

DISTRIBUTION OF TREE FROGS (*HYLA* SPP.) IN SERBIA – IMPLICATIONS OF THE RECENT TAXONOMIC REVISION

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We present the updated distribution data of the *Hyla arborea* species complex in Serbia. *Hyla arborea* inhabits all biogeographic regions, while *Hyla orientalis* inhabits only the easternmost parts of north-eastern, eastern and south-eastern Serbia. Potential hybrid zone encompasses parts of central and southern Serbia from the Đerdap gorge, over Niš to Bosilegrad. Since the taxonomic separation

between the tree frog taxa was not yet recognized in national nomenclature, we propose the official Serbian names. The species *H. arborea* will keep the standard Serbian name “Gatalinka”, while for the species *H. orientalis* we propose the name “Istočna gatalinka”.

Keywords: Amphibia, *Hyla arborea*, *Hyla orientalis*, herpetofauna

INTRODUCTION

Assessing species distribution and its trends is one of the most important steps in studying biodiversity and population monitoring (Jetz *et al.* 2019). The national distribution assessment usually provides the most of the records of the species having major part of, or the entire distribution range, within that particular country (i.e. endemic species), or for the species which are regarded as culturally or societally important (Oliver *et al.* 2021). During the last decade, the number of studies regarding national distribution of Serbian amphibians has increased considerably (Vukov *et al.* 2013, Sterijovski 2014, Đorđević *et al.* 2016, Jović *et al.* 2016, Urošević *et al.* 2018, Vučić *et al.* 2020, Urošević 2021), which was initiated by the need to publish the Red Books of Serbian Fauna I and II – Amphibians and Reptiles (Kalezić *et al.* 2015, Tomović *et al.* 2015) as well as to implement Natura 2000 networks and prepare national conservation legislative. The need for continuous updates of the national fauna still remained current. The taxonomy of the European fauna is in the state of constant flux (Speybroeck *et al.* 2020), due to the employment of the methods of molecular biology and the use of integrative systematics (de Queiroz 2007, Pante *et al.* 2015). Cryptic taxa, with different types of hybrid zones, are constantly being described which stresses the need for thorough studies in the key areas.

One of the examples of the cryptic species in the European fauna is the genus *Hyla*, with currently nine recognized species in the Western Palearctic and seven in Europe (Stöck *et al.* 2012, Speybroeck *et al.* 2020, Dufresnes *et al.* 2021). The European tree frogs are small arboreal amphibians with adhesive toe pads, usually uniform green colour and strong mating calls. Species are more or less morphologically similar and some species can be identified with certainty only by their geographic range and molecular analyses (Speybroeck *et al.* 2016). Most of the described lineages originate from Pliocene (~5MY ago) and are parapatric, i.e. geographically separated, but hybridize in the narrow contact zones (Stöck *et al.* 2012). For instance, *H. arborea* (Linnaeus 1758) and *H. orientalis* (Bedriaga 1890) are coming into contact in the Eastern and South-eastern Europe. The contact zones are situated in the plains of the

central Poland (Vistula valley), Eastern Serbia and North-eastern Greece, with the Carpathian massif being a main obstacle (Stöck *et al.* 2012). In Serbia and Greece, the contact zones form the narrow clines (~30 km), mainly because the Balkan and Rhodope massifs form barriers which confine tree frogs to valleys (Dufresnes *et al.* 2015). The detailed analysis of hybrid zone in Serbia showed that there is a cline around the city of Niš, with Niš itself being in the centre of the cline. There is an apparent reproductive isolation, with no F₁ generation detected and most hybrids being backcrosses (Dufresnes *et al.* 2015). According to Dufresnes *et al.* (2015), hybrid populations in Serbia were detected in Đerdap Gorge, in the Niš cline and, to the south, at the town of Bosilegrad, eastern from the Dukat Mt. (Rhodope masiff). The hybrid zone is most likely a 30 km wide crescent going from Đerdap gorge to Niš and then to the south-east to Bosilegrad, however the parts without DNA sampling must be treated as *incertae sedis*. *Hyla orientalis* populations that were not admixed or minimally admixed were found in the Wallachian plain, near Negotin, east from Niš and around Pirot and Stara planina Mt. and to the south on the Vlasina Plateau (Dufresnes *et al.* 2015). The Carpathian mountains in the north and the Rhodopes in the south seem to be the barrier between these two species, where admixing occurs along the suitable water bodies, while the Balkan mountains and associated water systems seem to be primarily *H. orientalis* zone, and the secondary contact occurs in the valleys.

