THE IBIZA WALL LIZARDS IN PARKS AND GARDENS

GOOD PRACTICES FOR CONSERVATION





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Cover photo: Iberia wall lizard in an urban park in Ibiza, by Jordi Serapio

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INTRODUCTION

A LIZARD UNIQUE TO IBIZA AND FORMENTERA

The Ibiza wall Iizard (*Podarcis pityusensis*) is a reptile in the Lacertidae family. This species is **autochthonous and endemic** – in other words, it is unique to the Pityusic Islands (the archipelago formed by Ibiza, Formentera and surrounding islets).

It is the only surviving species of non-flying terrestrial vertebrate fauna which inhabited these islands before the arrival of humans.

They are present across all the Pityusic Islands, including the smallest islets, and

there is a wide range of subspecies on each island and islet. These lizards have become a symbol of nature's coexistence with humans.

In contrast, the Lilford's wall lizard (*Podarcis lilfordi*), which once lived on Mallorca and Menorca, was not so fortunate and disappeared after the Romans brought carnivorous mammals to the islands. Today, it only survives on the surrounding islets, protected from predators.

INVASIVE SNAKES THREATEN LIZARDS

In 2003, the first imported snake on Ibiza was detected in olive trees transported from the Spanish mainland for use in gardens. A few years later, the first snake was detected on Formentera. Actually, three ophidian species have been introduced: the horseshoe whip snake (*Hemorrhois hippocrepis*), the ladder snake (*Zamenis scalaris*) and the Montpellier snake (*Malpolon monspessulanus*), although currently there is only a known presence of the first two.

The accidental introduction of these species occurred because of a lack of regulation regarding this type of merchandise until 2023. Roval Decree-Law 1/2023, dated January 30, was passed to establish extraordinary and urgent measures for the protection of the Ibiza wall lizard (Podarcis pityusensis) and the Lilford's wall lizard (Podgrcis lilfordi), as well as to prevent the arrival of snakes of the Colubridae family, particularly those imported in ornamental trees from elsewhere. Among other measures, the decree establishes a timetable for authorising the entry of specific trees, to minimise the accidental arrival of snakes hibernating in the trunks. It also classifies the lbiza wall lizard as threatened, falling within the Vulnerable category.

The presence of an efficient predator for which they are not prepared presents



captured by COFIB in Ibiza.

a new problem for the lizards. The snakes, unlike native predators, hide in rock cracks, like the lizards themselves, making it easier to prey on them. In fact, the lizard populations in the north of Ibiza are already in decline and are extinct in certain localities. Some snakes have even swum to the islets, putting the endemic lizard populations there in danger. Each and every lizard population on these islets is unique and irreplaceable, and their disappearance would constitute an irreversible loss to the largest terrestrial vertebrate biodiversity of Ibiza and Formentera.

WHAT CAN I DO FOR THE IBIZA WALL LIZARD?

Environmental authorities and councils are already acting to reduce the risk that the snakes pose to lizards in Ibiza and Formentera:

Limiting the arrival of snakes. As described above, the Royal Decree-Law 1/2023 which instigated extraordinary measures for the protection of lizards, has established, among other measures, a timetable for the importation of specific trees such as the olive, carob, oak, holm oak and cork oak in order to minimise the accidental arrival of snakes while hibernating in the trunks, and has classified the Ibiza wall lizard as threatened, falling within the Vulnerable category. This classification permits the introduction of more effective legal measures for the protection of lizards.

• Catching snakes. Both public bodies and private organisations are catching snakes in order to control the population density and, if possible, eradicate them, at least in Formentera.

• Urban lizard refuges. The creation of safe areas for the lizards in urban or peri-urban areas, where they can thrive in a space designed to optimise their survival. These urban refuges are particularly important because it is unlikely that snakes will move into the urban areas, given the constant human presence.

