FRESH-WATER MOLLUSCA OF THE FINGER LAKES REGION OF NEW YORK[1, 2]

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ABSTRACT

A study of the molluscan fauna in central New York State has provided information on the distribution of fresh-water mollusks in that region, and on the species composition of snails and pearly fresh-water mussels in the major Finger Lakes and thirteen additional lakes and reservoirs in the Oswego River drainage basin. The data are based on 120 collections taken by hand picking, sieving, and the utilization of diving equipment.

Small isolated upland lakes (Dryden, Cazenovia, Como, Panther, Kasoag Lakes), meromictic lakes (Fayetteville Green, Round, and Clark Reservation Lakes), and reservoirs with abnormal silt content and frequently fluctuating water levels (Jamesville and DeRuyter Reservoirs) support only a few species of mollusks. In the meromictic lakes in particular, empty shells collected are believed to represent former molluscan populations whose shells are preserved by the calcium-rich waters. Morphometrically oligotrophic lakes on the major waterways (the seven largest Finger Lakes) possess moderate numbers of molluscan species. In contrast, the shallow lakes of the limestone belt that are in direct communication with the larger rivers have the greatest species diversity.

A table is included that shows the distributions of the species of mollusks collected in these bodies of water, distinguishing between living and dead representatives.

INTRODUCTION

Hall and Waterman (1967) introduced what may develop into a reasonably complete faunistic treatment of all invertebrates of limnological importance in the Finger Lakes Region of New York. They analyzed the species composition of crustacean zooplankton in the seven major Finger Lakes of the Oswego River drainage system, and the four morphometrically similar but much smaller Finger Lakes of the Genesee Basin. This brief paper on fresh-water mollusks focuses on a similar, though not identical, series of eighteen lakes and two reservoirs in the Finger-Lake area, and is based on 120 collections made primarily by W. N. Harman during the past three years.

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Mollusks were collected in shallow water by hand picking and sieving; deep water samples (to 40 m) were taken by means of SCUBA equipment. Determinations are based upon Baker (1928), Berry (1943), Clarke and Berg (1959), Hubendick (1951), and Robertson and Blakeslee (1948).

Several well-known malacologists have contributed to the knowledge of the aquatic mollusks in this area. Among them are: F. C. Baker (1899, 1916a, 1916b, 1916c, 1916d, 1918a, 1918b, 1918c, 1918d), W. M. Beauchamp (1886, 1888), J. E. DeKay (1843), and W. B. Marshall (1890, 1892, 1895). The most recent work was done by Clarke and Berg (1959) on fresh-water bivalves (Unionaceae).

DESCRIPTION OF COLLECTING SITES AND EXPLANATION OF TABLE

The distributions of fresh-water mollusks in the lakes and reservoirs of the Oswego Watershed are presented in table 1. In this table, the Finger Lakes are given in the first seven columns at the left, in the same order (geographical arrangement, from east to west) as in the tables of Hall and Waterman (1967). An average of 14 species of living mollusks was found in each of these bodies of water. These lakes have steep sides, with a minimum of shallow areas. This is detrimental to many fresh-water mollusks, because most inhabitable substrates are restricted to cold, profundal environments. These disadvantages are counterbalanced by several desirable features. Each lake is large enough to provide several habitats that differ in substrate and other characteristics. These waters are sufficiently distinct from each other to result in colonization by different species. Because of this, species diversity in the Finger Lakes is higher than the moderate-to-low population densities might suggest.

Oneida, Onondaga, and Cross Lakes, which appear next in the table, are potentially the most productive lakes for mollusks in the Finger Lakes Region. This results from their shallow morphology, and their location in the nutrient-rich Limestone Belt and Lake Plain of central New York (Berg, 1963). Oneida actually has the greatest diversity of living species and some of the heaviest population-densities found in this survey. The largest lake in the northeastern states, it combines edaphic advantages, that include several types of substrate, with such morphometric variations as many isolated bays, inlets, and islands. Its location on the Erie Barge Canal and in direct communication with the Oswego River may be very important in colonization. Migration through the water is a major means of natural dispersal for all fresh-water mollusks and it is the only important means for the gill-breathing prosobranch snails and Unionacea. Cross Lake, which is similar to Oneida in many ways, although much smaller, also has some of the heaviest population densities of mollusks in the region. However, the mollusk fauna of Onondaga Lake has been almost completely destroyed by pollution. The quantities of empty shells found there (with more species being represented only by empty shells than in any other lake surveyed) indicate that it once had a dense and moderately varied molluscan fauna.

