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New data on the distribution of Pallas's spadefoot toad (*Pelobates vespertinus* (Pallas, 1771)) and fire-bellied toad (*Bombina bombina* L., 1761) (Anura, Amphibia) on the territory of the Saratov region and adjacent territories

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Abstract. New data on the geographical distribution of *Pelobates vespertinus* and *Bombina bombina* in the Saratov region and adjacent districts of the Volgograd, Voronezh, Penza and Ulyanovsk regions are presented. The habitation of *B. bombina* and *P. vespertinus* populations in 25 and 22 localities, respectively, was established. Most modern populations of these species of anuran amphibians have been recorded near water bodies in river valleys.
Keywords: anuran amphibians, populations, new localities

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Currently, the Pallas spadefoot toad (*Pelobates vespertinus*) and the fire-bellied toad (*Bombina bombina*) are among the most widespread and abundant species of anuran amphibians to form the structure of vertebrate communities in the river valleys of the Saratov region and adjacent territories (Kaybeleva et al., 2019). However, a significant climate transformation has been observed from the second half of the 20th and at the beginning of the 21st centuries. Warming leads to significant shifts in the seasonal phenomena of the annual cycle of anuran amphibians (Yermokhin et al., 2013 *a*, 2014, 2016; Yermokhin, Tabachishin, 2021). In addition, climatic changes lead to a local decrease in water content in the southeastern European Russia (Kireeva, 2013).

The system of floodplain water bodies in river valleys is noticeably degrading. This factor has a negative effect on the reproductive biology of local populations of anuran amphibians, disrupts the development of tadpoles by limiting the possibility of their successful completion of metamorphosis. Therefore, the death frequency of entire cohorts of anuran amphibians breeding in floodplain lakes has significantly increased. As a result, as in many other world regions (Stuart et al., 2004; Reading, 2007; Zylstra et al., 2019 *a*, *b*), amphibian populations are simplified, accompanied by a multiple decrease in their numbers. In addition, the disappearance of spawning water bodies when they dry up for a long time leads to the complete degradation of local populations of tailless amphibians and to a significant fragmentation of their spatial distribution. That is why conducting research on the distribution of these amphibians in dynamically transforming weather and climatic conditions in the Southeastern European Russia seems to be especially relevant for analyzing and assessing the short-term and medium-term prospects of the state of their populations.

Anuran amphibians were recorded on the territory of the Saratov region and adjacent ones (Ulyanovsk, Penza, Voronezh and Volgograd regions) in April–October 2009–2021 (Tables 1 and 2). To register the finding of individuals of these species, we used route counts, the method of linear fences with pitfall traps (during the period of spawning migrations and metamorph dispersal), as well as the bioacoustic method (Corn, Bury, 1990; Yermokhin, Tabachishin, 2011; Belyachenko et al., 2014). The coordinates of finds were determined using GPS navigators Garmin eTrex H (Garmin Ltd., Taiwan).

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Table 1. Localities of the revealed populations of *Bombina bombina* in the Saratov region and adjacent territories

No.	Locality	Coordinates		Year
		N	E	
	Saratov region			
1	Pond, near the city Khvalynsk	52.522143	48.065272	2009
2	Floodplain of the Volga river, near the village Chardym (Voskresenskiy district)	51.772981	46.304148	2009
3	Floodplain of the Latryk river, near the village Eremeyevka (Saratovskiy district)	51.500873	45.801600	2020
4	Floodplain of the Latryk river, near the village Novoaleksandrovka (Saratovskiy district)	51.500379	45.773678	2020
5	Pond, near the village Alexandrovka (Saratovskiy district)	51.514810	45.859201	2018
6	Pond, near the village Kuvyka (Tatishchevskiy district)	51.634832	45.613857	2020
7	Floodplain of the Khoper river, near the village Letyazhevka (Arkadakskiy district)	51.883163	43.395860	2009
8	Lake Rasskazan', near the village Rasskazan' (Balashovskiy district)	51.547760	42.613673	2019
9	Lake Koblovo (floodplain of the Medveditsa river), near the village Uritskoye (Lysogorskiy district)	51.310816	44.833772	2011
10	Lake Sadok (floodplain of the Medveditsa river), near the village Uritskoye (Lysogorskiy district)	51.359043	44.801349	2013
11	Lake Lebyazhye (floodplain of the Medveditsa river), near the village Uritskoye (Lysogorskiy district)	51.34046	44.827667	2013
12	Lake Cherepash'e (floodplain of the Medveditsa river), near the village Uritskoye (Lysogorskiy district)	51.363253	44.818795	2015
13	Kruglenkoe Lake (floodplain of the Medveditsa river), near the village Uritskoye (Lysogorsky district)	51.364733	44.815737	2015
14	Floodplain of the Saratovka river, near the town Pribrezhnyi (Engelsskiy district)	51.508453	46.290438	2019
15	Floodplain of the Volga river, near the village Rovnoe	50.760667	45.928074	2009
16	Floodplain of the Yeruslan river, near the village Dyakovka (Krasnokutskiy district)	50.720972	46.750479	2010
17	Floodplain of the Bolshoy Irgiz river, near the village Kamenka (Pugachevskiy district)	51.920464	48.651621	2009
18	Pond, near the village Balashi (Ozinskiy district)	51.370161	49.902464	2017
19	Pond, near the village Safarovka (Dergachevskiy district)	50.905088	48.961417	2017
20	Kharlamov Sad natural boundary, floodplain of the Bolshoy Uzen river (Alexandrovo-Gaiskiy district)	50.289019	48.467987	2017
21	Varfolomeevskoe reservoir, near the village Vetelki (Alexandrovo-Gaiskiy district)	49.948317	48.268323	2021
	Volgograd region			
22	Valley of the Yeruslan river, near the village Saltovo (Staropoltavskiy district)	50.611634	46.617332	2019
	Voronezh region			
23	Lake (valley of the river Khoper), near the village Makashevka (Borisoglebskiy district)	51.527738	42.588082	2019
	Penza region			
24	Sapolga river valley, Malaya village Serdoba (Maloserdobinskiy district)	52.460440	44.961816	2019
	Ulyanovsk region			
25	Syzransk river valley, near the village Repevka (Novospasskiy district)	53.155901	48.066837	2019