Although city gardens, towns and residential complexes are a secondary habitat for the lizards, these lizard populations, often numbering only a few individuals, play an important role in the conservation of the species. Urban lizard populations are more protected than those in rural or agricultural areas, as it is more difficult for snakes to penetrate and adapt to built-up areas.

Will you help us create a paradise for lizards in your garden or park?

The primary goal of this manual is to share key recommendations for establishing lizard reserves in both public parks and private gardens. These reserves should mirror the natural habitats of lizards, incorporating both anthropic and biological features, while also providing protection from snakes and other predators. By creating such environments, we aim to promote the conservation of the lbiza wall lizard and foster balanced, stable urban lizard populations.

The **objectives** of this manual are:

Create a network of urban or periurban reserves that closely resemble the



campaign underway in Ibiza.

lizard's natural environment, creating the conditions for it to thrive.

- Contribute to local biological diversity.
- Increase environmental awareness.
- Promote citizen science.

These lizard reserves are part of the **Urban** Greening Plans promoted through the EU Biodiversity Strategy for 2030, thus adding nature conservation value to your garden. These programs are designed to increase green infrastructure by restoring ecosystems, reducing habitat fragmentation and promoting connectivity. Additionally, they seek to expand green areas that are rich in biodiversity with low maintenance costs by adapting natural spaces -as opposed to the traditional model of more intensive gardening - and improve the health and well-being of citizens. In Spain, these programs have been included in Component 4, investment 3 (C4.I3) of the Plan for Recovery, Transformation and Resilience (PRTR) for the restoration of natural ecosystems and the development of connectivity and initiatives in urban areas for regreening and bringing the population closer to nature.

ESSENTIAL REQUIREMENTS OF THE IBIZA WALL LIZARD

BREEDING AND BRUMATION

The life expectancy of the lbiza wall lizard is largely unknown, but they have lived for ten years in captivity. They appear to reach reproductive maturity at around the age of two. The **breeding season** takes place **between February and August**, with clutches of between two and four eggs. Although one or two clutches are normal, a female may lay up to three in particularly good years.

The Ibiza wall lizard is diurnal, and is most active from the morning until noon, after which activity decreases.

During the winter, it is markedly less active, hiding in rock crevices and under stones for days. If the weather is sufficiently warm, around 15°C, with sunshine and no wind, they become active (sometimes intensely active).

VARYING TEMPERATURE AND HUMIDITY

The lbiza wall lizard, like virtually all reptiles, is an ectotherm, which means it regulates its body temperature through external means and seeks out warmer or cooler areas according to its needs. This conditions their behaviour, so they can be basking in the sun on hot rocks to speed up their metabolism or, depending on the time of day, hiding in stone walls, rockeries or dense vegetation in order to lower their body temperature.

VARIED DIET

The Ibiza wall lizard is **omnivorous**, and their diet is based largely on animals, particularly small invertebrates such as ants, spiders, beetles and snails. However, in certain seasons, localities and populations, they also consume plants, eating different parts depending on the plant species: nectar, pollen, flowers, leaves, fruit or seeds. In addition, they eat other remains left by human activity in the environment.

In short, they make use of different trophic resources depending on the time of year and availability. That is why it is important that there is a wide range of plant species in gardens, because they bloom and fruit at different times and also attract insects, which are a food source. The lizards help disperse seeds by expelling them in their faeces away from the mother plant.

HOW TO ENSURE OPTIMAL CONDITIONS IN YOUR PARK OR GARDEN

Ibiza wall lizard eating a juniper berry.

There are three key elements to ensuring optimal conditions in gardens or parks for lizards: an abundance of safe shelters; native, edible vegetation; and varied substrates that attract invertebrates, while offering a range of temperature and moisture gradients. Here's how to boost these elements in order to create a paradise for lizards.

ABUNDANCE OF SAFE SHELTERS

Facilitate brumation in winter, provide climatic shelters when the sun is hottest in summer and protection from predators.

