

THE PRESENCE OF THE RED-SPOTTED NEWT, *NOTOPHTHALMUS VIRIDESCENS* RAFINESQUE (AMPHIBIA, URODELA, SALAMANDRIDAE), IN WATERS EXCEEDING 12 METERS IN LAKE GEORGE, NEW YORK

During the course of studies concerned with the rooted aquatic plants and fishes of Lake George, New York, the newt, *Notophthalmus viridescens* Rafinesque, was commonly encountered in depths ranging from the highly organic shallows of embayments to depths up to 13 meters. In that Lake George is one of the type localities (Mecham, 1967) and the incidence of the species in depths greater than a few meters is generally unrecognized (Bishop, 1941; Brimley, 1921; Gage, 1891; Hurlbert, 1969, Mecham, 1967; Pope, 1924) we offer the following remarks.

Lake George is situated in northeastern New York, with an overall length of 51 km and a mean width of 2.3 km. Maximum depth is about 60 m. Transparency is exceptionally high with

secchi disc readings commonly 6 to 7 m. Thermal stratification is well developed during the summer months with epilimnetic waters typically reaching 24°C. The thermocline at the time of maximum summer temperature commences at about 12 to 13 m. The lake is classed as oligotrophic with somewhat higher productivity in the southern basin than in the northern basin. Much of the shore consists of base rock more or less covered with rounded talus. Several more protected bays produce conditions resulting in the collection of organic sediments which in turn support a more developed aquatic flora dominated by species of *Potamogeton*, *Vallisneria*, *Najas*, *Bidens*, and *Isoetes*.

Observations were made from June 1973 to March 1976 while diving with self-contained breathing apparatus (specif. R. Sheldon, C. George). Studied depths ranged from the surface to about 17 m. Figure 1 shows the location of 14 sites in Lake George where newts were either observed or searched for. The specific geographical location of these sites as well as various observation data are given in Table 1. Newts were first observed in the mid-summer of 1973 in Smith Bay in water depths exceeding 8 m. Their presence was subsequently noted at other locations that summer, always at depths greater than 8 m and just below the thermocline.

In July 1973, 25 specimens were collected from Smith Bay and taken to the laboratory for closer observations. Twelve were given to R. Walker of Rensselaer Polytechnic Institute for parasite studies. No erythrocytic sporozoa or trypanosomes in the plasma or other parasites were observed on any of the 12 although newts collected from several ponds and small lakes in eastern New York and western Vermont typically were infected with such parasites (R. Walker, per. comm.). The other 13 were placed in an aquarium at 22°C. They ranged in weight from 3.5 to 5.6 g. Total length varied from 90 to 105 mm and body length less than 55 mm. These data are consistent with the description of Blair et al., (1968). Both males and females were collected and mating behavior was observed; however, no young developed. Most of these specimens were still alive in aquaria after 24 months of captivity.

During late May of 1974, during the time of yellow perch spawning, dozens of newts were observed moving over and through the hollow cylinders of the egg masses, and when examined revealed perch eggs in their stomachs. Even into early June newts were restricted to depths between 2 and 3 m. None was found under close inspection of greater depths. Several individuals were seen swimming in mid-water several meters above the bottom. Two weeks later newts were generally restricted to depths of 9 to 13 m and were closely associated with the bed of *Nitella flexilis* typical of these depths of the lake. Usually, the newts were seen perching on top of the plant matter. When closely approached they swam into the silty sediment on the bottom. Densities of newts appeared to vary greatly but were rarely seen to exceed 1 per 4 m².

The newts remained in the zone from 10 to 13 m for the remainder of the summer. Observations in December 1974 indicated the absence of newts from their summer habitat and a possible migration to shallower depths since two newts were found at 7 m on beds of *Potamogeton robbinsii*. Adult red-spotted newts have been observed to overwinter in ponds in southwestern New York State (Hurlbert, 1970b), however the winter habitat of the Lake George newts is open to speculation. Some were observed under ice cover at 2-3 m in February 1975 and March 1976; none in January or April 1974.

