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REFERENCES: FELSENSTEIN, J. (1985): Confidence limits on phylogenies: an approach using the bootstrap.- *Evolution*, Lawrence; 39: 783-791. HARRIS, D. J. & ARNOLD, E. N. & THOMAS, R. H. (1998): Rapid speciation, morphological evolution and adaptation to extreme environments in Sand Lizards (*Meroles*) as revealed by mitochondrial gene sequences.- *Molecular Phylogenetics and Evolution*, San Diego; 10: 37-48. HARRIS, D. J. & SÁ-SOUSA, P. (2001): Species distinction and relationships of the western Iberian *Podarcis* lizards (Reptilia, Lacertidae) based on morphology and mitochondrial DNA sequences.- *Herpetol. J.*, London; 11: 129-136. HARRIS, D. J. & SÁ-SOUSA, P. (2002): Is *Podarcis hispanica* a species complex? Evidence from mitochondrial DNA sequence data.- *Molecular Phylogenetics and Evolution*, San Diego; 23: 75-81. KOCHER, T. D. & THOMAS, W. K. & MEYER, A. & EDWARDS, S. V. & PAÄBO, S. & VILLABLANCA, F. X. & WILSON, A. C. (1989): Dynamics of mitochondrial evolution in animals: Amplification and sequencing with conserved primers. *Proc. Natn. Acad. Sci. U.S.A.*, Washington; 86: 6196-6200. MAGRANER, J. (1986): Nouvelle donnée sur la répartition de *Podarcis bocagei carbonelli* (V. PÉREZ-MELLADO, 1981) (Sauria, Lacertidae) dans la Péninsule Ibérique et observations sur son écologie à Doñana (Andalousie, Espagne).- *Bull. Soc. Herpetol. France*, Paris; 38: 6-12. PÉREZ-MELLADO, V. (1997): *Podarcis bocagei* (SEOANE, 1884); pp. 272-273. In: GASC, J.-P. & CABELA, A. & CRNOBRNJA-ISAILOVIC, J. & DOLMEN, D. & GROSSENBACHER, K. & HAFFNER, P. & LESCURE, J. & MARTÍNEZ, RICA, J. P. & MAURIN, H. & OLIVEIRA, M. E. & SOFIANIDOU, T. S. & VEITH, M. & ZUIDERWIJK, A. (eds): Atlas of amphibians and reptiles in Europe. *Societas Europaea Herpetologica & Museum National d'Histoire Naturelle de Paris*, Paris. PINHO, C. & HARRIS, D. J. & CARRETERO, M. A. & FERRAND, N. (2002): Análise de variação genética de marcadores proteicos em *Podarcis carbonelli*. VII Congr. Luso-Espanhol Herpetol., Évora, Portugal, October 2002. SÁ-SOUSA, P. (2000): Distribución de la lagartija *Podarcis carbonelli* (PÉREZ-MELLADO, 1981) en Portugal.- *Bol. Asoc. Herpetol. Española*, Madrid; 11(1): 12-16. SÁ-SOUSA, P. (2001a): Comparative chorology between *Podarcis bocagei* and *P. carbonelli* (Sauria: Lacertidae) in Portugal.- *Rev. Española Herpetol.*, Barcelona; 15: 85-97. SÁ-SOUSA, P. (2001b): A controversa sistemática das lagartixas do género *Podarcis* WAGLER, 1830 (Sauria, Lacertidae) em Portugal. PhD. Univ. Lisboa. SÁ-SOUSA, P. & GONZÁLEZ DE LA VEGA, J. P. & BARNESTEIN, J. A. M. (2001): Presencia de la lagartija *Podarcis carbonelli* en Andalucía.- *Bol. Asoc. Herpetol. Española*, Madrid; 12(2): 77-79. SÁ-SOUSA, P. & HARRIS, D. J. (2002 in press): *Podarcis carbonelli* PÉREZ-MELLADO, 1981 is a distinct species.- *Amphibia-Reptilia*, Leiden; 23 (4). SWOFFORD, D. L. (2001): PAUP\*: Phylogenetic Analysis Using Parsimony (and other methods) 4.0.b5. Sinauer Associates, Sunderland, Massachusetts, USA.

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## New records of *Lacerta horvathi* MÉHELY, 1904, in Carinthia (Austria)

During herpetological field studies on the biology and distribution of *Zootoca vivipara* (JACQUIN, 1787) (MAYER et al. 2000), three new locations were discovered in Carinthia (southern Austria) in which Horvath's Rock Lizard *Lacerta horvathi* MÉHELY, 1904, occurs.

