

MEDITERRANEAN HOUSE GECKO, *HEMIDACTYLUS TURCICUS* (REPTILIA: GEKKONIDAE), HAS ESTABLISHED URBAN POPULATIONS IN CENTRAL EUROPE

**BORNA BREZAK^{1,+,*}, KARMELA ADŽIĆ², PATRICIA KOKOT³, TIN ROŽMAN⁴,
IVA ČUPIĆ⁵, DUJE LISIČIĆ¹, MLADEN KUČINIĆ¹, SRĐAN PICHLER⁶
& JOSIP SKEJO^{1,+,*}**

¹University of Zagreb, Faculty of Science, Department of Biology, Rooseveltov trg 6,
HR-10000 Zagreb, Croatia

²Labinska 4, HR-10000 Zagreb, Croatia

³Gajeva 9, HR-44320 Repušnica, Croatia

⁴Croatian Natural History Museum, Demetrova ulica 1, HR-10000, Zagreb, Croatia

⁵Croatian Biospeleological Society, Savski kuti, Lomnička 3, HR-10000 Zagreb, Croatia

⁶Environmental Protection and Energy Efficiency Fund, Radnička cesta 80, HR-10000 Zagreb, Croatia

+Authors of equal contribution to the study

Brezak, B., Adžić, K., Kokot, P., Rožman, T., Čupić, I., Lisičić, D., Kučinić, M., Pichler, S. & Skejo, J.: Mediterranean House Gecko, *Hemidactylus turcicus* (Reptilia: Gekkonidae), has established urban populations in Central Europe. *Nat. Croat.*, Vol. 34, No. 2, 267–276, Zagreb, 2025.

The Mediterranean house gecko inhabits the Mediterranean region of Southern Europe, Northern Africa, and Western Asia, but has been introduced in Northern America, in the United States and Mexico in 2015 and 2016. The species has been reported in 2014 in Serbia and then again from 2020 to 2022 in the same country. Here, we report more scattered findings from Romania and Central Europe: Croatia, Austria, Slovenia, Czechia and Hungary, from 2013 to 2025. In Zagreb, Croatia, the species has a small population established, as continuous records exist from 2013 till today in numerous localities, and with specimens observed throughout the year. On the other hand, records from continental Austria and Romania are known to be recently imported specimens.

Key words: iNaturalist, citizen science, allochthonous species, spreading, Zagreb, Croatia, Romania, Austria, Slovenia, Czechia, Hungary

Brezak, B., Adžić, K., Kokot, P., Rožman, T., Čupić, I., Lisičić, D., Kučinić, M., Pichler, S. & Skejo, J.: Kućni macaklin, *Hemidactylus turcicus* (Reptilia: Gekkonidae), uspostavio je gradske populacije u središnjoj Europi. *Nat. Croat.*, Vol. 34, No. 2, 267–276, Zagreb, 2025.

Kućni macaklin nastanjuje mediteransku regiju južne Europe, sjeverne Afrike i zapadne Azije, ali je unesen u Sjevernu Ameriku (u Sjedinjene Američke Države i Meksiko) 2015. i 2016. godine. Vrsta je prvi put zabilježena 2014. godine u Srbiji, a zatim ponovno od 2020. do 2022. u istoj zemlji. Ovdje predstavljamo podatke o dodatnim, raštrkanim nalazima iz Rumunjske i središnje Europe: iz Hrvatske, Austrije, Slovenije, Češke i Mađarske, u razdoblju od 2013. do 2025. godine. U Hrvatskoj u Zagrebu postoji mala uspostavljena populacija, što dokazuju opetovani nalazi na više mjesta od 2013.

* Corresponding authors - BB: borna.brezak1@gmail.com; JS: jskejo@biol.pmf.hr

do danas, ali i opažanja jedinki tijekom godine. S druge strane, nalazi iz kontinentalne Austrije odnose se na nedavno unesene jedinke.