The group of five lakes appearing next in the table are all small and shallow, occur in upland areas, and have much poorer species diversity. This may be due to their relative isolation, the reduced number of substrate types and distinctly different habitats in each, or the relatively restricted inflow of allochthonous nutrients. Lack of calcium may be an important limiting factor in these lakes of the northern Appalachian Plateau (Dryden, Cazenovia, and Como) and of the Adirondack foothills (Panther and Kasoag). Breaks in the periostracum of shells in these lakes result in severe erosion of the underlying layers because of carbonic acid in the water. The total alkalinity of Panther Lake on 19 July 1966, expressed as calcium carbonate, was only 21 ppm. In contrast, total alkalinities average about 100 ppm in the Finger Lakes and are even higher in lakes of the Limestone Belt.

Fayetteville Green Lake, nearby Round Lake, and Clark Reservation Lake

TABLE 1

Species of mollusks found in lakes studied

	Otisco	Skaneateles	Owasco	Cayuga	Seneca	Keuka	Canandaigua	Oneida	Onondaga	Cross	Dryden	Cazenovia	Como	Panther	Kasoag	Green	Round	Clark Reservation	Jamesville	DeRuyter
BIVALVIA																				
Margaritiferidae																				
Margaritifera margaritifera	·	·	·	·	·	·	·	+	·	·	·	·	·	·	·	·	·	·	·	·
Unionidae																				
Elliptio complanata	+	+	·	+	+	+	+	+	–	+	–	·	·	+	·	·	·	·	·	·
Lasmigona compressa	·	·	·	·	+	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Lasmigona costata	·	·	·	+	·	·	+	·	·	·	·	·	·	·	·	·	·	·	·	·
Anodonta grandis	+	·	+	+	+	+	+	+	·	+	+	·	+	·	·	·	·	·	·	·
Anodonta cataracta	·	+	·	·	·	·	·	·	·	·	·	+	·	·	·	·	·	·	·	·
Anodontoides ferussacianus	·	·	·	+	·	·	+	·	·	·	·	·	·	·	·	·	·	·	·	·
Strophitus undulatus	·	+	·	·	·	·	+	+	·	·	·	–	·	·	·	·	·	·	·	·
Leptodea fragilis	·	·	·	+	·	·	·	+	·	+	·	·	·	·	·	·	·	·	·	·
Proptera alata	·	·	·	+	·	·	·	+	·	+	·	·	·	·	·	·	·	·	·	·
Ligumia recta	·	·	·	·	·	·	·	+	·	·	·	·	·	·	·	·	·	·	·	·
Ligumia nasuta	·	·	·	·	+	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Villosa iris	·	·	·	+	+	·	+	·	·	·	·	·	·	·	·	·	·	·	·	·
Lampsilis radiata	+	·	+	+	+	+	+	+	·	+	·	·	·	·	·	·	·	·	+	·
GASTROPODA																				
Lymnaeidae																				
Lymnaea stagnalis	·	·	·	–	+	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Lymnaea palustris	·	+	·	·	+	+	+	+	·	+	·	·	·	·	·	·	·	·	·	·
Lymnaea emarginata	·	+	–	·	·	+	·	+	–	·	·	·	·	·	·	·	·	·	·	·
Lymnaea catascopium	·	·	·	–	+	·	·	+	·	+	·	·	·	·	·	–	–	·	·	·
Lymnaea humilis	+	+	+	–	+	+	+	+	·	+	·	·	+	·	·	–	–	·	·	·
Lymnaea haldemani	·	·	·	·	·	·	·	+	·	·	·	·	·	·	·	·	·	·	·	·
Lymnaea columella	·	·	·	·	·	·	·	+	·	·	+	·	+	·	·	·	·	·	·	·
Planorbidae																				
Gyraulus hirsutus	·	·	·	+	–	·	·	+	·	+	·	·	·	+	·	·	·	·	·	·
Gyraulus parvus	+	+	+	+	+	+	·	+	·	+	+	+	+	+	·	+	+	+	+	·
Helisoma anceps	·	+	–	+	·	+	+	+	–	·	+	·	·	·	·	–	–	+	·	·
Helisoma trivolvis	–	+	·	+	+	+	+	+	–	·	+	–	+	·	·	·	·	+	+	+
Helisoma campanulatum	–	–	·	–	·	·	·	+	–	+	+	+	·	+	+	·	·	+	·	·
Planorbula jenksii	·	·	·	·	·	·	·	–	·	·	·	·	·	·	·	·	·	·	·	·
Promenetus exacuous	·	·	·	·	+	+	+	·	·	·	+	+	·	+	·	–	–	·	·	·
Ancylidae																				
Ferrissia parallela	·	·	·	·	·	·	·	+	·	·	·	·	·	·	·	·	·	·	·	·
Ferrissia tarda	–	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Laevapex fuscus	·	·	·	·	·	·	·	+	·	·	·	·	·	·	·	·	·	·	·	·
Physidae																				
Physa sayii	+	+	·	·	·	+	·	+	·	+	·	·	·	·	·	·	·	·	·	·
Physa heterostropha	·	·	·	+	·	·	·	+	·	·	·	·	·	+	·	+	+	·	·	+
Physa gyrina	+	·	·	·	+	·	·	+	·	–	·	+	·	·	·	·	·	+	·	·
Physa elliptica	·	·	·	·	+	·	·	·	·	·	+	·	·	·	·	·	·	·	·	·
Physa integra	–	·	·	+	+	·	·	+	+	·	·	·	·	·	+	·	+	·	·	·
Physa ancillaria	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	–	·	·	·	·
Viviparidae																				
Viviparus georgianus	–	+	–	·	–	–	·	+	–	·	·	+	·	+	+	·	·	·	·	–
Campeloma decisum	–	+	–	+	+	+	·	+	·	+	+	·	·	·	+	·	·	·	·	·
Valvatidae																				
Valvata tricarinata	·	–	+	–	+	+	·	+	–	+	·	·	·	·	·	+	+	+	·	·
Valvata sincera	·	·	·	–	+	·	·	+	–	·	·	·	·	·	·	·	·	·	·	·
Valvata lewisi	·	·	·	·	·	·	·	+	·	·	·	·	·	·	·	·	·	·	·	·
Valvata piscinalis	·	·	·	+	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·