The tree frog (*Hyla arborea* s. l.) was mentioned as a part of the Serbian fauna in the oldest published studies (Đorđević 1900) and considered common and widespread, wherever it had suitable living conditions (Radovanović 1951). After that, the published distribution data on the tree frog remains scarce and usually focused only on certain places or regions (Prša 1959, Pasuljević 1968, Džukić 1972, Ham *et al.* 1981, Crnobrnja 1982, Tadijan & Mikeš 1984, Tadijan 1986, Crnobrnja & Rohalj 1988, Pantelić 1995, Ivančević *et al.* 2007, Crnobrnja-Isailović *et al.* 2012, Sterijovski 2014, Džukić *et al.* 2015, Đorđević *et al.* 2016, Jović *et al.* 2016, Urošević 2021). The study by Vukov *et al.* (2013) groups tree frogs with the most widespread amphibians inhabiting the entire territory of Serbia, but without accurate georeferenced data.

The aim of this study is to compile the existing spatial data on the distribution of tree frogs in Serbia and georeference it at the 10 × 10 km standard UTM grid (Universal Transverse Mercator). The spatial data is superimposed onto the contact zone revealed by the molecular studies (Dufresnes *et al.* 2015) to provide species delimitation, hybrid zone and highlight areas deficient in sampling which should be prioritised in the future studies. The official Serbian nomenclature is also suggested, since *H. orientalis* was previously not recognized as a part of the Serbian fauna.

MATERIALS AND METHODS

The data was gathered from different sources: published literature data (95 localities, 70 UTM), including published data from the Batrachological Collection of the Institute for the Biological Research “Siniša Stanković” – University of Belgrade (57), verifiable online sources such as field herpetology websites (117 localities, 54 UTM) and the unpublished data collected in field by the co-authors and collaborators mentioned in the Acknowledgements (246 localities, 165 UTM) (Figure 1). The field data are presented by locality names in the Appendix 1. The list of previously published data, including the Batrachological collection, are given in the Appendix 2. Data from the Internet databases, namely from the websites Balcanica (Balej & Jablonski 2015), iNaturalist (Inaturalist.org 2021) and Biologer (Maričić & Golubović 2021) are provided in the Appendix 3. Data was cited in compliance with terms and conditions of the databases, and each entry was given with individual citation and authorship.

Entries

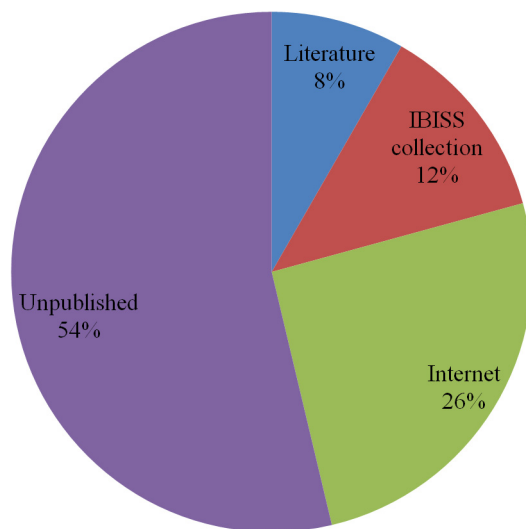


Fig. 1. – Percentage of entries from each source.

The data were mapped on the standard 10 × 10 km UTM grid. Georeferenced data were superimposed over the hypothetical boundary between *H. arborea* and *H. orientalis*, which was mapped according to the existing molecular studies (Stöck *et al.* 2012, Dufresnes *et al.* 2015). In this paper, we used standard biogeographic regions of Serbia proposed by Marković (1970) and Stevanović (1992): Bačka (Ba), Banat (Bt), Srem

(Sr), Pomoravlje (Po), Šumadija (Š), central Serbia (C), north-eastern Serbia (NE), eastern Serbia (E), north-western Serbia (NW), south-eastern Serbia (SE), western Serbia (W), south-western Serbia (SW), southern Serbia (S), Kosovo (K), and Metohija (M) (see Vukov *et al.* 2013).

