

Smooth newts *Lissotriton vulgaris* observed hibernating in a waterfowl nest

ATZE VAN DER GOOT¹, MANON DE VISSER^{1,2} & AUKE FLORIAN HIEMSTRA^{1,2*}

¹Naturalis Biodiversity Center, Leiden, the Netherlands

²Institute of Biology, Leiden University, Leiden, the Netherlands

*Corresponding author e-mail: aukeflorian.hiemstra@naturalis.nl

The smooth newt *Lissotriton vulgaris* occurs across most of Continental Europe as well as the British Isles, with a distribution that extends all the way into western Asia (Skorinov et al., 2008; Wielstra et al., 2018). Their presence indicates a healthy environment, which is why newts serve as bioindicators (Vershinin, 1996). Adult smooth newts are semi-aquatic and breed in stagnant or semi-flowing water during spring and early summer, favouring fish-free ponds, puddles and ditches as aquatic habitats. They generally spend the rest of the year on land, where they repose and hibernate (Sparreboom, 2014).

The length and start of the aquatic phase depends on the local climate and differs by region. In the Netherlands, for instance, the length of the breeding season is limited to four months and it generally starts around March (Creemers & van Delft, 2009). In warmer, south-western areas, however, the breeding season may already start around mid-February and the terrestrial phase is shorter, or even absent. The opposite is true for colder, north-eastern areas, where the aquatic phase is known to be shorter and will also start later, in summer or even autumn (Sparreboom, 2014).

The terrestrial phase is not well documented, with smooth newts being described as secretive animals that mostly live underground (Kaczmarek et al., 2018). They have a nocturnal existence, feeding on invertebrates nearby their overwintering shelter, the hibernaculum, in which they hibernate during the coldest period of the winter. They often overwinter in groups of several individuals (Creemers & van Delft, 2009; Sparreboom, 2014).

The hibernacula chosen by smooth newts are diverse, as they include wood piles, rotting tree logs, tree roots, compost heaps, stones, and even structures created by other animals, such as burrows of small mammals, or abandoned ant nests (Creemers & van Delft, 2009; Kaczmarek et al., 2018). Preferably, hibernacula are moist and frost-free. Basements, sheds, and wall cavities are also known to be used to hibernate within urban areas (Creemers & van Delft, 2009; Dervo et al., 2018).

Here we present, to our knowledge, the first documented account of a waterfowl nest being used as a smooth newt hibernaculum (Fig. 1A). After the bird's breeding season, on 5 October 2021, we collected the nest of a common coot (*Fulica atra*; Fig. 1B). We did so for a study on artificial nest material (Hiemstra et al., 2021), but the nest in question

was fairly natural and was constructed mostly of twigs. The nest was located in a stagnant ditch that was about two metres wide and one metre deep, located in the suburbs of the city of Leiden, the Netherlands (52° 09.065' N, 004° 28.568' E). For several consecutive years, the nest was used by coots for breeding.

After pulling the top part of the nest aside, we noticed the presence of several clustered, lethargic smooth newts (Figs. 1 C & D). They were located under the top layer, but above the water level, on the side of the nest. After about a minute, the newts started to slowly crawl deeper into the nest, after which we decided not to disturb them further and we restored the nest to its old state. We do not know the exact number, but at a first glance and just in one corner, there were at least five congregated individuals, suggesting the nest was used as a hibernaculum (Creemers & van Delft, 2009; Sparreboom, 2014). It is unknown if hibernating in a nest increases the chances of being preyed upon by coots, but it is known that smooth newts can fall prey to waterfowl.

There are many examples of bird nests being used by other organisms than the host species (Kosicki et al., 2007; Silva et al., 2018; Krištofik et al., 2009) and nests are even referred to as 'biodiversity hotspots' (Maciorowski et al., 2021). Waterfowl nests are found to include a wide range of species among which are planarians, leeches, worms, gastropods, crabs, spiders, insects, frogs, water snakes, and water voles (Ceylan et al., 2021). Red mites *Dermanyssus gallinae* are also common in urban bird nests (Cafiero et al., 2013), and nests should therefore be frozen before doing a deconstruction (Hiemstra et al., 2021), but from now on preferably not before checking if hibernating newts are present, considering they are often protected by law.

Increased winter activity in the smooth newt has been linked to climate change, which causes winters to be milder (Kaczmarek et al., 2018). Although waterfowl nests may not be frost-free in winter, climate change may thus instigate a shift to other hibernacula. All in all, the nests of waterfowl may provide microhabitats for a range of species, with a waterfowl nest acting as a hibernaculum for smooth newts being a seemingly, newly discovered example. For the future, it is important that nest researchers, ditch or pond dredgers, and conservation managers are aware that abandoned waterfowl nests potentially house overwintering newts.



