

# Darwin Initiative Annual Report

## Darwin Project Information

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Project Title	Conservation of fungi - a voice for vulnerable and unprotected organisms
Country(ies)	Argentina, Armenia, Cuba, India, Saudi Arabia, South Africa, Ukraine
UK Contract Holder Institution	BioNET-INTERNATIONAL
UK Partner Institution(s)	
Host country Partner Institution(s)	Universidad de Buenos Aires [& others]
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Project Leader Name	D.W. Minter
Project website	<a href="http://www.cybertruffle.org.uk/darwin-microfungi">www.cybertruffle.org.uk/darwin-microfungi</a>
Author(s), date	D.W. Minter, 29 April 2008

## 1. Project Background

Despite ample evidence of serious decline in many populations, fungi are almost completely unprotected worldwide. Most conservation law covers only animals and plants. Most protected areas lack policies to manage fungi in their care. The need for fungal conservation is rarely vocalized, so most policymakers are unaware of the issue. The few existing resources are directed only to Basidiomycetes, mainly in Europe and Australasia. For other fungi - microfungi - the conservation gap is total. In 1992, the Rio Convention year, Britain led the world in systematic mycology. Since then, our professional experts in microfungi have declined by over 85%, and average age has increased from 42 to 55. The picture is similar in other countries with previously strong mycological traditions. Urgent action is required to pass on expertise before it is gone forever, but countries with potential to develop future mycology lack key resources. This project works worldwide (but with key partners in Argentina, Armenia, Cuba, India, Saudi Arabia, South Africa and Ukraine) to address those issues. The purpose of the project is to initiate a global movement for biodiversity conservation of microfungi (a huge array of organisms covered by the *Convention on Biological Diversity* [CBD], but currently with no explicit protection anywhere in the world) by three key actions:

- establishing three [World Conservation Union \[IUCN\]](#)-compatible Specialist Groups (for [1] non-lichen-forming ascomycetes & conidial fungi, [2] rusts & smuts, and [3] chromistans, chytrids, myxomycetes & zygomycetes), working through them to prepare global conservation plans for fungi covered by each;
- in co-operation with the IUCN's [Sampled Red List Project](#) and compatible with its [red list assessment criteria](#), preparing and publishing global conservation status assessments for over 800 sample species of microfungi as baseline information for the CBD's [2010 Biodiversity Target](#);
- building capacity for conservation of microfungi and their sustainable use, prioritizing Africa, by training mycologists, enhancing web-based informational resources for mycology and recycling used equipment.

**Cybertruffle** ([www.cybertruffle.org.uk](http://www.cybertruffle.org.uk)). The present Darwin Initiative project has enormously enhanced development of the *Cybertruffle* server, which is now one of the world's largest internet resources for information about fungi. Throughout this report, there are frequent references to websites on that server. Three of the websites are particularly relevant to the current project: *Cyberliber* ([www.cybertruffle.org.uk/cyberliber](http://www.cybertruffle.org.uk/cyberliber)), the digital library for mycology, *Cybernome* ([www.cybertruffle.org.uk/cybernome](http://www.cybertruffle.org.uk/cybernome)), providing nomenclatural and taxonomic

information about fungi and their associated organisms, and *Robigalia* ([www.cybertruffle.org.uk/robigalia](http://www.cybertruffle.org.uk/robigalia)), providing information about the occurrence and distribution of fungi and their associated organisms. Those websites and their databases are described and discussed in section 3.1.3 of this report. The reader is accordingly invited and advised to visit and explore the *Cybertruffle* websites to understand fully their significance in the work of this project.

## 2. Project Partnerships

**Partnership between the UK lead institution and host country partner(s).** There has been frequent and active e-mail contact between the UK Project Leader and project partners in all of the participating countries. The main overseas partner, Dr Andrea Romero (Argentina), met Dr Minter twice during the year (Baton Rouge, USA, August 2007; Recife, Brazil, November 2007). Dr Siranush Nanagulyan (Armenia) met Dr Minter once (St Petersburg, Russia, September 2007). Dr Mayra Camino (Cuba) met Dr Minter three times (Alcalá de Henares, Spain, June 2007; Havana, Cuba, November 2007; Havana, Cuba, March 2008). Dr Tykhonenko (Ukraine) met Dr Minter four times (Kiev, Ukraine, July 2007; Kiev, Ukraine, October 2007, Kiev, Ukraine, January 2008; Kiev, Ukraine, March 2008). Contact with Dr Sankaran (India), Dr Al-Cashgari (Saudi Arabia) and Dr Rong (South Africa) was only by e-mail.

