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Food Composition of Youngs of Salmon (Salmo salar L.) in Lithuanian Rivers

by

A.P. Mitans

According to M.N. Lishev data (1959) the yield of the year-classes of the Baltic salmon (Salmo salar L.) depends on river periods conditions of its life. The present paper is written for the purpose of studying salmon youngs' food conditions in natural river conditions.

The stomach content of about 3oo young salmon caught from 196o - 1962 in the Daugava and the Salatsa Rivers entering into the Riga Bay were examined. Food habits of young salmon is closely connected with the peculiarities of its distribution and behaviour.

The feeding grounds of salmon fingerlings (0+) are distributed on sand- and gravel-bottom where the stream is quick. In August fingerlings feed in the same areas where elder young salmon feed, i.e., in rapids grounds and river shoals (current running from 0.8 to 1.3 m/sec., depth from 0.15 to 0.5o m, gravel and shingle ground).

Young salmon mainly feed on reophil benthic organisms, chiefly on larvae Ephemeroptera, Trichoptera, Placoptera and Chironomidae washed out by water. Insects' puppae in young salmon's food are scarce and adult air insects (imago) can be found only in the period of their massive flight (Table 1).

The qualitative composition of young salmon's food in the Daugava and the Salatsa Rivers is similar but the ratio of separate components might differ.

Larvae of Baetis (B. scambus and B. niger) of Ephemeroptera, free-living larvae (without shells) of Trichoptera, larvae Perla of Plecoptera, small ones Orthocladiinae of Chironomidae, young Theodoxus fluvi atilis and Ancylus fluvistilis of Mollusca, Asellus aquaticus and Sammerus pulex of Crustacea are of the greatest importance in young salmon's diet.

Late in May young salmon (average size 28 mm and average weight 2o2 mg, 3o days old) feed only on benthic organisms, i.e., small larvae Chironomidae and Ephemeroptera. From June to August the larvae Trichoptera begin to appear in the fingerlings' (0+) diet while the larvae Ephemeroptera are predominant (up to 72% by weight). Larvae Trichoptera (up to 8o% by weight) prevail as from September.

Beginning from spring yearlings (1+) mainly feed on larvae Ephemeroptera and Trichoptera. A portion of the latter increase by autumn. In contrast to fingerlings (0+) water invertebrae (up to 31% by weight in autumn) are one of the principal food items in the yearlings' diet. Salmon yearlings feed on larger size insects' larvae of older generations while fingerlings chiefly feed on smaller size larvae of generations of the year.

In the summer 1961-62 the weight of insects' larvae eaten by parrs was as follows:-

Fingerlings:- Hydropsyche - 4.2 mg; Baetis - 0.2 mg.
Yearlings:- Hydropsyche - 6.8 mg; Baetis - 1.9 mg.

A similar phenomenon in the food habits of trouts (Salmo trutta L.) is noted by N.A. Nilsson (1957).

The food composition of young salmon (age over 2) coincides with the yearlings' (1+).

The main fattening season of young salmon lasts from May to September. From mid-September, the wellgrown and fattened young salmon leave the summer feeding grounds and migrate to wintering places (i.e. deeper places and under stones), while poorly-fattened young salmon continue to feed in shoals even when the temperature of the water is about 0°C.

Larvae Trichoptera with shells (Leptocerus, Stenophylax, Brachycentrus and others) and larvae Plecoptera are important food species of young salmon in winter.

The larval period of life of the main food components of young salmon lasts a year and more, so the hydrometeorological regime of the spring (the main period of insect-breeding activities which are food items) influences upon the conditions of young salmon feeding not only in this year but during the whole period of the salmon's life in the river (two years on an average).

References

Lishev, M.N. 1959 "Some peculiarities of the population dynamics of the salmon stock of the eastern Baltic". Rapp. & Proc.-Verb., 148.

Nilsson, N.A. 1957 "On the feeding habits of trout in a stream of northern Sweden". Rep.Instit.Freshw.Res., Drottningholm, No. 38.

Table 1. Feeding habits of youngs (Salmo salar L.) in the Salatsa

Date of fishing	16.June 1961			August 1961			September 1961			March 1962			May 1962		
Age of youngs	0+			0+			0+			1			1+		
Length of youngs in mm (M and fluctuations)	38 (34-42)			76 (67-85)			9o (74-1o6)			91 (77-98)			99 (85-1o6)		
Weight of youngs in g (M and fluctuations)	o.66 (o.46-o.91)			5.9 (4.4-8.6)			9.5 (4.3-17.o)			8.6 (4.7-11.8)			13.3 (7.1-16.1)		
No. of organisms in 1 stomach	22			74			48			7			47		
Weight (mg) of organisms in 1 stomach	7			59			1o4			115			2o2		
1. Av.number of organisms in 1o stomachs															
2. Frequency of occurrence (%)	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
3. Ratio of components by weight (%)															
1. Larvae and puppae of insects:	219	1oo	93.8	744	1oo	99.3	453	1oo	75.1	62	1oo	73.2	474	1oo	93.o
a) Ephemeroptera	27	1oo	66.o	224	1oo	51.4	31	9o	4.3	4	5o	o.8	147	1oo	34.7
Baetis sp.	23	1oo	48.7	224	1oo	51,4	31	9o	4.3	-	-	-	127	1oo	17,6
Ephenerella ignita	4	18	17.3	-	-	-	-	-	-	-	-	-	-	-	-
Heptagenia sulphurea	-	-	-	-	-	-	-	-	-	4	5o	o.8	2o	1oo	17.1
b) Trichoptera	2	9	o.1	166	1oo	28.3	318	1oo	61.3	2o	75	11.4	177	1oo	5o.8
Tinodes waeneri	-	-	-	12o	1oo	9.5	49	7o	4.6	-	-	-	117	1oo	1o.1
Hydropsyche sp.	-	-	-	38	1oo	17.5	31	8o	23.9	-	-	-	3o	1oo	34.8
Larvae with shells	-	-	-	8	4o	1.3	237	1oo	31.9	18	75	11.1	2o	1oo	1.7
c) Plecoptera	1	9	2.5	-	-	-	3	1o	o.3	36	1oo	71.o	7	33	3.1
d) Diptera	189	1oo	25.3	354	2oo	19.6	1o1	1oo	9.2	2	25	o.1	143	1oo	4.4
Chironomidae	186	1oo	22.8	338	1oo	16.8	35	9o	o.9	2	25	o.1	123	1oo	2.8
2. Water invertebrae	-	-	-	-	-	-	4	2o	o.8	4	25	5.9	-	-	-
Mollusca	-	-	-	-	-	-	4	2o	o.8	-	-	-	-	-	-
Crustacea	-	-	-	-	-	-	-	-	-	4	25	5.9	-	-	-
3. Other organisms	1	9	2.5	2	2o	o.7	2o	9o	19.8	-	-	-	3	33	2.8
4. Water vegetation	-	9	2.5	-	-	-	-	1o	o.4	-	5o	5.7	-	33	4.2
5. Sand	-	9	1.2	-	-	-	-	2o	3.9	-	25	5.2	-	-	-