The fire-bellied toad is a common species of anuran amphibians in the region, living near the water's edge. During its spawning and post-spawning period, it is found in lentic water bodies used for reproduction. The distribution of *B. bombina* populations is generally similar to the previous species;

Table 2. Localities of the revealed populations of *Pelobates vespertinus* in the Saratov region and adjacent territories

No.	Locality	Coordinates		Year
		N	E	
	Saratov region			
1	Floodplain of the Khoper river, near the village Letyazhevka (Arkadakskiy district)	51.884099	43.392345	2009
2	Lake Rasskazan', near the village Rasskazan' (Balashovskiy district)	51.548417	42.611079	2019
3	Lake Koblovo (floodplain of the Medveditsa river), near the village Uritskoye (Lysogorskiy district)	51.310816	44.833772	2011
4	Lake Sadok (floodplain of the Medveditsa river), near the village Uritskoye (Lysogorskiy district)	51.359043	44.801349	2013
5	Lake Lebyazhye (floodplain of the Medveditsa river), near the village Uritskoye (Lysogorskiy district)	51.34046	44.827667	2013
6	Lake Cherepash'e (floodplain of the Medveditsa river), near the village Uritskoye (Lysogorskiy district)	51.363253	44.818795	2015
7	Kruglenkoe Lake (floodplain of the Medveditsa river), near the village Uritskoye (Lysogorskiy district)	51.364733	44.815737	2015
8	Liashchevo Lake (floodplain of the Medveditsa river), near the village Uritskoye (Lysogorskiy district)	51.385302	44.866288	2020
9	Pond, near the village near the village Uritskoye (Lysogorskiy district)	51.461065	44.908737	2020
10	Floodplain of the Latryk river, near the village Novoaleksandrovka (Saratovskiy district)	51.500379	45.773678	2020
11	Floodplain of the Zolotukha river, near the village Zolotoye (Krasnoarmeyskiy district)	50.839597	45.918000	2009
12	Pond, near the village Rovnoe	50.822205	46.120236	2009
13	Valley of the Yeruslan river, near the village Dyakovka (Krasnokutsky district)	50.728069	46.761788	2010
14	Floodplain of the Zhidkaia Solianka river, near the village Komsomolskoye (Krasnokutskiy district)	50.770180	47.001456	2011
15	Pond, near the village Tselinny (Krasnopartizanskiy district)	51.531670	49.120407	2009
16	Floodplain of the Bolshoy Uzen river, near the village Kurilovka (Novouzenskiy district)	50.759883	48.099515	2010
17	Valley of the Bolshoy Uzen river, near the village Monakhov (Alexandrovo-Gaiskiy district)	50.278916	48.510601	2017
18	Valley of the Bolshoy Uzen river near, the village Alexandrov Gai	50.147174	48.524298	2021
	Volgograd region			
19	Valley of the Yeruslan river, near the village Saltovo (Staropoltavskiy district)	50.611634	46.617332	2019
	Voronezh region			
20	Lake (valley of the river Khoper), near the village Makashevka (Borisoglebskiy district)	51.527738	42.588082	2019
	Penza region			
21	Sapolga river valley, Malaya village Serdoba (Maloserdobinskiy district)	52.460440	44.961816	2019
	Ulyanovsk region			
22	Syzransk river valley, near the village Repevka (Novospasskiy district)	53.155901	48.066837	2019

however, it uses terrestrial biotopes to a limited extent. During the period of activity, fire-bellied toads rarely move from their reservoir further 10–15 m for feeding (at twilight and at night with high humidity after heavy rainfall). More distant terrestrial biotopes are used by metamorphs and mature individuals during wintering only. The population size of *B. bombina* in the Medveditsa river valley is significantly lower than that of *P. vespertinus* and does not exceed, on average, 10% (0.6–41.5%) of the total numbers of amphibians during their breeding season (Yermokhin et al., 2018).