Ključne riječi: iNaturalist, građanska znanost, alohtona vrsta, širenje, Zagreb, Hrvatska, Rumunjska, Austrija, Slovenija, Češka, Mađarska

INTRODUCTION

The Mediterranean House Gecko, *Hemidactylus turcicus* (Linnaeus, 1758), also known as Turkish Gecko is a nocturnal, synanthropic species native to the Mediterranean region, encompassing Southern Europe, North Africa, and Western Asia (AGASYAN *et al.*, 2009; MORAVEC *et al.*, 2011; BOWLES 2024). Species consists of two main lineages, named '*H. turcicus* A' and '*H. turcicus* B', different in 6 out of 303 bp of the Cytb sequence (2.1%) with Southeastern Europe predominantly inhabited by the 'A' lineage (CARRANZA & ARNOLD, 2006; MORAVEC *et al.*, 2011). Due to human-mediated transport and adaptability to urban environments, the species has successfully expanded its range beyond its native distribution (SPEYBROECK *et al.*, 2018). It has been introduced to various parts of the world, including Northern America, where it has established populations in the USA (e.g., BYERS *et al.*, 2007; TEXAS INVASIVE SPECIES INSTITUTE 2014; RUHE *et al.*, 2019) and Mexico (VILLAVICENCIO *et al.* 2021; GRAJALES *et al.*, 2024). In Southeastern Europe *H. turcicus* was documented in Serbia in 2014, with subsequent records from 2020 to 2022 suggesting possible population establishment in certain localities (UROŠEVIĆ *et al.*, 2022, 2023a). However, reports from other parts of Central Europe remain scarce, and the persistence of these populations is not well understood.

Another Mediterranean gecko species complex, *Mediodactylus (kotschy)* (STEINDACHNER, 1870) (KOTSAKIOZI *et al.*, 2018), has also been reported in Serbia and Hungary, primarily in urban environments (UROŠEVIĆ *et al.*, 2022, 2023b; BABOCSAY, 2025). Unlike *H. turcicus*, which is predominantly nocturnal and often associated with human structures, *M. kotschy* is more diurnal, preferring rocky habitats and natural outcrops, though it can also be found on buildings (SCHWARZ *et al.*, 2016). In the north of its range, the species becomes more associated with anthropogenic habitats (ARNOLD & OVENDEN, 2002). *Mediodactylus kotschy* is distinguished from *H. turcicus* by having relatively long toes with no adhesive pads. It is also smaller, rarely exceeding 10 cm in length, while *H. turcicus* grows to 12 cm (SPEYBROECK *et al.*, 2018). Given the species complex evolutionary history, multiple lineages may be expected in continental Europe (KOTSAKIOZI *et al.*, 2018).

This study aims to report new records of *H. turcicus* from Central Europe and other parts outside its Mediterranean distribution area with a particular focus on an established population in Zagreb, Croatia. Our findings contribute to the understanding of the species' range expansion and potential for long-term persistence in this region.

MATERIALS AND METHODS

The identification of *Hemidactylus turcicus* (Fig. 1A–B) was based on morphological characteristics that distinguish it from *Mediodactylus kotschy* (Fig. 1C–D). *Hemidactylus turcicus* is distinguished by having a translucent body with variable coloration, often pinkish, yellowish or white with irregular dark bands. Scallation of the back is granular with white and brown tubercles. Ventral side of the animal is uniformly white. The tail is slightly flattened and pale with dark cross-bands, particularly visible in juve-

niles. The toes have adhesive pads, with two rows of lamellae below. Lamellae do not extend to toe tips and the claws are clearly visible (1A). *Mediodactylus kotschyi* (Fig. 1C) is usually pale-grey or grey-brownish in coloration with several dark V-shaped markings with pale edges on the back. Ventral coloration is uniform whitish to orange. The toes are slim and kinked without adhesive pads (Fig. 1D) (ARNOLD & OVENDEN, 2002; SPEYBROECK *et al.*, 2018).

