

# Collecting the Mallorcan midwife toad

Simon Tonge

The Mallorcan midwife toad was described, from subfossil remains, as recently as 1977, and it was not until 1980 that some living tadpoles were recognized as belonging to this new species. Once widespread in Mallorca, now perhaps only 1000–1500 adult toads remain, in secret and remote gorges in the mountains. In order to provide a safety net, should catastrophe strike at the fragile wild populations, the Jersey Wildlife Preservation Trust offered to set up a captive-breeding programme for the toad. In 1985 the author set out to collect eight toads, to be the founders of the captive colony. The FFPS contributed £85 from its Oryx 100% Fund towards the expedition.

When conservationists' thoughts turn to the tragic effects of man on fragile island ecosystems, they usually cite, as examples, the decimation of the flora and fauna of the West Indies, the Mascarene Islands, or New Zealand, by seafarers and traders from Europe, during the last two or three centuries. However, it is becoming apparent that the effects of human habitation, cultivation and trade have been destroying island ecosystems for a great deal longer and a good deal nearer home than in the examples given above.

The Balearic Islands, off the south-east coast of Spain, consist of four major islands—Ibiza, Formentera, Mallorca and Menorca—and many smaller ones, ranging in size from large boulders to the impressive land mass of Cabrera off the southern tip of Mallorca. How long the islands have been isolated from Spain is still a matter of some controversy, and the exact route by which the native fauna arrived on the islands is not

known. During the last ice-age, there were probably land connections between all the islands as sea levels were lower, but it is unlikely that they were connected to Spain at this time (Hemmer, 1984; J.A. Alcover, pers. comm.).

The largest of the Balearic Islands is Mallorca. It is 3640 sq km in area, bordered on its northern edge by a limestone mountain range reaching 1400 m at its highest point and occupying about 25 per cent of the total area of the island. Apart from a few hills reaching 500 m in the south-east corner, the rest of the island is a fertile, densely populated, and heavily cultivated plain.

Until about 4000 BC, the island was uninhabited by man (J.A. Alcover, pers. comm.). There were probably six endemic vertebrates living on the island at the time. These were: a goat *Myotragus balearicus*; a giant dormouse *Hypnomys morpheus*; an insectivore *Nesiotites hidalgo*; a barn owl *Tyto balearica*; a small lizard *Podarcis lilfordi*; and a midwife toad *Alytes (Baleaphryne) muletensis*. In addition to these, there were many bird species that also occurred on the mainland of Europe and, possibly, the tortoise *Testudo hermanni*.

The advent of man to Mallorca was a disaster for the endemic fauna. Initially the aboriginal peoples, and later the Romans, cleared the native vegetation (much of it endemic), planted crops, hunted, and introduced alien species. By AD 100 exotic carnivores such as the genet *Genetta genetta* and pine marten *Martes martes* were well established on Mallorca, as were several rodents, a shrew, the domestic goat and the rabbit *Oryctolagus cuniculus*. Not only were exotic mammals and birds introduced, but so were

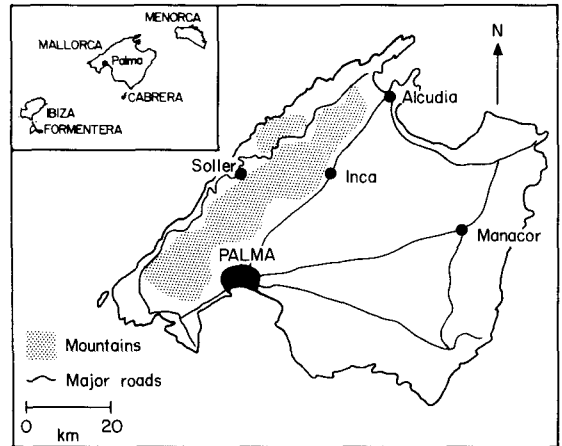
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lower vertebrates such as the gecko *Tarentola mauretana*, the marsh frog *Rana ridibunda* [although maybe *R. perezi* is the applicable name (E. Balletto, pers. comm.)], the green toad *Bufo viridis* and, most significantly, the viperine snake *Natrix maura*.

The endemic goat and the giant barn owl became extinct very early on, probably a few hundred years after the arrival of man, and the giant dormouse and the insectivore did not survive much longer. The lizard became extinct on the mainland of Mallorca about 200 BC, but managed to survive on off-shore islets in much the same way that the birds of New Zealand and the reptiles of Mauritius have done.