Lack of an adequate shelter is one of the main obstacles to lizard survival. In addition, many of the invertebrates that lizards consume also take refuge in the cracks in rocks. In fact, in many places, the most common prey for lizards are BE CAREFUL! Bear in mind that refuges that are perfect for lizards are also ideal for snakes, given that they both seek the same kind of shelter. Therefore, it is important to promote reserves in urban areas, which are more difficult for snakes to access, and it is also advisable to set traps and monitor the potential presence of snakes.

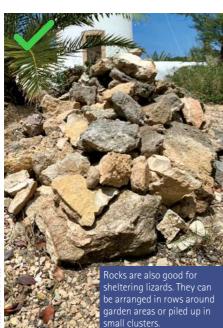
the insects and other invertebrates that live under rocks and underground, rather than flying insects.

First of all, it is very important **not to board over dry-stone walls** or cover the cracks, as there may be lizards inside that could be trapped.

Below is a series of structures that can serve as a shelter for lizards. They can be installed in gardens to increase the density of the lizard population. • DRY STONE WALLS: These are very commonly used by lizards because they provide a refuge both from predators and from adverse climactic conditions.









• **ROCKS ON SUBSTRATE:** These can provide shelter from predators and from adverse climactic conditions, and also aid the connectivity between different populations, as they use them as a refuge when moving.

• DENSE SHRUBS OR HERBACEOUS VEGETATION: These types of shelter are crucial for lizards, because they provide refuge from predators and climate, as well as attracting insects which are a food source.



• WOODEN STRUCTURES: Walkways or planters can serve as a refuge for the lizards but must have cracks or holes for them to access shelter, particularly when it's very hot.



photos: COFIB Eivissa

• ARTIFICIAL HOLES (12MM) IN WALLS: This is a simple way to provide a refuge for lizards. Drill holes into a wall using a 12mm drill bit, but the wall must be textured, rather than smooth, so that they can climb it.



• HOLLOW STRUCTURES (ARTIFICIAL SHELTERS): A type of shelter has been developed in Ibiza that encompasses a hollow cavity that can be used by lizards, which is surrounded by cement. They are easy to make, and lizards make use of them. These are a convenient option if you can't take advantage of any of the structures listed above (wood, walls or stone). See the annexe 1 at the end of this booklet to find instructions on how to build them.



There are other types of structure in gardens that provide no shelter at all and limit connections between populations and which should therefore be removed, or reduced, in gardens:



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SMOOTH SURFACES ON WALLS SUCH AS METAL OR POLISHED GRANITE: Lizards cannot climb these types of walls, which makes it difficult to reach the upper sections, which breaks up populations and can make it difficult for them to access certain resources or to flee from danger.

• **RENDERED DRY STONE WALLS:** These walls are one of the main shelters for lizards (as mentioned above) but rendering makes them unusable. This also contributes to the fragmentation of populations.



• **SOLID OUTDOOR FURNITURE:** Lizards can take refuge in hollow outdoor furnishings, but solid structures do not provide shelter.



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EDIBLE, NATIVE VEGETATION

This ensures lizards have access to an abundant and varied diet, and also offers them shelter and a range of temperature and humidity gradients. It also promotes biodiversity, by attracting insectivorous pollinators and other invertebrates.

Ideally, choose **plants native** to Ibiza and Formentera, which are adapted to the local climate, require less water, and help to maintain more stable populations of the Ibiza wall lizards. The use and introduction of invasive plants is prohibited by Royal Decree 630/2013, which regulates the Spanish catalogue of invasive exotic species, which builds on the provisions of Law 42/2007 on natural heritage and biodiversity in relation to the issue of introduced species impacting native fauna and flora or human interests.

