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# Urgent need to establish reserves for endemic fauna in the Pitiusas Islands: creation of refuges for wall lizards

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SHNB

SOCIETAT D'HISTÒRIA NATURAL DE LES BALEARS

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En aquest moment, tardor de 2026, la sargantana endèmica de les Pitiüses, *Podarcis pityusensis,* s'enfronta a una greu amenaça d'extinció a causa del colúbrid invasor *Hemorrhois hippocrepi*. Atès que els esforços de captura han resultat insuficients per controlar la població de serps, la població de sargantanes de l'illa d'Eivissa, *Podarcis pityusensis pityusensis*, es troba al llindar del col·lapse en tot el territori. En aquest context és urgent construir a l'illa d'Eivissa espais lliures de serps rodejats de tanques antiserp que evitin el contacte entre les espècies invasores i les sargantanes, amb l'objectiu de salvar els petits nuclis de població restants de l'espècie més emblemàtica de la fauna pitiüsa. A partir de més de cinquanta anys d'observació directa del comportament de les sargantanes en el seu hàbitat natural, aquest article ofereix pautes pràctiques per a l'establiment reeixit d'aquestes reserves de sargantanes.
***Paraules clau**: Gestió mediambiental,* Podarcis pityusensis*, reserva de sargantanes, tanca antiserps.*

URGENT NEED TO ESTABLISH RESERVES FOR ENDEMIC FAUNA IN THE PITYUSIC ISLANDS: CREATION OF REFUGES FOR WALL LIZARDS. In the autumn of 2026, the lizard endemic to the Pityusan Islands, *Podarcis pityusensis,* faces a severe threat of extinction due to the invasive colubrid snake *Hemorrhois hippocrepis*. Given that capture efforts have proven insufficient to control the snake population, the *Podarcis pityusensis pityusensis* population on the island of Ibiza is on the brink of extinction. In this context, there is an urgent need to create snake-free zones on Ibiza—demarcated by snake-proof fencing to prevent contact between the invasive snakes and the lizards—in order to save the remaining small population pockets of the species that has been the most emblematic element of Pityusan fauna. Drawing on over fifty years of direct observation of lizard behavior in their natural habitat, this article offers practical guidelines for the successful establishment of such lizard reserves.
***Keywords**: Environmental management,* Podarcis pityusensis*, lizard reserve, snake-proof fence.*

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## Introduction

It is well established that the fauna of the Pitiusas Islands represents an exception among Mediterranean island faunas, and the endemic lizard *Podarcis pityusensis* (Boscà, 1883) likely plays a central role and a fundamental ecological function in this unique status (Fig. 1). Studies of the Late Pleistocene point to an ecosystem with a faunal structure more akin to that of oceanic islands than continental ones, due to the absence of mammals capable of regulating the ecosystem. For this reason, the term "Hawaiian-type fauna" has been applied to the Pitiusas Islands during the Pleistocene (Seguí and Alcover 1999). This ecosystem featured a high diversity of birds—with the white-tailed eagle (*Haliaeetus albicilla*) acting as a keystone species—alongside an immense abundance of lizards on the ground (Alcover & Torres-Roig 2025).

This extraordinary abundance of reptiles and birds is an ecosystem characteristic that persisted well into the 20th century (Fig. 2). This is most likely due to the continued existence of an ecosystem devoid of the snakes that were introduced by Greco-Roman culture to the islands they colonized in antiquity. Given that the process of Romanization in the Pitiusas Islands differed from that in the northern Balearic Islands, no snakes arrived during that period; by the time full Romanization was achieved, the culture of the metropolis was already imbued with Christian elements, which carried a distinct ophiophobic character. However, it appears that the Pitiusas Islands are now facing a 21st century in which the extinction of *Podarcis pityusensis* is accelerating—precisely due to the inadvertent introduction of snakes within the trunks of centuries-old ornamental trees (Fig. 3)—while the competent authorities remain passive.



**Fig. 1.** The Pitiusan wall lizard *Podarcis pityusensis* endemic to the Pitiusan Islands, is the key regulatory species and the most iconic animal of the islands' ecosystems. (Photo: Sebastian Candela).







**Fig. 2.** *Podarcis pityusensis* was found throughout the Pitiusan Islands until the early 21st century, reaching high population densities in some areas. Platja d'en Bossa, August 2022. (Photo: Sebastian Candela).



**Fig. 3.** The importation of centuries-old olive trees for ornamental purposes—often with inadequate phytosanitary inspection—has facilitated the introduction of numerous invasive species. A grove of transplanted centuries-old olive trees at Punta Gavina, Formentera, February 2026.



