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Distribution of *Bufotes latastii* (Boulenger, 1882), endemic to the Western Himalaya

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The distribution of *Bufotes latastii*, a diploid green toad species, is analyzed based on field observations and literature data. 74 localities are known, although 7 ones should be confirmed. The range of *B. latastii* is confined to northern Pakistan, Kashmir Valley and western Ladakh in India. All records of "green toads" ("*Bufo viridis*") beyond this region belong to other species, both to green toads of the genus *Bufotes* or to toads of the genus *Duttaphrynus*. *B. latastii* is endemic to the Western Himalaya. Its allopatric range lies between those of bisexual triploid green toads in the west and in the east. *B. latastii* was found at altitudes from 780 to 3200 m above sea level. Environmental niche modelling was applied to predict the potential distribution range of the species. Altitude was the variable with the highest percent contribution for the explanation of the species distribution (36 %).

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INTRODUCTION

Bufotes latastii (fig. 1) is a relatively common green toad species which spreads in Kashmir Valley, Ladakh and adjacent regions of northern India and Pakistan. The distribution and taxonomy of the species were debated for many years. The first records of green toads ("*Bufo calamita*" and "*Bufo viridis*") in Kashmir were made by Anderson (1871) and Blanford (1875, 1878). *Bufo latastii* as a separate species was described by Boulenger (1882) from "Ladak" [Ladakh]. Since that time till now, two species of green toads (*Bufo latastii* and *Bufo viridis*) were considered to occur in Kashmir Valley and

Ladakh (Sclater 1892; Zugmayer 1909; Das *et al*. 1964; Das 1966; Sahi & Duda 1985, 1986; Sahi *et al*. 1996; Vasudevan *et al*. 2002). The karyological study of green toads ("*Bufo* sp.") from the Kashmir Valley, "Shopian" [Shupiyan, India] revealed that they were diploids and differed noticeably from European populations of *Bufo viridis* (Duda & Kaul 1971).

Later, Dubois & Martens (1977) examined external morphology and breeding calls of green toads from the Kashmir Valley and western Ladakh and suggested that only *Bufo latastii* is distributed in these regions of India. Moreover, the authors provided many records with map of *B. latastii* and other toads in the Western Himalaya and reported that the species was quite abundant in the Kashmir Valley and western Ladakh.

Figure 1. Male (above) and female (below) of *Bufotes latastii* from Kuns, 1506 m a.s.l. and Pahalgam, 2031 m a.s.l. respectively (Kashmir Valley, India).

Hemmer *et al.* (1978) studied external body characters and skull morphology, serum albumins, erythrocyte size and mating calls in green toads from various parts of Central Asia. The authors concluded that *Bufo latastii latastii* is a so-called polytypical species widely distributed in Central Asia from eastern Iran, Uzbekistan and Kazakhstan to western China, northern Pakistan and northwestern India. Kashmir and Ladakh harbors *B. latastii latastii* only whereas remaining parts of Central Asia are occupied by other subspecies, like *B. l. pseudoraddei* Mertens, 1971, *B. l. zugmayeri* Eiselt & Schmidtler, 1973 and *B. l. oblongus* Nikolskii, 1896.

Khan (1983) was the first who mentioned the existence of *Bufo latastii* in Pakistan. In 1997, he described a new species of green toad (*Bufo siachinensis*) from the Gilgit-Baltistan Province (Pakistan), but subsequently Stöck *et al.* (1999, 2001) synonymised this name with *Bufo latastii*. Importantly, Stöck *et al.* (1999) described a new subspecies *Bufo pseudoraddei baturae* with bisexual triploidy from Hunza and Gilgit river valleys and suggested that the range of this taxon eastwards may be limited by the steep rocky Indus valley between mouth of Gilgit River and Skardu in Pakistani Baltistan (Stöck *et al.* 2001). Later, Stöck *et al.* (2006) and Ficetola *et al.* (2010) analyzed mitochondrial DNA of green toads (*B. latastii*) from the Skardu region of the Gilgit-Baltistan Province and found that local populations form a separate lineage among green toad species.

Therefore, several green toad taxa with different ploidy were described from the Western Himalaya – Karakoram mountain range region. It should be mentioned that previously green toads were included in the genus *Bufo*, but relatively recently they were erected to a new distinct genus *Pseudepidalea* (Frost *et al*. 2006). However, this name is a junior synonym of *Bufotes* Rafinesque, 1815 (Dubois & Bour 2010).

Although many researchers reported on green toads in the Western Himalaya, the distribution of *B. latastii* is still insufficiently explored. In the present study, we attempt to apply the environmental niche modelling to predict the potential distribution range of the species.