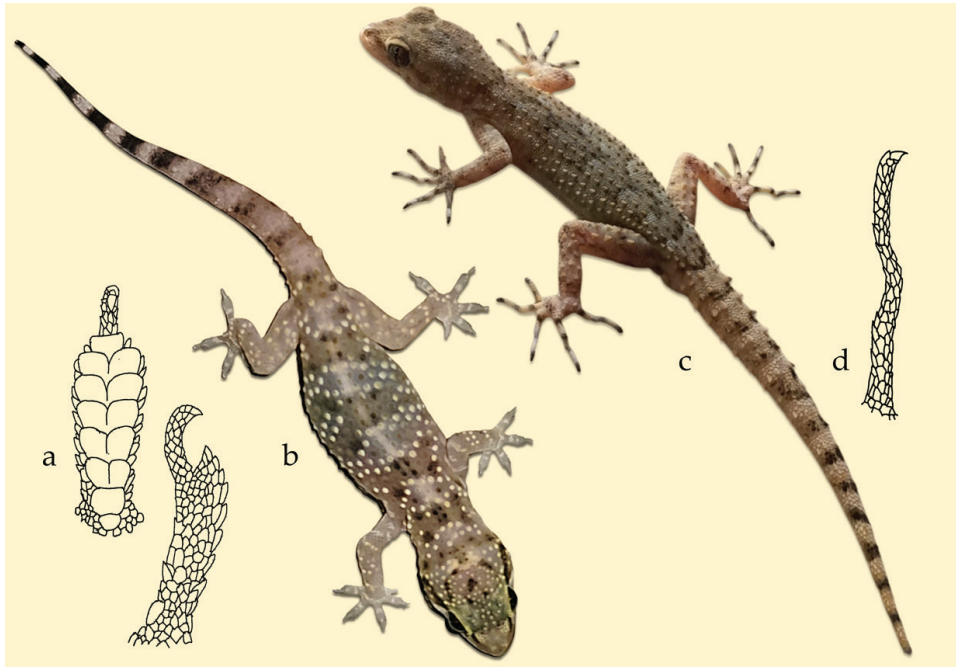


Fig. 1. Comparison of *Hemidactylus turcicus* and *Mediodactylus kotschyi*. a) Lateral and ventral view of *H. turcicus* toe drawn after SPEYBROECK *et al.* (2018); b) Appearance of *H. turcicus* (photo Borna Brezak); c) Appearance of *M. kotschyi* (photo Tikitu de Jager, source iNaturalist, ID 12095360, no copyright); d) Toe of *M. kotschyi* drawn after SPEYBROECK *et al.* (2018).

Observations were collected from iNaturalist, where all available records of the family Gekkonidae from Central Europe were examined and identified to species level. Besides the iNaturalist observations, observations from Biologer platform (POPOVIĆ *et al.*, 2020) were included (obs. Duje Lisičić, Tab. 1). All records were carefully reviewed to verify the species identity, ensuring no misidentifications with other gecko species in the region (*M. kotschyi*). To strengthen the dataset and confirm findings, a group of observers gathered together in this study as coauthors, collaborating to systematically document and verify occurrences of *H. turcicus*. AI tools (CHATGPT, 2025) were used to edit and improve text.

Tab. 1. *Hemidactylus turcicus* (Linnaeus, 1758) observations from continental Europe sorted chronologically. iNaturalist ID of each observation is shown in the last column, except for the observations marked with *, for which Biologer IDs are given. Countries' abbreviations: AUT—Austria, CRO—Croatia, CZE—Czechia, HUN—Hungary, ROM—Romania, SLO—Slovenia.

