

Supplementary material

Title: **Spoiled for choice during cold season? Habitat use and potential impacts of the invasive *Silurus glanis* L. in a deep, large and oligotrophic lake (Lake Maggiore, North Italy)**

Authors: **Vanessa De Santis** ^{1, *}, **Pietro Volta** ¹

¹ CNR-IRSA, Largo Tonolli 50, 28922 Verbania Pallanza, VB, Italy; vanessa.desantis@irsa.cnr.it (VDS); pie-tro.volta@cnr.it (PV).

* Correspondence: vanessa.desantis@irsa.cnr.it;

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Figure S1. Distribution of *S. glanis* in the main Italian hydrological basins. Highlight in red where the species is established: 1 = Po; 2 = Adige; 3 = Tagliamento; 4 = Isonzo; 5 = Sile; 6 = Brenta; 7 = Canalbianco; 8 = Serchio; 9 = Reno; 10 = Arno; 11 = Ombrone; 12 = Tevere; 13 = Aterno-Pescara; 14 = Volturno.



Table S1. Linear regressions parameters of length-weight relations (LWRs) of prey fish species calculated from an internal database of length and weight of fish species sampled in different Italian lakes from 2007 to 2014.

Species	Lakes	n	a	b	R ²	F	p value
<i>Silurus glanis</i>	L. Sirio, L. Varese and L. Maggiore	28	-2.32 (2.50 - 2.14)	3.07 (2.97-3.18)	0.99	3547.0	<0.001
<i>Alosa agone</i>	L. Iseo, L. Como, L. Maggiore, L. Mergozzo, L. Garda	757	-2.04 (2.07-2.0)	2.94 (2.91-2.97)	0.98	37867.5	<0.001
<i>Coregonus</i> sp.	L. Iseo, L. Como, L. Maggiore, L. Mezzola	347	-2.36 (2.40-2.31)	3.18 (3.14-3.21)	0.99	29485.8	<0.001
<i>Rutilus rutilus</i>	L. Varese, L. Mergozzo, L. Maggiore, L. Como, L. Ghirla, L. Caldaro	507	-2.26 (2.29-2.22)	3.24 (3.21-3.27)	0.99	46536.4	<0.001
<i>Perca fluviatilis</i>	L. Viverone, L. Mergozzo, L. Varese, L. Maggiore, L. Garda, L. Como, L. Candia, L. Iseo, L. Idro	497	-1.99 (2.03-1.96)	3.04 (3.00-3.06)	0.98	28015.8	<0.001
<i>Sander lucioperca</i>	L. Viverone, L. Mergozzo, L. Varese, L. Maggiore, L. Como, L. Candia, L. Caldaro, L. Mezzola	319	-2.3 (2.4-2.6)	3.15 (3.1-3.2)	0.97	11610.24637	<0.001
<i>Scardinius erythrophthalmus</i> / <i>S. hesperidicus</i>	L. Viverone, L. Mergozzo, L. Varese, L. Maggiore, L. Garda, L. Como, L. Candia, L. Iseo, L. Idro, L. Avigliana, L. Montorfano, L. Ghirla	1666	-2.07 (2.1-2.04)	3.13 (3.1-3.15)	0.97	59664.37102	<0.001
<i>Squalius squalus</i>	L. Iseo, L. Garda, L. Ghirla, L. Como, L. Maggiore, L. Mergozzo, L. Mezzola	103	-2.01 (2.14-1.88)	3.02 (2.91-3.12)	0.97	3056.512991	<0.001
<i>Cottus gobio</i>	L. Mezzola, L. Maggiore, L. Garda, L. Como	27	-1.62 (2.22-1.02)	2.62 (1.94-3.29)	0.72	63.67141701	<0.001
<i>Lota lota</i>	L. Iseo, L. Idro, L. Garda, L. Maggiore, L. Como, L. Mergozzo, L. Mezzola	91	-2.38 (2.49-2.28)	3.17 (3.09-3.25)	0.99	6523.169622	<0.001

Table S2. Feeding intensity (as Vacuity index, $V_i\%$) and amount of food ingested (as Fullness index, $F_i\%$) together with number and biomass of prey at each sampling site and for each of the two size classes (Class I < 100 cm and Class II > 101 cm) per month of capture of catfish caught in littoral and pelagic habitat of L. Maggiore.