We dedicate this paper to the 70-anniversary of our colleague and friend Prof. Alain Dubois in recognition of his outstanding contribution to the knowledge of amphibians of the Himalaya and the Oriental Realm.

MATERIAL AND METHODS

Since 2011, we visited the Western Himalaya in India four times traveling across the Jammu and Kashmir State as well as Himachal Pradesh State. In April and May of 2013 and June of 2015 *Bufotes latastii* was found in twelve localities in Kashmir and Ladakh divisions (Table 1).

To predict the potential distribution of *B. latastii*, we modeled the species' distribution using MaxEnt (ver. 3.3.3k; Phillips *et al*. 2006). This algorithm combines environmental parameters with geographic coordinates and produces high-quality predictions of species distribution, often more reliable when evaluated and compared with other predictive models (Hernandez *et al*. 2006). For the contemporary niche predictions, we used 67 reliable localities (Table 1: 1–67), comprising own and previously published records, including ones obtained from the Global Biodiversity

Information Facility database (http://www.gbif.org/). Additionally, we included in the analysis four localities provided by Bahaar and Bhat (2011). These authors found anuran larvae in some paddy fields in the Kashmir Valley. Based on our data, this valley is populated by only two syntopically occurring anurans: *B. latastii* and *Euphlyctis adolfi* Günther, 1860 (Khajeh *et al.* 2014; Howlader *et al.* 2015; Litvinchuk *et al*. 2017). Therefore, we considered that all four listed localities are inhabited by *B. latastii*. Ultimately, seven localities which needed clarification (Table 1: 68–74) were excluded from the analysis. Duplicated localities were removed by ENMTools 1.3 (Warren *et al*. 2010).

Altitude and 19 bioclimatic layers were extracted from the WorldClim 1.4 database (http://www.worldclim.org). Further, two layers (the aridity index and land cover) were obtained from the following databases: Global Aridity and Potential Evapo-Transpiration (http://www.cgiar-csi.org/data/global-aridity-and-pet-database) and GlobCover 2009 (Global Land Cover Map; due.esrin.esa.int/globcover/) respectively. In addition, 14 layers with various metrics quantifying spatial heterogeneity of global habitat based on the textural features of Enhanced Vegetation Index (EVI) imagery and the global Percent tree coverage were downloaded from EarthEnv (http://www.earthenv.org/texture.html) and Github (https://github.com/globalmaps/gm_ve_v1), respectively. To consider topography in the model, four landscape layers (aspect, exposition, slope, and terrain roughness index) were calulated with QGIS (http://www.qgis.org/).

To eliminate predictor collinearity prior to generating the models, we calculated Pearsons's correlation coefficients for all pairs of bioclimatic variables using the ENMTools. We excluded the variable of a correlated pair with $|r| > 0.8$ that we considered to be the less biologically important of the two, based on known preferences of *B. latastii*. The resulting dataset contained six bioclimatic variables: Bio1 (annual mean temperature; °C × 10), Bio2 (mean diurnal range; °C × 10), Bio4 (temperature seasonality; standard deviation × 100), Bio15 (precipitation seasonality; CV), Bio16 (precipitation of wettest quarter; mm), and Bio19 (precipitation of coldest quarter; mm). We used a jackknife analysis for estimating the relative contributions of the variables to the MaxEnt model and applied a mask that extends from 30° to 37°N and 71° to 81°E.

A total of 27 variables (30 arc-seconds resolution) were implemented in the final model. We used 70 % of the occurrence localities as training data, and the remaining 30 % were reserved for testing the resulting model. Model performance was measured using the Area Under the Curve (AUC) derived from the Receiver Operating Characteristic (ROC) plots. The plots represent a model's ability to discriminate species locations from pseudo-absences by plotting sensitivity against 1 - specificity. AUC values range from 0.5 to 1.0, with 0.5 indicating no greater fit than expected by chance and 1.0 indicating a perfect model fit. Models with test AUC values above 0.75 are considered useful and above 0.90 very good (Swets 1988; Elith 2000). To properly parameterize the model, we evaluated the performance of various combinations of ten regularization multipliers (from 0.5 to 5, in increments of 0.5). The best-fit models were parameterized with a regularization multiplier of 0.5. We used the default auto feature setting within the MaxEnt software to generate the model.