Date	Country: City: Locality	Coordinates	Observer	ID
2025-VII-26	CRO: Zagreb: Trešnjevka ¹	45.7880N, 15.9390E	Borna Brezak	301050422
2025-VII-15	CRO: Zagreb: Antuna Stipančića ¹	45.7860N, 15.9332E	Marko Čaleta	302916219
2025-VII-25	HUN: Hódmezővásárhely ¹	46.4202N, 20.3349E	@ifadri	301022122
2025-VI-07	CRO: Zagreb: Trešnjevka ¹	45.7928N, 15.9293E	Borna Brezak	287857898
2025-VI	ROM: Iași: Rediu ²	47.14N, 27.48E	Alex Strugariu	287111297
2025-V-17	CRO: Zagreb: Trešnjevka ¹	45.7844N, 15.9283E	Borna Brezak	281884500
2024-X-24	CRO: Zagreb: Trešnjevka ¹	45.7865N, 15.9196E	Borna Brezak	249323526
2024-X-06	CRO: Zagreb: Trešnjevka ¹	45.7857N, 15.9205E	Borna Brezak	246074344
2024-IX-09	CRO: Zagreb: Trešnjevka ¹	45.7868N, 15.9201E	Borna Brezak	240669656
2024-IX-04	CRO: Zagreb: Knežija ¹		Maja Lang Balija	-
2024-VIII-28	CRO: Zagreb: Trešnjevka ¹	45.8046N, 15.9656E	Lea Zoretić	238405822
2024-VIII-14	CRO: Zagreb: Gornji Grad ¹	45.8135N, 15.9706E	Mladen Kučinić & Srđan Pichler	-
2024-VIII-07	CRO: Zagreb: Ul. Nikole Škrlica ¹	45.8154N, 16.0033E	@szaza	234394757
2024-VIII	CRO: Prepuštovac ¹	45.90N, 16.13E	Patricia Kokot	236972502
2024-VII-20	CRO: Zagreb: Trešnjevka ¹	45.8089N, 15.9491E	Jakov Dabić	-
2024-VII-08	CRO: Zagreb: Ul. Nikole Škrlica ¹	45.8155N, 16.0032E	@pzf	234394871
2024-VI-26	HUN: Budapest: Petrezselyem ut.	47.5114N, 19.0284E	Marcell Hargitai	229225551
2024-VI-10	CRO: Zagreb: Trešnjevka ¹	45.7864N, 15.9195E	Borna Brezak	221891709
2024-VI-07	CRO: Zagreb: Plemićeva ul. ¹	45.8105N, 15.9918E	Josip Skejo	221319242
2024-I	AUT: Graz: Steiermark ³	47.06N, 15.40E	Carmen Schuebl	198148498
2023-X-04	CZE: Prague ⁴	50.0269N, 14.5270E	Pavel Škaloud	188512312
2022-XII-04	ROM: Bucharest ⁵	44.4288N, 26.0312E	Razvan Tilimpea	143644596
2022-I-05	CRO: Zagreb: Trešnjevka ¹	45.8003N, 15.9461E	Patricia Kokot	119885218
2021-VIII-10	CRO: Zagreb: Čnomerec ¹	45.8108N, 15.9489E	Ines Drvar	237828107
2021-IX-01	CRO: Zagreb: Ul. Nikole Škrlica ¹	45.8156N, 16.0037E	Tin Rožman	93233298
2020-X-28	CRO: Zagreb: Ul. Andrije Žaje ¹	45.8072N, 15.9561E	Iva Čupić	-
2020-VII-24	CRO: Zagreb: Ul. Andrije Žaje ¹	45.8072N, 15.9561E	Iva Čupić	-
2020-2021	CRO: Zagreb: Ludbreška ulica ¹	45.8036N, 15.9507E	Duje Lisičić	54859*, 104702*
2020-V-06	SLO: Lipje	46.3570N, 15.1554E	David Kosi	45080572
2015–2025	CRO: Zagreb: Vjekoslava Klaića ¹		Duje Lisičić	214706*
2013–2025	CRO: Zagreb: Mandaličina ¹	44.8135N, 15.9492E	Marija Ivković	-

¹On a building wall or inside a building; ²Found in a shopping mall; ³Found in salad (market); ⁴Likely escaped pet; ⁵Accidental import from Greece.

Observations of *H. turcicus* in Europe outside Mediterranean are publicly available in iNaturalist at https://www.inaturalist.org/observations?lat=48.67941312108878&lng=19.529375919370594&radius=472.52850172614507&taxon_id=34435 (iNATURALIST, 2025; GBIF, 2025).

RESULTS

Observations of *Hemidactylus turcicus* were recorded in the following Central European countries: Croatia, Hungary, Austria, Czechia, and Slovenia (Fig. 2), but also in Eastern Europe, in Romania. The greatest number of observations comes from Zagreb, Croatia. In Austria it was observed in Graz, in Hungary it was seen in Budapest and in Hódmezővásárhely, in Czechia it was observed in Prague, in Romania in Bucharest and in Iași, and finally in Slovenia it was recorded in Lipje (Tab. 1, Fig. 3). An individual found in Bucharest has been released into an urban park, where small urban population of *H. turcicus* is known to exist (Razvan Tilimpea, pers. comm.). A total of 32 observations were collected, with recorded activity spanning from 2013 till today.