The Pallas spadefoot toad populations on the territory of the Saratov region and adjacent territories live mainly in areas with light sandy soils, which are

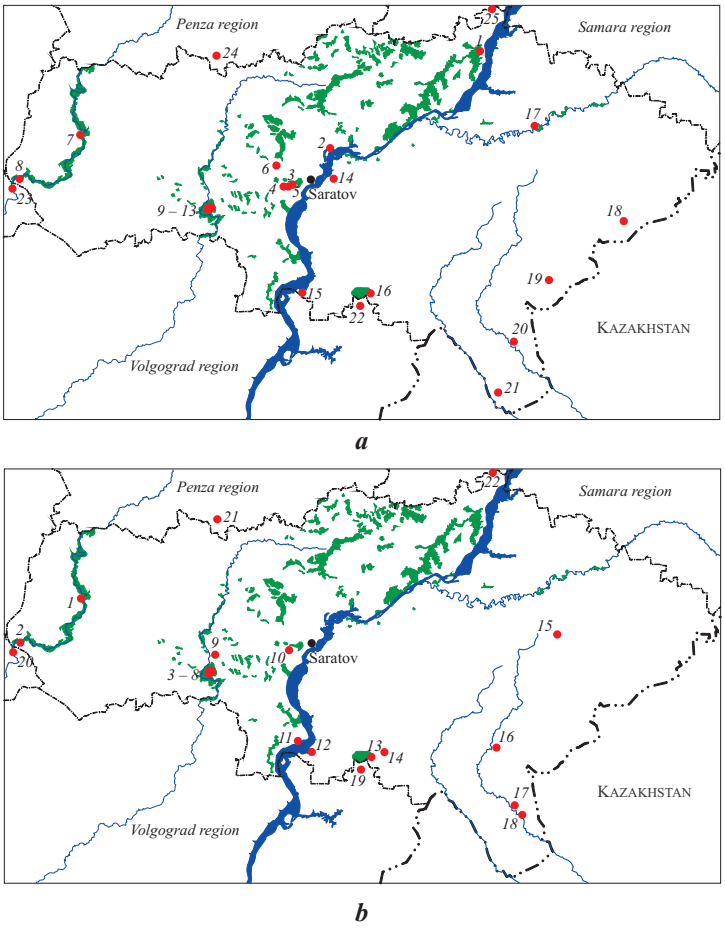

Figure. Studied populations of *Bombina bombina* (*a*) and *Pelobates vespertinus* (*b*) in the Saratov region and adjacent territories; for localities numbers and their coordinates, see Tables 1 and 2

confined to river valleys with a developed floodplain. In this region, the most numerous populations were recorded in the river valleys of the rivers of the Don (Khoper and Medveditsa) and Volga (Bolshoi Irgiz, Eruslan, and Tereshka) basins. Floodplain lakes there have become the main type of spawning water bodies for such populations. In the post-spawning period, spadefoot toads live mainly on sandy ridges and fluvial terraces near spawning lakes, weakly overgrown with herbaceous and shrubby vegetation. In heavily soddy areas, in forest biotopes and in agrocenoses, the population density is ten times lower than that in the main habitats.

Wintering of Pallas's spadefoot toad in the Saratov region occurs almost exclusively on sandy soils, in areas that rise above the river floodplain and are never subject to flooding during a flood rise in the water level. The depth of the wintering chambers of these amphibians varies in different years, is determined by the degree of soil freezing and ranges from 1 to 2.2 m. The density of individuals during the wintering period is on average 1–2 ind./m^2 (Yermokhin et al., 2013 *b*).

On watersheds, they are found near lentic water bodies (ponds and water reservoirs) at a distance of no more than 600 m, which is associated with the maximum dispersal distance of *P. vespertinus* (Yermokhin et al., 2014), and a similar value of the parameter was noted earlier for *Pelobates fuscus* in Eastern Europe (Blab, 1986) and somewhat smaller in Central and Western Europe (500 м: Hels, 2002; Trochet et al., 2014). In other terrestrial biotopes at a longer distance from spawning water bodies, as well as in areas with heavy soils, the populations of the species are very sparse (single findings were noted or these amphibians were absent).

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Распространение чесночницы Палласа (*Pelobates vespertinus* (Pallas, 1771)) и жерлянки краснобрюхой (*Bombina bombina* L., 1761) (Anura, Amphibia) на территории Саратовской области и сопредельных территорий

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Информация о статье

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Поступила в редакцию 22.08.2021, после доработки 23.09.2021, принята 28.09.2021

Аннотация. Приводятся новые данные о географическом распространении чесночницы Палласа и жерлянки краснобрюхой на территории Саратовской и смежных районов Волгоградской, Воронежской, Пензенской и Ульяновской областей. Установлено обитание популяций жерлянки краснобрюхой в 25 локалитетах и чесночницы обыкновенной в 22 локалитетах. Большинство современных популяций этих видов бесхвостых амфибий зарегистрированы вблизи водоемов в долинах рек.

Ключевые слова: бесхвостые амфибии, популяции, новые локалитеты

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