RESULTS

According to our field observations, *Bufotes latastii* inhabits deforested grasslands (Gulmarg, Sonamarg, Panikar and Skamboo), coniferous forests (Tangmarg), roadsides (Hokersar and Shadipora), paddy fields (Duru), and shores of large lakes overgrown with trees (Kuns) in the Kashmir Valley and treeless mountain desert in Kargil District of Ladakh (Panikhar, Suru River) occurring at altitudes from 1506 to 3119 m a.s.l. (fig. 2).

All defined records of *B. latastii* are summarized in Table 1 and fig. 3. These data showed that the distribution of the species is confined to mountain regions in northern Pakistan and northwestern India. In Pakistan, the Lataste's toad had been reported from 21 localities in three administrative provinces (Khyber Pakhtunkhwa, Azad Jammu and Kashmir and Gilgit-Baltistan). In India, the species is known from 46 localities in the Jammu and Kashmir State.

The MaxEnt model for *B. latastii* had robust evaluation metrics (AUC_{test} = 0.972 ± 0.008) and showed significance for the binomial omission test, indicating good performance of the model. The predicted potential niche model under the current climate conditions is shown in figure 4. Of the parameters included in the model, altitude was the variable with the highest percent contribution for the species (36 %). Additionally, EVI's contrast (reflected heterogeneity of habitat), temperature seasonality and precipitation of coldest quarter had notable contributions (16, 11 and 11 % respectively). According to the model, the most suitable habitats for the species were located in Kashmir Valley, as well as in Dras and Suru valleys in western Ladakh (India) and Kunhar, Shountar, Skardu, and Shigar valleys in Pakistan.

Figure 2. The breeding habitat of *Bufotes latastii* in Gulmarg, 2620 m a.s.l., 30.04.2013 (Kashmir Valley, India).

Table 1. List of localities with *Bufotes latastii*. NHMUK, Natural History Museum (London, Great Britain); MNHN, Muséum national d'Histoire naturelle (Paris, France); NRM, Swedish Museum of Natural History (Stockholm, Sweden); UF, Pakistan Museum of natural History (Islamabad, Pakistan). * Localities where we observed *Bufotes latastii*; ** Localities needing confirmation.

N	Locality	Country	Coordinates	Alt. (m)	Reference
1	Rawalkot	Pakistan	33.8600°N 73.7470°E	1620	UF.79058
2	Muzzafarabad	Pakistan	34.3958°N 73.4700°E	780	UF.81157, 81186, 82896–902
3	Kagan	Pakistan	34.7780°N 73.5210°E	2030	UF.82872, 82914–7
4	Rajwal	Pakistan	34.8550°N 73.5940°E	2260	UF.82041–5, 82905–13
5	Naran	Pakistan	34.9110°N 73.6540°E	2460	UF.70142–9, 82046
6	Sojh	Pakistan	34.9420°N 73.7000°E	2500	UF.70140–1, 70150
7	Sharda	Pakistan	34.7960°N 74.1910°E	1860	UF.82918–28
8	Kel	Pakistan	34.8230°N 74.3590°E	2017	UF.82930–5
9	Machalpoll	Pakistan	34.8180°N 74.4270°E	2300	UF.82929
10	Kachura Lake	Pakistan	35.4430°N 75.4480°E	2286	UF.82880–8, 82895
11	Kachura	Pakistan	35.4260°N 75.4540°E	2246	UF.79215
12	Hoto	Pakistan	35.3570°N 75.5110°E	2204	UF.79064–5, 79216–9, 79481–4
13	Skardu	Pakistan	35.2833°N 75.6667°E	2204	Ficetola *et al.* 2010
14	Buddha Rock	Pakistan	35.2690°N 75.6340°E	2370	UF.81360–2
15	Satpara Lake	Pakistan	35.2830°N 75.6170°E	2300	Stöck *et al.* 2006
16	Alchori	Pakistan	35.5080°N 75.6760°E	2350	UF.79059
17	Shigar Valley	Pakistan	35.4833°N 75.7000°E	2356	Ficetola *et al.* 2010
18	Shigar	Pakistan	35.4224°N 75.7450°E	2360	UF.79060–2, 79478–80
19	Hashopi	Pakistan	35.4840°N 75.7020°E	2325	UF.79037–8, 84668–9
20	Shyok Valley	Pakistan	35.1833°N 76.3167°E	2486	Ficetola *et al.* 2010
21	Shinu	Pakistan	35.2573°N 76.6350°E	2826	Khan 1997
22	Shergol	India	34.3979°N 76.3044°E	3180	Dubois & Martens 1977
23	Skamboo*	India	34.4792°N 76.2228°E	2931	Litvinchuk *et al.* 2017
24	Pashkum	India	34.5120°N 76.1930°E	2880	MNHN.1979.8982
25	Kargil	India	34.5300°N 76.1400°E	2680	Dubois & Martens 1977
26	Panikar*	India	34.0539°N 75.9496°E	3119	Litvinchuk *et al.* 2017
27	Kachan	India	34.3655°N 75.9692°E	2867	Raj 2015
28	Dras	India	34.4167°N 75.7667°E	3200	Gruber 1981
29	Meenamarg	India	34.3310°N 75.5780°E	2744	Dubois & Martens 1977
30	Kangmarg	India	34.0333°N 75.3333°E	2700	Fotedar 1965
31	Pahalgam*	India	34.0076°N 75.3162°E	2031	Dubois & Martens 1977
32	Thajiwas Glacier	India	34.2727°N 75.2743°E	2591	Fotedar 1973
33	Sonamarg*	India	34.3100°N 75.2710°E	2659	Present paper
34	Sonamarg*	India	34.3110°N 75.2680°E	2621	Present paper
35	Sonamarg*	India	34.2990°N 75.2210°E	2444	Dubois & Martens 1977
36	Traal Rukh	India	34.1165°N 75.0869°E	3048	NHMUK.1914.4.25.5
37	Naranag	India	34.3500°N 74.9800°E	2600	Hemmer *et al.* 1978

