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Polydactyly in the Common Wall Lizard *Podarcis muralis* (Squamata: Lacertidae)

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Polydactyly is a physical anomaly frequently reported in mammals (Sis and Getty, 1968; D'Souza, McDiarmid and Tickle, 1998; Villagomez and Alonso, 1998; Carstanjen, Abitol and Desbois, 2007; Gugołek, Strychalski and Konstantynowicz, 2011), birds (Hollander and Levi, 1942; Trinkaus, Müller and Kaleta, 1999; Huang et al., 2006; Sakai, 2006) and amphibians (Borkin and Pikulik, 1986; Piha, Pekkonen and Merilä, 2006). The malformation appears to be rare among reptiles, but number of reported cases continually grows, and so far, the condition was found in chelonians (Martínez-Silvestre et al., 1998), chameleons (Cuadrado, 1996), iguanids (Pelegrin, 2007; Minoli, Feltrin and Ávila, 2009), geckoes (Bauer, Hathaway and Fisher, 2009) and lacertids (Carretero et al., 1995).

Here, we report on the first case of postaxial pedal polydactyly in the lacertid lizard *Podarcis muralis* (Laurenti, 1768). One adult female was collected by noosing on 6 May 2012 at the Palilula ramp (N 43° 18.788' E 21° 53.997'), on a railroad that passes through the City of Niš in Southern Serbia. The specimen had a snout-vent length of 53.31 mm, body mass of 2.8 g and presented a 68.94 mm long regenerated tail. Of 132 individuals collected from this location and more than 700 collected in the wider area of Niš surroundings from 2011-2012, this was the first record of polydactyly. The specimen had six fingers on both hindlimbs (Fig. 1) while forelimbs were normally developed. Additional digits were around 1mm long, located posterior to fifth digit, and appeared normal with well developed nails and normal coloration. Lizard's movement was not affected by this deformity and animal appeared healthy and was without visible ectoparasites. Upon completion of measurements and photographing the individual was returned to its native habitat.

The malformation described here could be a case of brachydactly with fifth metacarpal being articulated with two phalanges like in *Podarcis pityusensis* (Carretero et al., 1995), or it could be a case of a true polydactyly with duplication of metacarpals and phalanges. Unfortunately, it was not possible to perform radiograph imaging and precise anatomical description of anomaly is therefore not possible.

There are many potential causes responsible for limb malformations in vertebrates, including pesticides (Piha, Pekkonen and Merilä, 2006), pollution (Dolk and Vrijheid, 2003; Linzey et al., 2003; Taylor et al., 2005), parasites (Johnson et al., 2001; Kiesecker, 2002), radiation (Ankley et al., 2002), inadequate incubation temperature and embryo anoxia (Frye, 1991) and genetics (Moore et al., 2007). It is difficult to answer whether anomaly described here is caused by environmental or genetic factors. There is no use of pesticides on this location, but on multiple occasions we found oil spills from the trains traveling on the railroad and oil and its derivates can act as teratogens (Hoffman, 1979).

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References

Ankley, G.T., Diamond, S.A., Tietge, J.E., Holcombe, G.W., Jensen, K.M., Defoe, D.L., Peterson, R. (2002): Assessment of the risk of solar ultraviolet radiation to amphibians. I. Dose-dependent induction of hindlimb malformations in the northern leopard frog (*Rana pipiens*). Environmental Science & Technology **36**: 2853-2858.

Bauer, A.M., Hathaway, S.A., Fisher, R.N. (2009): Polydactyly in the Central Pacific Gecko, *Lepidodactylus sp*. (Squamata: Gekkonidae). Herpetology Notes **2**: 243-246.

Borkin, L.J., Pikulik, M.M. (1986): The occurrence of polymely and polydactyly in natural populations of anurans of the USSR. Amphibia-Reptilia **7**: 205-216.

