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THE SCIENTIFIC VALUE OF COLLECTIONS*

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ABSTRACT

The global action plan 'Agenda 21', adopted by the United Nations Conference on the Environment and Development (UNCED) at Rio de Janeiro in 1992, prompts a significant element of English Nature's (EN) corporate plan. Together with Convention on Biological Diversity, Agenda 21 calls for participating countries to establish national strategies to inventory and understand their own biodiversity and develop programmes to conserve it for the future. The UK response was published in January 1994, as a set of white papers of which two, the strategy for sustainable development[1] and the biodiversity action plan[2] ,are of particular significance in guiding the work of EN. In support of the task to define ecosystems and designate sites, and to categorise rare or endangered species in need of conservation, staff of English Nature (as of any other national conservation organisation) depend on systematics knowledge and reliable identifications of the British wildlife resource.

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INTRODUCTION

The global action plan 'Agenda 21', adopted by the United Nations Conference on the Environment and Development (UNCED) at Rio de Janeiro in 1992, prompts a significant element of English Nature's (EN) corporate plan. Together with Convention on Biological Diversity, Agenda 21 calls for participating countries to establish national strategies to inventory and understand their own biodiversity and develop programmes to conserve it for the future. The UK response was published in January 1994, as a set of white papers of which two, the strategy for sustainable development[1] and the biodiversity action plan[2], are of particular significance in guiding the work of EN. In support of the task to define ecosystems and designate sites, and to categorise rare or endangered species in need of conservation, staff of English Nature (as of any other national conservation organisation) depend on systematics knowledge and reliable identifications of the British wildlife resource.

EN is also charged with wider national and international responsibilities, shared with the Countryside Council for Wales (CCW) and Scottish Natural Heritage (SNH), and administered through the Joint Nature Conservation Committee (JNCC). Around the world, tens of thousands of species of plants and animals are kept in cultivation or captivity, and their breeding and trade generate billions of dollars. For example, about 3000 species of decorative plants are cultivated in the United Kingdom alone. With technical advances in propagation and culture, over 5000 species of orchids are now being traded worldwide. At the level of international commerce, hundreds of millions of dollars each year are generated through trade in birds, reptiles, frogs, tropical fishes, butterflies, spiders and other animals. This vast worldwide trade has placed severe pressures on some natural populations. Effective monitoring and enforcement of laws preventing illegal trade depend on accurate identifications of species, many of which often look very

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similar. Systematics data contribute directly to the implementation and enforcement of the relevant international treaties and conventions, such as the Convention on International Trade in Endangered Species (CITES), for which EN is responsible, through the JNCC.

The wider international community faces severe challenges both in attempting to carry forward the UNCED commitment and in the implementation of CITES. One limitation is the inadequacy of resources in those countries housing most of the world's species. Through my professional involvement, I am acutely aware that many species-rich tropical countries are poorly equipped with the appropriate scientific infrastructure to provide the knowledge necessary for effective decision-making for biodiversity conservation within their territories or for the control of international trade.

BIODIVERSITY CONSERVATION

A prior requirement to conserving biodiversity is to discover, describe and inventory the species of a territory or region. Because most species are very small organisms, and often difficult to study, the biological diversity in all parts of the world remains imperfectly known. It would probably be impossible to list all the species living in a typical family garden found anywhere on the globe, let alone in one of the more complex ecosystems such as tropical rainforest.

Systematics research plays a fundamental role in the management and conservation of biodiversity and the palaeontological heritage. The support and enhancement of systematics must be an inalienable component of any biodiversity action plan. To date, systematists have described about 1.4 million species, most of which are insects. Estimates of the numbers of undiscovered and undescribed species range from 10 million to over 100 million. Such staggering numbers seem perfectly probable when we reflect that in tropical rain forests, hundreds of species of insects can be found on a single tree, more than a hundred different kinds of trees can grow in a one hectare plot, and thousands of species of mites, nematodes, fungi and (other) microorganisms can occur in one cubic metre of soil or leaf litter on the forest floor.

The many ecosystems in the world certainly contain millions of species, having extraordinarily complex interactions. Nature conservation managers study the dynamics of these interactions but, because of gaps in knowledge