Behaviour of lizards in the Maltese and Pelagian islands: a personal experience.

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Lizards have always been one of our favorites animals to observe. More so the small ones that live on the smallest natural territories of any nation; islets and rocks. The more islets one nation has, the bigger variety of lizards one will have, normally belonging to the same species. It's not just the morphological differences which are outstanding, but also their behaviour. As a result of isolation and ultimate inbreeding, their morphology helps them to survive through the topography and extreme climatic elements of their home islands and islets. However, their behaviour must be primarily a reflection of the biospheric community that co-exists with them.

Male *Podarcis filfolensis laurentimulleri*, from Lampione.

Hanging around the Maltese Wall lizard for so long brings to light some interesting facts on their behavior. To start with, the Maltese Islands have only one species of wild lizard, the Maltese Wall Lizard (*Podarcis filflolensis*) with a number of populations living on islands and islets(Sciberras 2004,2005b,2010). Even outside Malta though close by, on the Sicilian islands of Linosa, Lampedusa and Lampione, part of the Pelagian archipelago, this species exist as the only representative of these types of lizard. There this species is totally allopatric, isolated from similar species. The point is that there is no direct competition from a similar species, thus totally occupying its own niche with the ecosystem. However, even on such small islands, the ecosystem varies.

On Linosa, where the endemic population *laurentimulleri*, is perhaps the most numerous population of this species, occurs in a various altitudes, from the gently inclined coastline, to the steep volcanic hilltops. The altitudes also have varies vegetative communities, coastal garigue to hill top maquis.

Male *Podarcis filflolensis laurentimulleri,* from Linosa.

Female *Podarcis filfolensis laurentimulleri*, from Lampione.

In the Maltese islands, specifically on the mainland, altitude is not a contributing factor, as the species is greatly absent from the entire western part of the island, thus occurring mainly in the eastern part where it is shallow.

The latter *laurentimulleri*, also occur on Lampione, where it seems less abundant but still in good numbers, do not have such options, as their ecosystem is only uniform, typical to islets. However the latter population is morphologically different from that of Linosa and the recently introduced population of Lampedusa.

Underside of Female *Podarcis filfolensis laurentimulleri*, from Lampione.

Blue Rock Thrush, *Monticola solitarius*

This phenomenon is still unexplained but one hypothesis is that the recent increase of the Blue Rock Thrush *Monticola solitarius* may have aided to the decimation of the lizards from these mentioned zones.(Sciberras ,2006,2008) In Gozo and Comino, the situation is different where the species is still widespread. On the mainland, the phenomenon of urbanisation has also influenced the lizards, and like modern humans, (or Maltese in this case) most live in towns and villages, and their gardens. Apparently these days, villages and towns offer more resources to both lizards and humans alike.

While humans find commodity in shops, lizards find food in the form of domestic pests or organic refuse from our skips. With respect to safety, lizards in urban areas feel protected to due lack of natural predators in urban areas. Lizards never venture far from their territory, and when danger lurks by, such as a cat or dog, the lizards quickly learn to run into the crevices of walls.

The constant presence of humans, domestic animals and urban vermin, particularly rodents, make the urban lizards very wary, and thus hardly approachable.

In natural habitats on the mainland, the Maltese Wall Lizard occurs mainly in coastal shores along urban areas, and they seem more or less wary than their urban counterparts. (Sciberras, 2007,2008) Their diet might be slightly varied, a mix of coastal bugs and food leftovers of human leisure activities.

The situation is totally different in the rural countryside and in natural habitats where the species occurs. The surrounding islets are the harshest environments for lizards, but their populations are accustomed to it. Their behavior ranges immensely. A few are very approachable and fearless, while others disappear as soon as one sets foot on their islet, and are observable only if one stays still. Such a range in behaviour is not easily explicable, for sure it is contributed to by environmental and ecosystem factors, but such factors do not seem consistant with the typical islet environment in which they live.

Male *Podarcis filflolensis*, from Large Blue Lagoon rock.