The most enigmatic of the Balearic endemic species was the midwife toad. It was described as late as 1977 from subfossil deposits taken at a variety of localities in both lowland and highland areas of the island. Its relationship to the midwife toads of Europe (*Alytes obstetricans* and *Alytes cisternasii*) was apparent, but it was felt that the new species was sufficiently different to be placed in a new genus of its own; hence it was named *Baleaphryne muletensis*. In 1978, shortly after *Baleaphryne* was described, some tadpoles were discovered in a permanent pool in a deep gorge, high in the mountains in the north of the island. Specimens were taken and, in the laboratory, were identified as probably being those of an *Alytes* toad. However, it was not until 1980, when the discovery of *Baleaphryne* had become more widely known, that the possibility that the fossils and the tadpoles belonged to the same species was considered. During that same year, Joan Mayol, a biologist working for ICONA (Instituto para la Conservacion de la Naturaleza Ministerio de Agricultura), obtained an adult midwife toad in a gorge in the mountains. Although it was superficially similar to *A. obstetricans*, it differed from it in too many ways to be included under that species. A comparison of the femur of the specimen with those of the *Baleaphryne* fossils conclusively showed that they were one and the same species, and that *Baleaphryne* had indeed survived in a few relict populations in the northern Mallorcan mountains. New species of any animal or plant are rarely discovered in Europe these days, so this was an event of no little excitement in herpetological circles!

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Mallorca, which lies off the south-east coast of Spain in the Balearic Islands.

A great deal of work has now been carried out on the morphology, anatomy, ecology and physiology of *Baleaphryne*, and most of this work has been described in Hemmer and Alcover (1984). It is generally agreed that *Baleaphryne* is closely related to other toads of the genus *Alytes*, most closely to *A. obstetricans*, but represents a new phylogenetic level within the genus; thus, *Baleaphryne* is retained as a subgenus within *Alytes*.

All the mountain torrents have now been surveyed for populations of *Alytes muletensis*. They occur in only five torrents, but there is evidence of their survival until very recently in two others. The breeding populations are restricted to permanent plunge pools at the base of waterfalls, so, in a given length of gorge, the actual habitat occupied by toads may be only 10 per cent of that available. Current estimates, based on the numbers of calling males and of tadpoles in the breeding ponds, are that there are 1000–1500 adult toads left on Mallorca. For a complete account of the species's ecology, see Alcover *et al.* (1984).

Given that the toad was once widespread in Mallorca, what are the reasons for its present precarious status? The answer to this is twofold. Firstly, Mallorca suffers greatly from a lack of water. Whether this is due to long-term climatic change in the whole Mediterranean region, or

whether it is a local effect caused by habitat destruction and intensive agricultural methods, is not clear. Nor is it clear how much the climate has changed since pre-Roman times. However, the fact remains that the few permanent pools in which the toads breed are extremely susceptible to drying out, and if this occurs, the toads will become extinct in a very short time. The water levels are at their lowest during mid-summer, and the ponds become stagnant (J.A. Alcover, pers. comm.), but this does not seem to affect the tadpoles, which are apparently very hardy, though they are essentially specialized stream dwellers. The streams are also highly susceptible to accidental pollution by pesticides, fertilizers and the like. The loss of the two populations mentioned above may be attributed to desiccation or pollution.

The second reason for the current rarity of the toad, and doubtless the reason for its extinction in lowland areas of Mallorca, is the introduction of the viperine snake. This is a semi-aquatic species, which feeds largely on frogs. The Mallorcan midwife toad is a classic island species, in that it has evolved without predators and consequently has a lower reproductive rate than its congeners on the mainland. It simply could not cope with such a voracious predator, and was probably also out-competed by the introduced marsh frog. Both the snake and the marsh frog are found throughout lowland Mallorca and also in much of the mountainous region. Why they have not become established in the particular gorges where the midwife toads occur is not certain, but it is probably due to the steep sides and lack of vegetation in the gorges. However, the effect of even one snake accidentally washed into a breeding pond could be catastrophic for a small isolated toad population.

The Jersey Wildlife Preservation Trust (JWPT) first became involved with the fauna of Mallorca in 1981, when the Trust's Curator of Reptiles, Quentin Bloxam, visited the island on holiday. He met Joan Mayol, the biologist from ICONA, and came to hear of the discovery of the toad and of its precarious prospects in the wild. He offered the Trust's services for the setting up of a captive-breeding programme, should the Mallorcan authorities consider it advisable. The offer was

not acted upon at this time, but in 1983 I visited the island and met Antonio Alcover, the zoologist probably most involved with the toad. It was decided then that the JWPT would try to set up a captive-breeding programme, provided that the head office, in Madrid, of ICONA agreed. An application for the export of eight toads to Jersey was made later that year.

Permission was received in August 1984, but it was too late to act upon it until 1985. It was decided that an attempt to collect the toads would be made in the spring of that year, since it was hoped that the toads would perhaps maintain the momentum of their breeding season once they arrived in Jersey. The problem with collecting in the spring was that the gorges were more likely to be inaccessible due to melting snow and rain than they would be later in the year. A second reason for the timing of the collecting trip (13—20 April) was that the *Societas Europaea Herpetologicae* (SEH), a body responsible for the co-ordination of conservation measures for all European reptiles and amphibians, was meeting in Mallorca at that time and was intending to look at the toad gorges as well as some of the other Mallorcan herptiles.