In each partnership there has been distinct progress.

- **Argentina.** Agreement to hold a symposium on fungal conservation at the *VI Congreso Latino-Americano de Micología* (Mar del Plata, November 2008), with Dr Romero and Dr Minter as joint organizers. Preparations for the symposium began in late 2007 and are on schedule. Dr Romero has helped to prepare Spanish versions of *Cybernome* and *Robigalia*. These versions are now fully functional. Keyboarding of fungal records relating to Argentina has also been begun.
- **Armenia.** Dr Nanagulyan is preparing Armenian versions of *Cybernome* and *Robigalia*. The fixed pages are ready, and work on the dictionaries is in progress. Keyboarding of fungal records relating to Armenia has also been begun.
- **Cuba.** A workshop on using *IUCN* criteria to evaluate the conservation status of fungi was held in November 2007. Cuban mycologists have subsequently prepared draft national-level conservation status evaluations for over 200 species of fungi. Dr Camino has helped to prepare Spanish versions of *Cybernome* and *Robigalia*. These versions are now fully functional.
- **India.** Dr Sankaran is preparing Hindi versions of *Cybernome* and *Robigalia*. He has also begun the work of digitizing the checklist of fungi of India produced in the 1980s by Bilgrami & co-workers. The Indian component of this digitizing work has the following components: scanning to produce JPG images of each page, processing with OCR software to obtain text, correction of the text, editing the text to a format suitable for reading into a database. That will be followed by further processing by Dr Minter in the UK. Furthermore, Dr Sankaran has collaborated in producing an on-line version of the *Fungi on Eucalyptus* book which he produced with Dr Minter over ten years ago as a Darwin Fellow.
- **Saudi Arabia.** Dr Al-Cashgari has helped to prepare Arabic versions of *Cybernome* and *Robigalia*. The dictionaries are nearly ready, but work on the fixed pages has not yet begun. The Arabic version will be particularly challenging, as the script reads from right to left.
- **South Africa.** Dr Rong has led the *African Mycological Association* over the last year, exploring possibilities for courses and for a possible continental-level congress within the next two or three years. Plans to hold courses have encountered various problems. In particular, it was necessary to delay a hoped for course in Kenya because of political instability at the end of 2007. Contact with a possible Kenyan local organizer has now been resumed, and it is hoped that this course will now take place in 2008. A large number of fungal records relating to South Africa have already been keyboarded.
- **Ukraine.** A workshop on using *IUCN* criteria to evaluate the conservation status of fungi was held in October 2007 (with subsequent follow-up workshops). Ukrainian mycologists have subsequently prepared draft national-level conservation status evaluations for over 60 species of fungi. Dr Tykhonenko has supervised significant amounts of the scanning work for *Cyberliber*. Another Ukrainian mycologist, Dr T.W. Andrianova, has prepared Russian

and Ukrainian versions of *Cybernome* and *Robigalia*. These versions are now fully functional.

**Other collaboration.** The first year of this project has seen very active extension of collaboration to other existing or new partners. Close co-operation with *IndexFungorum* ([www.indexfungorum.org/Names/Names.asp](http://www.indexfungorum.org/Names/Names.asp)) the *de facto* world nomenclator for fungi is perhaps the most important (*Cyberliber*, as described in section 3.1.3 of this report, provides the literature backing for *IndexFungorum*), but it is also highly significant that the partners for Georgia, Dominican Republic, Mexico, Puerto Rico, Trinidad & Tobago and Venezuela were either participants of earlier Darwin Initiative projects or contacted as a result of earlier Darwin Initiative projects. Some of the larger areas of collaboration are listed below.