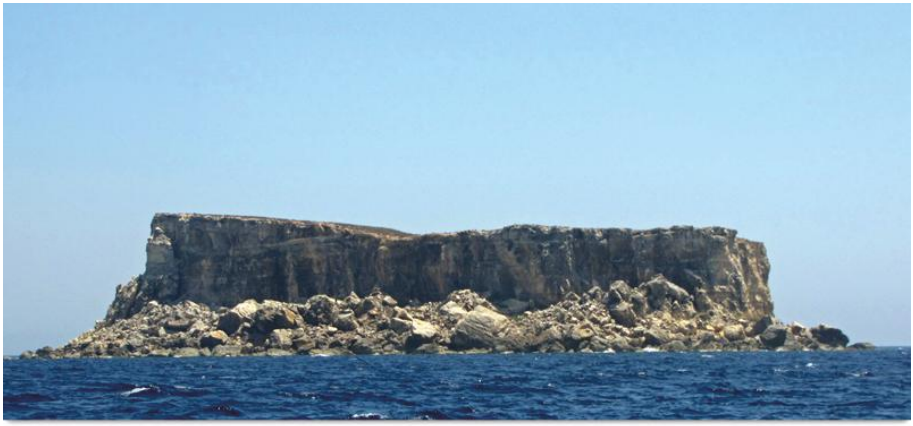
Male *Podarcis filflolensis*, from Pigeon rock.

Male *Podarcis filflolensis*, from Ta`Fraben island.

To start picturing the situation, approachable populations are few, found only on Filfla, Cominotto and Linosa. These three islands are very different from each other in every aspect, yet there is one common occurrence through all of them, in having numerous populations of lizards. Filfla and Linosa do not form part of any cluster of very nearby islets, while Cominotto does. The similar islets close to Cominotto and in the Comino archipelago, ie: Large Blue Lagoon Rock, Small Blue Lagoon Rock and Pigeon Rock are only a few metres apart, have very small populations, unlike Cominotto, and their lizards are very shy.

Even the peninsula of Cominotto itself hosts a very different population both morphologically and behaviour wise, from that of mainland Cominotto. Very shy populations also occur on Ta`Fraben islet, Fungus Rock, Halfa Rock and Tac-Cawl Rock, near Gozo, and Ta`Fraben island off the coast of Qawra in Malta. They hardly see any humans and yet they fear them. Filfla's population also sees few humans, and yet they don't fear humans. On the other hand Cominotto is visited a lot by sun-bathers, while Linosa is actually inhabited by humans, and also their lizards are fearless. The presence of humans equates to food, and this is very evident on Cominotto, especially in summer. Most people do not directly feed the lizards, left -overs and insects around disposed food feeds the lizards, but on a personal note, Cominotto lizards are brave enough to take food from our hands.

Filfola's lizards are not so fortunate, as the lack of humans means that no easy food is available, and they rely mostly on dead sea-birds to feast on and when the latter birds are alive they do feed on the lizards themselves.



Filfola island, terra typical of *Podarcis filflolensis,* approximately 4 km to the south of Malta.

Fifola's lizards are bold enough to bite bare human feet in order to get something, though not all of them. Food is definitely a driving force, and coupled with a relatively high density population of lizards on small islands, it makes sense that intra-specific competition is the key factor.

The islets of the Maltese and Pelagian archipelago can be divided into three categories:
1) Islets and rocks that do not sustain land vegetation because they are annually inundated by sea-sprays and waves can never sustain a population of lizards. Examples of such islets are Fessej Rock and Ghallis rocks.
2) Islets with vegetation can sustain a population of lizards, provided that lizards managed to survive the detachment of the islet from the mainland, and through isolation they evolved. All of the islets in Malta, except for Filfola, are very close to their nearby main-islands, and do not sustain large populations of large sea-bird, due to human disturbance.
3) The isolated islets of Filola and Lampione are far and big enough to occupy large populations of large sea-birds, which have great effect on the vegetation and other faunal communities of the islet.
The analogical biospheric evolution of Filfola and Lampione are amazingly very similar. With the presence of dense populations of Sea-gulls, the vegetation consist of a degraded coastal weedy community, which doesn't seem to effect the lizards, at least directly.

Distribution map of *Podarcis filfolensis* in the Mediterranean Sea, between Italy and Libya.

Male *Podarcis filflolensis generalensis,*
from Fungus rock.

Male *Podarcis filflolensis,*
from Tac-Cawl rock.

Male *Podarcis filflolensis,*
from Cominotto.

Female *Podarcis filflolensis maltensis,*
from Comino.

Female *Podarcis filflolensis maltensis,*
from Gozo.

Male *Podarcis filflolensis,*
from Halfa rock.

Both populations of lizards are in good numbers and rely on the Sea-birds for food, such as from dead chicks and juveniles, and hatched or rotten eggs.