Carretero, M.A., Llorente, G.A., Santos, X., Montori, A. (1995):

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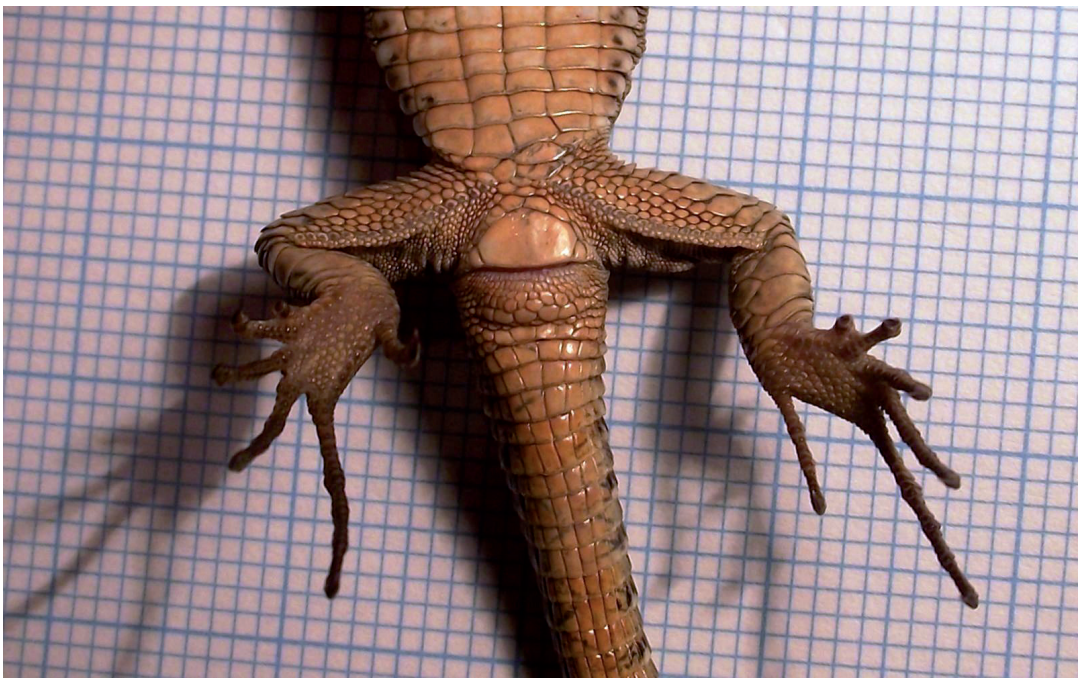

Figure 1. Ventral view of the adult female *Podarcis muralis* showing polydactyly of both hindlimbs.

Un caso de polidactila en lacértidos. Boletín de la Asociación Herpetológica Española **6**: 11-13.

Carstanjen, B., Abitol, M., Desbois, C. (2007): Bilateral Polydactyly in a foal. Journal of Veterinary Science 8: 201–203.

Cuadrado, M. (1996): Tasa de polidactilia en el camaleón común Chamaeleo chamaeleon. Boletín de la Asociación Herpetológica Española **7**: 23-24.

Dolk, H., Vrijheid, N. (2003): The impact of environmental pollution on congenital anomalies. British Medical Bulletin **68**: 25-45.

D'Souza, D., McDiarmid, J., Tickle, C. (1998): A polydactylous human foot with "double-dorsal" toes. Journal of Anatomy **193**: 121-130.

Frye, F.L. (1991): Reptile Care: An Atlas of Diseases and Treatments. Neptune City NJ: T.F.H. Publications, Inc.

Gugołek, A., Strychalski, J., Konstantynowicz, M. (2011): Polydactyly in Arctic foxes (*Vulpes lagopus*). Turkish Journal of Veterinary and Animal Sciences **35**: 277-280.

Hoffman, D.J. (1979): Embryotoxic and teratogenic effects of petroleum hydrocarbons in mallards (*Anas platyrhynchos*). Journal of Toxicology and Environmental Health **5**: 835-844.