N	Locality	Country	Coordinates	Alt. (m)	Reference
38	Ganderbal	India	34.2179°N 74.7681°E	2000	Fotedar 1965
39	Harwan	India	34.1667°N 74.9000°E	1695	Kaw 1950
40	Dashigaon	India	34.1505°N 74.9193°E	1895	Sahi & Duda 1985
41	Shalimar	India	34.1423°N 74.8628°E	1583	Kaw 1950
42	Brain	India	34.1330°N 74.8800°E	1615	MNHN.1979.8909–41
43	Nishat	India	34.1300°N 74.8830°E	1620	Fotedar 1980
44	Vicharnag	India	34.1100°N 74.8023°E	1584	Gupta 1967
45	Srinagar	India	34.0833°N 74.7833°E	1890	Annandale & Narayan 1919
46	Bimna	India	34.0795°N 74.7632°E	1584	Kaw 1950
47	Hokersar*	India	34.1120°N 74.7212°E	1587	Present paper
48	Shadipora*	India	34.1498°N 74.6750°E	1590	NHMUK.1973.559
49	Mirgund Lake	India	34.1667°N 74.6500°E	1580	Alfred & Nandi 2001
50	Bandipora	India	34.4245°N 74.6333°E	1595	Bahaar & Bhat 2011
51	Kuns*	India	34.3780°N 74.5260°E	1506	Present paper
52	Duru*	India	34.3610°N 74.4807°E	1600	Present paper
53	Sopore	India	34.3000°N 74.4700°E	1586	Fotedar 1965
54	Hundawara	India	34.3966°N 74.2918°E	1600	Kaw 1950
55	Kupwara	India	34.4301°N 74.1208°E	1935	Bahaar & Bhat 2011
56	Baramulla	India	34.2093°N 74.3431°E	1828	Fotedar 1965
57	Gingal	India	34.1306°N 74.1082°E	1375	NRM.30226
58	Dal Lake	India	34.0917°N 74.1417°E	1585	Pandit & Qadri 1986
59	Haigam Rakh Lake	India	34.1000°N 74.3100°E	1580	Alfred & Nandi 2001
60	Tangmarg*	India	34.0490°N 74.4280°E	2135	Dubois & Martens 1977
61	Khilanmarg	India	34.0400°N 74.3700°E	2680	Dubois & Martens 1977
62	Gulmarg*	India	34.0510°N 74.3970°E	2620	Dubois & Martens 1977
63	Shaopian	India	33.7259°N 74.8248°E	2030	Kaw 1950
64	Pulwama	India	33.8833°N 74.9167°E	1620	Bahaar & Bhat 2011
65	Anantnag	India	33.7300°N 75.1500°E	1600	Bahaar & Bhat 2011
66	Verinag	India	33.5500°N 75.2500°E	1840	Fotedar 1965
67	Kishtwar	India	33.3175°N 75.7708°E	1670	Sahi & Duda 1985
68	Nubra Valley**	India	34.7953°N 77.5283°E	3184	Schmidt 1926
69	Shey**	India	34.0711°N 77.6353°E	3240	Sahi *et al.* 1996
70	Leh**	India	34.1678°N 77.5832°E	3522	Sahi & Duda 1985
71	Khalsi**	India	34.3211°N 76.8800°E	3000	Sahi *et al.* 1996
72	Surankote**	India	33.6409°N 74.2639°E	1372	Murthy & Sharma 1976
73	Rajouri**	India	33.3595°N 74.3403°E	823	Murthy & Sharma 1976
74	Bhadarwah**	India	32.9747°N 75.7167°E	1613	Murthy & Sharma 1976