- **Austria.** Dr Walter Jaklitsch (Wien) has prepared German versions of *Cybernome* and *Robigalia*. These versions are now fully functional. Following earlier agreement by the Editorial Board of *Sydowia*, Austria's main scientific journal for mycology, ten of its volumes have been added to the *Cyberliber* website on the *Cybertruffle* server.
- **Brazil.** Dr Manuela da Silva (Rio de Janeiro) and other Brazilian mycologists have collaborated in producing a website on the *Cybertruffle* server dedicated to *Fungi of Brazil*. This website is powered by the *Cybertruffle* databases. Dr da Silva, furthermore, has prepared Portuguese versions of the *Cybernome* and *Robigalia* databases, and these versions are now fully functional. Dr Leonor Maia (Recife) has agreed to organize keyboarding of the huge fungal reference collection made by Batista and co-workers. There are about 80,000 specimens which represent the single largest accumulation of material of microfungi from Brazil. Information from over 5,000 collection packet labels has already been keyboarded. She has also obtained permission for the approximately 600 publications by the former *Instituto de Micologia da Universidade do Recife* to be made available through *Cyberliber*, and work on that is in progress. At the annual meeting of the *Brazilian Mycological Society* in November 2007, Dr Minter persuaded Brazilian mycologists to establish a specialist group to work on fungal conservation. Dr Robert Barreto (Universidade Federal de Viçosa) has kindly agreed to lead that group, and will report at the *VI Congreso Latino-Americano de Micología* (Mar del Plata, November 2008).
- **Chile.** Dr Hernán Peredo (Valdivia) has collaborated in producing a website on the *Cybertruffle* server dedicated to *Fungi of Chile*. This website, which functions in English and Spanish, is powered by the *Cybertruffle* databases. Dr Peredo, furthermore, helped prepare the now fully functional Spanish versions of the *Cybernome* and *Robigalia* websites.
- **China.** Dr Jin Jing (Qingdao Agricultural University) has prepared now fully functional Chinese versions of the *Cybernome* and *Robigalia* websites. Dr Jin Jing demonstrated those websites at the *Asian Mycological Congress* in December 2007.
- **Dominican Republic.** Dr Omar Pérdomo (Santo Domingo) has collaborated in producing a website on the *Cybertruffle* server dedicated to *Fungi of the Dominican Republic*. This website, which functions in English and Spanish, is powered by the *Cybertruffle* databases.
- **France.** M. Jean Béguinot, an amateur mycologist, has prepared French versions of *Cybernome* and *Robigalia*. These versions are now fully functional.
- **Georgia.** Ms Angelina Jorjadze (Tbilisi), a postgraduate mycologist student, has prepared Georgian versions of *Cybernome* and *Robigalia*. These versions are now fully functional.
- **Mexico.** Dr José Marmolejo (Nuevo León) has collaborated in producing a website entitled *Fungi on Pinus* based on work done with Dr Minter over ten years ago as a Darwin Fellow. This website, which functions in English and Spanish, is powered by the *Cybertruffle* databases.
- **Poland.** Dr Malgorzata Ruskiewicz-Michalska (Łódź) has prepared Polish versions of *Cybernome* and *Robigalia*. These versions are now fully functional. Various Polish mycologists in Łódź are actively contributing scanned digitized literature for the *Cyberliber* website. In particular, the Editorial Board of *Acta Mycologica*, Poland's main scientific journal for mycology, has kindly given permission for scanned images of its volumes to be added to the *Cyberliber* website on the *Cybertruffle* server.
- **Puerto Rico.** Dr Sharon Cantrell & Dr Jean Lodge (San José) have collaborated in producing a website on the *Cybertruffle* server dedicated to *Fungi of Puerto Rico*. This website, which functions in English and Spanish, is powered by the *Cybertruffle* databases. In August 2007, in Baton Rouge, Louisiana, at the annual meeting of the Mycological

Society of America, jointly with Dr Minter, Dr Cantrell led a symposium on *Fungi and the Rio Convention*. A proposal was made to establish a specialist group for fungal conservation within the Mycological Society of America. The society's executive is now considering that proposal.

