

**THE DURRELL WILDLIFE
CONSERVATION TRUST AND THE
MALLORCAN MIDWIFE TOAD,
ALYTES MULETENSIS - INTO THE
21ST CENTURY**

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ABSTRACT

The Mallorcan Midwife Toad recovery programme is one of The Durrell Wildlife Conservation Trust's most long standing and successful conservation projects. Combining captive-breeding, re-introduction, *in-situ* and *ex-situ* research and a diverse educational programme, this integrated approach has helped secure the immediate future of this critically endangered (IUCN, 1996) amphibian.

A project grant received in 1999, from the Captive-Breeding Committee of the British Herpetological Society, has helped fund new facilities in the Herpetology Department of Jersey Zoo, and financed important and pioneering health screening work on wild populations of midwife toads.

This short report describes the work carried out as a consequence of this grant, and some of the results achieved so far.

INTRODUCTION

It is still less than 20 years ago, that the fossil Discoglossid amphibian, the Mallorcan Midwife Toad *Alytes (Balephryne) muletensis*, was discovered alive and breeding (albeit in perilously low numbers), in the deep gorges of the Balearic island's remote northern mountain range - the Sierra de Tramuntana.

Once believed to be widespread throughout Mallorca, the midwife toad, or Ferreret, was extirpated from almost the entire island - not this time by the environmentally catastrophic demands of the invading package deal tourist - but by the more subtle, yet no less devastating invasion of predator and competitor species such as the

viperine snake *Natrix maura*, and the Green Frog *Rana perezi*.

The Durrell Wildlife Conservation Trust (then the Jersey Wildlife Preservation Trust), first became involved with the species and its plight in 1985 when, at the request of the Mallorcan Government, toads were brought to Jersey Zoo, to form the nucleus of a captive breeding programme (Tonge, 1986). One of the primary aims of this programme was to generate captive-bred toads and tadpoles for re-introduction to the wild. The first re-introductions were carried out in 1989, and have occurred on almost an annual basis ever since.

Toads are now held and bred at a number of other European institutions including; Barcelona Zoo, The Durrell Institute of Conservation and Ecology at the University of Kent, Marineland (Palma de Mallorca), The Open University, Stuttgart Museum and, The Wildfowl and Wetlands Trust.

The success of the recovery programme, now in its fifteenth year, is probably best demonstrated by the following facts:

- 1] 25% of the current wild population in Mallorca now originates from captive-bred toads.
- 2] The distribution of the toad has increased by 100% since the instigation of the recovery programme. From its estimated range of only 100km² in the early 1980's, the species is now believed to occupy a range in the region of 200km²
- 3] Twelve new breeding sites have been established since 1989 through re-introductions of captive-bred toads. This compares with an estimated thirteen original wild sites.

**HEALTH SCREENING OF WILD
MALLORCAN MIDWIFE TOADS**

Previous work on the parasite loads of this species, carried out at both Jersey Zoo and Barcelona Zoo, have focused entirely on those animals kept in captivity (Roca et al, 1998). Analysis of wild toad populations would enable a comparative study on



Typical habitat of *Alytes muletensis*, Mallorca.

Photo by G. Garcia.

the endo-parasite fauna between captive and wild animals. Such a study will enable the health status of captive-bred toads to be more accurately assessed, and those destined for re-introduction to be more effectively screened. Furthermore, a comparison of endo-parasite loads between original wild toad sites and recent reintroduction

sites may yield important information on how the parasite levels in released captive animals, may differ from those that have always lived in the wild.

During a field trip in July 1997 (Buley & Garcia, 1997), Mallorcan Government and Jersey Zoo staff collected faecal samples from wild toad populations in preparation for such a study. Samples from tadpoles were gathered at all of the wild toad breeding sites in Mallorca including original wild sites and historic reintroduction sites.

The collection of faecal material proved relatively straightforward. Groups of 5-20 tadpoles from an individual pool were placed in a plastic bottle filled with water for 10-15 minutes. After this time it was usually found that sufficient faecal material had been produced.

At least two samples were collected from each site. One sample was preserved in 10% formol saline, for specific identification of endo-parasitic species including protozoa, nematodes and coccidia and the second was preserved in a 2.5% solution of potassium dichromate to hatch any coccidial cysts to enable identification of the species.