RESULTS

Of all gathered distribution data for the *Hyla* spp. in Serbia, the previously published records represent 46% of the sample while the unpublished data represent 54% of the sample (Figure 1). Despite a relatively large number of historical and new distribution data, the distribution of tree frogs in Serbia still seems fragmented, which can be mostly attributed to the lack of systematic research (Figure 2). Tree frogs are usually well camouflaged in the vegetation and often inconspicuous and extremely difficult to detect outside the breeding season. Findings of tree frogs are present in all biogeographic regions. In the Pannonian parts of Serbia (81 UTMs), they are dense along the floodplains of great rivers – Danube, Sava and Tisza, and associated wetlands, while they seem scarce in the mostly agricultural land. Distribution in the Peripannonian region seems to be scarcer (39 UTMs) and also concentrated along Danube and Sava. The distribution records in the Mountain-valley region are numerous (106 UTMs) but scattered, and mostly densely distributed around river valleys, wetlands on the plateaus and at lower altitudes.

DISCUSSION

Tree frogs seem to be widespread in Serbia, occurring in all biogeographic regions, but patchily distributed (Vukov *et al.* 2013). The densest grouping of findings is in the Pannonian region, along the floodplains of rivers Danube, Sava and Tisza and in the areas of Deliblato and Subotica sands, while they appear almost totally absent from the agricultural zones. South of Danube and Sava, the distribution is more scattered, but it doesn't seem to be limited by the altitude – indeed, according to Radovanović (1951) the tree frogs seem to reach altitudes up to 1500 m a.s.l. On the other hand, they have specific requirements for both aquatic and terrestrial habitats (Arnold & Ovenden 2002, Speybroeck *et al.* 2016). Tree frogs breed in a variety of still, vegetated waters, well exposed to sunlight. The tadpoles are sensitive to predation so fishless ponds, lakes or stagnant parts of rivers are preferred. The terrestrial habitats are sunny and well vegetated – forest edges, bushes, hedges and reed beds but some-

