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## Limb abnormalities in the palmate newt, *Lissotriton helveticus* (Caudata: Salamandridae)

Francisco J. Diego-Rasilla

Departamento de Biología Animal, Universidad de Salamanca, Campus Miguel de Unamuno, Edificio de Farmacia 5ª planta, 37007. Salamanca. C.e.: [fjdiego@herpetologica.org](mailto:fjdiego@herpetologica.org)

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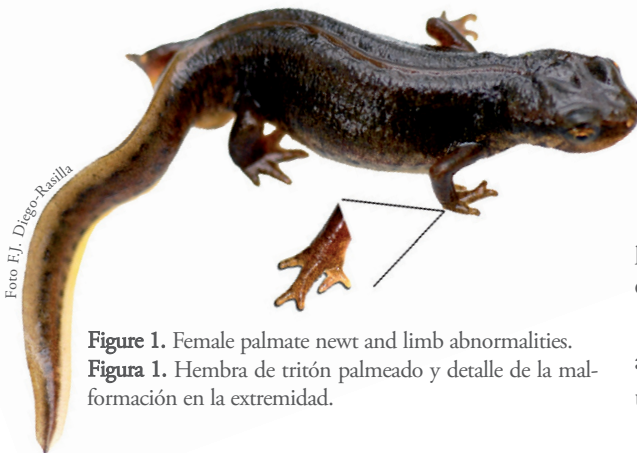
**RESUMEN:** Se describen las malformaciones halladas en la extremidad anterior derecha de una hembra adulta de tritón palmeado (*Lissotriton helveticus*) observada en Cantabria. Dos son los tipos de malformaciones observadas en este miembro: sindactilia, puesto que los dedos II y III se encuentran ampliamente soldados, y polifalangia, ya que el dedo I presenta falanges duplicadas.

Herein I report the presence of skeletal abnormalities in an adult female palmate newt, *Lissotriton helveticus*, observed during spring (20 March) in 2008, in Fresnedo (Cantabria, northern Spain; UTM VP0501;

233 masl), where a drinking trough was monitored for palmate newts. Twenty-five adult palmate newts (8 males and 17 females) were collected and only one of them had visible abnormalities (% abnormal: 4%). All of them were subsequently released, after photographing the abnormal animal.

The newt presented visible abnormalities in its right fore limb (Figure 1). Thus, digits II and III were fused together (syndactyly) and digit I had a duplicated phalanx (polyphalangy), being both phalanges orthogonally oriented to each other.

Although different types of skeletal abnormalities have been reported in Iberian urodeles, such as *Chioglossa lusitanica*



**Figure 1.** Female palmate newt and limb abnormalities.  
**Figura 1.** Hembra de tritón palmeado y detalle de la malformación en la extremidad.

(Sequeira *et al.*, 1999), *Triturus marmoratus* (Diego-Rasilla, 2000; Diego-Rasilla *et al.*, 2007) and *Salamandra salamandra* (Escoriza & García-Cardenete, 2005; Villanueva, 2007), to my knowledge, this is the first documented case of limb abnormalities in *L. helveticus*, and the first amphibian skeletal malformation described in Cantabria.

Polyphalangy (extra bones in a digit), together with ectrodactyly (missing toe) and brachydactyly (dwarfed toe) are among the more frequent skeletal malformations found in urodeles (Diego-Rasilla *et al.*, 2007; Williams *et al.*, 2008). On the contrary, syndactyly (fused digits), as well as polymelia (excessive number of limbs) and phocomelia (absence of proximal portion of limb) are rare in urodeles (Escoriza & García-Cardenete, 2005; Diego-Rasilla *et al.*, 2007; Villanueva, 2007; Williams *et al.*, 2008).

Observed rates of visual abnormalities (4%) exceeded the baseline abnormality percentage of 0-2% predicted in amphibian populations (Ouellet, 2000); however, these

rates should not be treated as significant because of the small number of newts found in this place, and a high occurrence of limb abnormalities can not be concluded from the available data.

Multiple etiologies could be responsible from these malformations; however, the available information does not permit to determine causes for the observed malformations. They could be attributed to both anthropogenic and natural changes in the abiotic and biotic factors in the environment. Suggested causes for these abnormalities include parasites and pathogens, UV radiation, regeneration following trauma, high levels of anthropogenic pollution, or synergistic interactions of some or all of these factors (Blaustein *et al.*, 1997; Reaser & Johnson, 1997; Gilliland & Muzzall, 2002; Johnson *et al.*, 2002; Diego-Rasilla *et al.*, 2007; Williams *et al.*, 2008).

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