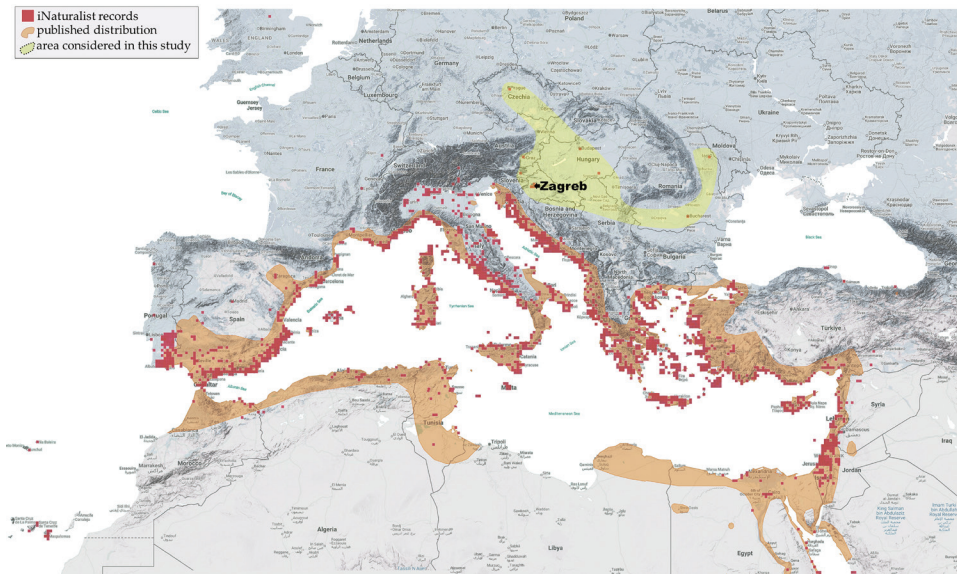


Fig. 2. Native distribution of *Hemidactylus turcicus* in the Mediterranean Basin (orange), overlapped with iNaturalist observations (red squares), and with area discussed in this study in yellow. iNaturalist map available at [inaturalist.org/geo_model/34435/explain](https://www.inaturalist.org/geo_model/34435/explain).

All recorded observations were from urban environments, specifically buildings and their surroundings. This suggests that *H. turcicus* outside Mediterranean primarily associates with human structures. In a few observations it was noted that the gecko was found either in a store-bought lettuce (Austria), was accidentally imported (to Romania from Greece), or is likely an escaped pet (Czechia).

An interesting outlier observation, though not directly related to this study, is a record of the Mediterranean house gecko in Brande, Central Denmark, on November 24, 2024, documented by Henrik Ploger (iNaturalist ID: 253011219).



Fig. 3. *Hemidactylus turcicus* individuals photographed in continental Europe from 2020 to 2024. a–d) Zagreb, Croatia; e) Graz, Austria; and f) Prague, Czechia. Photographers and numbers of iNaturalist records are denoted under each photograph. a) Photo Patricia Kokot; b) Tin Rožman; c) Borna Brezak; d) Josip Skejo; e) Carmen Schuebl (licence CC-BY-NC); f) Pavel Škaloud (reproduced with permission).

DISCUSSION

The Mediterranean house gecko (*Hemidactylus turcicus*) in Croatia is among the most frequently encountered lizard species in the Adriatic region (iNATURALIST, 2025). However, despite its widespread presence, data on its natural populations, distribution, and ecological dynamics remain limited. Ecology of the introduced American populations seems to be much better understood than in the species' Mediterranean home range (e.g., ROSE & BARBOUR, 1968; DALLAS *et al.*, 2022). Our findings confirm the presence of a synanthropic population in Zagreb established in 2013 or earlier, indicating that this species might be adapted to urban environments of the continental region of Europe, outside its previously documented Mediterranean range. Besides the established populations, our study reports more scattered findings in Romania and Central Europe (Slovenia, Austria, Czechia, Hungary), some of them even evidencing the spreading mechanism.

The scattered nature of these observations suggests that the species' range expansion is more extensive than currently documented. Repeated sightings of individuals in Zagreb over multiple years (Tab. 1) provide strong evidence that this population is not ephemeral but rather established. Besides observing numerous individuals over the years, the strongest evidence of an established population is the observation of individuals of different age stages, from juveniles to adults.

On the other hand, examples similar to the *Hemidactylus turcicus* 'salad' case in Austria (Tab. 1) were already reported in the Caribbean Island of Saint-Barthélemy where *Salamandra salamandra terrestris* (Amphibia: Caudata) was imported from France (iNaturalist observation 192746319), and in a *Lycorma delicatula* (Hemiptera: Fulgoromorpha) whose distribution area include Northeastern USA, but was found to have hitchhiked to Southeastern state of Alabama (iNaturalist ID: 97998348). Such records are not evidence of established populations.

Observations presented in our study (Tab. 1) suggest that *H. turcicus* primarily overwinters within buildings, with multiple individuals observed repeatedly over extended periods. The capacity to persist through winter in artificially heated "Mediterranean" microhabitats is likely a key factor enabling its successful establishment in colder continental regions. Given ongoing climatic changes, it is plausible that *H. turcicus* will continue to expand its range further into Central Europe. Continuous monitoring and further ecological studies will be essential for assessing the broader ecological implications of this expansion on native biodiversity and urban ecosystems.