I flew to Mallorca on 13 April and met up with the SEH party and Joan Mayol. The SEH had scheduled 17 April to be their first day in the mountains, and, as Joan Mayol was involved with them, there was no one to show me the toad localities, which are a closely guarded secret. Also, only one pond can be reached by 'conventional' walking; all the others can be reached only by rock-climbers. I, therefore, spent three days with the SEH party as they carried out their fieldwork on the native tortoises and on the populations of the lizards *Podarcis lilfordi* on the islands off Mallorca, and *Podarcis pityusensis* on the islands off Ibiza. Each island has its own subspecies; many of them are very beautiful, and the range of variation is astonishing.

On 17 April, we visited the mountains for the first time. We were not quite sure what to expect as the island had had its heaviest snowfalls for many years during the winter and there was much talk of the gorges being inaccessible due to melting snow. We visited the only pond that is accessible to walkers and found that our fears of too much

water were unfounded. The pond is 15 minutes' walk from the track where we had left our vehicles, and is about 50 sq m in size. To our surprise, it contained about 200 large tadpoles, which we estimated to be two or three years old. Apparently, some specimens do not metamorphose at the end of their first summer for reasons that are, as yet, unknown. This was a great relief to me as I realized that, even if I could not get adult toads, I could take tadpoles and try to get them to metamorphose in Jersey. Shortly after our arrival at the pond we heard a male calling, and by the time we left, two hours later (at about 17.00 hrs), we estimated that there were perhaps 50 males calling.



Mallorcan midwife toad (*Q. M. C. Bloxam*).



Abseiling in the gorges in search of the midwife toad (*Simon Tonge*).

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The toads live in narrow crevices and fissures in the sides of the gorge, and we caught two and saw several others. However, the fissures are very deep and the toads are practically impossible to retrieve from them. The two that were caught were unwise enough to jump from crevices into space where they could be caught by hand. It soon became obvious that I would be lucky to obtain the full quota of eight adults, so I collected four tadpoles and took them, plus the two adults (which are very hard to sex accurately), back to my hotel.

The next day, Antonio Alcover and his wife, two of his Mallorcan colleagues with extensive climbing experience, and I visited another part of the same torrent to try to obtain the two adult toads that were still required. Access to the upper reaches of the torrent is appreciably more difficult, but some of the exertion can be lessened by abseiling in from above rather than trying to climb up from below. We drove to a culvert in the mountains near to the top of the gorge and made our way on foot down some steep, scree-covered and rather dangerous slopes into the torrent. The gorges may be 15 m or more deep and rarely more than 2 m wide. Because they are so narrow, direct sunlight does not penetrate for long, so they are pleasantly cool (16–18°C at that time of year). The floor of the torrent is completely covered with eroded boulders up to the size of a car. Considering that the streams are almost entirely dry for most of the year, the force of the water when they are wet must be considerable

and the tadpoles must be hardy to survive both these conditions and the stagnant summer ponds.

During our descent, we had to abseil down six pitches of up to 10 m high. It was my first experience of abseiling and I did not emerge unscathed. At one point I fell about 2 m on to a ledge and was lucky not to have fallen all the way to the bottom (another 5 m). I sustained rope burns and a damaged ego, but it could have been a great deal worse! We visited four permanent ponds, which all contained tadpoles. None was as large, or contained as many tadpoles, as the one that we had visited the day before. At most of them, we found that the sound of our voices stimulated the males to call, even at 14.00–15.00 hrs.

We succeeded in capturing the two specimens that I needed. I had learnt the night before that at least one of my captives was a male, because it called inside my wardrobe! So we were looking particularly for females, and one specimen that we found in some leafy detritus under a boulder was rather large and plump, which we hoped was a sign that it might be gravid. The second specimen was of indeterminate sex.

Transporting the toads and, particularly, the tadpoles back to Jersey was the most worrying part of the trip in many ways. Plastic sandwich boxes were used and they travelled in my hand luggage. Despite the buffeting and constant changes of temperature and humidity, which cannot be avoided during travel by air, car and on foot, all the specimens arrived safely in Jersey and were installed in a cool room at the rear of the reptile house.

Unfortunately, one of the tadpoles succumbed to a bizarre accident four days after its arrival in Jersey. We think that it was somehow trapped against a rock in its vivarium by one of the others, and it suffered a rupture of the body wall. Regrettably also, despite feeding well and being very active, the adult toads have shown no sign of breeding, and we now suspect that their collection and removal to Jersey has disrupted their breeding cycle. On a happier note, all the tadpoles have completed metamorphosis and are now toads. The first specimen took only 20 days, from the time we first noticed its tiny hind limbs, to leaving the water.

The purpose of the Trust's captive breeding programme is to provide a safety net, should some tragic event befall the fragile wild populations of this attractive toad. It is, of course, possible that the toad will stage a dramatic recovery and become common in all the mountain torrents, especially if current plans to translocate tadpoles to uninhabited ponds are successful. However, common sense and the observed trends of recent history would seem to argue that, at best, the toad will always be local in occurrence and very vulnerable to even short-term habitat change, and at worst could be extinct in the wild sometime in the near future.

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