Two record localities are situated in the mountain range of the eastern 'Gailtaler Alpen' (municipality of 'Berg im Drautal'), one in the 'Lienzer Dolomiten' mountains (municipality of Oberdrauburg) (fig. 1). The valley of the river Gail separates the above massifs from the hitherto known Carinthian distribution area of *L. horvathi* in the Southern Limestone Alps (Carnic Alps and Karawanken Mountains). The new records extend the known Carinthian range of *L. horvathi* about 5 km to the north. Minimum distance to the nearest 'old' record locations is about 10 km linear distance in each case.

In two of the new record localities, *L. horvathi* occurs syntopic with *Podarcis muralis* (LAURENTI, 1768) (at altitudes between 900 m and 1,000 m a.s.l.). In close vicinity to the new *L. horvathi* records, *Zootoca vivipara carniolica* MAYER et al., 2000 was observed in two locations (at altitudes of about 950 m a.s.l.) and *Anguiss fragilis* LINNAEUS, 1758 in one case (at 1,000 m a.s.l.). In the last years, syntopy of *L. horvathi* and *P. muralis* was also observed at the Bärenthal valley location in the Karawanken Mountains (at 650-750 m a.s.l.). In Austria, *L. horvathi* shares its habitats also with *Zootoca vivipara vivipara* (JACQUIN, 1787) (FRANZEN et al. 1993; SCHMIDTLER & SCHMIDTLER 1996; GRILLITSCH & CABELA 2001), and reportedly also with *Vipera berus* (LINNAEUS, 1758), *Natrix natrix* (LINNAEUS, 1758), and *Elaphe longissima* (LAURENTI, 1768) (MARKERT 1990). Syntopic occurrence of *L. horvathi* and *P. muralis* or *Z. vivipara* was also

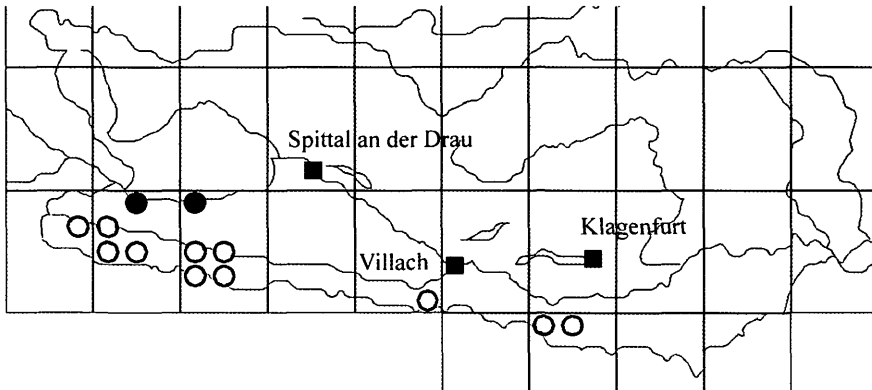


Fig. 1: Grid map (dots represent grids of 3 minutes latitude x 5 minutes longitude) showing the distribution of *Lacerta horvathi* MÉHELY, 1904 in Carinthia. ○ - records in the Carnic Alps and Karawanken Mountains; ● - the new records in the Gailtaler Alpen and Lienzer Dolomiten Massifs.

found at Alpine locations in Germany, Italy and Slovenia (BISCHOFF 1984 and literature herein; LAPINI 1987; DE LUCA 1992; LAPINI et al. 1993; RICHARD & LAPINI 1993; FRANZEN et al. 1993; SCHMIDTLER & SCHMIDTLER 1996).

The new record localities are situated at altitudes between 900 and 1,250 m a.s.l. Their physical characteristics match well with the following habitat description summarized from 17 other Austrian locations in which *L. horvathi* is found (compare GRIL-

LITSCH & TIEDEMANN 1986; TIEDEMANN 1992; CABELA et al. 1992; SCHMIDTLER & SCHMIDTLER 1996; GRILLITSCH & CABELA 2001): (i) at altitudes between 650 m a.s.l. (Bärental valley, Karawanken Mountains, GRILLITSCH & CABELA 2001) and 1,665 m (Tröpolacher Alm, Carnic Alps, MARKERT 1994); (ii) in rocky and stony limestone terrain, rich in crevices where the habitats are generally bound to extended rock formations in ravines and gorges, but also on