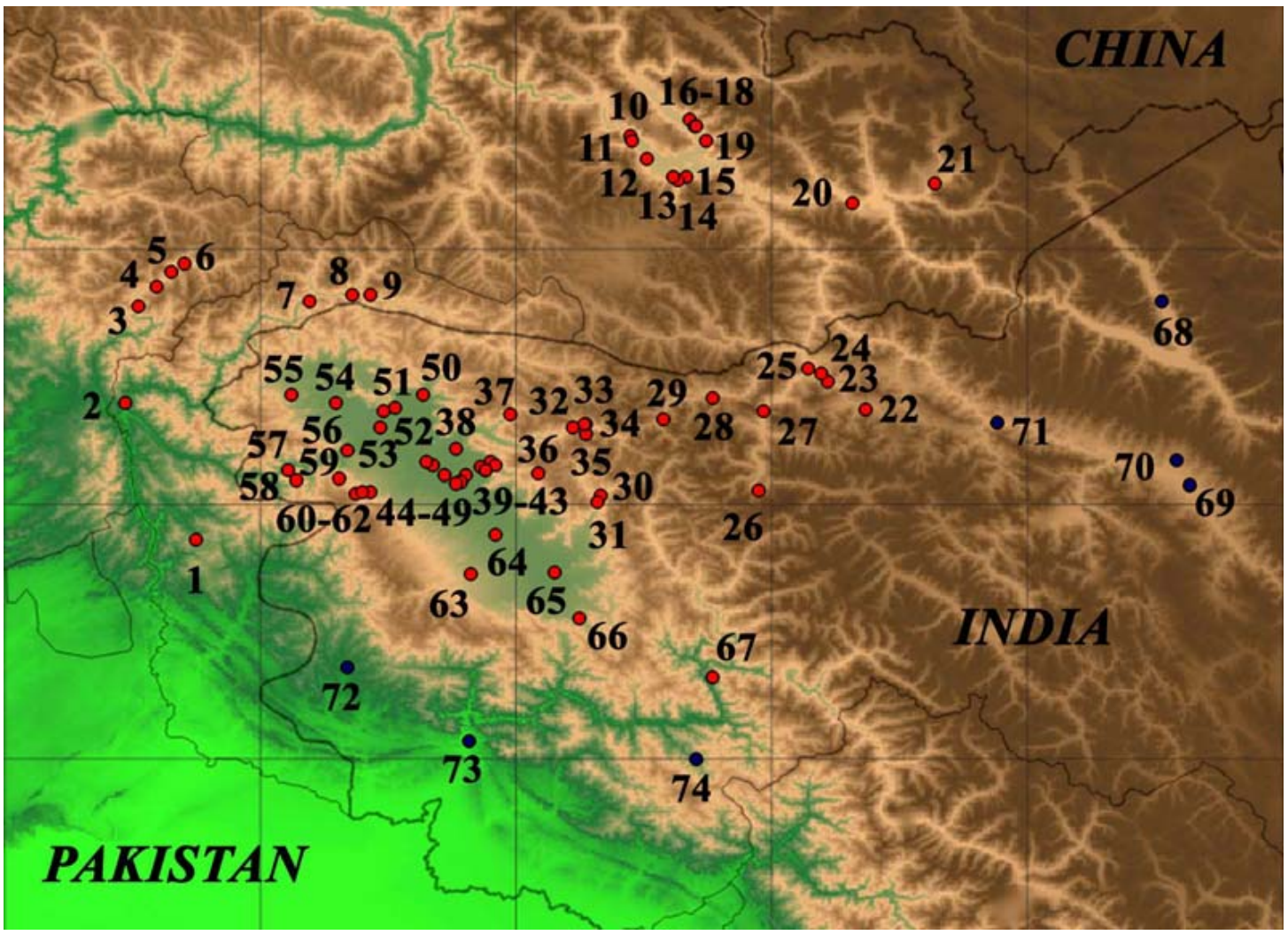

Figure 3. The map of distribution of *Bufotes latastii*. Numbers of localities are given in Table 1. Red circles are reliable localities and dark blue circles are questionable.

