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Predation on the Eggs of Steelhead Trout by Stream Salmonids in a Tributary of Lake Ontario

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The problem at Greers Ferry Hatchery has been alleviated by the installation of two additional hatchery intake ports in Greers Ferry Dam, one at a depth of 15.2 m and another at 27.4 m. During fall 1979, water was taken from the 27.4-m port and no abnormal mortalities were observed (Jon Streufert, personal communication).

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Predation on the Eggs of Steelhead Trout by Stream Salmonids in a Tributary of Lake Ontario

Investigators in the Great Lakes region have reported that the eggs of Pacific salmon (*Oncorhynchus* spp.) are heavily preyed on by stream salmonids during the fall (Stauffer 1971; Johnson and Ringler 1979). Similar observations of egg predation by stream salmonids have been made on west coast streams (Idyll 1942; Shapovalov and Taft 1954; Roos 1959; Reed 1967). However, predation on the eggs of spring spawning steelhead (rainbow) trout (*Salmo gairdneri*) has not been as thoroughly examined. In early studies in Michigan, Metzelaar (1929) and Greeley (1932) found only minor predation on eggs of rainbow trout by stream

salmonids. The purpose of the present study was to determine whether stream salmonids were preying on steelhead trout eggs in a New York tributary of Lake Ontario.

Salmonids were collected in April 1980 from Orwell Brook (Oswego County, New York), which discharges into the Salmon River at Pineville, New York, about 17 km from Lake Ontario. All fish analyzed for diet composition were collected with a backpack electroshocker during two consecutive days of sampling. High stream discharges (which are typical in New York tributaries of Lake Ontario during the steelhead

spawning season) made sampling difficult and resulted in low collection efficiency.

After collection, fish were slit and preserved in 10% formalin. All fish were measured (total length in millimeters) before stomach analysis; a correction factor was used to account for length shrinkage caused by preservation (Stauffer 1971). Dry weight estimates were derived for prey of each category to assess their relative contribution to the diet. For a further explanation of the procedure, see Johnson and Ringler (1979).

A total of 50 salmonids were collected — 30 yearling hatchery-reared steelhead (distinguishable by pelvic fin clips), 12 yearling wild steelhead, and 8 stream-resident brook trout (*Salvelinus fontinalis*).

Although peak steelhead trout spawning in Orwell Brook occurred a week before collections were made, the stomachs of all three salmonid groups contained steelhead eggs (Table 1). Steelhead egg remains were found in 10 hatchery and 5 wild steelhead trout and contributed 52 and 59% of the diet of hatchery and wild fish, respectively. Steelhead eggs composed only 20% of the diet of brook trout and were found in only two of the eight fish. Caddisfly larvae (13–24%), mayfly nymphs (7–18%), and stonefly nymphs (4–34%) were the major aquatic invertebrates consumed by fish of the three salmonid groups (Table 1).

The smaller contribution of steelhead trout eggs to the diet of brook trout than to that of both groups of yearling steelhead trout may be a result of differences in habitat distribution. Both wild and hatchery-reared steelhead trout were primarily collected in areas with moderate to fast current, whereas brook trout were collected in areas with slower current. Elliott (1976) observed that the density of eggs of brown trout (*Salmo trutta*) in the drift increased with water velocity. If the eggs of steelhead trout in Orwell were similarly distributed, eggs dislodged from redds and carried downstream would be more readily available to yearling steelhead than to brook trout.

Johnson and Ringler (1979) found that salmon eggs composed at least 90% of the fall (October) diet of stream salmonids in Orwell Brook. The limited data of the present study suggest that salmonid (steelhead trout) eggs compose a substantial portion of the diet of some stream salmonids in the spring as well.

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Table 1. Percentage dry weight composition of the stomach contents of stream-dwelling salmonids (hatchery-reared steelhead, wild steelhead, and brook trout) in Orwell Brook, Oswego County, New York, in April 1980. Values shown are for prey taxa that composed at least 2% of the diet of one of the salmonid groups.

Taxa	Trout		
	Hatchery-reared steelhead ^a	Wild steelhead ^b	Brook trout ^c
Aquatic			
Decapoda	9.6	—	—
Plecoptera	3.5	6.6	33.7
Ephemeroptera	7.4	15.9	18.0
Trichoptera	23.5	12.6	18.1
Diptera	1.4	4.5	—
Steelhead trout eggs	51.5	59.2	20.1
Terrestrial			
Annelida	—	—	10.1
Miscellaneous	3.1	—	—

^a No. = 30 fish 112–173 mm, \bar{X} = 155 mm, total length.

^b No. = 12 fish 80–151 mm, \bar{X} = 113 mm, total length.

^c No. = 8 fish 55–142 mm, \bar{X} = 100 mm, total length.

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