Public monitoring in the assessment of bird biodiversity in Veliky Novgorod

M A Konovalova and T V Denisenkova
Yaroslav-the-Wise Novgorod State University, 41, ul. B. St. Petersburgskaya, Veliky Novgorod, Russian Federation
E-mail: konovma@mail.ru

Abstract. Veliky Novgorod has considerable potential for birdwatching development due to its rich bird biodiversity and possibility of combining cultural and eco-tourism, as more and more people are interested in the quality of the urban environment. Reporting of bird sightings by members of the public provides an opportunity to collect data continuously over wider geographical areas, increase detectability of species. Modern technologies greatly facilitate what was previously available only to professionals: photo and video recording of sightings, definition of species. This potential is not fully realized, which is clearly demonstrated by the fact that the all-Russian platform Online Diaries of Bird Observation does not provide data for the Novgorod region at all. The research methods were: observation, survey of students, teachers, and employees of the Institute of Agriculture and Natural Resources, analysis of cartographic data for 2016-2020. The community of amateurs is concentrated around enthusiasts of professional ornithologists, as in the community of Birds of Novgorod Region. Since 2016, Veliky Novgorod has been providing data on the Nightingale evenings platform, after an increase in 2017, the number of respondents remained the same. Since only a part of respondents are permanent, and there are no regular routes for shift ones, the coverage of districts is uneven. Each year information is provided by 16-28 people, sightings vary from 84 to 116. To attract birdwatching volunteers to monitor birds in Novgorod region, one needs to develop a special project, including through NovSU project activities.

1. Introduction
International experience shows that taking into account biodiversity of urban birds is one of the few areas where attracting nonprofessionals has a real benefit for the professional community [1]. Analysis of the distribution of bird species with the involvement of the population allows to maximize detectability of species. Moreover, 55%-65% of the data is detected during surveys [2]. This does not mean that the role of professionals is diminishing, but they have a new function, namely, to develop, coordinate, and administrate projects, to highlight the results obtained and their importance for the formation of a healthy urban environment. Mass media play an important role in this process [1].

A number of factors contribute to the growing popularity of bird watching in our country and abroad. It is primarily about the increased availability of information via the Internet, the affordability of optical equipment, urbanisation of Russia’s society, support for public interest in the environmental issues [3]. Social networks and special apps enable to quickly identify bird species without those clunky, hard-copy field guides. Through social media, birdwatchers can easily define locations where the redistribution of bird species occur in response to climate change [4].

Moreover, such international specialized platforms as eBird, iNaturalist and Flickr and Russian
Online Diaries of Bird Observation, programs Birds of Moscow and Moscow Region (Zoological Museum of Moscow State University), Nightingale Evenings (the Russian Bird Conservation Union) contribute to record observations online. Data analysis of such resources is widely used in environmental education, the formation of databases on habitats and bird migrations. In addition, the found relationship between the number of observations, the vector of interaction with observed species, and civilian scientific data show a high potential for understanding the regulation of human-wildlife interactions [5]. All measures of urban environment management based on the obtained knowledge can increase the relative frequency of interaction with birds, and the associated positive effects for people (as a psychological well-being, reducing the number of harmful insects), and, through positive feedback, their desire to search for these effects [6]. Even such a simple act, as feeding birds, provides a sense of psychological comfort, relaxation, and unity with nature and, in part, concern for the environment [7]. The value of bird watching is largely determined by the fact that their conservation is directly dependent on the preservation of high-quality habitat, which increases the importance of active participation of local communities in monitoring [8].

Despite the undoubted success of research in the field of urban biodiversity, there is still insufficient understanding of the interaction of various groups of taxa from different trophic levels and the spatial-temporal organization of urbanization processes [9]. Feeding of individual species significantly affects the balance of native and introduced species, but remains aloof of research [10].

2. Materials and methods

The research methods were: analysis of literature on the relevant topic, observation, a survey of university students majoring in ‘Biology’ and ‘Teacher education with two training profiles: biology and chemistry’, a survey of teachers and employees of the departments of biology and biological chemistry, forestry, teachers of biology. Denisenkova T V., a coordinator from Veliky Novgorod, analysed map data (2016-2020) provided on the website ‘Nightingale evenings’ (available at: https://www.luscinia-luscinia.ru).

3. Results and discussion

Novgorod region is distinguished by an exceptional bird diversity due to great diversity of its biotopes. Its ornithofauna has been studied since the 19th century. For a long time, this topic was a top priority for scientific experts. A lot of attention was paid to rare and hunting species.

The involvement of mass media as a resource for maintaining the interest of the population can be talked since 1958, when regular notes by individual authors appeared.

Social networks bring together like-minded enthusiasts around professionals. Most birdwatchers pursue this activity for recreational or social reasons, while professional ornithologists facilitate data collection, cover the detectability of species without having to organize long routes every day. A good example is the social network community ‘Birds of the Novgorod region’ (Russian social network ‘Vkontakte’) with more than 560 subscribers who upload photos and videos, get advice in species identification from Natalia Zueva, an ornithologist of the Rdeysky Nature Reserve. An important limitation of this monitoring method is the availability of high-quality photo equipment for taking pictures. At the same time, the most striking and unusual representatives of the bird world attract more attention, and major publications are devoted mainly to red listed species, such as the black stork and the white heron [11].