- **Trinidad & Tobago.** Ms Doreen Jodhan (St Augustine), who collaborated with Dr Minter in the earlier Darwin Initiative project *Fungi of the Caribbean*, has now collaborated to produce a website on the *Cybertruffle* server dedicated to *Fungi of Trinidad & Tobago*. This website is powered by the *Cybertruffle* databases.
- **USA.** Following agreement from the Editorial Boards of *Mycotaxon* and *Mycologia*, two of the world's most prestigious mycological scientific journals, based in the USA, scanned images of their journals are being to the *Cybertruffle* website on the *Cybertruffle* server.
- **Venezuela.** Dr Teresita Iturriaga (Caracas), who participated in the earlier Darwin Initiative project *Fungi of the Caribbean*, has collaborated in producing a website on the *Cybertruffle* server dedicated to *Fungi of Venezuela*. This website, which functions in English and Spanish, is powered by the *Cybertruffle* databases.

### 3. Project progress

In general, activities have been carried out more or less as planned, with the following exceptions:

- progress in development of internet information facilities for mycology has gone spectacularly better than planned;
- in the light of experience, it has been necessary to change the plans for producing global conservation status evaluations (although this change is unlikely to affect project outputs).

At the start of the project, following discussions, a detailed project plan was produced and distributed to all participants. Information about the project and about conservation of microfungi was disseminated at a series of international mycological meetings throughout 2007: *European Mycological Association Linnaeus Tercentenary Meeting* (Uppsala, Sweden, May 2007), *Mycological Society of America Main Annual Meeting* (Baton Rouge, USA, August 2007), *XV Congress of European Mycologists* (St Petersburg, Russia, September 2007), *Annual Meeting of the Brazilian Mycological Society* (Recife, Brazil, November 2007), *World Fungi 2007, International Conservation Meeting* (Córdoba, Spain, December 2007). The meetings in Baton Rouge, St Petersburg, Recife and Córdoba all had sessions explicitly dedicated to fungal conservation, those in Baton Rouge and St Petersburg being specifically organized through this project. Plans have also been initiated to advertise the work of this project through further meetings, including microfungi conservation workshops, in Ukraine (*6th International Congress for Systematics & Ecology of Myxomycetes*, Yalta, October 2008), Rumania (*European Council for Conservation of Fungi Meeting*, October 2008), Argentina (*VI Congreso Latino-Americano de Micología*, Mar del Plata, November 2008) and, tentatively, at a meeting specifically devoted to Darwin and mycology in Thailand (2009) and at the 2009 *Annual Meeting of the Mycological Society of America* (Utah, USA).

#### 3.1 Progress in carrying out project activities

##### 3.1.1. Formation of specialist conservation groups

The three proposed specialist groups have now been established. Trawls for members of each group were made at the international scientific meetings of mycology listed above. As a result, membership of each group is currently as follows:

- **Ascomycetes & their conidial states.** J. Berubé (Canada), S. Cantrell (Puerto Rico), V.P. Hayova (Ukraine), J. Mena Portales (Cuba), D.W. Minter (UK), A.I. Romero (Argentina).
- **Rusts & smuts.** R. Barreto (Brazil), C. Denchev (Bulgaria), Yu.Ya. Tykhonenko (Ukraine).
- **Chromistans, myxomycetes & zygomycetes.** M. Cafaro (Puerto Rico), M. Camino Vilaró (Cuba), T.I. Krivomaz (Ukraine).

Membership of these groups is expected to develop further. Preliminary websites exist for each group, but these have not yet been updated to reflect the new members. Each group is now

considering what activities it should be starting. A draft strategy for trichomycete conservation has been prepared, and work has begun on a document reviewing possible impacts of climate change on fungi. Work has also begun to prepare an internet version of Cuba's national strategy for conservation of fungi. These will, in due course, appear on the website(s) of the new specialist groups. For as many countries as possible, the internet-accessible CBD national biodiversity plans and strategies have been downloaded, and have been collated to extract information about what is being done in respect of the fungi. When that information is extracted, it will be subjected to a critical appraisal. At this point, the indications are that the fungi have been almost totally overlooked by those CBD plans and strategies. Some very preliminary and cautious assays have been made into the world of active conservation. A document prepared under the name of the *European Mycological Association* was submitted by the project leader to the UK House of Lords Science and Technology Committee (an electronic copy is submitted with this report and the reviewer is invited to read it; the document is also available on-line from parliament's website [www.parliament.uk/documents/upload/stSTEuropeanMycologicalAss.pdf](http://www.parliament.uk/documents/upload/stSTEuropeanMycologicalAss.pdf)). Letters have been written to the media.