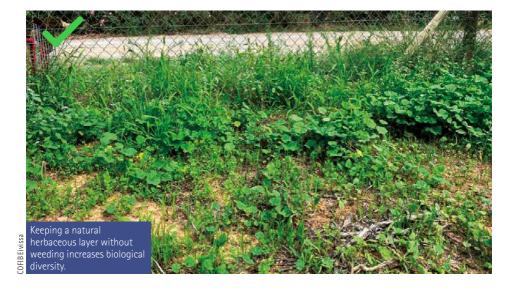
Name	Use by lizards
Rosemary (Salvia rosmarinus)	Eats flowers and nectar
Maritime juniper (Juniperus phoenicia subsp. turbinata)	Eats fruit
Mastic (Pistacia lentiscus)	Eats flowers and fruit
Caper (<i>Capparis spinosa</i>)	Eats flowers and fruit
Spurge Olive (Cneorum tricoccon)	Eats flowers and fruit
Sea Daisy (Asteriscus maritimus)	Eats nectar and pollen
Golden Starwort (Asteriscus aquaticus)	Eats nectar and pollen
Mallow Bindweed (Convolvulus althaeoides)	Eats flowers
Mediterranean Strawflower (Helichrysum stoechas)	Eats flowers
Fennel (<i>Foeniculum vulgare</i>)	Eats flowers
Conehead Thyme (Thymbra capitata)	Eats flowers and nectar
French Lavendar (<i>Lavandula dentata</i>)	Eats flowers and nectar
Sea Fennel (Crithmum maritimum)	Eats leaves, nectar and pollen
Foxtail Asparagus (<i>Asparagus horridus</i>)	Eats fruit
Dodder (<i>Cuscuta epithymum</i>)	Eats flowers and seeds

LIST OF NATIVE PLANTS RECOMMENDED FOR THE USE THAT LIZARDS MAKE OF THEM

A variety of landscapes within the garden is crucial for lizards to be able to regulate their temperature. This means that lizards require both open ground and rocky areas for basking in the sun, as well as bushes and plants for sheltering in the shade. Most importantly, a place where they can remain active with sunlight filtered through the vegetation, but which also warms the surroundings sufficiently for the lizards to be active. The typical dense Mediterranean mastic bush that touches the ground is an excellent microhabitat during the summer, as the interior temperature is ideal, and the lizards are hidden from predators.







- Another good practice is not to remove native vegetation from gardens. The herbaceous layer which grows naturally, wrongly called "weeds" (grasses, dandelions, sedges, etc.), attracts pollinating insects which provide food for the lbiza wall lizard while also increasing biological diversity. In addition, these plants produce flowers and fruit that lizards can feed on, and then aid with seed dispersion through its faeces. To this end, we suggest that specific areas are allowed to grow without being cleared or dug up so that the plants can complete their natural biological cycle.
- Another important precaution is to avoid pruning the lower parts of trees and shrubs in gardens, so they become tree-like in appearance as they grow. This practice eliminates the shelter that these plants provide for the

lizards as well as for the invertebrates on which they feed.

- We also need to provide a wide variety of temperature and humidity levels in gardens, with areas of full sun exposure and other shady sections for shelter. This permits lizards to regulate their body temperature as required.
- If the park or garden is ornamental rather than productive, avoid the use of pesticides and herbicides as they are detrimental to all organisms because they decrease biological diversity. If pest control is required, use organic farming treatments that have minimal impact on the ecosystem and nontarget species.

Encouraging the presence of lizards is a natural way to combat potential pests in the garden naturally.

A VARIETY OF ATTRACTIVE SUBSTRATES

The lizard population density can be increased by using a variety of natural substrates that offer a range of temperature and humidity gradients, making them suitable for laying eggs.

Practically all types of natural substrate on Ibiza and Formentera favour the increase of the lizard population density. Ensure that there is a diverse range of ground types, rather than focussing on the type of substrate, in order to create a mosaic with a range of environments. Avoid bare or grassy surfaces. Lizards require specific surfaces to thrive. such as rocks, on which they bask to raise their body temperature. Other surfaces, such as mulch (a plant-based laver, such as shredded bark) attract invertebrates. which are potential prey. And also, as previously mentioned, we recommend allowing plants to grow naturally.

