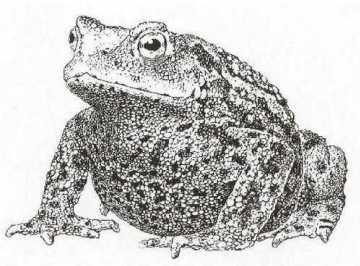

THE HERPETOLOGICAL CONSERVATION TRUST

BHS

***The Herpetological Conservation Trust** and*
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ABSTRACTS

Amphibians, diseases and genetics: MHC class II loci in *Rana temporaria*

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The causes of amphibian declines pose a major challenge to Biologists worldwide. Apart from habitat destruction, climate change and pollution one of the major causes is disease, especially fungal infections. In this talk I will present results from a study that aims to characterize exon 2 of the MHC (major histocompatibility complex) class II beta locus of the amphibian *Rana temporaria*. This is the most variable part of the MHC class II and has been shown to be important for triggering immune responses against extra cellular antigens, such as fungal infections.

Linking global warming to amphibian declines

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Currently there is a consensus that mean annual global temperatures have increased significantly over recent years and that there is a continuing worldwide decline in many amphibian species and extinctions in some others. There is less agreement about the causes of this decline and although a link with global warming is suspected, the mechanism of any such link has not been clearly demonstrated. The results of an ongoing long-term study (1983-2006) of common toads (Bufo bufo) in the UK, has revealed two pathways by which amphibian populations are adversely affected by rising environmental temperatures. First, there is a clear relationship between a decline in the body condition of female toads and the occurrence of warmer than average years, particularly winters, since 1983. This has been paralleled by a decline in their annual survival rates. Second, there is a significant relationship between the occurrence of mild winters and a reduction in female body size resulting in fewer eggs being laid annually. The effects of partial hibernation,

resulting from mild winters, on female toad physiology appear to be an important factor linking the observed decreases in both body condition and survival rates.

Add an Adder: a web-based survey of adder status in Britain

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The adder Vipera berus is perhaps the best known of Britain's reptiles. Although geographically widespread this general awareness is probably less from direct involvement but rather from anecdote and hearsay. Nationally, evidence indicates that adders are declining with regard to both range and abundance, though undoubtedly there are still extensive areas where the species is doing well. Recently a number of surveys have been undertaken to try to better understand the status of the species in Britain – most of which have focused on the need for detailed fieldwork.

With a view to collecting information from a wide range of sources that might not normally be accessible, The Herpetological Conservation Trust (the HCT) launched a web-based survey called 'Add an Adder' in 2005. The aims were two-fold: to tap into information held by people who would not normally contribute information to local records centres and surveys; and to gather information on the loss of adder populations around Britain. The Add an Adder website (www.adder.org.uk) was designed to provide information about adders and threats facing it, but also to explain about the species' role in Britain, both biologically and culturally (e.g. in folklore). It was designed to compliment the more intensive field-based 'Make the Adder Count' scheme. Immediate feedback was available to recorders, through a map page and the 'Adder Abacus' which displayed records by region. Populations that were thought to be extant and those thought lost were highlighted in green and red respectively.

The Add an Adder website has now accumulated about 850 records, from 600 recorders. We present the findings of our initial analyses here. Verification of records collected from the general public is potentially problematic, but the large majority of the Add an Adder records appear to be reliable, judging by the associated notes and descriptions. Clusters of population extinctions have been submitted for some areas of the country, but this highlights the need to gather such data for other areas. Examination of the qualitative data submitted by recorders has also proved worthwhile, including numerous anecdotes about adder bites, attitudes and population trends. Finally, a significant number of recorders appear familiar enough with adders to take part in more involved surveys like Make the Adder Count, which is encouraging as it shows the potential of broad public involvement campaigns as a recruitment tool for systematic surveys.

A comparison of tins and felt and their associated microclimates as artificial refugia for reptiles

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Three sites in Kent were seeded with paired sets of tins and felt to compare the use of artificial refugia by slow-worms and adders. At all sites slow-worms showed an overall preference for tins in 2006. In 2005 this pattern was reversed at one site (i.e. slow-worms preferred felt), while at another there was no preference. However, these overall preferences conceal considerable variation within sites in refuge preference. At all three sites there were some locations where felt was preferred over tin – and vice versa – within the same year. When adders used artificial refugia they almost exclusively preferred tin over felt. However, at one site where adders were regularly

observed basking, both types of refuge remained unused for a period of several years. Temperature and relative humidity under different refugia were recorded continuously using data loggers. The mean daily temperature under artificial refugia varied from 10 C to 28 C between April and July 2006. Although felt provided a marginally warmer microclimate than tin, the thermal properties of the refugia displayed complex interactions with their location within the site, and with season. Relative humidity varied between 80% and 100% beneath refugia, with a slight decline between April and July. Once again, however, any differences in relative humidity between tins and felt depended very much on their location within the site and season. Refuge microclimate and refuge preference by reptiles therefore varies within sites, between sites and between years. Consequently, the detectability of different species will be equally variable, and needs to be taken into account when designing reptile surveys.