### 3.1.2. Sampled red lists of fungi

**The list of fungi to be evaluated.** At the start of the project, Dr Ben Collen (*Zoological Society of London*) was consulted for advice about sampling techniques. At the time when the original proposal for the current project was submitted, the number of species to be sampled for 99% and 95% confidence limits had not yet been determined. Dr Collen advised that the ideal sample size for a single taxonomic group has now been determined as 1500 species, but that 900 species is acceptable for the lower confidence limit. As a result, a decision was made to exclude chromistans, myxomycetes, rusts, smuts and zygomycetes from the list of microfungi to be evaluated, because their inclusion would have resulted in a statistically unacceptable level of initial diversity. The one remaining category - the ascomycetes, including lichen forming species - is in any case by far the largest group of microfungi. Using the *IndexFungorum* database 1500 ascomycete species were randomly selected (this list is available on-line from the project's website: [www.cybertruffle.org.uk/darwin-microfungi/names\\_1500.htm](http://www.cybertruffle.org.uk/darwin-microfungi/names_1500.htm)). From that selection, a subset of 900 species was randomly selected to form the list to be evaluated by the current project. The evaluation of 900 species is more than compatible with the original project proposal, which promised evaluation of over 800 species.

**Evaluation using IUCN criteria.** Shortly after the start of the project, Dr Craig Hilton-Taylor (*IUCN*) was contacted for advice about evaluation techniques. Copies of the *IUCN*'s evaluation criteria, standard forms for evaluation, and database template for storing evaluation data were downloaded from the *IUCN* website. Copies of the evaluation criteria and standard forms were distributed to project participants and certain mycologists suitable for making evaluations were identified. Six training workshops involving from three to fifteen participants were then held in Alcalá de Henares (Spain) [Cuban participants were in Europe funded by other projects, and this was an excellent opportunity to start without great costs to the Darwin Initiative], Kiev (Ukraine) [two workshops] and Havana (Cuba) [three workshops]. The *IUCN* criteria and forms are designed for animals and plants, and during these workshops it rapidly became clear that there are many difficulties when using them to evaluate fungi. These difficulties are being noted and collated with the intention of drawing them to the attention of the *IUCN*. There was a strong feeling at each workshop that for conservation of microfungi to progress, it will be necessary to obtain recognition by *IUCN* that the fungi are separate and have different needs from animals and plants. During the workshops, it also became clear that a lot of training and practice, together with much better access to information, would be necessary before global level evaluations could be begun. As a result, a decision was made to start by preparing national-level evaluations of microfungi for participating countries (mycologists could be reasonably expected to have access to information about the occurrence of fungi in their own country, and to be familiar with the status of those organisms) while the question of better access to information was being addressed (see below). To date, therefore, about 50 evaluations of microfungi have been produced for Ukraine, and about 200 evaluations for Cuba. These are currently in MS-WORD format, following the *IUCN* criteria as nearly as possible, although lacking distribution maps. These evaluations have not yet received peer-group assessment, but after that has happened, further training can be expected.

**Standards.** For conservation of microfungi, globally, there are very few experts, and each expert has to work with hundreds or thousands or even tens of thousands of species. Such a person cannot be an expert in the same sense as the expert in bird conservation, where an individual is unlikely to be responsible for more than a few tens of species. A bird expert can be expected to have in-depth knowledge of each species within his or her remit. That is likely to extend to geographic distributions, changes in status, abundance, rarity, relevant literature, and names of other people who can offer further help and advice. For an expert in microfungi, none of this can be assumed. To evaluate the conservation status of microfungi, therefore, much more so than for vertebrates or flowering plants, it is necessary for the “expert” to consult reference collections, literature, the internet and other sources. That being so, it is also necessary to establish norms determining what information sources should be consulted. Without those norms, the user cannot have confidence that the conservation status assessment is soundly based and that the assessment of one species is comparable with that of another. As a first step, therefore, work was begun on a document establishing standard sources of information which will be consulted when microfungi are evaluated. These sources are divided into two main categories: general sources which should be consulted for every species, and specialist sources which should only be consulted when appropriate, for example works devoted to a particular taxonomic group, or a particular geographical area. This document is still being compiled, and version 1.00 will be in use, and will be made publicly available on the internet during the second year of the project.