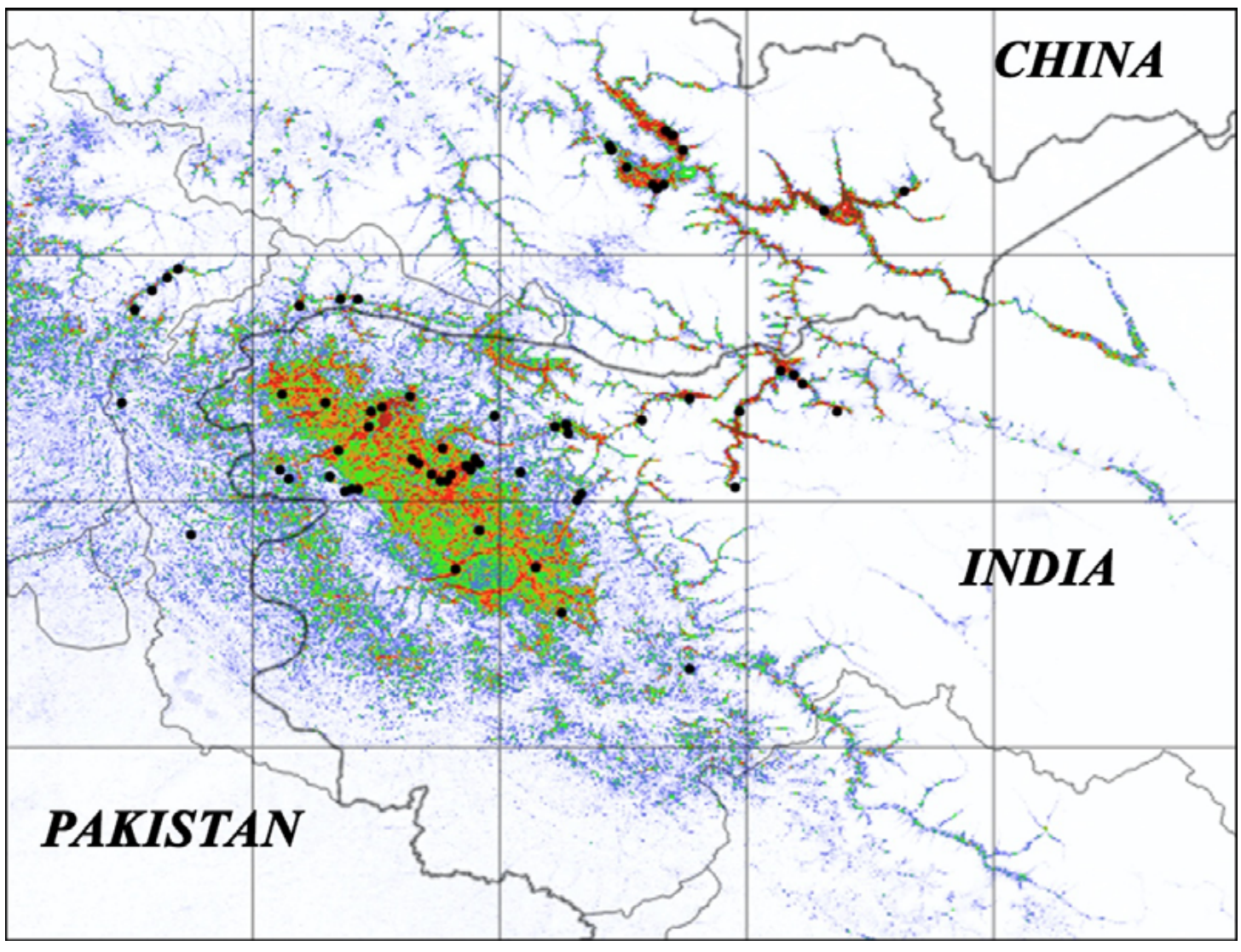

Figure 4. The predicted potential distribution model of *Bufotes latastii* made using Maxent. Most suitable regions are designated by orange and red colors (probability of occurrance of the species are 0.5–1.0); moderately suitable are in green and blue (0.1–0.5); and little or unsuitable are in white (0–0.1). Localities of the species are given as black circles.