Lusitania revisited: How did natterjack toads colonise Ireland?

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The Lusitanian question begs an explanation for the isolated occurrence of several species of plants and animals, including natterjack toads, in south-west Ireland. Hypotheses include natural (postglacial) colonisation via southern England, introduction by humans, and the persistence of a refuge during the last ice age. We used molecular genetic methods (mitochondrial DNA and microsatellites) to test these hypotheses. The results indicated that natterjacks must have survived somewhere north of the Pyrenees even at the height of the last glacial maximum about 20,000 years ago. Furthermore, they support the hypothesis that during the last (Younger Dryas) cooling, about 11,000 years ago, the toads probably survived in a refuge in or near southern Ireland. Introduction by humans and natural colonisation via southern England are not easily reconciled with the genetic data.

Using GIS to model opportunities for great crested newt metapopulation connectivity at the landscape level

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The viability of great crested newt metapopulations depends upon clusters of breeding ponds in hospitable terrestrial habitat without impermeable barriers. In such situations, dispersal and gene flow can occur between ponds, and opportunities for colonisation and recolonisation are maintained. Pond loss and habitat fragmentation in Britain has meant that population connectivity has been reduced in many places, and dispersal hampered; with the effect that isolated populations run the risk of extinction. With limited resources for great crested newt conservation, action must be targeted wisely. This project, funded by Countryside Council for Wales (CCW), aims to use GIS modelling to identify opportunities in northeast Wales for targeting pond creation, habitat management and other action to maximise the effects on connectivity and viability. Northeast Wales constitutes one of the great crested newt's strongholds in Britain, yet comparison of historic maps shows a pattern of severe pond loss there over the last 150 years. By attributing permeability 'costs' to land cover types, functional networks of accessible habitat can be mapped across the whole landscape. The larger the network, the more viable the population should be. The network maps can be used to identify areas with suitable ponds that are isolated due to impermeable terrestrial habitat, large-scale barriers to dispersal, and existing large networks where protection measures should be focused. The outcomes will be used to guide CCW's great crested newt conservation strategy, and could be applied elsewhere in Britain.

When is a spade not a spade? A study of population structure and genetic diversity in two similar sympatric anurans (*Bufo bufo* and *Rana temporaria*)

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A general prediction of the neutral theory is that genetic diversity should correlate positively with effective population size. We compared the genetic diversities across eight microsatellite loci of two widespread anurans, *Bufo bufo* and *Rana temporaria*, at shared multiple sites within their UK ranges. *Bufo bufo* consistently exhibited less genetic diversity than *R. temporaria* despite having greater census population sizes. We discuss reasons for this apparent contradiction, suggesting that distinct autecological features of the two species are the most likely explanation of the diversity differences seen.

Resource partitioning of sympatric *Norops* (Beta *Anolis*) in a subtropical mainland community in Belize.

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During an approximately four-week period the ecology and interrelationships of sympatric (*Norops* spp., Beta *Anolis*) was studied at a lowland forest site in Belize. The primary aim was to investigate aspects of niche overlap and resource partitioning among species in a typical mainland community by quantifying the dimensions of morphology, structural habitat and microclimate. Through characterization of each ecological niche our hope was that a clear understanding would arise of how these lizards partition the complex resource base and habitat in which they co-exist. Anole species at the study site clearly appear to partition environmental resources along the three major resource axes of micro-climate, habitat structure, and probably also prey size, as originally defined by Pianka (1974). Two of the species also show evidence of sexual size dimorphism, indicating that the 'total' niche of these species is further divided into two 'sub-niches' corresponding to each sex. Further experimental manipulations are required, however to demonstrate conclusively whether interspecific competition alone is responsible for structural patterns within anole communities such as this, and also to define the function of differential susceptibility among species to parasites. In the case of three species, a positive correlation between the number of lamellae on the fourth toe of the hind foot and perch height was observed, supporting the notion that lamellae number is highly adaptive for an arboreal lifestyle and related to habitat use.