**Informational infrastructure.** Dr Hilton-Taylor has advised that the *IUCN* hopes to phase out the use of conservation status evaluation forms in MS-WORD format, in favour of a general move to databasing all evaluation information. While this project's work supports such a move in general terms, there are problems in applying it directly to the case of microfungi, because the species name dictionaries supplied by *IUCN* contain no names of fungi. It is hoped that, rather than re-invent the wheel, *IUCN* will be able in due course to link its database directly to the *IndexFungorum* nomenclator. In the meantime, this project will continue to accumulate evaluations in MS-WORD format, but will also take steps to move the information contained in those files to a database format compatible with that of the *IUCN*, but linked through the *Cybernome* website to the *IndexFungorum* nomenclator. Those databases will then be made available for public viewing through the *Cybertruffle* server. This is likely to be an important step during the second year of this project.

### **3.1.3. Enhanced capacity for conservation of microfungi**

**Training courses.** Six workshops (on making conservation status evaluations of microfungi using *IUCN* criteria) have already been mentioned. In addition, there have been further workshops to enhance editorial skills keyboarding biological records of fungi for *Robigalia* and to prepare web pages for *Cyberliber*. Problems have, however, been encountered in organizing training courses in Africa. Plans were in place for a course in Kenya, when severe political problems in the country caused them to be abandoned. An attempt to set up a course in Morocco was unsuccessful when agreements could not be reached over a suitable budget for the course. The political situation in Kenya now seems more settled again, and efforts will begin again to organize a course there.

**Equipment.** Several of each of the following (laptop computers, specialized book scanners, memory-sticks, digital cameras, rechargeable batteries and battery chargers, and digital camera memory cards) have been purchased and delivered to beneficiaries among the project participants. The book scanners have, on the one hand, been excellent in facilitating high quality images from publications but, on the other hand they have also been rather fragile, and at least one developed significant problems, perhaps through rough handling by air-baggage handlers during transport. In addition, work has begun to upgrade the *Cybertruffle* server, where the hard disk is already nearly full.

**Web-based information resources.** The first year of this project has seen a phenomenal development in website resources for mycology through the *Cybertruffle* server. The server uses the LINUX operating system, and the databases referred to below use MySQL software. Access programs are written in PERL. The three main websites (*Cyberliber*, *Cybernome* and *Robigalia*) are described below. Each is fully integrated with the others. *Cybernome* and *Robigalia*, which contain information generated over the past twenty-five years (much of it

funded through earlier Darwin Initiative projects), are totally new, and have appeared as a result of the current project. *Cybernome* and *Robigalia* can each be accessed in ten different languages (Chinese, English, French, Georgian, German, Polish, Portuguese, Russian, Spanish, Ukrainian). Further versions, including Arabic, Armenian and Hindi, are currently being prepared. The full functionality in all of those languages makes these websites probably unique among on-line databases for biodiversity, and means that their information is accessible not only to English-speakers, but to a much wider potential audience (the numbers in millions of speakers of these languages (native and otherwise), source Wikipedia, are as follows: Arabic [322], Armenian [6], Chinese [1,050], English [1,500], French [365], Georgian [4.1], German [170], Hindi [242], Polish [52], Portuguese [176], Russian [255], Spanish [500], Ukrainian [47]).

