REPTILES & AMPHIBIANS

Rat the Ripper: Large scale Predation of Marbled Newts (*Triturus marmoratus*) by Brown Rats (*Rattus norvegicus*) in Vigo (Pontevedra), Spain

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Rodents regularly prey on amphibians and reptiles (e.g., Draud et al. 2004; Cabrera-Guzmán et al. 2015; Pezaro et al. 2018; Borroto-Paez and Fabres 2023; Hannibal et al. 2024; López-Darias et al. 2024). For example, both Ship Rats (*Rattus rattus*) and Brown Rats (*R. norvegicus*) are known predators of amphibians (e.g., Velo-Antón and Cordero-Rivera 2011; de Oliveira et al. 2016; Egeter et al. 2019; Lobos et al. 2023; Van Tran and Nishikawa 2023). However, reports of large-scale predation on amphibians by rodents are scarce (Egeter et al. 2015). We herein describe extensive predation of newts, mainly Marbled Newts (*Triturus marmoratus*) and some Palmate Newts (*Lissotriton helveticus*), by Brown Rats (*R. norvegicus*) in an artificial pond in northwestern Spain.

The pond, near Vigo (Pontevedra), Spain (42.170619, -8.739954), is in a recreational zone where artificial ponds constructed of concrete serve as habitats for Marbled Newts (*T. marmoratus*). The amphibian fauna of the area includes Iberian Newts (*Lissotriton boscai*), Palmate Newts (*Lissotriton helveticus*), Fire Salamanders (*Salamandra salamandra*), Iberian Painted Frogs (*Discoglossus galganoi*), and Iberian Green Frogs (*Pelophylax perezi*). Since the fires that devastated the area in the fall of 2017 (Chergui et al. 2022), we have conducted regular visits to the site. During a visit in the spring of 2023, we detected several carcasses of newts on the shores of the only pond that was full of water. The pond (Fig. 1), with an area of 450 m² and depths ranging from 20 cm to less than 1 m, is characterized by clear water devoid of aquatic vegetation, which facilitated observation and enumeration of newts. Initially, we found no evidence or traces to identify the predator, so we set camera traps near the cluster of dead newts in an effort to identify it (Fig. 2).

Figure 1. An artificial pond in Vigo (Pontevedra), Spain, where we observed predation by Brown Rats (*Rattus norvegicus*) on Marbled (*Triturus marmoratus*) and Palmate Newts (*Lissotriton helveticus*). Photograph by Cesar Ayres.

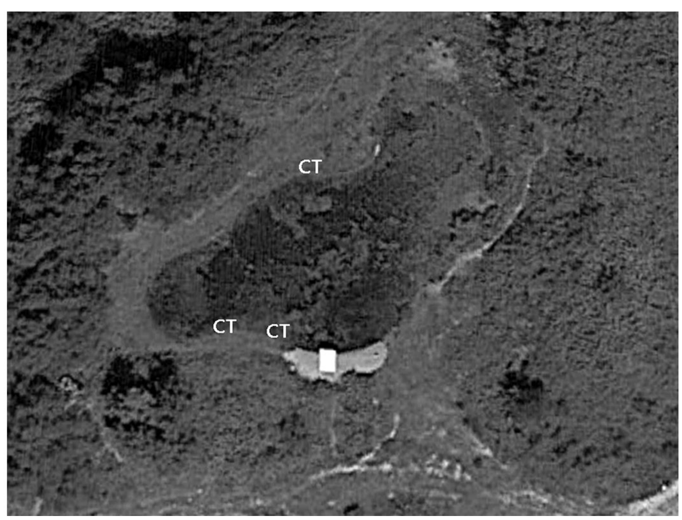

Figure 2. Aerial view of the artificial pond in Vigo (Pontevedra), Spain, indicating the positions of camera traps.

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We visited the pond on a daily basis on 3–17 April 2023 in order to detect additional newt carcasses and to download images from the camera traps. Each morning, we checked the shores of the pond for dead or dying newts and removed fresh remains to avoid overcounting.

