

# The Caudata.org Grant 2010

## 1. Name and institutional affiliation of applicant(s) and principal investigator(s)

Responsible researcher: **Guillermo Velo-Antón**, Postdoctoral Fellow (Cornell University, Dept. of Ecology & Evolutionary Biology Ithaca, NY 14853; Vigo University, Dept. of Ecology and Animal Biology, EUET Forestal, Spain).

Collaborator: **Adolfo Cordero Rivera**, Professor (Vigo University, Dept. of Ecology and Animal Biology, EUET Forestal, Spain)

## 2. Title of project: *Rapid adaptation in an island population of Salamandra salamandra*

## 3. Salamander species involved:

The fire salamander (*Salamandra salamandra*, Photo 1) is widespread across Europe. This species is **nocturnal** and **ovoviviparous**, with some viviparous populations in two northern Iberian subspecies from the Cantabrian Mountains (*S. s. bernardezi*), and the southwest Pyrenees (*S. s. fastuosa*); and two populations of small offshore islands (San Martiño and Ons; Photo 2) in the Atlantic ocean (NW Iberia, Galicia's Atlantic Islands National Park), which belong to a third subspecies and evolved to viviparity independently in these islands (*S. s. gallaica*).

## 4. Summary of the project

I have been observing for the last 4 years that one of these two **viviparous** island populations (San Martiño, 146 ha; Photos 2 and 3) has **diurnal** activity, and it has never found active individuals in nocturnal field surveys. On the contrary, the second island population (On, 428 ha) has an expected nocturnal activity and it has never found diurnal activity in the numerous field surveys on this island. A likely explanation for this behavioral change is the high predation pressure driven by the high densities of two invasive mammals in the small island of San Martiño: the ship rat (*Rattus rattus*) and the American mink (*Mustela vison*), which are the only mammals in the island, and the unique potential predators of *S. salamandra*.

To investigate this predation pressure which might be driving a rapid adaptation response in this small amphibian population, I performed a preliminary predation experiment in April 2009 to elucidate whether this amphibian population is predated at night or during the day, and what species predate on them. I used salamander models by melting non toxic, black VanAken Modeling Clay in a silicone mold previously made from a plastic *S. salamandra* carcass. The models were similar painted to *S. s. gallaica* and distributed across the island (80 in total), and were checked at 9 am and 10 pm every day for three days. The preliminary results only showed night attacks to the models, and all of them had marks from the incisors of rats, but not from the mink or birds. Considering the short-time of this experiment, and the 30% of the models attacked, the selective pressure on this island salamander populations mediated by rat predation might be the only cause of this adaptive behavioral event. In consequence, while the other nocturnal *S. salamandra* population (Ons) has hundreds of animals, the San Martiño population seems to harbor only dozens of animals and is therefore highly threatened.

The funding of this grant will be used to 1) continue the models experiment in both islands to determine differences of mammal predation in both islands, 2) estimate the population sizes on both island populations by using PIT tags, and 3) eradicate the invasive species from the San Martiño island in order to save this scarce and evolutionary interesting population.

## 5. Estimated Budget

<b>Plasticine VanAken</b>	<b>\$200.00</b>
<b>PIT tags</b>	<b>\$600.00</b>
<b>Traps for mammals eradication</b>	<b>\$200.00</b>

Total requested: US\$ 1,000.00

## 6. Timeline

Goals	Place	2010	2011
Fieldwork	Atlantic Islands N.P.	◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇	◆◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇
Analyses	Vigo University	◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇	◆◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇
Writting	Vigo University	◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇	◆◆◇◇◇◇◇◇◇◇◇◇◇◇◇◇

**Photo 1**



**Photo 2**



**Photo 3**