DISCUSSION

As marked in the Table 1, seven localities previously reported for green toads should be confirmed. These are the vicinities of Surankote (near Poonch [Punch] town), Rajauri and Bhadarwah [Bhaderwah] settlements (Table 1: no. 71–73) on the southern slope of the Pir Panjal Range in the Jammu division of the Jammu and Kashmir State, India. Murthy and Sharma (1976) and Murthy *et al.* (1979) were the first who recorded *Bufo viridis* from these localities. Later, the occurrence of green toads there was confirmed by other authors (Verma *et al*. 1995; Saba & Tripathi 2012, 2013; Saba 2013). However, the photographs of toads published by Murthy and Sharma (1976: fig. 1–2) and Saba and Tripathi (2012: fig. 1–3; 2013: fig. 1), to our opinion, depicted *Duttaphrynus stomaticus* (Lütken, 1864). In April 2013, we visited two of these localities (Rajauri and Bhadarwah) and did not find any green toads, although *Duttaphrynus melanostictus* (Schneider, 1799) and *D. stomaticus* were observed in Rajauri and *D. stomaticus* in Bhadarwah. Moreover, after analysis of the karyological data provided by Saba and Tripathi (2013) and Saba (2013) we concluded that the reported karyotypes of "*Bufo viridis*" (or "*Pseudepidalea viridis*") from Bhadarwah belonged to *D. stomaticus*. Based on our data, *Bufotes latastii* from the Kashmir Valley (India) has the nucleolus organizer regions (NORs) located on a long arm of the 5th pair of chromosomes, while in "*Bufo viridis*" and *D. stomaticus* from Bhadarwah NORs were located on the long or short arms of the 7th chromosome pair, respectively (Saba & Tripathi 2013; Saba 2013). Moreover, according to the MaxEnt model (fig. 4), localities in Surankote, Rajauri and Bhadarwah have little suitable environmental conditions for survival of *B. latastii* (probabilities of occurring are 0.050, 0.002 and 0.029 respectively).

Additionally, a record of "*Bufo viridis*" from the Nubra Valley (Taghar or Panamik villages, Ladakh, India) is of particular interest. Schmidt (1926) listed green toads collected there in May of 1925 by the James Simpson–Roosevelt Asiatic Expedition of the Field Museum of Natural History (Chicago, USA). Based on the MaxEnt model (fig. 4), the Nubra Valley has quite suitable environmental conditions for survival of *B. latastii* (probabilities of occurring are up to 0.703). However, to our knowledge, no other reports or collections of amphibians are available from this area. We visited the Nubra Valley in May of 2013 and June of 2015 and found no amphibians. Two alternative explanations may be suggested. The first one: the species is extinct. Starting the end of 19th century, the brown trout (*Salmo trutta*) was introduced to this state (Hassan & Pandey 2012). According to our field observations, all suitable water bodies in the Nubra Valley were populated by trout, which could prey on tadpoles. The second explanation is confusion in the museum labels. Schmidt (1926) mentioned that toads were collected in May of 1925. However, at that time the expedition was in Kashmir and the northwestern part of Ladakh, India (Hellmayr 1929), reaching the Nubra Valley only in June 9–14th. Perhaps, these toads were collected in Kashmir, Dras or Suru valleys.

Importantly, the Nubra region with Shyok River is isolated from the Indus River valley by high Ladakh Range, and the village Panamik at Nubra River is located at the southern foothills of Karakorum Range, geographically not so far from the Siachen Glacier region where the river originates. Curiously, the Shyok River connects the

Nubra Valley with Pakistani-controlled Baltistan region where *B. latastii* was found in the western part of the river (Ficetola *et al.* 2010).

Three localities of green toads in the Indus River valley in Ladakh (India) need clarification as well. These places are in the vicinities of Leh town, as well as Khalsi and Shey settlements (Sahi & Duda 1985; Sahi *et al.* 1996). In May of 2013 and June of 2015, we visited these localities, but did not find any amphibians; that is concordant with the field searches in eastern Ladakh by Dubois & Martens (1977). According to the MaxEnt model (fig. 4), the Indus River Valley in the Ladakh division (including Khalsi and Shey) has suitable environmental conditions for survival of *B. latastii* (probabilities of occurring are up to 0.879). However, the locality in Leh has unsuitable conditions (0.006). Perhaps, local populations were extinct due to human activity, climate change or predatory fish introductions.

Numerous records of green toads were previously reported for a few other regions of India (see Dubois & Martens 1977). We consider that all the records beyond the Kashmir Valley and Ladakh do not belong to *B. latastii*. According to our data (Borkin *et al.* 2012; Litvinchuk *et al*. 2012, 2017), triploid green toads from Sutlej and Spiti river valleys in the eastern part of Himachal Pradesh (India) could be assigned to *B. zamdaensis* described from the western part of Tibet (Fei *et al.* 1999). So-called green toads ("*Bufo viridis*") which were found in the Rajasthan and Gujarat states of India (Sarkar 1984; Saxena 1999; Sharma & Mehta 2007; Vyas 2007) seem to belong to *D. stomaticus*. That can also be concluded from the photographs published by Saxena (1999: plate 1) and Vyas (2007: 18). Moreover, in March of 2014 we visited Gujarat. In the vicinities of Dwarka town, where "green toads" were previously noted (Vyas 2007), we succeeded to find *D. stomaticus* only.