Now, people begin pay attention to the usual birds of the urban landscape which is evidenced by records in the Journal of the Zoological museum. In 2016, 7 out of 18 entries were dedicated to the white heron, and in the following years, the records are mostly for typical urban inhabitants: rooks, thrushes, starlings, gulls, etc.

Since 1999, Russian Bird Conservation Union has been running a campaign ‘Nightingale evenings’, it allows everyone to take part in monitoring the number of urban birds. Amateur sightings become part of the shared effort to map Nightingales around Russia. On the one hand, the detection of a Nightingale is easily possible by a bright recognizable song without visual detection, on the other – this species is
a bioindicator of the quality of the urban environment. Thus, the results can be taken to recommend necessary measures to maintain and improve its quality of urban environment. To map any bird, one does need any special skills or equipment, just the access to the Internet.

Denisenkova T. V., a senior researcher at Yaroslav the Wise Novgorod State University, has been a coordinator of this programme since 2016, when Veliky Novgorod joined it. In 2016, 77 sightings, together with characteristics of their habitats, were registered by 16 people. The majority of respondents were teachers and employees of the Institute of Agriculture and Natural Resources, this is logical, since the centre of events was the Zoological Museum (Institute of Agriculture and Natural Resources, Yaroslav the Wise Novgorod State University). Data collection was carried out almost manually. Out of 60 sightings, registered in the city and its nearby areas, 44 were in Veliky Novgorod, a third of them – on the Trade side (historical district).

In 2017, radio, local television, and newspapers were involved in covering the event, this helped to increase the number of participants up to 28 people. 116 bird observations were recorded and mapped. The respondents were mostly students of departments of biology and biological chemistry, forestry of NovSU, as well as students majoring in biology. Students performing vertebrate animal research contributed to the study of this topic, they reported bird sightings and finally shared their experience with school students when undergoing teaching internship at schools and gymnasiums. The first sighting of the Nightingale was reported on May, the 13th, which is important for keeping track of birds. 60 sightings were reported in the city, the focus has shifted to the Trade side – this year two-thirds of the observations were recorded there. Compared to 2016, the number of observations outside the city limits increased to 29 (81%).

In 2018, 95 sightings were reported, of these only 47 were located within the city limits, and 87% were located on the Trade side. Relative as well as absolute frequency of sightings increased, from 16 in 2016 to 41 in 2018. There were no sightings reported in the Western district of the city, the number of sightings outside the city has also decreased to 26. Teachers of biology from Novgorod schools joined the campaign, expanding the audience that participates in bird monitoring. An enthusiastic teacher can engage students to take part in the activities, significantly expanding coverage of the observed territories.

In 2019, phenological observations showed that the first song of the Nightingale sounded very early, on the 25th of April. This year saw a large number of spring grass fires, active construction in the suburban area (in particular, in the village of Beregovy Moriny), and within the city limits. This is a possible reason for reducing the frequency of sightings to 84. Less than half of them are located in Veliky Novgorod. Even prosperous areas with a lot of greenery showed a significant reduction in sightings to isolated cases (park of the 30th anniversary of the October Revolution, Antonovo). At the same time, 24 people recorded their observations online.

The year 2020 was ambiguous for phenological observations. The active arrival of birds and vocal marking of the territory were during the period of self isolation due to the coronavirus pandemic. This made it difficult to organize observation routes, it contributed to a significant reduction in bird anxiety, which immediately affected the number of nesting birds. 26 people took part in the registration of data, they noted 158 sightings. In Veliky Novgorod – 89, the predominant number (two-thirds) — in Grigorovo and Pskovskaya street. There are only 6 points in the suburban area. This may be due to the lack of getting indoors. The song was first recorded on May, 3rd.

Each observer reported an average of 3.5 to 4.8 sightings (6 sightings were recorded in 2020). To some extent, the difference in the representation of city districts can be explained by the fact that teachers and staff of Novgorod State University provide data on the place of residence, which does not change every year. Students live in different districts and observations are reported each year from different locations. Information is also regularly provided by citizens of Novgorodsky, Okulovsky, Krestetskoy, Soletsky, and Valdaysky districts. In general, the population of Veliky Novgorod has not been actively participating in the campaign for several years. It may be necessary to attract public attention to the campaign through the media, as it happened in 2017. It was then that there was the highest relative number of observations.
4. Conclusion

Veliky Novgorod has a huge potential in the development of national bird monitoring, both because of their diversity, and because of the ability to combine ecological routes with general cultural ones, to expand the active part of the audience through tourists and schoolchildren, as well as students. Mostly amateurs act independently or unite around a professional community of ornithologists.

Less than 30 people take part in the ‘Nightingale evenings’ campaign, there is no data on the Novgorod region on the website ‘Online diaries of bird observation’. It is too early to talk about comprehensive studies that take into account the distribution of species in space and ecological niches, especially for making important urban planning decisions, as is the case in Western countries.

To attract more people to bird monitoring, one needs to develop a special project aimed at collecting information and sightings of urban birds, and possibly synanthropic mammals, as their population is increasing on the territory of Veliky Novgorod.

The Zoological Museum (Institute of Agriculture and Natural Resources, Yaroslav the Wise Novgorod State University) can become a focal point. The Museum is actively developing the project of student activities. This allows to implement the creation of such a project as part of this activity.

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