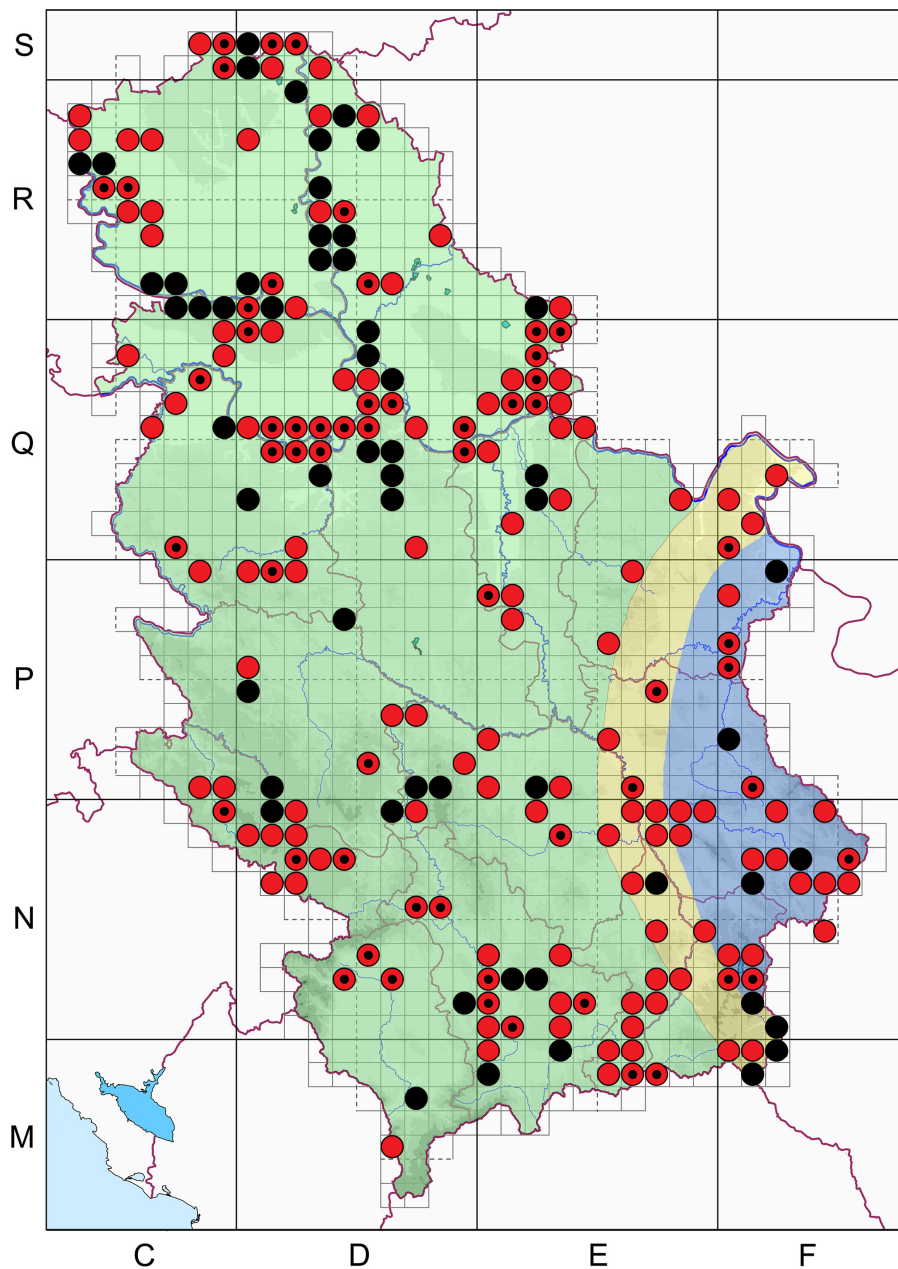


Fig. 2. – Records of *Hyla arborea* complex from Serbia. Red circles – new records, black circles – literature and Internet records, concentric red and black circles – literature records confirmed by new findings. The boundaries of two species of *Hyla* are given according to Dufresnes *et al.* (2015): green shading – *Hyla arborea*, blue shading: *Hyla orientalis*, yellow shading: hybrid zone or *incertae sedis*.

times also open places with lush herbaceous vegetation. The relatively low number of published literature research (20%) compared to the Internet records (26%) and field data (54%) demonstrate that tree frogs were very under-researched taxa in Serbia. In fact, many distribution gaps observed in this study likely result from the lack of systematic research.

Hyla arborea and *H. orientalis* are cryptic species – they cannot be distinguished by morphology or vocalization (Speybroeck *et al.* 2016). It makes delimitation between the two species in Serbia, and identification of the contact zone extremely difficult. It was hypothesized that the Carpathian, Balkan and Rhodope massifs are the major barrier between the two species, with the river valleys providing opportunity for secondary contact (Stöck *et al.* 2012, Dufresnes *et al.* 2015). Unfortunately, there is a lack of genetic data for the most of the range of both species in Serbia, so the width and extent of the hybrid zone can only be assumed (Dufresnes *et al.* 2015). The presence of hybrid zone and peripheral populations of two species (Džukić & Kalezić 2004) make territory of Serbia very important for the evolution of both species (Stöck *et al.* 2012, Dufresnes *et al.* 2015), as is the case for some other taxa, namely great crested newts (Vučić *et al.* 2020 and references therein) and slow worms (Urošević *et al.* 2020 and references therein).

The national threat category of *H. arborea* was first assessed in the Red Book of fauna of Serbia – Amphibians (Kalezić *et al.* 2015). However, since *H. orientalis* was lacking from that assessment, we re-assessed both species, based on the data collected during the past 10 years, i.e. based on more intensive field research (see acknowledgements). According to new assessment upon IUCN criteria (IUCN 2012), *H. arborea* has the status of a Least Concern species (LC) in Serbia, the same as the one in the Red Book of fauna of Serbia I – Amphibians (Kalezić *et al.* 2015). On the other hand, the distribution range of *H. orientalis* in Serbia is quite small (EOO 7853 km²), and, upon available data, seems to be fragmented (Figure 2). Thus, according to the IUCN criteria (IUCN 2012), *H. orientalis* has the status of a Vulnerable species (VU B1ab(iii)) in Serbia.

CONCLUSIONS

Recent taxonomic updates and discovery of cryptic species enriched the amphibian fauna in Serbia with one new species, *Hyla orientalis*. Although the hybrid zone is well-resolved in one part of its distribution in Serbia, there are remaining sampling gaps along the proposed contact zone. Therefore, additional intensive samplings in north-eastern, eastern, south-eastern and southern Serbia are needed to reveal the precise range borders and hybrid zone width. The more detailed information on distribution of

H. orientalis and on its hybrid zones is also needed to estimate potential threats and propose conservation measures for this species. As for the official national nomenclature, we propose that the nominal species, *H. arborea*, should keep the standard Serbian name “Gatalinka”, while for the species *H. orientalis* we propose Serbian name “Istočna gatalinka”, following the species distribution in Serbia and Europe in general.

