American Rotifer *Kellicottia bostoniensis* (Rousselet, 1908) (Rotifera: Brachionidae) in Reservoirs of the Upper Volga Basin

V. I. Lazareva and S. M. Zhdanova

Papanin Institute of the Biology of Inland Waters, Russian Academy of Sciences,
Borok, Nekouzskii raion, Yaroslavl oblast, 152742 Russia
e-mail: lazareva_v57@mail.ru

Received March 14, 2013

Abstract—Rotifer *Kellicottia bostoniensis* (Rousselet), typical for North American waterbodies, was found in three reservoirs (Ivankovo, Uglich, and Sheksna) of the Upper Volga Basin in 2005–2012. The size and density of mature rotifers (<4 thousands ind./m³) are comparable to or smaller than in the lakes that are the probable donors of this species.

Keywords: *Kellicottia bostoniensis*, new locations, morphological variability, Upper Volga reservoirs

DOI: 10.1134/S1995082914030110

INTRODUCTION

Rotifer *Kellicottia bostoniensis* (Rousselet, 1908) is common in various waterbodies of northern areas of the United States and Canada [1]. Since the mid-20th century this species dwells in the waterbodies of Western Europe [14]. In 2000 it was found for the first time in Russia in the lakes of Karelian Isthmus [2]. Later, a high number of *K. bostoniensis* was reported in several rivers and lakes of the Upper and Middle Volga basins [1, 5] in the waterbodies of the Lake Onega basin and Lake Ladoga littoral [5, 6]. Most habitats of this species are confined to rivers and lakes, and this species was not found in large reservoirs [1, 2, 5, 6, 11, 12, 14].

The goal of the present paper is to describe the locations and morphological variability of *K. bostoniensis* in the reservoirs of the Volga and Sheksna rivers.

MATERIALS AND METHODS

The materials of combined research was carried out by the staff of the Papanin Institute of the Biology of Inland Waters at the Sheksna Reservoir in August 2005 and 2007 (14–26 sampling stations) and Uglich and Ivankovo reservoirs in August 2005 and 2012 (25–27 sampling stations). Additionally, we analyzed data of the regular (May to October) monitoring of the Rybinsk Reservoir communities in 2005–2012. Morphological parameters of rotifers were compared by the results of studies carried out in summer 2007–2008 on three small (area less than 0.5 km²) carst lakes of the Valdai Upland (lakes Trestino, Bol’shoye, and Maloye Yaichko) (Fig. 1). Theses lakes are described in paper [1].

The reservoirs studied belong to the Upper Volga basin and are situated in the subzones of mixed coniferous-deciduous forests (Ivankovo and Uglich reservoirs) and the southern taiga (Rybinsk and Sheksna reservoirs). Ivankovo and Uglich reservoirs are upstream waterbodies in the Volga River cascade. These reservoirs are relatively small (areas of 327 km² and 249 km², respectively), shallow (maximal depths of 5 m–8 m), and are characterized as considerably lotic, with a water turnover coefficient of 10.1–10.6 year⁻¹ [9]. The Rybinsk and Sheksna reservoirs are much larger (areas of 4550 km² and 1669 km², respectively), deeper (to 30.4 m and 17 m, respectively), and are characterized by slow water turnover (water turnover coefficient of 1.9 and 0.96 year⁻¹ [8, 9]. In addition, water-covered areas belonging to the reservoirs’ basins have a complicated configuration (Fig. 1). The Rybinsk Reservoir consists of one lacustrine Glavnii Reach and three well defined riverine reaches: Volzhskii, Molozhskii, and Sheksinskii. The Sheksna Reservoir is a separate northern branch of the Volga basin; this reservoir is part of the Volga–Baltic navigable waterway. The reservoir includes vast (1284 km²) Lake Beloye and two riverine reaches: northern Kovzhinskii and southern Sheksinskii (bordering the Rybinsk Reservoir). In terms of phytoplankton development, the Sheksna and the Uglich reservoirs are mesotrophic, the Rybinsk Reservoir is moderately eutrophic, and the Ivankovo reservoirs are eutrophic [7].
In all reservoirs the pelagial and coastal waters were studied. The rotifers were counted in the total zooplankton samples collected using a Juday net (12–18 cm in diameter; mesh 91–120 µm in diagonal. The concentration of dissolved oxygen and water temperature were measured using a YSI-85 portable device (YSI Inc., United States). The samples were preserved in 4% formalin solution and essayed in a laboratory using MC-2 and StereoDiscovery-12 (Carl Zeiss) stereomicroscopes. To study the morphological variability of *K. bostoniensis*, 10 to 100 specimens from each sample were analyzed. Upon the analysis, the following parameters were measured: total body length (*l_{tot}*), with spines, lorica length (*l_{lorica}*), and lengths of the longest anterior (*l_{as}*), and posterior (*l_{ps}*), spines. The lengths were measured using an ocular micrometer under a MBI-3 light microscope.

**RESULTS**

American rotifer *K. bostoniensis* was found for the first time in the Upper Volga basin in 2005–2007 [1, 4]. In summer 2005, *K. bostoniensis* was found (<300 ind./m$^3$) in the Kema River mouth (60°16′40″ N; 37°18′43″ E) within the Sheksna Reservoir (Fig. 1) [4]. Presumably, the rotifer was introduced into this waterbody from the Kema River upstream. This rotifer was noted in the shallow (4 m in depth) Lake Vidogoshch, the Soya River headwater, and in neighboring waterbodies (with a rotifer number reaching 180 000 ind./m$^3$) situated on the Atlantic–Arctic–Caspian watershed [5].

In 2005, numerous *K. bostoniensis* (about 3000 ind./m$^3$) was revealed in the deep (>16 m) stratified Lake Vidogoshch (56°42′04″ N; 36°22′03″ E) with anaerobic hypolimnion. The lake is situated on...