Site	Habitat	Size Class	Month	N _{stomach}	$V_i\%$	Mean $F_i\%$ $\pm$ 95% CI	Total N _{prey}	Mean N _{prey}	Total W (kg)	Mean W (g) $\pm$ 95% CI
1	Littoral	Class I	Nov	3	0.0	4.72 $\pm$ 12.81	3	1.00 $\pm$ 0.00	0.44	146.3 $\pm$ 474.3
			Dec	15	25.0	5.30 $\pm$ 2.78	61	4.07 $\pm$ 2.90	4.2	279.8 $\pm$ 153.5
			Jan	6	14.3	4.04 $\pm$ 1.46	27	4.50 $\pm$ 1.28	1.08	179.8 $\pm$ 44.3
	Pelagic	Class II	Nov	2	0.0	6.88 $\pm$ 49.17	7	3.50 $\pm$ 6.35	0.99	495.5 $\pm$ 3005
			Jan	8	11.1	4.54 $\pm$ 4.06	29	3.62 $\pm$ 2.36	2.71	339.4 $\pm$ 285.7
		Class I	Nov	7	44.2	6.45 $\pm$ 3.00	25	3.57 $\pm$ 1.59	2.61	373.0 $\pm$ 189.8
			Dec	1	0.0	4.35	3		0.27	
		Class II	Nov	20	9.1	4.06 $\pm$ 0.99	56	2.80 $\pm$ 0.77	8.85	442.8 $\pm$ 88.5
			Dec	11	31.3	4.64 $\pm$ 1.38	31	2.82 $\pm$ 0.41	6.92	629.1 $\pm$ 257.8
			Jan	6	40	3.21 $\pm$ 1.83	12	2.00 $\pm$ 0.94	1.96	326.3 $\pm$ 199.2
2	Littoral	Class I	Jan	10	37.5	6.09 $\pm$ 2.80	48	4.80 $\pm$ 2.47	2.75	275 $\pm$ 180
		Class II	Nov	5	37.5	5.47 $\pm$ 5.09	13	2.6 $\pm$ 1.42	2.35	469.8 $\pm$ 350.6
			Dec	4	33.3	5.51 $\pm$ 1.20	17	4.25 $\pm$ 5.42	2.04	510.7 $\pm$ 316.4
			Jan	1	0.0	6.2	2		0.63	
	Pelagic	Class I	Nov	2	83.3	4.38 $\pm$ 25.7	3	1.50 $\pm$ 6.35	0.57	287.5 $\pm$ 1734.4
			Dec	14	0.0	4.00 $\pm$ 1.26	26	1.86 $\pm$ 0.64	3.05	218.2 $\pm$ 75.2
			Jan	6	0.0	2.70 $\pm$ 1.90	18	3.00 $\pm$ 1.99	0.9	149.3 $\pm$ 85.1
		Class II	Nov	21	8.7	2.74 $\pm$ 1.62	48	2.29 $\pm$ 0.61	5.47	260.3 $\pm$ 110.7
			Dec	5	37.5	3.44 $\pm$ 3.50	16	3.20 $\pm$ 1.36	1.52	304.2 $\pm$ 290.1
			Jan	2	0.0	3.95 $\pm$ 34.3	5	2.5 $\pm$ 19.06	0.93	464.5 $\pm$ 4123.2
3	Littoral	Class I	Nov	2	0.0	3.26 $\pm$ 6.35	4	2.00 $\pm$ 0.00	0.42	209 $\pm$ 406.6
			Dec	9	10.0	5.36 $\pm$ 2.16	41	4.56 $\pm$ 3.63	2.86	318.1 $\pm$ 146.1
			Jan	8	0.0	9.32 $\pm$ 9.48	36	4.50 $\pm$ 3.43	3.57	446 $\pm$ 433.5
	Pelagic	Class II	Nov	6	0.0	6.49 $\pm$ 3.11	18	3.00 $\pm$ 3.11	3.1	516 $\pm$ 241.5
			Nov	1	0.0	3.38	4		0.22	

Class II	Nov	4	33.3	3.22 ± 1.51	20	5.00 ± 7.69	1.79	448.2 ± 212.9
	Dec	3	25.0	2.48 ± 4.48	8	2.67 ± 3.69	1.16	386.3 ± 690.7

Table S3. List of the 12 prey species composing catfish diet and relative frequency of occurrence (FO%), numeric (N%) and biomass (W%) abundance for each catfish size class in each habitat.

Species	Perlagic						Littoral					
	Class I (N = 31)			Class II (N = 72)			Class I (N = 53)			Class II (N = 26)		
	%FO	%N	%W	%FO	%N	%W	%FO	%N	%W	%FO	%N	%W
<i>Coregonus</i> sp.	80.6	54.43	62.2	54.2	46.9	66.2	7.5	1.8	4.7	23.1	15.1	16.8
<i>Alosa agone</i>	32.3	34.2	28.7	50.0	50.0	30.5	-	-	-	-	-	-
<i>Rutilus rutilus</i>	9.7	11.4	9.1	5.6	3.1	3.30	37.7	15.9	18.3	23.1	12.8	8.30
<i>Perca fluviatilis</i>	-	-	-	-	-	-	37.7	21.4	11.4	23.1	12.8	3.7
<i>Sander lucioperca</i>	-	-	-	-	-	-	5.7	0.9	4.7	7.7	4.7	15.6
<i>Scardinius hesperidicus</i>	-	-	-	-	-	-	3.8	0.9	2.7	7.7	4.7	11.5
<i>Squalius squalus</i>	-	-	-	-	-	-	1.9	0.5	3.0	-	-	-
<i>Silurus glanis</i>	-	-	-	-	-	-	3.8	0.9	13.7	19.2	5.8	33.1
<i>Cottus gobio</i>	-	-	-	-	-	-	1.9	0.9	0.15	-	-	-
<i>Lota lota</i>	-	-	-	-	-	-	1.9	0.5	1.21	3.8	1.2	1.35
<i>Faxonius limosus</i>	-	-	-	-	-	-	58.5	50.9	38.6	50.0	41.9	15.8
<i>Procambarus clarkii</i>	-	-	-	-	-	-	1.9	0.9	1.5	3.8	1.2	0.54