TABLE—1 *Continued*

	Otisco	Skaneateles	Owasco	Cayuga	Seneca	Keuka	Canandaigua	Oneida	Onondaga	Cross	Dryden	Cazenovia	Como	Panther	Kasoag	Green	Round	Clark Reservation	Jamesville	DeRuyter
Hydrobiidae																				
Amnicola limosa	·	+	·	+	+	+	·	+	–	+	+	+	·	+	·	·	·	·	+	+
Amnicola walkeri	·	·	·	–	·	·	–	·	·	·	·	·	·	·	·	·	·	·	·	·
Amnicola lustrica	·	–	·	–	·	·	·	+	–	+	·	·	·	·	·	+	+	·	·	·
Amnicola integra	·	·	·	·	+	+	·	+	·	+	·	·	·	·	·	·	·	·	·	·
Amnicola binneyana	·	·	·	·	–	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Bithynia tentaculata	·	·	·	+	+	·	·	+	–	+	·	·	·	·	·	·	·	·	·	·
Pleuroceridae																				
Pleurocera acuta	·	·	·	·	·	·	·	–	·	–	·	·	·	·	·	·	·	·	·	·
Goniobasis livescens	·	·	+	+	+	+	·	–	–	·	·	·	·	·	·	+	·	·	·	+
Goniobasis virginica	·	·	·	·	·	·	·	–	·	–	·	·	·	·	·	·	·	·	·	·
Number of living species	7	13	6	19	23	16	12	34	1	19	10	7	5	8	4	5	5	6	4	4

(G. J. Brunskill, personal communication, 1968) are small, deep, isolated, meromictic, marl lakes, with very restricted shoal areas. Despite the abundance of calcium, these waters support depauperate molluscan faunas. The many empty shells found in Green and Round Lakes are believed to represent a Pleistocene fauna that has been excellently preserved in waters constantly saturated with calcium.

The species diversity in Jamesville and DeRuyter Reservoirs is limited by the small size, isolation, and restricted shoal areas of these environments, in addition to other features more or less common to artificial lakes. They have had much less time for colonization than have the natural lakes surveyed; they have substantial problems of siltation and their frequently fluctuating water levels arrest normal succession and tend to prevent vigorous communities from becoming established.

Symbols are used in the table to indicate:

+—that living representatives of the species were present; –—that only empty shells were present; and · —that no trace of the species was found.

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