

Short Note

Developing Land Snail Expertise in South and Southeast Asia, a New Darwin Initiative Project

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There is widespread concern that the World appears to have entered its sixth mass-extinction event and that current extinction rates will lead to a loss in biodiversity comparable to that at the end of the Mesozoic 65 million years ago (see for example: <http://news.bbc.co.uk/1/hi/sci/tech/3667300.stm>). A major attempt to respond to this crisis was the 1992 Convention on Biological Diversity (CBD) <http://www.biodiv.org/default.shtml>, a far-reaching international agreement with a powerful agenda that is likely to form the basis for international co-operation in biodiversity for many years to come. The CBD not only provides a framework by which nations exercise control of biological resources but recognises obligations for nations to record, conserve and understand their living diversity and seeks to promote international co-operation to that end¹.

At the launch of the CBD the British Government announced the Darwin Initiative, which seeks to assist countries that are rich in biodiversity to meet CBD objectives by harnessing British resources and expertise. Darwin Initiative funding provides support for both British workers and their project country partners to address CBD objectives. As these objectives include the understanding and recording of biological diversity and biological conservation, Darwin Initiative projects can facilitate international co-operation in developing a traditional

role of natural history museums and university biology departments.

The current project *Developing land snail expertise in South and Southeast Asia* seeks to build on two earlier Darwin Initiative land snail projects in Sri Lanka¹⁻¹⁰. The idea is for the Mollusca research group at The Natural History Museum, London, to work with the Mollusca research group in the Biology Department at Chulalongkorn University in providing regional support, initially to projects in India, Nepal, Laos Cambodia and Vietnam and with a project in Thailand. The Natural History Museum, London, offers rich collections of reference specimens with extensive series of historical specimens, including many types, and it has the most extensive specialist literature resources available anywhere for the land snails of South and Southeast Asia. The research group in Thailand, led by Somsak Panha at Chulalongkorn University, has been very active working on many aspects of land snail research since 1988¹¹⁻¹⁶. We have been developing collaborative links for sometime and recognise a common purpose in seeking to develop co-operative land snail research in the region. In addition to having this large, dynamic research group, which can act as a regional focus of land snail research, Thailand has a diverse snail fauna with a rich component associated with the extensive ranges of limestone hills and outcrops, including many micro-snails¹⁷. Thailand also has the advantage of occupying a key zoogeographical position with a snail fauna ranging from Indo-Himalayan to the north and

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west to Malaysian in the south and Indo-Chinese to the east. These projects will be based on taxonomic inventory surveys as a basis for systematic research and development of conservation strategies. A separate project based in Sri Lanka will be an extension of our earlier projects there, and will focus on monitoring snail faunal recovery in a montane forest restoration project. In addition to research outputs, the projects will reach a wide audience through the publication of illustrated guides and communication through the media.

Land snails possess a number of characteristics that make them valuable tools for biological research, such as a shell that in the right conditions might become fossilised. It is not just as fossils that snails leave a record, a good picture of the species present in an area might be established at any time of day or season from shells alone. Living examples might only be encountered in humid conditions and when a snail's crepuscular activity brings it into view, but anyone looking through leaf litter will encounter empty shells. In addition, generally low powers of dispersal have a significant influence on the nature of distributions that make snails valuable subjects for studies in historical biogeography^{6,10}.

Most invertebrates disappear without trace, but it has long been recognised that the possession of a shell allows the presence of species at a site to be detected and permits the extinction of many land snails to be recorded. Charles Darwin¹⁸, provided a succinct and erudite exposition of the value of land snails in studying environmental change. When the *Beagle* arrived off St Helena in 1836 natural forest cover had long been lost. On the higher parts of the island numerous shells of *Chilonopsis*, an endemic genus of distinctive land snails, attracted Darwin's attention and he noted (page 470) that 'it is remarkable that none of them are now found living. Their extinction has probably been caused by the entire destruction of the woods, and the consequent loss of food and shelter, which occurred during the early part of the last century'. He added that 'there can be little doubt that this great change

in the vegetation affected not only the land-shells, causing eight species to become extinct, but likewise a multitude of insects'.

It is the 'destruction of the woods' particularly the loss and fragmentation of tropical rainforest that is likely to account for most of the recent and ongoing species extinctions. A high priority for biologists at a time of major extinctions should surely be to aim to prevent extinction and maintain viable populations of species. To achieve this we need to know what species exist, something of their range and abundance, what threats they face and what conservation measures might be taken.

In the current extinction crisis, which is so far almost exclusively confined to non-marine organisms, we consider land snails to be a high-priority group under CBD criteria, in part because of their high extinction levels. Known extinctions of land snails are disproportionately high and there is clear evidence for snail extinctions over the past few hundred years that exceed those known for all other animal groups combined. From the Hawaiian Islands alone Cowie et al.¹⁹ estimated that some 570 of the 763 species listed in their catalogue are probably extinct and this does not take account of the c. 200 species of 'known' but undescribed species of now extinct Hawaiian charopids in the Bishop Museum. Compare this with the 484 recorded extinctions cited by Groombridge²⁰ for all animal groups, which includes 191 molluscs. The 2002 IUCN Red List (www.redlist.org) records 1222 land snail species as being threatened but fewer than 2% of described molluscs have had their conservation status properly assessed²¹. We clearly have little measure of the problem. Furthermore, there are many new species to be described. For example, the Sri Lankan snail fauna was thought to be well known prior to our recent surveys but over 40% of the species collected were new to science.

The approach adopted by the Frozen Ark project (www.frozenark.org) accepts that the extinction of a large number of species cannot be avoided. Ultimately it aims to store viable

cells from animals in danger of extinction but will also collect, preserve and store DNA of threatened species that might be lost. The project organizers consider that ‘no more animals should be allowed to approach extinction without such material being conserved’. Land snails have been identified as the priority trial group for the Frozen Ark. We accept the case made for the Frozen Ark project and will work with the affiliated organisations to contribute to their collections.

At the 2002 Johannesburg World Summit on Sustainable Development a target was set for achieving a significant reduction in the current rate of biodiversity loss by 2010²². This 2010 target has stimulated a number of initiatives including recognition of the need for suitable indicators of biodiversity and the immediate need for a global extension of monitoring programmes and developments in capacity building²³. An IUCN response to the 2010 target is the development of a Sampled Red List Index (SRLI). This seeks to provide information on trends in extinction risk for major taxonomic groups and for species in different biogeographic regions and ecosystems. Molluscs were recognised as one of twelve taxonomic groups that were considered for the index, and in March 2005 one of us (FN) was invited to a meeting at which a final decision was made on the groups to be included in the index. It is clear from the above that land snails should be a key group in any such undertaking. However, the advice given (FN) at the meeting was that there was insufficient global expertise in land snails for their inclusion to be viable. In this new project we hope to contribute to remedying this situation for South and Southeast Asia.

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