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REFERENCES

- Arnold, N., Ovenden, D. (2002): A Field Guide to the Reptiles and Amphibians of Britain and Europe. – Harper Collins Publishers, London.
- Balej, P., Jablonski, D. (2006–2019): Balcanica.info. [<http://www.balcanica.cz/>]
- Crnobrnja, J. (1982): Faunističke crtice o gmizavcima i vodozemcima Homoljja. In: Homolje '81, Rezultati bioloških istraživanja, Beograd: 49–52. – Mladi istraživači Srbije, Beograd.
- Crnobrnja, J., Rohalj, A. (1988): Prilog poznavanju herpetofaune Kopaonika. In: Zbornik radova biološkog istraživačkog društva „Josif Pančić“: 59–76. – Biološko istraživačko društvo „Josif Pančić“, Beograd.
- Crnobrnja-Isailović, J., Jelić, I., Stanisavljević, B., Ćosić, N. (2012): Vodozemci i gmizavci Beograda: 1–114. – Endemit, Beograd.
- De Queiroz, K. (2007): Species concepts and species delimitation. – **Systematic Biology** 56(6): 879–886.
- Dufresnes, C., Brelford, A., Crnobrnja-Isailović, J., Tzankov, N., Lymberakis, P., Perrin, N. (2015): Timeframe of speciation inferred from secondary contact

- zones in the European tree frog radiation (*Hyla arborea* group). – **BMC Evolutionary Biology** 15: 155.
- Dufresnes, C., Brelsford, A., Jeffries, D. L., Mazepa, G., Suchan, T., Canestrelli, D., Niecieza, A., Fumagalli, L., Dubey, S., Martínez-Solano, I., Litvinchuk, S. N. (2021): Mass of genes rather than master genes underlie the genomic architecture of amphibian speciation. – **Proceedings of the National Academy of Sciences** 118(36): e2103963118.
- Đorđević, S., Simović, A., Krizmanić, I., Tomović, Lj. (2016): Colour variations in the European tree frog, *Hyla arborea* (Linnaeus, 1758), from two small adjacent ponds in the Vojvodina province, Serbia. – **Ecologica Montenegrina** 5: 18–21.
- Đorđević, Ž. (1900): Prilozi za poznavanje Srpske faune Amfibije i Reptilije. – **Glas Srpske Kraljevske Akademije** 64: 185–201. [in Serbian]
- Džukić, G. (1972): Herpetološka zbirka Prirodnjačkog muzeja u Beogradu. – **Glasnik Prirodnjačkog muzeja B** 27: 165–180. [in Serbian]
- Džukić, G., Kalezić, M. L. (2004): The biodiversity of amphibians and reptiles in the Balkan Peninsula. In: Griffiths, H., Krystufek, B., Reed, J. M. (eds): *Balkan biodiversity – pattern and process in the European hotspot*: 1–26. – Springer, Dordrecht.
- Džukić, G., Cvijanović, M., Urošević, A., Vukov, T., Tomašević Kolarov, N., Slijepčević, M., Ivanović, A., Kalezić, M. (2015): The batrachological collections of the institute for biological research "Siniša Stanković", University of Belgrade. – **Bulletin of the Natural History Museum** 8: 118–167.
- Ham, I., Džukić, G., Tvrtković, N., Kataranovski, D., Mikuska, J. (1981): Faunistička i ekološka građa za sisare, vodozemce i gmizavce Deliblatskog peska. – **Priroda Vojvodine** 6–8: 29–41. [in Serbian]
- iNaturalist.org (2022): *Hyla arborea* (Linnaeus, 1758) in GBIF Secretariat (2021). GBIF Backbone Taxonomy. Checklist dataset on 03 November 2022. [https://www.gbif.org/species/2427573]
- IUCN (2012): IUCN Red List Categories and Criteria: Version 3.1. Second edition. – IUCN, Gland, Switzerland and Cambridge, UK. [www.iucnredlist.org/technical-documents/categories-and-criteria]
- Ivančević, B., Savić, S., Sabovljević, M., Niketić, M., Tomović, G., Zlatković, B., Randelović, V., Lakušić, D., Četković, A., Pavićević, D., Krpo-Četković, J., Crnobrnja-Isailović, J., Puzović, S., Paunović, M. (2007): Pregled vrsta Stare planine u Srbiji. In: Lakušić, D., Četković, A. (eds): *Biodiverzitet Stare planine u Srbiji*: 159–219. – Regionalni centar za životnu sredinu za Centralnu i Istočnu Evropu, Kancelarija u Srbiji, Beograd.
- Jović, D., Ajtić, R., Tomović, Lj. (2016): New records of Fire-bellied Toad (*Bombina bombina* (Linnaeus, 1761)) and Common Spadefoot Toad (*Pelobates fuscus* (Laurenti, 1768)) in Serbia. – **Bulletin of the Natural History Museum** 9: 107–112.
- Jetz, W., McGeoch, M. A., Guralnick, R., Ferrier, S., Beck, J., Costello, M. J., Geller, G. N., Keil, P., Merow, C., Meyer, C., Muller-Karger, F. E., Pereira, H. M., Regan, E. C., Schmeller, D. S., Turak, E. (2019): Essential biodiversity