The expansion of *H. turcicus* and *Mediodactylus kotschyi* more northern into Europe, region previously considered unsuitable for their long-term survival, and the establishment of their populations provide compelling evidence of ongoing climatic shifts, as already reported in many plant species (SUKOPP & WURZEL, 2003). Rising temperatures are presumably facilitating the overwintering and persistence of these thermophilic reptiles in novel habitats, in the same time harming species adapted to cold (ARAÚJO *et al.*, 2006). This trend is consistent with decreasing range shifts observed in many reptilian and amphibian taxa (HENLE *et al.* 2008), likely driven by global climate change, as exemplified in Italy (D'AMEN & BOMBI, 2009).

Further research is required to elucidate the mechanisms underlying this expansion. Potential pathways of introduction include unintentional human-mediated dispersal, such as transport *via* tourists or imported goods, natural dispersal through urban corridors that provide suitable microhabitat, such as building walls, but also

by railway infrastructure (GHERGHEL *et al.* 2009; VAN DOORN *et al.* 2021). Given that most observations in Central Europe originate from urban settings, it is reasonable to hypothesize that *H. turcicus* is utilizing anthropogenic structures as thermal refugia, thereby mitigating the constraints imposed by colder winter temperatures.

Systematic monitoring efforts are imperative to determine whether additional populations in Central European cities exhibit signs of establishment. Citizen science platforms such as iNaturalist have proven instrumental in tracking the spread of many medically relevant species, such as ticks (CULL, 2022), but also invasive species (DIMSON *et al.*, 2023), and here also of allochthonous *H. turcicus*, so we encourage continued data collection from both amateur naturalists and professional herpetologists.

ACKNOWLEDGEMENTS

Many thanks to all the observers who upload their observations to iNaturalist, and these are Marko Čaleta, Ines Drvar, Marcell Hargitai, David Kosi, Henrik Ploger, Carmen Schuebl, Alex Strugariu, Pavel Škaloud, Razvan Tilimpea, Lea Zoretić, and iNaturalist users @ifadri, @pzf and @szaza. Many thanks to Pavel Škaloud for the discussion on his iNaturalist observation and for additional information. Thanks to Razvan Tilimpea for the discussion under the observation. Thank you to Maja Lang Balija and Jakov Dabić for sharing their observations and data with us. Thanks to Marija Ivković, Dario Bjelkanović, Juraj Bjelkanović, Martina Pavlek, Tanja Vojvoda Zeljko, Vlatka Mičetić Stanković, Morana Dulić, Vedrana Pretković, Romana Gračan and Fanica Vresnik for the data on the oldest population in Zagreb. Finally, thank you to Sebastian Čato and anonymous reviewers for their comments and suggestions.

Received April 4, 2025

REFERENCES

- AGASYAN, A., AVCI, A., TUNIYEV, B., CRNOBRNJA ISAILOVIĆ, J., LYMBERAKIS, P., ANDRÉN, C., COGALNICEANU, D., WILKINSON, J., ANANJEVA, N., ŪZŪM, N., ORLOV, N., PODLOUCKY, R., TUNIYEV, S., KAYA, U., VOGRIŅ, M., CORTI, C., PÉREZ MELLADO, V., SÁ-SOUSA, P., CHEYLAN, M., PLEGUEZUELOS, J., EL DIN, S.B., VAROL TOK, C., 2009: *Hemidactylus turcicus* (Global assessment). The IUCN Red List of Threatened Species 2009: e.T157261A5063993.
- ARAÚJO, M.B., THULLER, W., PEARSON, R.G., 2006: Climate warming and the decline of amphibians and reptiles in Europe. *Journal of biogeography* **33**(10), 1712–1728.
- ARNOLD, N., OVENDEN, D., 2002: *Field Guide Reptiles & Amphibians of Britain & Europe*, second edition. Ed. Collins Field Guide. Harper Collins.
- BABOCSAY, G., 2025: New data on introduced geckos of the *Mediodactylus kotschyi* complex in Hungary. *Herpetology Notes* **18**, 707–713.
- BOWLES, P., 2024: *Hemidactylus turcicus* (Europe assessment). The IUCN Red List of Threatened Species 2024: e.T157261A205698798.
- BYERS, M., SIAS, D.S., STUART, J.N., 2007: The introduced Mediterranean Gecko (*Hemidactylus turcicus*) in north-central New Mexico. *Bulletin of the Chicago Herpetological Society* **42**(2), 18–19.
- CARRANZA, S., ARNOLD, E.N., 2006: Systematics, biogeography, and evolution of *Hemidactylus* geckos (Reptilia: Gekkonidae) elucidated using mitochondrial DNA sequences. *Molecular phylogenetics and evolution* **38**(2), 531–545.
- CHATGPT, 2025: OpenAI's ChatGPT model. Available at: <https://chat.openai.com> (accessed March 19, 2025).
- CULL, B., 2022: Monitoring trends in distribution and seasonality of medically important ticks in North America using online crowdsourced records from iNaturalist. *Insects* **13**(5), 404.