**Fig. 4.** Horseshoe whip snake *Hemorrhois hippocrepis* inside a snake trap.

At the beginning of the 21st century, several sightings of snakes occurred, alerting to their presence on islands where they had historically been absent. In 2003, the presence of various colubrid snakes was confirmed on Ibiza, and in 2010 on Formentera (Oliver et al. 2008; Alvarez et al. 2010). Although snakes have been present on Mallorca since the process of Romanization, new species of colubrids have also been detected there since the turn of the century (Ayllon 2015).

We know from the theory of island ecology that any species arriving in a new ecosystem takes some time to acclimate to the new conditions (MacArthur & Wilson 1982) and that its behavior does not always severely disrupt the host ecosystem (Gorman 1991). However, in the case of the horseshoe whip snake (*Hemorrhois hippocrepis*) (Fig. 4) was clearly invasive; from the very first sightings, the areas where snakes were captured coincided with an alarming decline in the lizard population (Montes et al. 2015)—even though it was known that *Podarcis pityusensis* was present throughout the Pitiusan Islands (Salvador 1984; Cirer 1987).

There was a very high probability that these newly introduced snake species would become invasive and problematic for the fragile island ecosystems, posing a significant threat to native fauna (Alvarez et al. 2010; Mateo et al. 2011; Mayol & Álvarez 2010; Oliver & Alvarez 2010; Pinya & Carretero 2011; Silva-Rocha 2012). Furthermore, COFIB warned of a rapid territorial expansion, as evidenced by the relentless increase in the number of snakes captured (Parpal et al. 2015). Before long, excellent studies became available regarding *Hemorrhois hippocrepis*—the species that has proven to be the most problematic (Ayllón 2015)—as well as *Zamenis scalaris* (Carretero & Silva-Rocha 2015). To date, the latter's distribution remains restricted to La Mola (Formentera) and a few isolated locations on Ibiza, where its population density is low. As well as from sporadic observations of the Montpellier snake, *Malpolon monspessulanus* (Mateo 2015).

In this context, the danger posed by invasive species and their consequences in the Balearic Islands were reaffirmed (Silva-Rocha et al. 2018), specifically regarding their impact on *Podarcis pityusensis* (Montes 2021)—with a forecast that the lizard population on the island of Ibiza, *Podarcis pityusensis pityusensis*, will collapse within a few years (Montes et al. 2022).





**Strategic Actions Regarding Invasive Snakes**

At the turn of the century, environmental management in the Balearic Islands was still in its infancy. We all know that simply understanding what is happening—the domain of scientists—is not enough; action must also be taken to avert the worst-case scenarios—the domain of environmental managers. To determine the situation and the necessary steps, the Spanish Herpetological Society (Asociación Herpetológica Española) produced a report on the impact of introduced snakes on the native fauna (AHE 2012). Subsequently, the Island Council of Ibiza (Consell Insular d'Eivissa) launched a pilot project for snake control on the island of Ibiza (AHE 2015) between 2014 and 2015—an initiative that was later abandoned.

These reports, along with proposals from the Institute of Ibizan Studies (Institut d'Estudis Eivissencs) presented through the citizen volunteer group "SOS Salvem sa Sargantana Pitiüsa" (SOS Save the Pitiusan Wall Lizard) (Cirer 2021), converge on the need for three strategic lines of action to address the threat posed by invasive snakes to the native fauna. These measures are interconnected and must be implemented simultaneously until a reasonable level of biosecurity for the endemic fauna is achieved. The three pillars of action are:

- Institutional, legislative, and management-related action.
- Reduce snake population numbers as much as possible: trapping and active capture.
- Establish reserves for wall lizards.

**Legislative action**

It reached its peak—just twenty years after the first specimens of these invasive species were captured—with the approval of Decree-Law 1/2023, which served as the first legal provision for the protection of endemic Balearic wall lizards (*Podarcis lilfordi* and *Podarcis pityusensis*) and measures to combat invasive snakes. However, by 2023, the area affected by the presence of *Hemorrhois hippocrepis* on the island of Ibiza already encompassed more than half of its territory. Once again, legislative measures arrived only after irreparable damage had already occurred.

**Reducing snake population numbers**

Trapping has been a constant practice since snakes first appeared in the Pitiusic Islands. Most people living in the countryside have made an effort to keep a trap active on their land. Some of these traps were distributed free of charge through local municipal councils, but most were funded by the individuals themselves. Each volunteer took on the responsibility of keeping the mouse used as bait in good health, as well as handling any snakes that were caught—a task that was far from easy for people who had never seen a snake before. Cultural and civic organizations encouraged citizens to get involved in managing traps, with the aim of reducing the snake population and facilitating more specialized tasks carried out by environmental technicians (Cirer 2023).