Several possible reasons for the deep habitat of these newts may be inferred. In most instances the newts were found at or just below the thermocline. Throughout the summer, as the thermocline shifted to deeper depths, so did the newts, possibly indicating a thermal preference. Such behavioral thermoregulation has been demonstrated in the red-bellied newt, *Taricha rivularis*, in which the aquatic adults avoided temperatures above 18° to 20°C

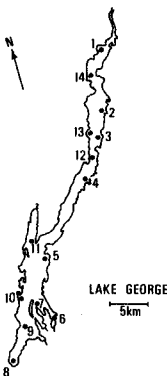


FIGURE 1. Locations inspected for the presence of the newt, *Notophthalmus viridescens* (Rafinesque), in Lake George, New York.

TABLE 1. Locations in Lake George surveyed for the presence of newts.

Site No.	Location	Date of Observance	Depth, ^a m	Surface Water Temp.	Approx. No. of Newts Seen	Sediment Character	Predominant Macrophyte
1	Hearts Bay	7/24/73	0-10	24	0	sandy	barren
		8/07/73	0-10	23	0		
		6/13/74	0-10	19-21	0		
		8/15/74	0-10	23	0		
2	Smith Bay	7/11/73	8-11	23	50	silty	<i>Nitella flexilis</i>
		8/07/73	10-13	23	50		
		1/30/74	2-10	2	0		
		4/11/74	2-10	2	0		
		6/05/74	2-7	14-15	12		
		6/20/74	8-11	19-21	50		
		8/29/74	10-13	22	50		
		12/11/74	7	6	2		
3	Lamb Shanty Bay	8/15/73	9-11	23	10	silty	<i>Nitella flexilis</i>
		8/01/74	9-11	23	10		
4	Hulett's Landing	8/08/73	0-10	23	0	humic silt	<i>Nitella flexilis</i>
		8/01/74	0-8	23	0		
5	Shelving Rock Bay	8/16/73	0-10	23	0	silty	barren
6	Warner Bay	7/24/73	0-9	22-24	0	humic silt	<i>Nitella flexilis</i>
		8/21/73	0-9	22-24	0		
		7/18/74	0-9	22-24	0		
7	Sandy Bay	8/21/73	0-9	22-24	0	humic silt	<i>Nitella flexilis</i>
8	Lake George Beach	8/23/73	0-10	22-24	0	humic silt	<i>Nitella flexilis</i>
9	Diamond Island	5/20/73	0-10	7-9	0	silty, sandy	<i>Nitella flexilis</i>
		8/23/73	0-10	22-24	0		
10	Boon Bay	9/10/73	0-10	20-22	0	silty, sandy	barren
11	Montcalm Point	8/09/73	8-9	22-24	10	silty, sandy	<i>Nitella flexilis</i>
12	Sabbath Day Pt.	8/15/73	0-7	22-24	0	silty, sandy	<i>Isoetes macrospora</i>
13	Silver Bay	7/25/73	0-9	22	0	silty, sandy	<i>Nitella flexilis</i>
14	Forest Bay	8/01/73	10-14	22	6	silty clay	<i>Isoetes macrospora</i> & <i>Nitella flexilis</i>

^aFor sites at which newts were found, depth indicates habitat of newts. For sites at which no newts were found, depth indicates total depth surveyed.

but showed little avoidance of near-freezing temperatures (Licht and Brown, 1967). The cover and food associated with the vast beds of *Nitella flexilis* may be other factors.

Their role in the ecosystem remains poorly understood. Stomach examinations of several thousand yellow perch, small mouth bass, lake trout, cisco, rock bass, red breast sunfish, pumpkinseed sunfish, Atlantic salmon and rainbow trout did not, in spite of their proximity, yield a single newt. The apparent avoidance may be a result of the toxins produced in the newt skin (Brodie, 1968; Webster, 1960).

The diet of the adult newt in its aquatic habitat stresses worms, insects (adults and larvae), leeches, small crustaceans, mollusks, small amphibians, small fish such as sticklebacks, and amphibian eggs (Bishop, 1941). They have also been observed to prey upon their own larvae (Hurlbert, 1970). Because of the observation here and elsewhere (Bishop, 1941) of the eating of vertebrate eggs, there may be some value in considering their potential (but probably highly limited) role as egg predators of the cisco, the lake trout, and other fishes.

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CARL J. GEORGE, Department of Biological Sciences, Union College, Schenectady, New York 12308, USA, CHARLES W. BOYLEN and RICHARD B. SHELDON, Department of Biology, Rensselaer Polytechnic Institute, Troy, New York 12181, USA