

# *Salamandra algira spelaea*: A Vanishing Salamander to Protect

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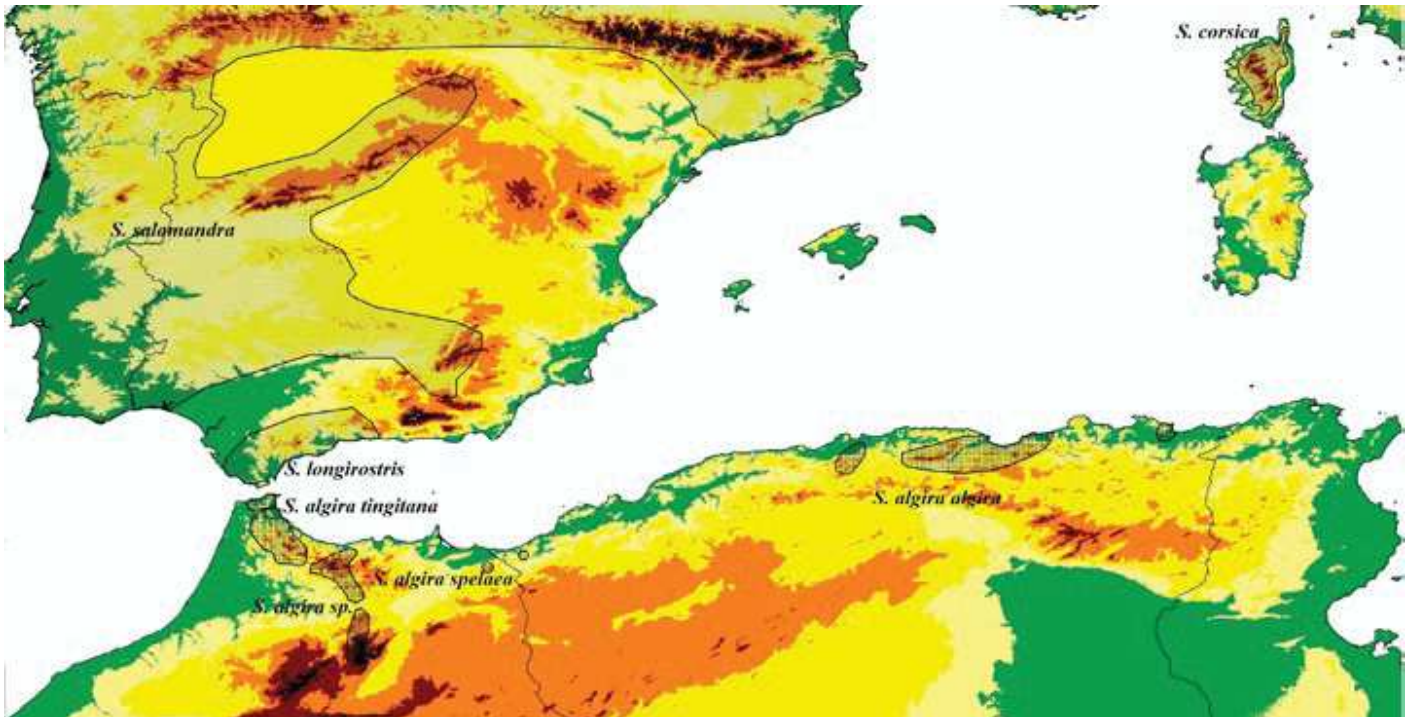


Figure 1: Distribution map of the genus *Salamandra* in the Western Mediterranean region.

*Salamandra* is a genus of the family Salamandridae that extends along the Western Palearctic, appearing especially diversified in the Mediterranean region. *Salamandra algira* is one of the southernmost species of the genus, and is endemic to north-west Africa. Its distribution is confined to the humid mountain ranges of northern Morocco and northern Algeria (1,2) (Fig. 1). There is an uncertain record of this species from Tunisia (3) where its occurrence is questionable and unconfirmed (4).

In Morocco, the distribution range of *S. algira* is not continuous, some populations being isolated by major climatic barriers, like the semiarid valley of the Moulouya river. Such isolation would be very old, and therefore some of these populations show significant genetic divergence (5), such as the northeastern clade (Beni Snassen massif), which belong to a separate lineage from the rest of Morocco. The presence of *S. algira* in Beni Snassen massif was initially reported by Melhaoui & Chavanon (1989) (6), but despite several field surveys, it could not be found again over a 17 year period, until it was rediscovered by Escoriza *et al.* (2006) (5). Shortly after this population, based on morphological and molecular criteria, was described as a distinct subspecies, *S. algira spelaea* (1) (Fig. 2). The ecology of the Beni Snassen's fire salamander is largely unknown, but the first surveys indicated the species favored the use of small caves, which may retain favorable conditions for their activities in the driest months of the year.

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From this starting point we began to monitor this population, which has been extended for a period of five years. The working methodology was to perform visual encounter surveys in suitable habitats for reproduction, in this case water bodies, as this species is ovoviviparous (1). This monitoring has confirmed that the species is found in low densities and occupies a very restricted area in the Beni Snassen mountains. Beni Snassen's fire salamanders inhabit subhumid forest biomes, consisting of evergreen oaks, Sictus trees and Aleppo pines (Fig. 3); although they also occur in traditional agricultural fields, such as orchards, where it can survive if suitable breeding habitats are available. However, during our surveys in 2011 and 2013, we have witnessed the loss of at least two peripheral breeding sites. These sites were altered by local people, preventing



Figure 2: Habitat of *Salamandra algira spelaea* in Beni Snassen Massif. Photo: Daniel Escoriza.



Figure 3: Juveniles of *Salamandra algira spelaea*. Photo: Jihène Ben Hassine.

access to water of adult females, who could not deposit their larvae in the water. Considering the limited range of this salamander, the loss of these peripheral populations is very detrimental, limiting its ability to expand its range into other favorable areas. Other factors threatening the species are degradation of the forest, due to overgrazing and fires. Particularly in the Beni Snassen's, given the prevalent semiarid conditions, deforestation is very negative for the remaining populations of salamanders, since this loss of vegetation cover is strongly related to a decrease in humidity. The combined effect of the fragmentation of the forest and the scarcity of suitable sites for reproduction could have disastrous consequences on the long-term survival of Beni Snassen's fire salamanders. Appropriate protective measures must be undertaken as quickly as possible to ensure the survival of this interesting endemic. These measures should go through the integral protection of the remaining patches of forest and construction of fountains and watering holes suitable for the reproduction of this species. Similar management has proven to be effective for the protection of species of amphibians in semiarid environments such as *Alytes dickhilleni*, in the

southeast of the Iberian Peninsula (7). Taking account of the relict status of the Beni Snassen's fire salamander it would also be advisable to start a captive breeding program with the aim of ensuring the existence of individuals, in the possible event of a total collapse of wild populations.

#### References

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