The dispersed residential settlement pattern on the island of Ibiza can pose a challenge for COFIB-Ibiza technicians, as traps must be installed on private property, which is not always feasible. However, the volunteer group "SOS Salvem sa Sargantana Pitiüsa" does not view this factor as a weakness; rather, it can become a strength, since there is someone in every small area of the territory who can check the traps near their own home (Cirer 2023). It is simply a matter of providing traps to all the volunteers, assisting them with the handling of any captured animals, and maintaining a good supply of mice available. This is a task that the Institut d'Estudis Eivissencs has carried out since 2020, encouraging all inhabitants of rural areas to get involved in defending the ecological characteristics of the territory.

Unfortunately, cultural and civic organizations can only perform this role in the initial stages—to address an urgent, high-alert situation like the one triggered by the arrival of non-native snakes. It is the authorities responsible for environmental management who must continue this work, address the needs of the population, foster their cooperation, and assume the responsibilities that properly belong to the Administration. This has not happened. Among other shortcomings, the traps are not provided free of charge—even though they have already been paid for by the Government of the Balearic Islands (a €20 "deposit" is charged per trap)—and if a large snake is caught, there is no technical assistance available to handle it (Fig. 5). Furthermore, there is no system in place to distribute mice in the spring to bait the traps, nor to collect them in the autumn. Conversely, the technical staff responsible for managing invasive species viewed the volunteers as unfair competition to their own professional and commercial interests; consequently, there was a significant decline in volunteer motivation starting in 2024.

Nevertheless, the captures made by volunteers have been instrumental in curbing the rise in snake population density, accounting for hundreds of captures annually— most of which go unreported, as they are carried out by individuals unfamiliar with digital reporting tools (Table 1).

Using the information provided by the volunteers, the captures were manually plotted on traditional maps to obtain accurate data on the presence of snakes on the island of Ibiza, resulting in a map of snake distribution for the year 2022. (Fig. 6) and from 2024 (Fig. 7). Trapping efforts must continue—that is clear. But it is also clear that, as things stand, this is not enough, and the third line of action must be accelerated: the establishment of **reserve areas for lizards**. Areas free of snakes, before it is too late to maintain small, in-situ population samples of a species that represents not only the ecosystems of the Pitiusic Islands—as well as the history, character, and idiosyncrasy of Ibiza—but is also something more than a mere tourist symbol: it serves as a warning regarding the impoverishment of island ecosystems and their "McDonaldization."




**Fig. 5.** A volunteer with a snake captured in her garden. The large size that *Hemorrhois hippocrepis* can reach often compels volunteers to hire private services for their removal.

| Any/*Year* | 2020 | 2021 | 2022 | 2023 | 2024 |
|---|---|---|---|---|---|
| Tècnics / *Technical Staff* | 1300 | 1047 | 2710 | 2007 | 2590 |
| Voluntariat / *Volunteers* | | 885 | 1117 | 1087 | 539 |

**Table 1.** Number of snake captures on Ibiza carried out by environmental technicians and volunteers from SOS Salvem sa Sargantana Pitiüsa during the five-year period 2020–2024.





## Lizard reserves

In 2022, an area in the city of Ibiza—Puig des Molins – Es Soto—was designated as a "Lizard Reserve." This was a joint initiative involving the Archaeological Museum of Ibiza and Formentera, the Island Council of Ibiza, and the Ibiza City Council, among other organizations. This area preserves the ecological characteristics that have defined the Pitiusan Islands for millennia—conditions under which lizards were once particularly abundant. Surrounded by the city of Ibiza and the sea, it was an area thought to be less accessible to snakes. However, the initiative was more of a publicity stunt than an effective measure. Only Informational signs were put up, but the area was not enclosed with snake-proof fencing; by the summer of 2023, there was already evidence that *Hemorrhois hippocrepis* had reached the area. Experience shows that simply declaring an area "snake-free" is not enough. This protection must be made effective by establishing a perimeter—a physical, snake-proof barrier—to prevent the movement of fauna. This approach has not yet been explored, but it must be urgently considered in order to rescue the few remaining