- variables for mapping and monitoring species populations. – **Nature, Ecology & Evolution** **3**(4): 539–551.
- Kalezić, M., Tomović, Lj., Džukić, G. (2015): Crvena knjiga faune Srbije I: Vodozemci: 1–208. – Univerzitet u Beogradu – Biološki fakultet i Zavod za zaštitu prirode Srbije, Beograd.
- Maričić, M., Golubović, A. (2020): *Hyla arborea*. In: Popović, M., Golubović, A., Živanović, N. (eds): Biologer.org. [<https://biologer.org> (26 October 2022)]
- Oliver, R. Y., Meyer, C., Ranipeta, A., Winner, K., Jetz, W. (2021): Global and national trends, gaps, and opportunities in documenting and monitoring species distributions. – **PLOS Biology** **19**(8): e3001336.
- Pante, E., Schoelinc, C., Puillandre, N. (2015): From integrative taxonomy to species description: one step beyond. – **Systematic Biology** **64**(1): 152–160.
- Pantelić, N. (1995): Pregled vodozemaca i gmizavaca na Obedskoj bari tokom 1993–1994. In: Povratak Obedskoj bari: 25–29. – Mladi istraživači Srbije, Beograd.
- Pasuljević, G. (1968): Prilog poznavanju herpetofaune Kosova i Metohije. – **Zbornik Filozofskog fakulteta u Prištini** **5**: 61–75. [in Serbian]
- Prša, A. (1959): Prilog poznavanju herpetofaune Fruške Gore. – **Zbornik Matice Srpske za prirodne nauke** **17**: 90–101. [in Serbian]
- Radovanović, M. (1951): Vodozemci i gmizavci naše zemlje. – Naučna knjiga, Beograd. [in Serbian]
- Speybroeck, J., Beukema, W., Bok, B., Van Der Voort, J. (2016): Field guide to the amphibians and reptiles of Britain and Europe. – Bloomsbury Publishing, London & New York.
- Speybroeck, J., Beukema, W., Dufresnes, C., Fritz, U., Jablonski, D., Lymberakis, P., Martínez-Solano, I., Razzetti, E., Vamberger, M., Vences, M., Vörös, J., Crochet, P.-A. (2020): Species list of the European herpetofauna - update by the Taxonomic Committee of the Societas Europaea Herpetologica. – **Amphibia-Reptilia** **41**: 139–189.
- Sterijovski, B. (2014): Systematic survey of amphibian and reptile fauna in the Bosilegrad region of southern Serbia. – **Biologia Serbica** **36**: 65–68.
- Stöck, M., Dufresnes, C., Litvinchuk, S. N., Lymberakis, P., Biollay, S., Berroneau, M., Borzée A., Ghali, K., Ogielska, M., Perrin, N. (2012): Cryptic diversity among Western Palearctic tree frogs: postglacial range expansion, range limits, and secondary contacts of three European tree frog lineages (*Hyla arborea* group). – **Molecular Phylogenetics & Evolution** **65**: 1–9.
- Tadijan, Z. (1986): Herpetofauna okoline Apatina: 1–31. – Prirodno-matematički fakultet Univerziteta u Novom Sadu. (Bachelor thesis) [in Serbian]
- Tadijan, Z., Mikeš, M. (1984): Herpetološka osmatranja na Fruškoj gori. In: Zbornik studentskih radova: 41–50. – Institut za biologiju PMF Novi Sad. [in Serbian]
- Tomović, Lj., Kalezić, M., Džukić, G. (2015): Crvena knjiga faune Srbije II: Gmizavci: 1–256. – Univerzitet u Beogradu – Biološki fakultet i Zavod za zaštitu prirode Srbije, Beograd.