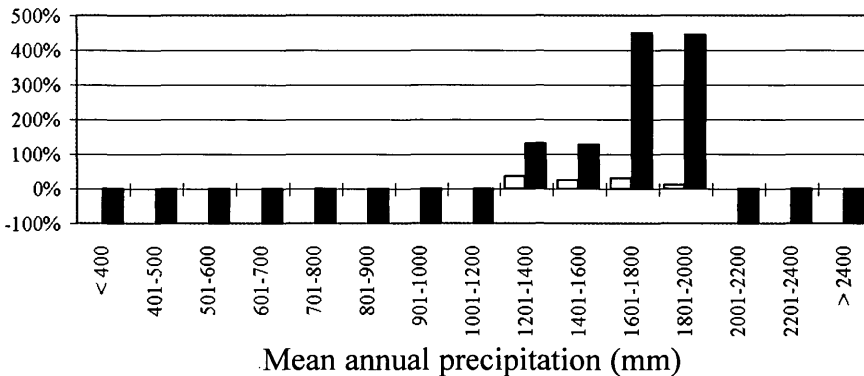


Fig. 2: Mean annual precipitation values preferred by *Lacerta horvathi* MÉHELY, 1904 in Austria. The analysis (according to BERGHAUSEN et al. 1989 and DALBECK et al. 1997) shows that the species clearly favours areas which are characterized by mean annual precipitation values from 1,200 mm to 2,000 mm. Outlined columns - relative frequency of records; black columns - degree of preference.

stonework and walling; (iii) chiefly at clearings and at the edge of coniferous forests, (iv) in places characterized by high levels of terrestrial and atmospheric humidity caused by the close vicinity to flowing water; habitats frequently close to trickled-over rocks.

Based on the precipitation values observed between 1901 and 1950 (PASCHINGER 1951), GRILLITSCH & CABELA (1992) defined annual precipitation means of 2,000 mm and more as a suited criterion to describe the distribution of *L. horvathi* in Carinthia. According to the means of the years 1931 to 1960 (LOIBL 1998), we analyzed the distribution of the grid cells which include *L. horvathi* records ( $n = 20$ ) within the entirety of grid cells covering Austria ( $n = 35,924$ ) according to the methods mentioned in BERGHAUSEN et al. 1989 and DALBECK et al. 1997. Figure 2 shows that in Austria, *L. horvathi* occurs in places characterized by precipitation means of 1,200 to 2,000 mm per year; the above mentioned old value is no longer valid.

Based on the assumption that the distributional discontinuity of *L. horvathi* in the eastern Alps (e. g., as shown in the map of LAPINI & DAL FARRA 1994) is pretended and only due to insufficient knowledge, the authors intend to conduct a systematic search of the lizard in the interjacent areas. For this purpose, the merits of GIS (geographical information system) shall be utilized in order to define and display potential areas of occurrence.

REFERENCES: BERGHAUSEN, W. K., RADLER, K., WILLEMS, H. (1989): Besiedlungspräferenzen des Uhus (*Bubo bubo* L.) in der Eifel.- Charadrius, Bonn, 25: 157-178. BISCHOFF, W. (1984): *Lacerta horvathi* MÉHELY, 1904 - Kroatische Gebirgseidechse; pp. 265-275. In: BÖHME, W. (ed): Handbuch der Reptilien und Amphibien Europas. Band 2/1. Echsen (Sauria) II (Lacertidae II: *Lacerta*). Wiesbaden (Aula). CABELA, A. & GRILLITSCH, H. & HAPF, H. & HAPF, F. & KOLLAR, R. (1992): Die Kriechtiere Kärntens.- Carinthia II, Klagenfurt; 102: 195-316. DALBECK, L. & HACHTEL, M. & HEYD, A. & SCHÄFER, K. & SCHÄFER, M. & WEDDELING, K. (1997): Amphibien im Rhein-Sieg-Kreis und der Stadt Bonn: Verbreitung, Gewässerpräferenzen, Vergesellschaftung und Gefährdung.- Dechenia, Bonn, 150: 235-292. DE LUCA, N. (1992): Notes on biology and ecology of Horvath's Rock Lizard (*Lacerta horvathi* MÉHELY, 1904, Lacertidae, Reptilia). pp. 129-135. In: KORSÓS, Z & KISS, I. (eds.): Proc. 6th Ord. Gen. Meeting Societas Europaea Herpetologica, Budapest 1991. FRANZEN, M. & GRUBER, H.-J. & HECKES, U. (1993): Untersuchungen zum Vorkommen der Kroatischen Gebirgseidechse (*Lacerta horvathi*) im Karwen-