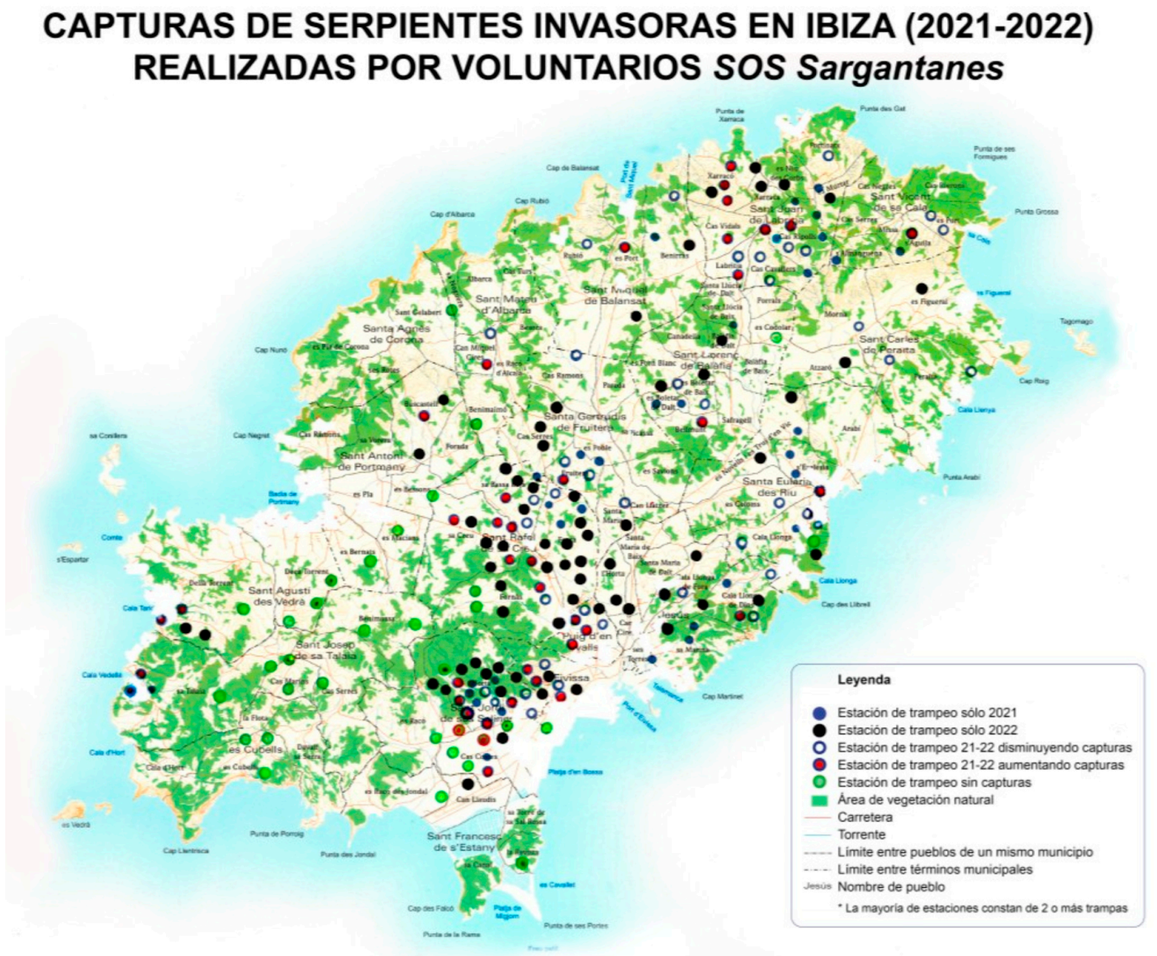



**Fig. 6.** Locations where snakes were captured by volunteers during the 2021–2022 period. There are few areas left where the presence of snakes has not yet been detected.

lizards and preserve representative populations of these endemic species—specifically the Pitiusan wall lizard (*Podarcis pityusensis*) and, by extension, the Balearic wall lizard (*Podarcis lilfordi*)—which embody a wealth of biodiversity.

Ex situ breeding programs have been established (Fig. 8), but a simpler, more efficient approach—with greater biological value—would be to create small in situ areas enclosed by snake-proof barriers. These would be spaces where the lizards, which have always inhabited these islands, could continue to live—feeding on the available resources, supported by local plants visited by local insects—and reproduce, with the consequent intrapopulation pressures, with dry-stone walls for shelter, and subject to potential aerial predation—just as they have always been. The only requirement is to prevent the arrival of snakes by using an effective barrier, as snakes represent the sole new ecological factor currently impacting their survival.