Hollander, W.F., Levi, W.M. (1942): Polydactyly, a sub-lethal character in the pigeon. Journal of Heredity **33**: 385-391.

Huang, Y.Q., Deng, X.M., Du, Z.Q., Qiu, X., Du, X., Chen, W., Morisson, M., Leroux, S., Ponce de Léon, F.A., Da, Y., Li, N. (2006): Single nucleotide polymorphisms in the chicken Lmbr1 gene are associated with chicken polydactyly. Gene **374**: 10-18.

Johnson, P.T.J., Lunde, K.B., Haight, R.W., Bowerman, J., Blaustein, A.R. (2001): *Ribeiroia ondatrae* (Trematoda: Digenea) infection induces severe limb malformations in western toads (*Bufo boreas*). Canadian Journal of Zoology **79**: 370–379.

Kiesecker, J.M. (2002): Synergism between trematode infection and pesticide exposure magnifies amphibian limb deformities in nature. Proceedings of the National Academy of Sciences USA **99**: 9900–9904.

Linzey, D., Burroughs, J., Hudson, L., Marini, M., Robertson, J., Bacon, J., Nagarkatti, M., Nagarkatti, P. (2003): Role of environmental pollutants on immune functions, parasitic infections and limb malformations in marine toads and whistling frogs from Bermuda. International Journal of Environmental Health Research **13**: 125-148.

Martínez-Silvestre, A., Soler, J., Solé, R., Sampere, X. (1998): Polidactilia en *Testudo hermanni* y causas teratogénicas en reptiles. Boletín de la Asociación Herpetológica Española **9**: 35-38.

Minoli, I., Feltrin, N., Ávila, L.J. (2009): Un caso de polidactilia en *Liolaemus petrophilus* (Iguania: Squamata: Liolaemini). Cuadernos de Herpetología **23**: 77-88.

Moore, C.M., Hubbard, G.B., Dick, E., Dunn, B.G., Raveendran, M., Rogers, J., Williams, V., Gomez, J.J., Butler, S.D., Leland, M.M., Schlabritz-Loutsevitch, N.E. (2007): Trisomy 17 in a baboon (*Papio hamadryas*) with polydactyly, patent foramen ovale and pyelectasis. American Journal of Primatology **69**: 1105-1118.

Pelegrin, N. (2007): Presence of a polydactylous *Tropidurus etheridgei* (Squamata: Iguanidae: Tropidurinae) in the Dry Chaco of Córdoba province, Argentina. Cuadernos de Herpetología **21**: 115-116.

Piha, H., Pekkonen, M., Merilä, J. (2006): Morphological abnormalities in amphibians in agricltural habitats: a case study of the common frog *Rana temporaria*. Copeia 2006: 810-817.

Sakai, W.H. (2006): Polydactyly in a Vaux's Swift. The Wilson Journal of Ornithology **118**: 424-426.

Sis, R.F., Getty, R. (1968): Polydactylism in cats. Veterinary Medicine & Small Animal Clinician **63**: 948-951.

Taylor, B., Skelly, D., Demarchis, L.K., Slade, M.D., Galusha, D., Rabinowitz, P.M. (2005): Proximity to Pollution Sources and Risk of Amphibian Limb Malformation. Environmental Health Perspectives **113**: 1497–1501.

Trinkaus, K., Müller, F., Kaleta, E. (1999): Polydaktylie bei einem Turmfalken (*Falco tinnunculus tinnunculus* Linné, 1758) — ein Fallbericht. Zeitschrift für Jagdwissenschaft **45**: 66-72.

Villagomez, D.A., Alonso, R.A. (1998): A distinct Mendelian autosomal recessive syndrome involving the association of anotia, palate agenesis, bifid tongue, and polydactyly in the dog. Canadian Veterinary Journal **39**: 642-643.

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