.02
9.7	12.22	m	0.15	4.3	0.75	f	0.03
6.4	3.65	f	0.10	7.5	4.80	f	0.20
6.8	4.12	m	0.05	11.3	13.60	f	0.35
8.8	10.45	m	0.20	6.8	3.60	f	0.10
8.3	7.40	m	0.18	8.8	9.00	m	0.20
6.9	4.05	f	0.10	10.0	11.50	m	0.18
7.9	6.60	f	0.20	7.1	4.65	m	0.15
5.0	1.60	m	0.07	9.6	13.50	m	0.25
10.3	15.00	m	0.30	6.5	2.95	f	0.07
9.9	13.52	m	0.30	7.1	4.80	m	0.10
7.8	6.48	f	0.13	5.5	2.00	m	0.05
8.4	7.72	f	0.12	4.2	0.80	m	0.03
9.4	10.71	m	0.28	5.2	1.75	m	0.04
8.6	8.81	m	0.45	11.3	16.10	m	0.40
4.1	0.87	f	0.10	7.0	4.35	m	0.12
7.2	4.90	m	0.10	6.2	2.75	m	0.05
6.4	3.10	f	0.02	6.2	3.10	f	0.08
8.6	8.25	m	0.21	9.4	12.35	m	0.20
6.1	2.68	f	0.01	8.8	9.25	m	0.18
6.7	4.18	f	0.10	6.6	3.75	m	0.05
7.4	4.00	f	0.30	7.5	6.30	f	0.09
5.0	1.25	m	0.10	4.7	1.25	f	0.03
4.5	1.00	f	0.005	5.0	1.15	f	0.005
7.6	6.85	f	0.08	5.1	1.65	f	0.07
6.4	2.82	f	0.03	4.9	1.25	f	0.05
n= 45				45			
\bar{x} 6,89	5,59		0,13	6,56	4,50		0,11
26♂	7,16			17♂	7,75		
19♀	3,45			28♀	2,89		

Table 3 (continued)

Day-time: 15 00 - 17 00
 Date : 11 to 13 July 1978
 Average water temperature: 13°

L_t	W_t	sex	W_{st}
8.0	6.15	m	0.10
7.7	5.90	m	0.19
8.2	6.93	m	0.17
6.3	2.75	f	0.01
4.9	1.22	f	0.03
6.4	3.05	m	0.12
7.2	4.95	f	0.20
5.5	1.52	m	0.01
6.5	3.03	f	0.02
7.1	4.38	m	0.08
6.9	3.98	f	0.01
7.3	5.31	f	0.09
6.1	2.82	f	0.02
6.8	3.57	m	0.02
4.4	0.82	f	0.01
5.9	2.49	f	0.04
5.5	1.81	f	0.02
6.1	2.65	f	0.01
8.5	7.60	f	0.10
9.0	11.37	m	0.20
4.7	1.30	m	0.06
4.7	1.21	m	0.02
6.2	2.70	m	0.01
6.7	3.85	m	0.03
9.2	9.27	f	0.19
7.1	4.48	f	0.09
4.7	1.10	f	0.01
4.6	1.12	f	0.02
6.8	4.08	m	0.08
5.6	1.92	f	0.01
8.9	9.10	m	0.13
8.7	8.45	m	0.12
4.6	1.15	m	0.03
5.1	1.52	f	0.03
6.4	2.72	m	0.08
5.8	2.79	f	0.05
4.4	0.92	m	0.01

Σ 37
 \bar{x} 6,45 3,78 0,065
 19 ♀ 3,24
 18 ♂ 4,35

Day-time: 20 00 - 22 00
 Date: 10 and 14 August 1978
 Average water temperature: 12°

L_t	W_t	sex	W_{st}
8.6	8.02	m	0.15
6.0	2.53	f	0.05
8.7	7.82	m	0.09
5.2	1.51	f	0.02
5.2	1.58	f	0.03
5.4	1.88	f	0.02
4.8	1.18	f	0.02
5.0	1.62	f	0.02
5.6	1.90	m	0.05
5.7	2.50	f	0.02
6.8	3.10	f	0.05
5.1	1.48	f	0.02
5.6	2.01	f	0.02
6.1	2.75	f	0.01
8.9	10.61	m	0.09
9.9	11.77	m	0.15
9.1	9.78	m	0.20
10.1	12.93	m	0.18
9.9	11.03	m	0.18
9.1	10.75	f	0.16
9.4	12.88	f	0.15
5.9	2.51	m	0.02
5.3	1.82	f	0.02
5.7	2.79	f	0.04
5.6	2.10	m	0.03
8.1	7.43	m	0.10
5.9	2.40	f	0.04
5.9	2.64	f	0.09
5.3	1.48	f	0.02
5.2	1.73	f	0.04
7.0	3.78	f	0.04
5.9	2.85	f	0.08
8.6	9.28	m	0.19
6.4	2.75	f	0.04
7.8	5.51	m	0.07
7.0	4.11	f	0.07
6.3	2.85	f	0.05
9.3	9.95	f	0.12
7.5	5.82	f	0.08
7.0	4.34	f	0.10
6.6	3.69	m	0.09
9.0	9.62	m	0.09
4.8	1.10	f	0.01

Σ 43
 \bar{x} 6,89 4,89 0,07
 28 ♀ 3,34
 15 ♂ 7,61

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Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

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