- D'AMEN, M., BOMBI, P., 2009: Global warming and biodiversity: Evidence of climate-linked amphibian declines in Italy. *Biological Conservation* **142**(12), 3060–3067.
- DALLAS, J.W., HARRIS, A., REINBOLT, J., WARNE, R.W., 2022: Ecology of the synanthropic editerranean house gecko (*Hemidactylus turcicus*) at their northern invasion front. *Urban Ecosystems* **25**(1), 329–340.
- DIMSON, M., BERIO FORTINI, L., TINGLEY, M.W., GILLESPIE, T.W., 2023: Citizen science can complement professional invasive plant surveys and improve estimates of suitable habitat. *Diversity and Distributions* **29**(9), 1141–1156.
- GBIF 2025: Dataset *Hemidactylus turcicus*, with four-points polygon in Central Europe. Available at [https://www.gbif.org/occurrence/search?dataset_key=50c9509d-22c7-4a22-a47d-8c48425ef4a7&has_coordinate=true&has_geospatial_issue=false&taxon_key=5221528&geometry=POLYGON\(\(14.28563%2046.49567,18.13402%2043.64411,25.22115%2046.67897,20.99173%2049.9709,14.28563%2046.49567\)\)](https://www.gbif.org/occurrence/search?dataset_key=50c9509d-22c7-4a22-a47d-8c48425ef4a7&has_coordinate=true&has_geospatial_issue=false&taxon_key=5221528&geometry=POLYGON((14.28563%2046.49567,18.13402%2043.64411,25.22115%2046.67897,20.99173%2049.9709,14.28563%2046.49567))) (Accessed August 25th 2025)
- GHERGHEL, I., STRUGARIU, A., SAHLEAN, T. C., ZAMFIRESCU, O., 2009: Anthropogenic impact or anthropogenic accommodation? Distribution range expansion of the Common wall lizard (*Podarcis muralis*) by means of artificial habitats in the north-eastern limits of its distribution range. *Acta Herpetologica* **4**, 183–189.
- GRAJALES, J.G., JUÁREZ, C.L.C., SILVA, A.B., 2024: Nuevo registro de *Hemidactylus turcicus* (Squamata: Gekkonidae) en la costa central de Oaxaca, México. *Revista Latinoamericana de Herpetología* **7**(4), e1049–26.
- HENLE, K., DICK, D., HARPE, A., KÜHN, I., SCHWEIGER, O., SETTELE, J., 2008: Climate change impacts on European amphibians and reptiles. In: *Biodiversity and climate change: Reports and guidance developed under the Bern Convention Council of Europe Publishing*, Strasbourg, France, pp. 225–305.
- INATURALIST, 2025: *Hemidactylus turcicus*. Available at <https://www.inaturalist.org/taxa/34435-Hemidactylus-turcicus> (accessed August 25th 2025).
- KOTSAKIOZI, P., JABLONSKI, D., ILGAZ, Ç., KUMLUTAŞ, Y., AVCI, A., MEIRI, S., ITESCU, Y., KUKUSHKIN, O., GVOŽDIK, V., SCILLITANI, G., ROUSSOS, S., JANDZIK, D., KASAPIDIS, P., LYMBERAKIS, P. & POULAKAKIS, N., 2018: Multilocus phylogeny and coalescent species delimitation in Kotschy's gecko, *Mediodactylus kotschyi*: Hidden diversity and cryptic species. *Molecular Phylogenetics and Evolution* **125**, 177–187.
- LINNAEUS, C., 1758: *Lacerta turcica* in: *Systema Naturae per regna tria naturae. Secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Tomus I. Editio Decima, Reformata. Holmiae: Impensis Laurentii Salvii, Stockholm, Sweden. P. 202.*
- MORAVEC, J., KRATOCHVÍL, L., AMR, Z.S., JANDZIK, D., ŠMÍD, J., GVOŽDIK, V., 2011: High genetic differentiation within the *Hemidactylus turcicus* complex (Reptilia: Gekkonidae) in the Levant, with comments on the phylogeny and systematics of the genus. *Zootaxa* **2894**(1), 21–38.
- POPOVIĆ, M., VASIĆ, N., KOREN, T., BURIĆ, I., ŽIVANOVIĆ, N., KULIJER, D., & GOLUBOVIĆ, A. 2020: Biologer: an open platform for collecting biodiversity data. *Biodiversity Data Journal* **8**, e53014.
- ROSE, F. L., BARBOUR, C. D., 1968: Ecology and reproductive cycles of the introduced gecko, *Hemidactylus turcicus*, in the southern United States. *American Midland Naturalist* 159–168.
- RUHE, B., LADUKE, T.C., TAYLOR, K., URBAN, C.A., POSTON, J.L., 2019: The Mediterranean Gecko (*Hemidactylus turcicus*) in Pennsylvania, USA. *Herpetological Review* **50**(3), 536–537.
- SCHWARZ, R., GAVRIILIDI, I.-A., ITESCU, Y., JAMISON, S., SAGONAS, K., MEIRI, S., PAFILIS, P., 2016: *Mediodactylus kotschyi* in the Peloponnese peninsula, Greece: Distribution and habitat. *Acta Herpetologica* **11**(2), 179–187.
- SPEYBROECK, J., BEUKEMA, W., BOK, B., VOORT, J.V.D., 2018: *Field Guide to the Amphibians and Reptiles of Britain and Europe*. Bloomsbury Publishing, London, UK.
- STEINDACHNER, F., 1870: Herpetologische Notizen (II). I. Reptilien gesammelt während einer Reise in Senegambien (October bis December 1868). *Sitzungsberichte der Mathematisch-Naturwissenschaftlichen Classe der Kaiserlichen Akademie der Wissenschaften* **62**, 326–335.
- SUKOPP, H., WURZEL, A. 2003: The effects of climate change on the vegetation of central European cities. *Urban habitats* **1**(1), 66–86.
- TEXAS INVASIVE SPECIES INSTITUTE, 2014: Mediterranean House Gecko. Available at tusunvasives.org/database/hemidactylus-turcicus (accessed March 19, 2025).
- UROŠEVIĆ, A., ANDELKOVIĆ, M.Z., MARIČIĆ, M.S., VUČIĆ, T.Z., ŠEVIĆ, M.M., TOKIĆ, G.T., TOMOVIĆ, L.M., 2023a: Further introductions and population establishment of *Hemidactylus turcicus* (Linnaeus, 1758) in Serbia (Squamata: Gekkonidae). *Herpetology Notes* **16**, 21–24.