If you want some sort of ground cover, we recommend planting Frogfruit (*Lippia nodiflora*) rather than grass, because it is more resistant to droughts and pests, does not require maintenance, has very low water consumption and withstands frequent trampling. Another alternative is Red creeping thyme (*Thymus praecox coccineus*), which is sold in many garden centres, or *Phyla filiformis*.



It is essential to create partially shaded areas with shrubby plants and a soft substrate to promote the spring reproduction of the lbiza wall lizard in gardens. This species typically buries its eggs in sandy or loamy soil that is easy to dig.



NATIVE BIODIVERSITY

One way to encourage lizard populations indirectly is to highlight the **native biodiversity** of Ibiza and Formentera.

Gardens that most closely resemble the surrounding natural environment are those that will create a nesting area, a shelter or a source of food for local fauna, including the lizard. This can be achieved by planting native plant species that attract pollinators; establishing focal points with high diversity such as a small pond with vegetation (with sidewalks without steps, on a gentle slope); installing artificial refuges for insects (such as insect hotels); nesting boxes for birds such as barn owls (*Tyto alba*); or shelters for bats.

DANGERS TO AVOID

Among the serious dangers that face lizards in gardens are waterlogging as a result of over-watering, things into which lizards can fall and be unable to get out such as fountains, buckets, sinks, etc., and the presence of predators such as cats or snakes. Below, we list these dangers are make practical suggestions to prevent the risk of death to lizards.

WATER MANAGEMENT

Lizards hydrate through the plants and animals that they consume, as well as from the dew.

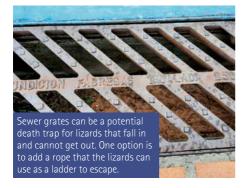
They can fall into decorative fountains and drown if they are unable to get out. Quick, low-cost solutions include providing a means of escape with a rough surface, such as a piece of wood or a plant, or even a rope, so that the lizards can climb up and escape if they fall in. Irrigation with sprinklers causes flash flooding and a drastic drop in soil temperature in large areas of lawns and limits connectivity. We recommend small plots of grass (if you don't want to do without them) or, preferably, create a floral carpet such as Frogfruit or creeping thyme, and build paths from wood or cement to help lizards move around.

Drip irrigation is the preferred watering method, as it does not waterlog the ground, and is optimal for the survival of lizards, as well as reducing water wastage.

POTENTIAL LIZARD TRAPS

Ponds, buckets, sewers and sinks, among others, can trap lizards that fall in and are unable to escape. This is particularly true if the sides are smooth so that the lizards can't climb up to get out.





It is important to be aware of possible traps found in the park or garden and ensure that lizards have a means of escape or find a way to prevent them from falling in. Solutions include providing a rough surface or adding a rope or plant or something else that will allow the lizard to climb out to safety.

AVOID NON-NATIVE PREDATORS

There are two main non-native predators on lizards in the islands of Ibiza and Formentera: snakes and cats.

Do not allow cats to enter habitats where lizards are present. We recommend that both individuals and local authorities should prevent cats from entering areas being used to promote the density of native species such as the Ibiza wall lizard, and that municipal ordinances governing domestic animals are followed

To effectively manage snakes, we recommend strategically placing and monitoring snake traps in areas surrounding the reserve in order to protect lizards from this predator.





density in the garden.



It is important to note that a higher density of lizards may attract predators such as seagulls. However, this can be prevented easily by placing some nylon netting at a height of at least two metres, allowing people to pass underneath. Seagulls will be prevented by the netting from alighting on the around.

KEEP TRACK OF YOUR LIZARDS

If you want, you could track the population of Ibiza wall lizards in your garden to see the effect of the measures that you have introduced to protect them. Below, we suggest a simple method that can be done with family members or school groups.

- What time of year can you count lizards? From April to May and from September to October.
- What time of day is best? Lizards are most active between 10am and 4pm.
- What are the ideal weather conditions? It is best to carry out the census when it is sunny and windless, with temperatures of between 20 and 30°C.
- How do you count lizards? Walk all over the garden or park, counting

each lizard that you see. You have to walk at a steady pace because, if you walk too slowly, you may count the same individual twice. Follow the same paths each time you count in order to compare results efficiently.