Thus, once the situation caused by invasive snakes—which are currently at the peak of their expansion across the island, having just completed

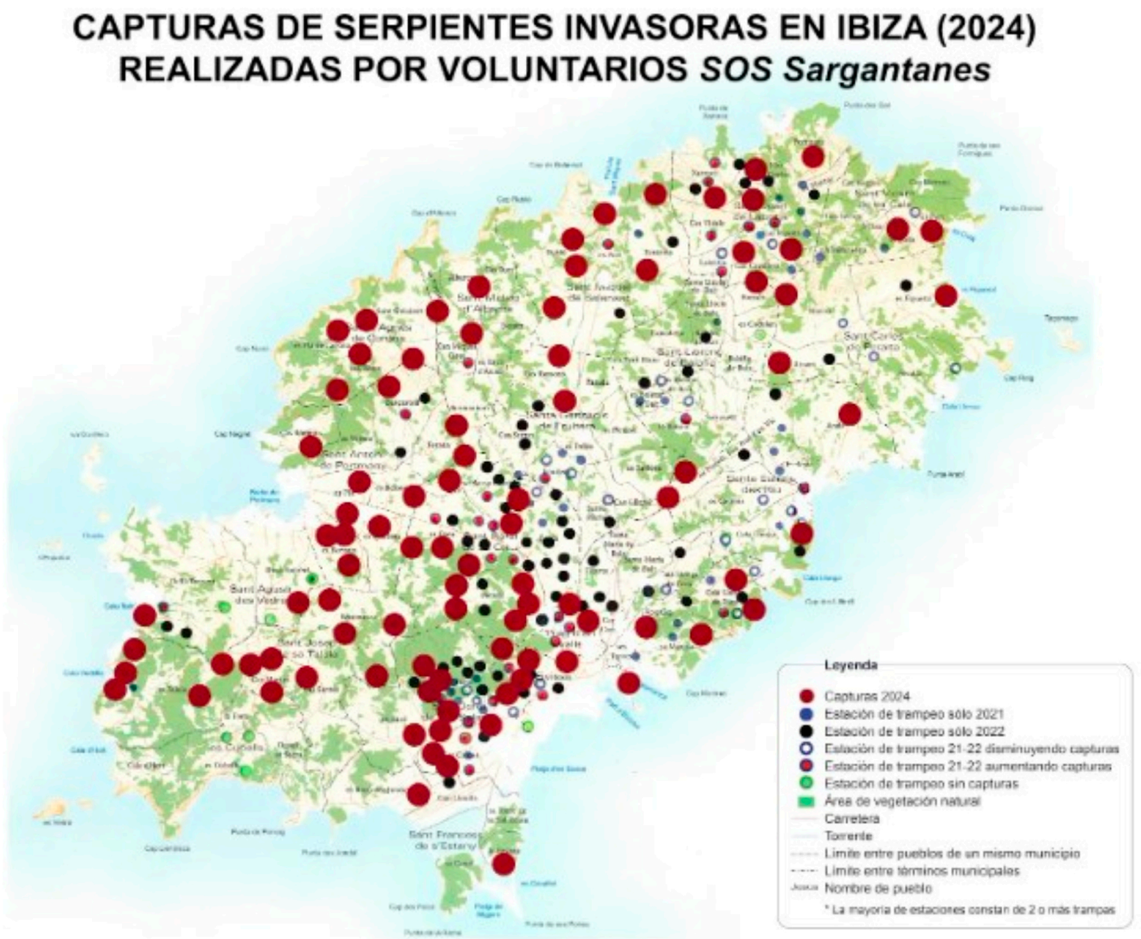



**Fig. 7.** Locations of new captures made during the 2023–2024 period have been added to the previous map. These new captures illustrate the spread of the territory affected by invasive snakes.








**Fig. 8.** Terrariums at the Barcelona Zoo housing breeding pairs of *Podarcis pityusensis*.

their colonization of the entire territory of Ibiza (Cirer 2025a; 2025b)—has been reversed, there will be a chance to repopulate the island of Ibiza with endemic wall lizards. However, if no small refuges for these lizards remain—acting as a sort of "Noah's Ark"—the loss will be total and irreversible. Any public or private space where these lizards have historically been observed is a suitable location to create an area that maintains the specific ecological conditions required for a lizard population. In fact, establishing a successful lizard reserve in their traditional habitat requires only two things: preserving the natural habitat and preventing the entry of snakes.

To facilitate the establishment of lizard reserves throughout the territory, this text outlines several factors to consider during their creation, helping to avoid the errors observed in some recent initiatives.

## The anti-snake enclosure

In general, *Hemorrhois hippocrepis* is a good climber of trees and walls, with a preference for human-altered environments (Feriche 2004). It favors rocky habitats and sunny areas with a Mediterranean climate, avoiding colder regions (Pleguezuelos 1997). These characteristics have

enabled it to successfully colonize the Pityusic Islands and occupy spaces previously inhabited by wall lizards. In the affected areas, where lizard burrows once existed, the horseshoe snake now takes shelter. However, it does not appear to be a particularly skilled burrower. Juveniles are approximately 20 cm long, with a head width of just over 5 mm, while adults on Ibiza can reach lengths of up to 2 meters.