- **Cyberliber.** At the end of March 2008, *Cyberliber* ([www.cybertruffle.org.uk/cyberliber](http://www.cybertruffle.org.uk/cyberliber)) was providing free access to over 59,000 bibliographic records relating to scientific publications about fungi, and to over 135,000 scanned images of individual pages from those publications. The number of scanned pages available has already more or less doubled in size as a result of the current project: over the past year, scanned images of over 70,000 pages of mycological literature have been added. This includes all of the out-of-copyright volumes of standard species catalogues (*Saccardo*, *Petrak's Lists*, *Index of Fungi*, *Zahlbruckner* etc.) which are fundamental for any work of this nature (Fungi may be the only biological kingdom for which full catalogues are freely available on-line). It also includes, among many other publications, 70 volumes of *Mycotaxon*, and more than 30 volumes of *Mycologia*. *Cyberliber* is currently the largest single repository of mycological literature freely available on the internet, and is expected to exceed this project's target of 200,000 pages available on-line before the project ends in 2010. Significantly, it is fully integrated with *IndexFungorum*, the world nomenclator for the fungi: as a result, for a huge number of scientific names of fungi, the user of *IndexFungorum* can click on a hyperlink to view the actual original description and designation of the nomenclatural type.
- **Cybernome.** More than 560,000 records relating to the nomenclature and taxonomy of scientific names of animals, chromistans, fungi, monerans, plants and protozoans have been made freely available on-line through the *Cybernome* website ([www.cybertruffle.org.uk/cybernome](http://www.cybertruffle.org.uk/cybernome)). The user can search for any scientific name over a wide range of taxonomic ranks. The result is a report to screen created dynamically, showing full information about the current name with authors and place of publication, its synonyms, rank and taxonomic position, with a list of component taxa. Hyperlinks connect the report to *Cyberliber*, *Robigalia* and a range of key external websites (Genbank, Google Images, IndexFungorum, International Plant Name Index, Landcare New Zealand, New York Botanic Garden Virtual Herbarium, USDA etc.). The user can move up or down taxonomic ranks, and from one kingdom to another, with great facility.
- **Robigalia.** More than 685,000 records of the occurrence in space and time of fungi and their associated organisms have been made freely available on-line through the *Robigalia* website ([www.cybertruffle.org.uk/robigalia](http://www.cybertruffle.org.uk/robigalia)). The user can view records of fungi and/or their associated organisms through a range of entry points. In particular, it is possible to select any country of the world, and see database records for that country. The search can be broadened or refined at any stage, even to the point of viewing single source records. In many cases there is an option to view a dynamically created distribution map. Where the map relates to a subnational unit (county, oblast', provincia, state etc.), the facilities exist to zoom in and to change the view from a map to a satellite image. Hovering the mouse cursor over a point on the map representing an individual record results in the original information for that record being displayed in a pop-up box. A particularly significant facility is the ability to reverse the search syntax, ie to specify an interest in the fungi associated with, for example, a particular plant rather than the plants associated with a particular fungus. This facility makes this website almost unique in biological recording in terms of the searching flexibility it provides.

Work to digitize further biological records of fungi has continued, with a particular emphasis on information relating to Africa. In addition to the 685,000 records already available through the *Robigalia* website, there is now a very substantial queue of additional records already keyboarded and awaiting editing. There are very few skilled editors within this project, and

training participants in editorial skills may therefore become a significant component of the work of the coming year.

### 3.2 Progress towards Project Outputs

In general there have been no changes in output level assumptions. Plans for production of global level conservation status evaluations have been subject to some change, although this is unlikely to affect the final output.