Figure 1. **A.** The nest of a common coot *Fulica atra* in which smooth newts were observed to hibernate, **B.** One of the common coots from Leiden, the Netherlands, **C.** Two hibernating smooth newts *Lissotriton vulgaris* from the nest, visible close to the wall and residing above the water level, **D.** One of the lethargic smooth newts under the nest cup after the top of the nest was pulled aside

REFERENCES

- Cafiero, M.A., Camarda, A., Galante, D., Mancini, G., Circella, E., Cavaliere, N., Santagada, G., Caiazzo, M. & Lomuto, M. (2013). Outbreaks of red mite (*Dermanyssus gallinae*) dermatitis in city-dwellers: an emerging urban epizoonosis. In *Hypothesis In Clinical Medicine*, 413–424 pp. Shoja, M.M., Agutter, P.S., Tubbs, R.S., Ghanei, M., Ghabili, K., Harris, A. & Loukas, M. (Eds). Nova Science Publisher, New York, NY.
- Ceylan, M., Çetinkaya, O. & Kvist, S. (2021). Function of the waterfowl nests as reproduction and living areas for leeches (Annelida: Hirudinea). *Animal Reproduction Science* 232(February): 106816. <https://doi.org/10.1016/j.anireprosci.2021.106816>.
- Creemers, R.C.M. & van Delft, J.J.C.W. (Eds) (2009). *De Amfibieën en Reptielen van Nederland, België en Luxemburg*. KNNV Uitgeverij, 480 pp.
- Dervo, B.K., Museth, J. & Skurdal, J. (2018). Assessing the use of artificial hibernacula by the great crested newt (*Triturus cristatus*) and smooth newt (*Lissotriton vulgaris*) in cold climate in Southeast Norway. *Diversity* 10(3): 1–12. <https://doi.org/10.3390/d10030056>.
- Hiemstra, A.F., Gravendeel, B. & Schilthuizen, M. (2021). Birds using artificial plants as nesting material. *Behaviour*. <https://doi.org/10.1163/1568539X-bja10115>.
- Kaczmarek, J.M., Piasecka, M. & Kaczmarek, M. (2018). Winter activity of the smooth newt *lissotriton vulgaris* in central Europe. *Herpetological Bulletin* 144: 31–32.
- Kosicki, J.Z., Sparks, T.H. & Tryjanowski, P. (2007). House sparrows benefit from the conservation of white storks. *Naturwissenschaften* 94(5): 412–415. <https://doi.org/10.1007/s00114-006-0207-x>.
- Krištofik, J., Mašán, P., Šustek, Z. & Karaska, D. (2009). Arthropods in the nests of lesser spotted eagle (*Aquila pomarina*). *Biologia* 64(5): 974–980. <https://doi.org/10.2478/s11756-009-0148-x>.
- Maciorowski, G., Jankowiak, Ł., Sparks, T.H., Polakowski, M. & Tryjanowski, P. (2021). Biodiversity hotspots at a small scale: the importance of eagles' nests to many other animals. *Ecology* 102(1): 1–4. <https://doi.org/10.1002/ecy.3220>.
- Silva, D.E., Silva, G.L., Nascimento, J.M. Do, & Ferla, N.J. (2018). Mite fauna associated with bird nests in Southern Brazil. *Systematic and Applied Acarology*, 23(3):, 426–440. <https://doi.org/10.11158/saa.23.3.2>.
- Skorinov, D.V., Kuranova, V.N., Borkin, L.J. & Litvinchuk, S.N. (2008). Distribution and conservation status of the smooth newt (*Lissotriton vulgaris*) in Western Siberia and Kazakhstan. *Russian Journal of Herpetology* 15(2): 157–165.
- Sparreboom, M. (2014). *Salamanders of the Old World*. Brill. 431 pp.
- Vershinin, V.L. (1996). The common newt (*Triturus vulgaris* L.) in urban ecosystems. *Russian Journal of Ecology* 27(2): 133–137.
- Wielstra, B., Canestrelli, D., Cvijanović, M., Denoël, M., Fijarczyk, A., Jablonski, D., Liana, M., Naumov, B., Olgun, K., ... & Babik, W. (2018). The distributions of the six species constituting the smooth newt species complex (*Lissotriton vulgaris* sensu lato and *L. montandoni*) - An addition to the New Atlas of Amphibians and Reptiles of Europe. *Amphibia Reptilia* 39(2): 252–259. <https://doi.org/10.1163/15685381-17000128>.

Accepted: 7 July 2022