- Urošević, A. (2021): Vodozemci smederevskog kraja – pregled dosadašnjih istraživanja, distribucija i biogeografska pripadnost. – **Smederevski zbornik 7**: 11–40.
- Urošević, A., Tomović, Lj., Krizmanić, I., Anđelković, M., Golubović, A., Maričić, M., Ajtić, R., Ćorović, J., Čubrić, T., Tomašević-Kolarov, N., Cvijanović, M., Vukov, T., Jovanović, B., Vučić, T., Ajduković, M., Tot, I., Nadaždin, B., Labus, N., Džukić, G. (2018): Distribution and diversity of brown frogs (*Rana* spp., Anura, Amphibia) in Serbia. – **Bulletin of the Natural History Museum 11**: 227–245.
- Vučić, T., Tomović, Lj., Ivanović, A. (2020): The distribution of crested newts in Serbia: An overview and update. – **Bulletin of the Natural History Museum 13**: 237–252.
- Vukov, T., Kalezić, M. L., Tomović, Lj., Krizmanić, I., Jović, D., Labus, N., Džukić, G. (2013): Amphibians in Serbia – distribution and diversity patterns. – **Bulletin of the Natural History Museum 6**: 90–112.

SUPPORTING INFORMATION

Online Appendices:

Appendix 1. – Unpublished records.

Appendix 2. – Previously published records.

Appendix 3. – Online records.

**ДИСТРИБУЦИЈА ГАТАЛИНКИ (*HYLA* SPP.) У СРБИЈИ –
ИМПЛИКАЦИЈЕ СКОРАШЊЕ ТАКСОНОМСКЕ РЕВИЗИЈЕ**

АЛЕКСАНДАР УРОШЕВИЋ, МАРКО АНЂЕЛКОВИЋ, ЈЕЛКА ЦРНОБРЊА-
ИСАИЛОВИЋ, ИМРЕ КРИЗМАНИЋ, РАСТКО АЉТИЋ, АЛЕКСАНДАР
СИМОВИЋ, МИЛИВОЈ КРСТИЋ, МАРКО МАРИЧИЋ, ТИЈАНА ВУЧИЋ,
ДАНКО ЈОВИЋ, ГЕОРГ ЦУКИЋ, ЉИЉАНА ТОМОВИЋ

РЕЗИМЕ

У овом раду, приказујемо ажуриране податке о дистрибуцији комплекса врста *Hyla arborea* у Србији. Подаци се састоје од налаза објављених у литератури или на Интернету, заједно са претходно необјављеним теренским подацима. Од ове две врсте, највећи део територије Србије, укључујући све биогеографске регионе, насељава *H. arborea*. *Hyla orientalis*, са друге стране, насељава само крајње источне делове североисточне, источне и југоисточне Србије, са потенцијалном хибридном зоном која такође обухвата делове централне и јужне Србије. Дистрибуција *H. arborea* је густа у панонским деловима Србије, конкретно у плавним зонама река Дунав, Сава и Тиса, док је дистрибуција више раштркана у перипанонским и планинско-котлинским деловима Србије. *Hyla orientalis* насељава искључиво најисточније делове планинско-котлинског региона, где је повезана са воденим системима који припадају Балканском планинском венцу, док Карпатски и Родопски масиви представљају североисточну и југоисточну границу дистрибуције, респективно. За хибридну зону се претпоставља да обухвата оквирно 30 км широк коридор који се протеже од Ђердапске клисуре, преко Ниша до Босилеграда, али додатно узорковање ће морати да се изврши како би се ово потврдило.

Пошто таксономско раздвајање између криптичних врста гаталинка још увек није препознато у нашој националној номенклатури, овај рад предлаже званичне српске називе за ове врсте. Номинална врста *H. arborea* ће задржати стандардни српски назив „гаталинка“, док за врсту *H. orientalis* предлажемо име „источна гаталинка“.