

# A Tale of Two Frogs

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## Introduction

Frogs belong to that class of vertebrates (animals with backbones) known as the Amphibia, which in the main are semi-aquatic in that the eggs and larvae (known as tadpoles) develop in water, or at least in moist environments, although some species have managed to adapt to live in arid habitats. The frogs of the title are the only two species that are presently found living in the wild in the Maltese Islands: the Painted Frog (scientifically *Discoglossus pictus*) and Bedriaga's Frog (scientifically *Rana bedriagae* also known as *Pelophylax bedriagae*). The Painted Frog is a true native and semi-fossilized bones of this species have been found in the superficial deposits at Ghar Dalam (Hunt & Schembri, 1999), however, Bedriaga's Frog is a recent arrival that seems to have only managed to establish a breeding population, in Gozo, sometime in the late 1990s – and therein lies the tale.

## The Painted Frog

Globally, the native range of the Painted Frog is Algeria, Tunisia, Sicily and Malta, which is quite restricted. The distribution is actually more limited because the Northwest African populations of the species present morphological and genetic differences from the Maltese and Sicilian populations to an extent that these two groups of populations are considered separate races (subspecies) and have been named *Discoglossus pictus auritus* (Northwest Africa<sup>1</sup>) and *Discoglossus pictus pictus* (Sicily and Malta) (Lanza et al., 1986). The Painted Frog that lives in the Maltese Islands is therefore what is called a Siculo-Maltese endemic, that is, this race is only found in Sicily and the Maltese Islands and nowhere else in the world.

The Painted Frog, being a true native of the central Mediterranean, is highly adapted to live in the



The Painted Frog, *Discoglossus pictus pictus*, the only native amphibian in the Maltese Islands. [Photo credit: P.J. Schembri].

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<sup>1</sup> Although it has been introduced to parts of southern France and northeast Spain

semi-arid Maltese environment, where it manages to thrive in spite of a dearth of freshwater that it requires to complete its life-cycle. In the Maltese Islands it occurs wherever there is water: in rainwater pools that form on rocky ground, in ponds and reservoirs, and along watercourses; however, it is most abundant where there is a plentiful supply of freshwater for most of the year and such places are key breeding grounds that serve to regenerate populations in other areas where water is less abundant (Baldacchino & Schembri, 2002). Populations living in suboptimal environments are likely to go extinct should environmental conditions change for the worse, for example, during exceptionally dry years when the water supply might dry up; when conditions become favourable again, these marginal habitats are re-colonized by frogs that have survived in more optimal habitats.

### Adaptations

If water is permanently present, the frog is active all the year, however, a key adaptation of the species is the ability to survive the arid summer months by aestivating (that is, the frogs enter a state of quiescence and remain dormant as long as dry conditions prevail). The animals have a remarkable capacity to detect water and emergence from hiding places is triggered by rain and occurs within hours of wetting.

The Painted Frog breeds whenever water is available, usually during the wet season, but also in the dry season in habitats with permanently available water. It is able to lay its eggs in even very small bodies of water but most perish if the water dries up too soon. For this reason, places with abundant water are particularly important since here the animal is able to complete its life cycle to replenish the population. Female frogs lay up to 500 eggs per clutch in a single layer on the bottom and the eggs hatch within 24 hours of laying, while development takes on average six weeks (depending on temperature and population density), which is very rapid and is yet another adaptation for coping with transiently available water (Sammut & Schembri, 1991).

### Conservation Status

The *Red Data Book for the Maltese Islands* (Schembri & Sultana, 1989) lists the local populations of *Discoglossus pictus pictus* as 'Vulnerable'. This 'vulnerable' designation is according to the IUCN threat status classification that was current at the time of publication of the *Red Data Book for the Maltese Islands*. The IUCN has since replaced the old threat status categories by a completely new set (2001). The status of the local populations of the Painted Frog using the new IUCN criteria has not yet been evaluated, however, in a recently published report<sup>2</sup>, the Malta Environment and Planning Authority lists local populations of *Discoglossus pictus pictus* as "inadequate and deteriorating".