Living with Sea-gulls is no easy task, as Sea-gulls are predatory birds and can easily turn lizards into their prey, but experienced lizards are fast enough to escape such potential threats. Human approach on the islet is also very rare on Lampione. This is where the similarity ends. Lampione's lizards are not very approachable, but are not as shy as those of the offshore islets of Malta, so they are adequately observable. Immediate behaviour can be easily spotted. Fighting for a mating or territory is one of them. Lampione's female lizards have been seen fighting ferociously between each other for individual males, when it's usually the other way round. Fighting observed on Filfola was of territorial purpose, where adult males chase off unwanted juveniles and females out of their territory. Such observations were done in different seasons and thus not so comparable. Occasions to visit such islets have been infrequent, and thus further future visits are necessary to study their behaviour in depth. What also makes Lampione's population very different from that Filfola's is their obvious morphological and genetic makeup. Filfola's population has been isolated from mainland Malta for millenia, while the one of Lampione has been only separated from that of Linosa much more recent, through introduction hypothetically assisted by man.

Even though they derived from the docile population of Linosa, thus making them almost genetically identical to them, their lifestyle is very different because of their totally different habitat. Visited in the same mating season (May 2010), one can tell the difference. Linosa's lizards are seem to have a gender ratio 1:1 at a glance, while on Lampione it seems that are more females than males, same situation to that of Filfola. While females fight between each other on Lampione, Linosa's coupled lizards seemed at ease/relaxed, and not overlapping other couples territories. This make sense since Linosa is much larger than Lampione, so space factor is highly important here.

Linosa lizards are some of the most approachable lizards to date. Even without food, some of the lizards are confident enough to climb on one's hand to investigate. Coupled lizards also seemed unafraid of us whilst taking pictures of them. Juvenile lizards are a bit wary at first. A group of Linosa lizards was observed hunting down, like a pack of wolves, a Death's Head Hawkmoth *Acherontia atropos* in broad daylight, as if our presence did not exist, even as we approached the moth in distress, they still attacked it.

What makes *laurentimulleri* unique from those of Malta, apart from their morphological appearance, is their relationship with other reptiles, particularly the Ocellated Skink *Chalcides ocellatus*, which also occur in Malta. The Ocellated Skink co-exists happily with the lizards, they share the same habitats on both Lampione and Linosa, and don't mind one another, often observed side by side.

Male *Podarcis filfiolensis kieselbachi,* from Selmunett.

The situation is totally different in the Maltese islands, they don't seem to live near one another here.

On the mainland, most of the natural habitats are skink territory, where certainly lizards are absent. In urban or hectic coastal, they might co-exist, but do not often share territories. One reason for the phenomenon, maybe the fact that the subspecies of skink on the pelagian islands is different from that of Malta. The pelagian ones are smaller than those of Malta, and even their morphological pattern is different. this might be the reason why such differences exist between the two archipelagoes. Moreover, the skink is absent from most of the islets in Malta, leaving it to the lizards.

The shyness of some populations might be more of mystery then to why some lizards are friendly. The reasons could be entirely genetic as well as culturally obtained.

Lizards do live very long lives when compared to some other reptiles of their same size(some individuals by the authors counted over 11 years in the wild) so some may be passed culturally. Yet since shy lizards tend to be very territorial, the community of lizards with that islet might not be that united, so most of the fear cannot be passed down culturally, but rather genetically from one generation to the next, but it's not all. That fear must have started somewhere. It could have ancient predatory threats, from their ancient predators, that still lingers fear as a strong instinct in them.

Selmunett island, where the endemic population of *Podarcis filflolensis kieselbachi,* has become extinct.

As much as courage and bravery is essential for survival, so is fear. While fearless lizards are more prone to adapting to change, as their characters make them versatile, fearful lizards do not take chances, and are most likely to escape predators. The recent rat and other alien species invasions on the small islands is the culprit of lizard populations diminishing from islets all over the world. The unfortunate extinction of the Selmunett lizards is a very sad and well known example. The once numerous *kieselbachi* is now extinct.(Sciberras 2005a, 2007c Sciberras & Schembri 2008, Sciberras & Sciberras 2011, Sciberras, Sciberras & Pisani 2012)

Fungus rock (General's rock), home of the threatened population of *Podarcis filflolensis generalensis*.

They might have been approachable at first, but with their decrease in numbers, they became very fearful, but to no avail, as being isolated on a islet is like a trap on it own, nowhere to go, and lizards do not like to swim across the sea to escape.

Fungus rock and Qawra islet are also under the invasion of rats, and if left unchecked, the *generalensis* lizards might end up the same.

Other islets do not seem to have the rat problem yet, but they are very vulnerable just the same. (Sciberras & Lalov 2007, Sciberras 2007).

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