Given the known biological traits of this snake, any barrier should be at least one meter high, with the top section angled outward—forming an overhang of about 50 cm—so that if a snake climbs the wall, its own weight will cause it to fall back down upon reaching the overhang. These barriers can be constructed from various materials, depending on the specific location, the size of the reserve, the intended durability, and so on (Fig. 9).

It is highly recommended that the barriers be made of traditional wire mesh or electrowelded metal mesh with openings smaller than 5 mm, to prevent a juvenile's head from passing through. The mesh size here is somewhat wider than that of a typical mosquito net, and it is the type used for constructing snake traps (Fig. 10). A mesh wall allows for airflow—facilitating a healthy exchange of microflora and microfauna—and prevents the "sail effect" during windstorms (which, in winter, can be strong enough to knock over a solid panel). It also prevents overheating within the enclosure, ensuring that temperature and humidity levels remain consistent both inside and outside the space designated for the lizards. Conversely, if the enclosure is small, walls made of solid panels or bricks can lead to overheating within the reserve area and create a somewhat artificial environment. The walls of the enclosure must be set into a base at least 10 cm deep. Furthermore, one should avoid having trees nearby with branches extending over the enclosure—especially carob trees and old olive trees—since the horseshoe whip snake often hides in the hollows of such ancient trunks.

Evidently, the entire enclosure must remain open



**Fig. 9.** Mesh wall at a lizard reserve under construction, featuring an outward-facing overhang at the top designed to cause any snakes attempting to climb it to fall off.

to the sky to facilitate the movement of insects, pollen, seeds, and plant propagules— just as if the fence were not there. Care must also be taken to ensure that no gaps larger than 5 mm appear, including at drainage outlets.

There is no minimum surface area within which a population of wall lizards can thrive for generations without experiencing a lack of space, shelter, or food, or issues related to inbreeding. Everything depends on feeding conditions, the abundance of crevices in the rocks, and the verticality of potential shelters. There are small islets of less than one hectare with thriving populations of lizards, snails, and all kinds of insects, while others with a larger surface area do



**Fig. 10.** Snake trap made of wood and welded wire mesh. On the left is the compartment for the mouse used as bait. On the right, a ladder snake has entered through the central trapdoor.

not support any terrestrial fauna (Cirer & van den Berg 2025). Habitability depends more on the abundance of suitable shelters, vegetation diversity and cover, and the presence of invertebrates, rather than on surface area alone. Therefore, it is important that within the lizard reserve area there are dry-stone piles, ruined walls, rubble, bricks, fissured aggregate, etc.— positioned sufficiently above the ground to remain dry during torrential rains— to serve as shelters for overwintering (Fig. 11).

It should be remembered that not all materials possess the same thermoregulatory properties, and that lizards tend to avoid certain materials—such as clays, silts (garden soil), or massive limestones (solid rock)—showing a preference instead for the calcareous crusts that cover most of the Pityusas territory left untouched by humans. These materials also foster the presence of various mollusks and small arthropods that form part of their regular diet of the lizards (Fig. 12).

**A hospitable habitat for the Pitiusan wall lizard**

A habitat is more than just a space. Not all places offer the same possibilities to a reptile, which has specific requirements for shelter, thermoregulation, food, and predator avoidance. Direct, personal observation of *Podarcis pityusensis*— spanning hundreds of hours over more than fifty years in the wild, across various

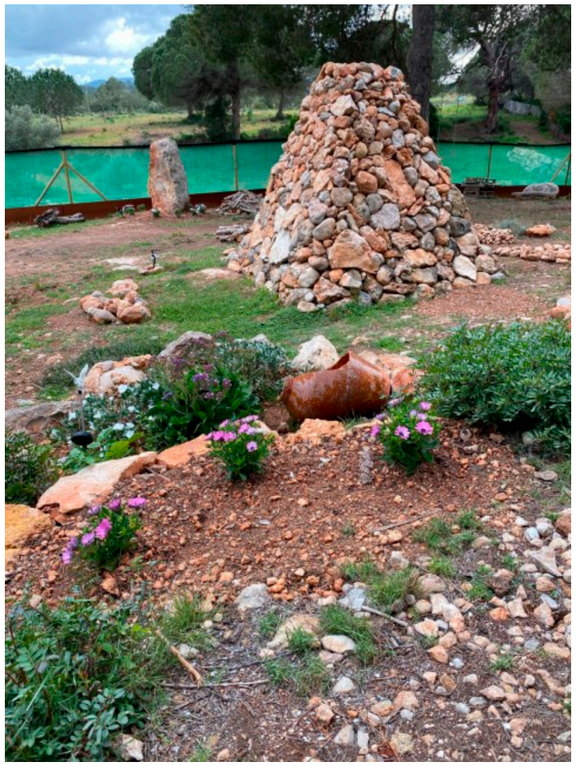


**Fig. 11.** A garden area welcoming to lizards, featuring sunny and shady spots, numerous crevices among the stones, and vegetation that encourages the presence of invertebrates.