The local populations of the Painted Frog have been legally protected since 1993 (Legal Notice 49 of 1993). Presently they are protected by virtue of being listed in Schedule V (Animal and plant species of Community interest in need of strict protection) of the Flora, Fauna and Natural Habitats Protection Regulations, 2006 (Legal Notice 311 of 2006). These regulations transpose the requirements of the European Union's 'Habitats Directive' to local legislation. The 'Habitats Directive' is the European Union's Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora. *Discoglossus pictus* is listed in Annex IV (Animal and plant species of Community interest in need of strict protection). Apart from this, *Discoglossus pictus* is listed in Appendix II of the Bern Convention. The Bern Convention is the Convention on the Conservation of European Wildlife and Natural Habitats; Appendix II lists strictly protected fauna species and the Convention prohibits the deliberate capture, the destruction of breeding or resting sites, the deliberate destruction or taking of eggs and the deliberate killing of, and trade in, these species.

All endemic species in the Maltese Islands are protected species in terms of Regulation 26 of the Flora, Fauna and Natural Habitats Protection Regulations, 2006 and therefore cannot be deliberately picked, collected, cut, uprooted, destroyed, pursued, taken, damaged, captured, or

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Tadpoles of the Painted Frog, *Discoglossus pictus pictus*. [Photo credit: Jacqueline Galea].

killed. Note that as defined by these regulations, ‘endemic’ refers not only to those species that occur solely within the Maltese archipelago, but includes all species whose native distribution range is limited to the Central Mediterranean region where ‘Central Mediterranean’ is defined to include Central and Southern Italy (all Italian territory south of Florence), Sardinia, Corsica, Sicily and circum-Sicilian islands (including Pantelleria and the Pelagian Islands), the Maltese Islands, Tunisia and islands off Tunisia. Moreover, ‘endemic species’ also includes possibly endemic species whose taxonomic status or identity requires further analysis. Therefore, not only are local populations of the Painted Frog protected by being specifically listed in Schedule V of the Flora, Fauna and Natural Habitats Protection Regulations, 2006, but being a Siculo-Maltese endemic subspecies, *Discoglossus pictus pictus* is further protected by the provisions of Regulation 26 of these regulations.

### A New Discovery

The Painted Frog is the only native living amphibian in the Maltese Islands; however, a few years ago, an amateur herpetologist, Arnold Sciberras, discovered a thriving population of a different species of frog

in the freshwater pool at Ta’ Sarraflu in Gozo. This discovery was made when he investigated strange calls that he heard from the pool area. These peculiar calls were first noticed in 2000 but were dismissed as those of a bird, since they were similar to the sounds that a number of water birds make. However, more careful study of these calls showed them to be different from those of birds and similar to those that some frogs make. Investigation of the water in the pool revealed the presence of the Painted Frog, but also of what appeared to be a large frog, however, these larger frogs proved very difficult to observe since they disappear very rapidly under water and into the dense reed beds in the pool at the slightest movement. It was only in 2004 and after a lot of work that the animal was photographed and its calls were recorded. It was immediately obvious that these large frogs were something different and the two of us then attempted to find out what was this species that had suddenly appeared in Gozo.

The Painted Frog belongs to the family Discoglossidae, but the new frog had all the characteristics of a completely different group of frogs belonging to the family Ranidae and known as the ‘Water Frogs’. From its size, colour and morphology the species at Ta’ Sarraflu seemed to

belong to the southeastern European/northeastern African group of the genus *Rana*, but this is a very difficult group to identify because many very similar-looking species occur in the region, some of which hybridise where their ranges overlap. Identifying these frogs is rendered more complex as some species have been transported outside their range and have mixed with other species to give populations that are partly composed of hybrids and partly of the parent species. In many cases, certain identification is not possible from appearance alone. The problem was solved by Professor Ulrich Sinsch of the University of Koblenz, Germany, when he compared our recordings of the advertisement calls of the frogs from Ta' Sarraflu with reference calls of different species – although species of *Rana* may be near identical in appearance, the mating calls of the males are species-specific and quite distinct from each other.