- UROŠEVIĆ, A., CRNOBRNJA-ISAILOVIĆ, J., LJUBISAVLJEVIĆ, K., VUKOV, T., ANDELKOVIĆ, M., IVANOVIĆ, A., GOLUBOVIĆ, A., VUČIĆ, T., TOMOVIĆ, L., 2022: An updated checklist of the Serbian batracho-and herpetofauna. *Bulletin of the Natural History Museum* **15**, 149–169.
- UROŠEVIĆ, A., MARIČIĆ, M., ŠEVIĆ, M., VUČIĆ, T., TOMOVIĆ, L., ANDELKOVIĆ, M., 2023b: Note on the further spread of the Kotschy's Gecko (*Mediodactylus kotschyi*) in Serbia with pholidosis description. *Herpetology Notes* **16**, 533–537.
- VAN DOORN, L., SPEYBROECK, J., BRYN, R., HALFMAERTEN, D., NEYRINCK, S., ENGELEN, P., ADRIAENS, T., 2021: Aesthetic aliens: invasion of the beauty rat snake, *Elaphe taeniura* Cope, 1861 in Belgium, Europe. *BioInvasions Records* **10**, 741–754.
- VILLAVICENCIO, J.H.V., MAHRDT, C., GUTIERREZ, D.C., 2021: *Hemidactylus turcicus* (Squamata: Gekkonidae) in Baja California Sur, México. *Revista Latinoamericana de Herpetología* **4**(1), 235–236.