**Fig. 12.** Dry-stone walls are a favorite habitat for Pitiusan wall lizards.

locations in the Pitiusan Islands— supports the available information regarding this species' preferences, thereby revealing preferences of this species, and thus learn how to keep it under conditions as similar as possible to those it has experienced throughout the last millennia of its evolution.

The lizards must find everything they need within the enclosure, so a suitable habitat must be created. Rockeries and dry-stone walls are essential for ensuring the lizards can thrive—recall that their English name is "Pitiusan wall lizard." Rockeries are a landscaping feature that enhances the aesthetic appeal of the surroundings, provides hiding spots and shade, allows vegetation to take root, and serves as a habitat for all kinds of invertebrates. *Podarcis pityusensis* is a species that favors stone walls; among the stones, one should allow all sorts of native plants—ruderal species, or what are commonly called "weeds"—to grow. It has been directly observed that these lizards feed on the flowers of the caper (*Capparis spinosa*), sow thistles (*Sonchus tenerrimus*), bindweed (*Convolvulus* sp.), wild madder (*Rubia* sp.), mallows (*Malva* sp.), *Limonium* sp., rock samphire (*Crithmum maritimum*), and many others. They also consume the fruits of *Ficus*, *Opuntia*, *Pistacia lentiscus*, or *Cneorum tricoccum*. Fennel and asparagus plants can also be included, Asphodels (*Asphodelus* spp.), climbing plants, etc. It is best to avoid aromatic plants such as *Rosmarinus officinalis*, *Thymus* spp., *Lavandula* spp., or *Salvia* spp.; lizards are not observed visiting these plants, likely because the plant essences they emit repel them, and they are not effective at attracting insects.

Plants serve as food for many insects and snails, and they facilitate the presence of spiders; meanwhile, the damp soil beneath stones supports small crustaceans, myriapods, and annelids. All these animals and plants make up the typical diet of wall lizards. An area the size of a garden or a road roundabout is sufficient to sustain all this





biodiversity. To encourage population growth among wall lizards, it is necessary to increase the number of shelters—such as those found among stones—and boost the available food supply. When there is a shortage of shelter or food, adults may prey on juveniles, keeping the population stable. They are not strictly territorial; many wall lizards can coexist within the same den (Fig. 13). However, a hierarchy does exist regarding access to food (Fig. 14). The available food supply can be increased by introducing small pieces of very ripe fruit—such as tomatoes, apples, watermelon, or figs—on a weekly basis (Fig. 15). The lizards eat these fruits directly, and the fruit also acts as an effective lure for insects, particularly dipteran (fly) larvae. Citrus and acidic fruits are not recommended, as it has been observed that wall lizards show less interest in them. Animal protein supplements can be easily provided by introducing tenebrionid beetle larvae (*Tenebrio molitor*).

Let us not forget that lizards are reptiles—ectothermic organisms with very specific thermoregulation requirements. For this reason, they select shelters with a certain degree of thermal efficiency; they are far more demanding when choosing their den than an endothermic organism, such as a small mammal. The chosen space must be exposed to the sun, featuring surfaces that heat up easily— such as dry-stone structures, calcareous crusts, or bricks—while also providing some shade to help buffer against extreme temperatures. It is essential to ensure a cozy refuge for a small animal: a well-hidden spot



**Fig. 13.** Any crevice serves as a potential shelter for more than one lizard; no intraspecific competition for space is observed. (Photo: Sebastian Candela).



**Fig. 14.** A hierarchy does exist regarding access to food. When new food appears, the dominant male eats first and prevents other lizards from approaching until he is satiated. (Photo: Sebastian Candela).



**Fig. 15.** Lizards detect pieces of fruit by scent and quickly move in to taste them. (Photo: Sebastian Candela).








**Fig. 16.** Municipal garden with a sign explaining that the box has been placed there for the lizards' use.



**Fig. 17.** Lizards regulate their body temperature by adjusting the amount of their body surface in direct contact with the sun-warmed wall. (Photo: Sebastian Candela).

within narrow crevices or between stones, sheltered from rain and cold. A rockery containing some soil will serve this purpose well. It is even better if the stones are weathered, bearing traces of cobwebs, lichens, or signs of small arthropods. So-called "fresh" stone— recently extracted from a quarry—is rarely visited by lizards.