del- und Mangfallgebirge. München (Ökokart, Bericht im Auftrag des Bayerischen Landesamtes für Umweltschutz); 11 pp. GRILLITSCH, H. & CABELA, A. (1992): Die Arealgrenzen der Reptilien in Kärnten (Österreich) dargestellt durch den Verlauf ausgewählter klimatischer Iso- und Grenzlinien.- Herpetozoa, Wien; 5(1/2): 41-49. GRILLITSCH, H. & CABELA, A. (2001): *Lacerta horvathi* MÉHELY, 1904 - Kroatische Gebirgseidechse; pp. 480-488. In: CABELA, A. & GRILLITSCH, H. & TIEDEMANN, F.: Atlas zur Verbreitung und Ökologie der Amphibien und Reptilien in Österreich. Wien (Umweltbundesamt). GRILLITSCH, H. & TIEDEMANN, F. (1986): *Lacerta horvathi* MÉHELY 1904 - Erstnachweis für Österreich.- Ann. Naturhist. Mus.; Wien, (B) 88/89: 357-359. LAPINI, L. (1987): Osservazioni sulla fauna erpetologica (Amphibia, Reptilia) dell'Alta Val Torre (Italia nord-orientale, Prealpi Giulie).- Gortania - Atti Mus. Friulano Stor. Nat., Udine; 9: 201-222. LAPINI, L. & DAL FARRA, A. (1994): *Lacerta horvathi* MÉHELY, 1904 sulle Dolomiti. (Reptilia, Lacertidae).- Boll.-Mus. Civ. Stor. Nat., Venezia, 43 (1992): 205-208. LAPINI, L. & RICHARD, J. & DALL'ASTA, A. (1993): Distribution and ecology of *Lacerta horvathi* MÉHELY, 1904 (Reptilia, Lacertidae) in north-eastern Italy.- Gortania - Atti Mus. Friulano Stor. Nat. Udine; 14 (13. Jul. 1992): 213-230. LOIBL, W. (1998): Kleinräumige Modellierung von Klimafaktoren. 25 pp. In: KNOFLACHER, H. & LOIBL, W.: Grundlagen der Biodiversitätssicherung in Österreichs Kulturlandschaften. Teilbericht 3. - Seibersdorf Research Report, OEFZS-A-4347. MARKERT, H. (1990): Zur Herpetofauna von Almregionen in den Gailtaler Alpen und Karnischen Alpen. Diplomarbeit Karl-Franzens-Universität, Graz; 107 pp. MARKERT, H. (1994): Ein Beitrag zur Lurch- und Kriechtierfauna von Almregionen in den Gailtaler und Karnischen Alpen.- Carinthia II, Klagenfurt; 104: 59-71. MAYER, W. & BÖHME, W. & TIEDEMANN, F. & BISCHOFF, W. (2000): On oviparous populations of *Zootoca vivipara* (JACQUIN, 1787) in south-eastern Central Europe and their phylogenetic relationship to neighbouring viviparous and South-west European oviparous populations.- Herpetozoa, Wien; 13 (1/2): 59-69. PASCHINGER, V. (1951): Geographischer Atlas, 1. Lieferung. In: Geschichtsverein für Kärnten - MORO, G. (ed.): Kärntner Heimatatlas. Klagenfurt (Kärntner Druckerei). RICHARD, J. & LAPINI, L. (1993): Trophic niche overlap in syntopic populations of *Lacerta horvathi* and *Podarcis muralis* (Reptilia: Lacertidae).- Atti Mus. Civ. Stor. Nat., Trieste; 45: 151-157. SCHMIDTLER, H. & SCHMIDTLER, J. F. (1996): Zur Reptilienfauna der Nördlichen Kalkalpen zwischen Isar und Inn (Bayern/Tirol).- Mitt. Landesverband Amphibien- und Reptilien-Schutz (LARS) in Bayern, München; 15 (1): 1-36. TIEDEMANN, F. (1992): Zur Verbreitung der Kroatischen Gebirgseidechse, *Lacerta horvathi* MÉHELY, 1904, in Österreich (Squamata: Sauria: Lacertidae).- Herpetozoa, Wien; 5 (1/2): 67-69.

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