• How often should you count? This count can be done as often as you want, for example between once a month and every six months, in order to see population fluctuations.

You can collect the data using the form in annexe 2. In addition, you can also contribute to the conservation of the species by providing your data through the following Google Form managed by COFIB: <u>https://forms.gle/n9cH7hhg8DpFmKPV8</u>



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QR link to the form for compiling data on lizard censuses in parks and gardens.



ANNEXE 1

INSTRUCTIONS FOR CONSTRUCTING AN ARTIFICIAL SHELTER FOR LIZARDS

MATERIAL

For the cement:

- 40% white cement
- 60% sand
- water

For the mortar:

- Cement
- Sand
- Water

For the interior of the shelter:

• Recycled wood to make a box

 Metal mesh (optional, but recommended)

• Material to fill the box, like tree bark, small stones, straw, etc.

Tools:

- Staples and stapler and/or nails or screws to make the box
- Drill
- 12mm drill bit
- Work trowel and plastic bucket
- Plastic sheeting to protect the ground



INSTRUCTIONS





Make a box (approx. 20 x 35×50 cm) with the recycled wood, but don't put a lid on it yet. We recommend covering the box in metal mesh, which helps the cement stick to the surface. The sizes provided are a guide, but is best not to make it too big because of the weight.





Fill the box with natural material such as pine bark, stones and straw, and then close it with a wooden lid, metal mesh or with cement.



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Make the cement with sand and cover the box with it completely. We recommend working on some protective plastic sheeting (such as a manure bag) to keep the ground and the cement clean.

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3



Mix up the mortar, using enough sand to give it the colour of stone or earth. Spread the mixture over the cement all over the box except the base (because the mortar is to make the box look like a rock) and let it dry.



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When the box is dry, place it in its final location in the garden. Then drill two or three holes on every side of the 'fake rock' using a 12mm-drill bit. Do not use larger bits to prevent adult snakes being able to access the interior. Only drill the holes when the box is in place in the garden to ensure that you don't transport small snakes from the area in which you constructed it.

ANNEXE 2

LIZARD CENSUS FORM

DATA COLLECTION FORM FOR IBIZA WALL LIZARD CENSUS

Form template for collecting data on population density over time in urban parks and gardens that have introduced measures to increase the threatened Ibiza wall lizard population.

If you would like to share your data with COFIB in order to contribute to a citizen science program for the safeguarding of the native Ibiza wall lizard population in the Pityusic Islands, you can upload your results in the following Google Form (available in Catalan and Spanish): <u>https://forms.gle/n9cH7hhg8DpFmKPV8</u>



1. Name of the contact person for the lizard reserve (whether a public park, school park, or private garden):

2. Name of the house, public park or centre where the reserve is located:

3. Telephone number:

4. Full address of the reserve:

5. Describe which measures have been introduced to the reserve, including the date (e.g., May 2023: 2 rock shelters created, 5 rosemary bushes planted, 1 rope added to a drinking fountain for lizards to escape).

6. Date on which the lizard census took place:

7. Weather conditions during the census (temperature, wind, sun, clouds, etc.):

B. Number of lizards detected (you can either put the total number found or, if you did a census in several separate zones, indicate the number of individuals found in each zone, e.g. zone a, zone b, etc.):

For more information, to get in touch, or to download useful information, visit the website of the 'PRTR-UE Control of Invasive Species on the Balearic Islands 2022-2026' project:

https://recuperacionfaunabaleares.es/ca/prtr-ue-lluita-contraespecies-invasores-a-les-illes-balears-2022-2026/



Contact COFIB Ibiza: cribiza@cofib.net

You can report the presence on invasive species, whether animals or plants, using the following app Línea Verda COFIB- Espècies Invasores:

http://www.lineaverdecofib.es





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