The Ta' Sarraflu frog tuned out to be Bedriaga's Frog *Rana bedriagae*, now known as *Pelophylax bedriagae* (Sciberras & Schembri, 2006a). This species has a native distributional range in Cyprus, Egypt, Greek islands close to the Turkish coast, Israel, Jordan, Lebanon, Syria and Turkey; it is also present in Iraq and possibly further east. This frog is not native to the Maltese Islands but has obviously been introduced, probably sometime in the late 1990s. Given their larger size, different coloration and the very loud noises these frogs make, especially in spring and summer when the males establish territories and court females, it is unlikely that these animals would have been overlooked, especially given that many naturalists visit Gozo regularly and



The freshwater pool at Ta' Sarraflu, one of very few permanent freshwater bodies in the Maltese Islands. [Photo credit: Jacqueline Galea].

that there are no other species present in the Maltese Islands that make comparable calls; in fact, it was the unusual calls from Ta' Sarraflu that alerted us to the presence of this species in the first place (Sciberras & Schembri, 2006b).

### Alien Species

The presence of Bedriaga's Frog at Ta' Sarraflu is worrying. L-Ghadira ta' Sarraflu is a very important habitat in the local context since it is one of very few pools where natural freshwater accumulates and persists throughout the year, even during the hot summer months when most other freshwater dries up. For this reason, a significant number of plant and animal species that require a constant supply of freshwater throughout the year occur there and are overall very rare in the Maltese Islands, since their habitat is rare. Because of this, in 1995 the pool at Ta' Sarraflu was scheduled as a Level 1 'Area of Ecological Importance' and as a 'Site of Scientific Importance' under the Development Planning Act of 1992, while the entire western coastal area of Gozo, including L-Ghadira ta' Sarraflu, was declared a 'Special Area of Conservation - Candidate Site of International Importance' under the Flora, Fauna and Natural Habitats Protection Regulations, 2006, and the Ta' Sarraflu pool was further designated as a 'Special Area of Conservation - Site of National Importance' under the same regulations. The western coastal area of Gozo 'Special Area of Conservation' has now been accepted by the European Commission as a NATURA 2000 site.

What the impact of the alien Bedriaga's Frog on the biota and ecology of the pool has been, or will be, is not known, but where species of *Rana* have been introduced into environments where they did not occur before, the native amphibian fauna has generally suffered, since *Rana* eat the tadpoles and froglets of smaller species. The native Painted Frog used to occur at Ta' Sarraflu, but since the alien Bedriaga's Frog was introduced, populations have dwindled and the native species may have been extirpated from the pool. The impact of Bedriaga's Frog on the Painted Frog and on the other pool biota needs to be studied, especially given the status of L-Ghadira ta' Sarraflu as a protected area.

So far, Bedriaga's Frog seems to have remained confined to the Ta' Sarraflu pool, probably because





The alien Bedriaga's Frog *Rana bedriagae*, now known as *Pelophylax bedriagae*, from the Ta' Sarraflu pool. [Photo credit: Jacqueline Galea].

of its requirements for water; unlike the Painted Frog, it does not seem able to traverse large expanses of arid ground. It is important that the alien Bedriaga's Frog does not spread to other habitats. However, there is a real danger of this happening as people have already collected specimens of this frog to keep as 'pets'. The danger lies if unwanted 'pets' are then disposed of in the environment. After habitat destruction, the introduction of alien species is the largest threat faced by local biota. At Ta' Sarraflu alone, apart from the alien Bedriaga's Frog, somebody has introduced a population of Mosquito Fish (*Gambusia*), that has devastated the insect fauna, and at least two terrapins, while in the past there were also goldfish there. While it is easy to introduce alien species, it is very difficult to eradicate them. In the same way that we would not dream of 'contaminating' our cultural heritage by, for example, introducing aluminium fixtures on the facades of historic buildings, we should not 'contaminate' our natural heritage by introducing alien species.

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