During that period, we found 310 *T. marmoratus* and 23 *L. helveticus* carcasses on the shores of the pond (Table 1). These newts were consumed following a pattern whereby rats avoided the dorsal regions and instead accessed the internal organs via the pectoral area (Fig. 3). The majority of carcasses (Fig. 3) were concentrated in areas close to rat dens along the shores and under Willows (*Salix* spp.). We found no evidence of predation on other amphibian species during the course of this study.

Over the course of several nights (4–8 and 12–13 April), the camera traps documented the presence of at least two Brown Rats in the area and the consumption of newts by the rats (Fig. 4). In addition to the rats, we identified only one other potential predator, a Red Fox (*Vulpes vulpes*) captured once on camera during the initial night of the study. However, the observed injuries are not consistent with those typically inflicted by a fox.

Figure 3. Marbled Newt (*Triturus marmoratus*) showing a pectoral incision inflicted by a Brown Rat (*Rattus norvegicus*) (left) and carcasses of newts on the shore of the pond (right). Photographs by Cesar Ayres.

Table 1. Carcasses of Marbled (*Triturus marmoratus*) and Palmate Newts (*Lissotriton helveticus*) detected in the study area.

Date	**Marbled Newts** (*Triturus marmoratus*)	**Palmate Newts** (*Lissotriton helveticus*)
03 April 2023	168	20
04 April 2023	10	0
05 April 2023	2	0
06 April 2023	20	0
07 April 2023	3	0
08 April 2023	12	0
09 April 2023	8	0
10 April 2023	3	0
11 April 2023	8	0
12 April 2023	0	0
13 April 2023	0	0
14 April 2023	60	3
15 April 2023	6	0
16 April 2023	10	0
Totals	**310**	**23**

The introduction of rats has been identified as a contributing factor to the extirpation of amphibians on islands (Towns 2009; Bell 2010). However, little information addresses interactions between invasive rats and native amphibians in continental areas. Moreover, few literature accounts examine predation of toxic amphibians by rats in Europe (Velo-Antón and Cordero-Rivera 2011; Hagnier et al. 2024; Velo-Antón 2024) or the mechanisms by which predators process the toxic components of their prey. Cabrera-Guzmán et al. (2015) proposed that rodents selectively consume the less toxic portions of their prey, a strategy that was documented by Parrott et al. (2019). This behavior appears to apply to the mass-predation event we describe herein, as the majority of Marbled Newts exhibited a puncture wound in the axillary-pectoral region (Fig. 3) and avoided the dorsum, where poison glands are concentrated. Comparable rat-induced injuries were reported by Melzer et al. (2012) in Archey's Frogs (*Leiopelma archeyi*) in New Zealand.

Figure 4. Camera-trap images showing Brown Rats (*Rattus norvegicus*) eating a Marbled Newt (*Triturus marmoratus*) on the shore of the pond (left) and at the entrance of a den (right).

The rats likely were opportunistic, exploiting an abundance of breeding amphibians. However, during prior monitoring seasons beginning in 2017, we found no evidence of predation in the study pond and two adjacent ponds. However, the pond was covered by invasive Water Hyacinths (*Eichhornia crassipes*) until the summer of 2022. The dense vegetative cover provided by the hyacinths could have afforded the newts a degree of protection, rendering them undetectable by rats, suggesting that the removal of these invasive plant rendered the newts vulnerable to capture by rats.

Also noteworthy is that *L. helveticus* were present in far greater numbers than *T. marmoratus* (a ratio of at least 5:1; Table 1), yet *L. helveticus* were consumed at a lesser rate. This could be attributed to their smaller body size, as larger size could facilitate capture and handling by rats or simply provide more energy for a comparable amount of handling and processing (Ayres and Garcia 2011).

Contrary to our expectations, our research revealed no evidence of predation in the study area during the springs of 2024 and 2025. However, we did observe a substantial decline in the number of newts, just two Marbled Newts in 2024 and no newts in 2025. Further research is necessary to elucidate the capture and handling techniques employed by the rats, clarifying the apparently unbalanced consumption of the two species of newts, and investigating the negative effects on these amphibian populations.

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