**Urban gardens**

In some urban areas, there have been proposals to establish "Lizard Reserves" in certain zones landscaped. This seems like a good idea, as snakes find it more difficult to go unnoticed within the city. However, instead of preserving old dry-stone walls or incorporating prominent rockeries, the ground has been leveled—sometimes covered with lawn, other times with shrubs supplied by drip irrigation. For the lizards, an information sign has been installed, along with a sort of mud-coated box featuring holes through which the lizards are supposedly meant to enter (Fig. 16). Why would a lizard abandon its usual den to move into this new, inhospitable, and sterile space? A wall is not merely a shelter for a lizard; it is a place where it finds small invertebrates and, crucially, materials with a thermal conductivity that allows it to maintain an appropriate body temperature. When a lizard is inside a den, it relies on thigmotaxis—that is, close physical contact with the surrounding materials—to regulate its body temperature (Fig. 17). The hollow spaces inside these boxes are subject to overheating and cooling, which prevent the lizard from carrying out the necessary thermoregulatory functions.

And let’s not forget the most basic point: any opening large enough for a lizard to enter is also large enough for a snake (Fig. 18). Anatomically speaking, a snake is essentially a legless lizard—lacking a sternum and possessing retractable ribs—a design specifically adapted to allow it to pass through holes and crevices that would be impassable if it had legs.

Furthermore, one must avoid self-deception. Building something new in the garden may provide the comforting sense that the authorities are "doing something" (Fig. 19). This can act as a sort of placebo for one’s conscience, but it carries two serious drawbacks: nothing will have been done to save the lizards—resulting in the loss of precious time—and it will lead to profound disappointment when the effort invested without reward, because the extinction process will follow its own timeline. If anything is to be done in the garden, it is not to install a shelter for lizards, but rather to enclose an area with a snake-proof fence.



**Fig. 18.** Size of the holes through which the lizards must enter, but which snakes can also enter.



**Fig. 19.** Lizard box model located in the public garden in front of the Sa Real school in Ibiza.

**Institutional coordination and regulations**

It should be noted—as previously mentioned—that the Pitiusan wall lizard (*Podarcis pityusensis*) is under strict legal protection at the regional, national, and European levels, classified as "Vulnerable" in the Balearic Catalogue of Threatened and Specially Protected Species.

Regarding regional regulations, Decree-Law 1/2023 of January 30 (ratified by the Parliament of the Balearic Islands) was enacted; it includes *Podarcis pityusensis* in the Balearic Catalogue of Threatened Species under the "Vulnerable" category. Furthermore, it establishes urgent measures to control the introduction of invasive snakes (family Colubridae)—the primary threat to the species—such as seasonal restrictions and mandatory quarantine periods for the importation of ornamental trees (olive trees, carob trees, and large-trunked holm oaks).

And also Decree 75/2005, of July 8: It regulates the Balearic Catalogue of Threatened and Specially Protected Species and mandates the approval of a conservation plan for species classified as vulnerable.

Regarding state legislation, Law 42/2007, of December 13, on Natural Heritage and Biodiversity: It expressly prohibits the intentional capture, injury, killing, or disturbance of individual specimens, the destruction of their nests or habitats, and the possession or commercialization of live or dead specimens.

And Royal Decree 139/2011, of February 4: It includes the species in the List of Wild Species





under a Special Protection Regime (LESRPE).

European and international regulations also address this, specifically through:

- The Habitats Directive (Directive 92/43/EEC): The species is included in Annexes II and IV, which requires the designation of Special Areas of Conservation (SACs) for its habitat and ensures strict protection throughout the European Union.
- The Bern Convention: The species is included in Annex II (strictly protected fauna species).
- IUCN Red List: Classified globally as "Endangered" (EN) due to a severe population decline caused by invasive snakes on Ibiza and Formentera.

In light of this regulatory framework—and given its classification as a vulnerable species—it is prohibited to capture, relocate, or keep any individual in captivity without an exceptional scientific or environmental management authorization issued by the Species Protection Service of the Government of the Balearic Islands.

Finally, while the situation on the larger islands is highly concerning, it is even more critical on the smaller islets surrounding the Pitiusan Islands (Ibiza and Formentera). In these areas, urgent "in situ" and "ex situ" interventions are required to protect these populations. Snakes possess a strong swimming ability and are capable of reaching these islets. Data regarding snake captures on these islets is deeply worrying; snakes have been caught on numerous islets, including Ses Margalides, Illa Murada, Illa de Cala Salada, Illa des Canar, Illa de Santa Eulària, Illa Redona, and Escull d'en Terra.

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