A total of 103 samples were collected and stored in the laboratory at Jersey Zoo. The grant from the British Herpetological Society in 1999 meant that a qualified parasitologist could be employed to carry out the arduous analysis of these valuable samples.

Each of the 103 samples was analysed using a direct preparation method. A drop of the preserved

Table 1. Preliminary comparison of endoparasite types in wild and captive *A. muletensis*

Wild <i>A. muletensis</i>	Captive <i>A. muletensis</i> (from Roca <i>et al.</i> , 1998)
Helminths - Cestodes - Nematodes - Trematodes	Helminths - Nematodes
Protozoa - Ciliophora (Ciliates) - Sporozoa (Coccidia) - Sarcodina (Entamoeba)	Protozoa - Ciliophora (Ciliates) - Sporozoa (Coccidia)



Cisterns at reintroduction site. Photo by G. Garcia.



Alytes muletensis. Reintroduced adult, 2nd February 1997. Photo by G. Garcia.

faecal sample solution was placed on a microscope slide, and a cover slip placed over it. Each slide was then screened in its entirety using a Nikon YS2-H binocular microscope under 10x magnification and any oocysts, protozoa, eggs or larvae were identified using 40x magnification. The abundance of each endo-parasite type was recorded for each preparation. Individual organisms were measured, using a graticule

(Graticules Ltd. Tonbridge, Kent), and photographed using a Canon EOS 1000FN camera with the appropriate microscope attachment.

Table 1 gives just a preliminary indication of the types of endoparasite found during the study and, on a very superficial level compare this with what was found in the study of captive animals at Barcelona Zoo and Jersey Zoo.

It would, at this stage, certainly be premature to attempt an interpretation of this very basic data. Endo-parasite levels in this investigation however, as with the captive work, show low, or very low prevalence in most samples screened, suggesting high endo-parasitic infection is not common in wild Mallorcan Midwife Toads. Some caution must be employed in any direct comparisons, as samples from the wild originated from the aquatic larval stage of the species life-cycle, whilst in the captive study faeces were taken from the terrestrial toads. It would be quite reasonable to expect that endo-parasite loads will change with a changing physiology, environment, and diet.

The full results and an analysis of the faecal screening work carried out will be published at a later date (Gonzalez, in prep.).

A RENEWED CAPTIVE-BREEDING EFFORT

In late 1996, at a meeting of the International Group for the Recovery of the Ferreret, it was decided that fresh breeding stock should be collected from the wild for the captive programme



Veterinary pathologist Candelaria Gonzalez-Villavicencio examines Mallorcan Midwife Toad faecal samples for parasites.



Fig. 5. New adult *Alytes muletensis* breeding facilities at the Durrell Wildlife Conservation Trusts' Herpetology Department. Photo by K. Buley.

to ensure that as wide a genetic base as possible is represented in the captive colonies.

During the 1997 field trip, this new stock was collected from three different wild populations in isolated gorges across the species natural range, 25 tadpoles were collected from each site. Tadpoles were taken from sites which had not previously been used to provide captive stock.

These three populations would be maintained and bred separately - thus maintaining the integrity of the potentially genetically distinct groups (the tiny populations of toads cannot cross from gorge to gorge and have therefore been reproductively isolated for up to 2000 years).

The Midwife Toad breeding facilities at Jersey Zoo, which had served the programme well for almost fifteen years, were in need of expansion and upgrade, to accommodate adequately the three separate breeding groups (in the past, the room has only had to cope with the one group).

The husbandry, breeding and rearing of this species has always proved relatively simple and the associated equipment/housing required is similarly uncomplicated. Large, clear plastic, lidded tanks with gravel substrate, hides and a large water bowl, coupled with an irrigation system for simulated rainfall have, in the past, proved to be an effective set-up for breeding (Tonge & Bloxam, 1989).

The BHS funding for 1999 ensured that the appropriate breeding and rearing tanks could be purchased and an efficient, automated irrigation system installed. Construction of the new facilities was completed in March, and the young toads started producing eggs in late May. By the end of September a total of 40 clutches (433 eggs) had been laid by the three breeding groups - a clear testament to the suitability of the new captive facilities.

Tadpoles hatched this year have already started to metamorphose, and these first generation captive-bred animals will be used to establish further colonies of toads at a number of the involved European institutions - colonies which will then generate further captive-bred stock, ultimately destined for release into the wild.

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