Thus, based on our original and literature data, we can resume that *Bufotes latastii* is endemic to the Western Himalaya (and peripherally the easternmost Karakoram) in the territory from northern Pakistan to Kashmir Valley and Ladakh in India. The species is allopatric in relation to other six species of toads (*B. pseudoraddei, B. baturae, B. zamdaensis, Duttaphrynus stomaticus*, *D. melanostictus* and *D. himalayanus* [Günther, 1864]) inhabiting the Western Himalaya.

Curiously, the range of diploid *B. latastii* covers the territory situated between those of green toad species characterized by so-called bisexual triploidy. In the west, the closest localities of two triploid species of the genus *Bufotes* are in 104–105 km by air: the village of Mingora (34.7929°N, 72.3576°E, 920 m a.s.l.) which is the type locality of *B. pseudoraddei* (Mertens 1971) and the Bargot Valley (36.0363°N, 74.5863°E, 2632 m a.s.l.) populated by *B. pseudoraddei baturae* (Ficetola *et al*. 2010) erected to the full species status by Stöck *et al*. (2010). In the east from the range of *B. latastii*, according to our data, the closest locality of triploid *B. zamdaensis* is situated in distance of about 245 km (Kaza; 32.2319° N, 78.0644° E, 3656 m a.s.l.; the Spiti Valley, Himachal Pradesh, India).

Additionally, three species of the genus *Duttaphrynus* could be found on the southern slopes of Himalaya (Dubois & Martens 1977; Litvinchuk *et al*. 2017). However, there are no confirmed records of their sympatric occurrence with *B. latastii*, distributed more northward. The single evidence that *Duttaphrynus* species inhabit Kashmir and Ladakh was provided by Chabanaud (1922). Based on the collections of Guy Babault's mission in 1914, he mentioned that "*Bufo andersoni*" and "*Bufo*

himalayanus" (valid as *D. himalayanus*) were captured in Dras in Ladakh and Kashmir, respectively. However, examination of these collections in the Museum national d'Histoire naturelle (Paris, France) revealed that "*Bufo andersoni*" corresponds to the Himalayan lazy toad, *Scutiger occidentalis* Dubois, 1976 from the family *MEGOPHRIIDAE* Bonaparte, 1850 (Dubois 1986; Litvinchuk *et al*. 2018). The presence of *D. himalayanus* in the Kashmir Valley was not confirmed by any museum collections. According to the electronic list of specimens of the museum (http://www.gbif.org/), Babault collected *D. himalayanus* in the vicinities of Manali town only (Kullu Valley, Himachal Pradesh, India).

According to the MaxEnt Model, the altitude was the variable with the highest percent contribution for *B. latastii.* According to Dubois & Martens (1977), the species was recorded at elevations between 1600 and 3300 m a.s.l. However, the highest limit of altitudinal distribution of the Lataste's toad was long time under discussion because Khan (1997) described "*Bufo siachinensis*" (valid name of *B. latastii*) at the altitude of 5238 m a.s.l. This was assumed as the world record for the highest distribution of a species of amphibians (Borkin 1999). However, in the description of this species the author pointed out that the "species was collected from small seepage puddles along sides of terraced cultivated fields on the southern bank of Shyok River near Shinu village." In this region such conditions are located at the much smaller altitude which is not more than 3150 m a.s.l. An indirect confirmation of this suggestion could be found in another paper of Khan (2008), where the latter reported that maximum altitude for the species is 3000 m a.s.l. Additional high-altitude record (3522 m a.s.l., Leh, Ladakh) was published by Sahi and Duda (1985), but it should be confirmed (see above discussion). As far as we know (Table 1), *B. latastii* was found at altitudes ranging from 780 m a.s.l. (Muzzafarabad in Pakistani part of Kashmir, locality 2 in Table 1 and fig. 3) and 3200 m a.s.l. (Dras, western Ladakh, India; locality 28 in Table 1 and fig. 3).

In contrast with diploid green toads of Central Asia, the Himalayan *B. latastii* occurs at markedly higher altitudes. Nevertheless, this diploid species was found in the Western Himalaya at lower elevations in comparison with triploid green toads (e.g., *B. zamdaensis*). Such situation is similar to that described in Central Asia including the Pamirs (Litvinchuk *et al.* 2011).

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