- **4C, 4D.** Planned output for 2007-2008 was 14 postgraduates trained through course(s). Actual output was zero. Progress in these outputs was hampered by the difficult political situation in Kenya. The project is likely to achieve all of this output by the end of March 2010.
- **6A, 6B.** Planned output for 2007-2008 was 4 workshops. Actual output was 6 workshops. The project is likely to achieve all of this output by the end of March 2010.
- **7.** Planned output for 2007-2008 was preparation of conservation assessment guidance notes. Actual output was draft conservation assessment guidance notes, with the final version expected soon. The project is likely to achieve all of this output by the end of March 2010.
- **8.** Planned output for 2007-2008 was UK partner to spend 8 weeks in host countries. Actual output was over 7 weeks. The project is likely to achieve all of this output by the end of March 2010.
- **9.** Planned output for 2007-2008 was progress towards conservation plans for ascomycetes, rusts, smuts, chromistans, chytrids, myxomycetes and zygomycetes (global, not one-country), and 800 individual species global red list assessments by the end of the project. Actual output was some progress in all of those areas: changes in production of global conservation status assessments are discussed elsewhere in this report. The project is likely to achieve all of this output by the end of March 2010.
- **10.** Planned output for 2007-2008 was progress towards extensive field guide style information for microfungi, available on-line, possibly also on CD in a format similar to the [Plants of Viñales](#) website by the end of the project. Actual output was some progress in this area. The project is likely to achieve all of this output by the end of March 2010.
- **11B.** Planned output for 2007-2008 was progress towards 7 paper publications by the end of the project. Actual output was 1 work submitted for publication, and more than 3 others at advanced manuscript stage. The project is likely to achieve all of this output by the end of March 2010.
- **12B.** Planned output for 2007-2008 was progress towards 3 existing databases (for nomenclature & taxonomy, observations & collections, and literature) shared as an international resource enhanced and freely available to all for interrogation on-line (team already has necessary skills); original national data sets freely available for participant and target countries; enormous shared scanned literature resource on-line for all by the end of the project. Actual output exceeded plans. The project is likely to achieve all of this output by the end of March 2010.
- **14B.** Planned output for 2007-2008 was progress towards project work being presented at 2 global and 5 continental level mycological congresses by the end of the project. Actual output was project work presented at 1 global level and 2 continental level mycological congresses, and various other major meetings. The project is likely to achieve all of this output by the end of March 2010.
- **15, 16.** Planned output for 2007-2008 was an unpredicted number of press releases and electronic newsletters. Actual output was a project website, and several announcements about the *Cybertruffle* server in a range of publications by mycological societies. The project is likely to achieve all of this output by the end of March 2010.
- **17A.** Planned output for 2007-2008 was progress towards establishment of 3 international specialist groups to conserve microfungi by the end of the project. Actual output was establishment of those groups. The project is likely to achieve all of this output by the end of March 2010.

- **20.** Planned output for 2007-2008 was part of a total of £23,000 by the end of the project. Actual output was an estimated £7,000. The project is likely to achieve all of this output by the end of March 2010.
- **23.** Planned output for 2007-2008 was part of a total of £84,000 by the end of the project. Actual output was an estimated £44,000, calculated as follows: access to CABI databases (£8,000); internet server space and related support (£2,000); donated salaries / time of self-funded participants (£4,000); donated equipment (£4,000); records keyboarded through *Global Biodiversity Information Facility* DIGIT project (US\$50,000 = £26,000). The project is likely to achieve all of this output by the end of March 2010.

### 3.3 Standard Measures

**Table 1 Project Standard Output Measures**

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Total planned from application
<b>4C, 4D</b>	14 postgraduates, 1 week each	0			0	14 postgraduates each year; 4 week-long training courses
<b>6A; 6B</b>	2 workshops, 4 days each	6			6	8 workshops (each 4 days long, 2 in year 1, 4 in year 2, 2 in year three); 6 working weeks
<b>7</b>	1 (conservation assessment guidance notes)	1			1	1 (conservation assessment guidance notes, first year)
<b>8</b>	UK partner 8 weeks in host countries	7			7	UK partner 8 weeks each year in host countries
<b>9</b>	work begun on 7 conservation plans, for ascomycetes, rusts, smuts, chromistans, chytrids, myxomycetes and zygomycetes (global, not one-country); work begun on 800 individual species global red list assessments					7 conservation plans, for ascomycetes, rusts, smuts, chromistans, chytrids, myxomycetes and zygomycetes (global, not one-country); 800 individual species global red list assessments
<b>10</b>	work begun on extensive field guide style information for microfungi, available on-line, possibly also on CD in a format similar to the <a href="#">Plants of Viñales</a> website					extensive field guide style information for microfungi, available on-line, possibly also on CD in a format similar to the <a href="#">Plants of Viñales</a> website
<b>11B</b>	1 manuscript submitted for publication; 3 manuscripts at advanced draft stage	0				7 (this team increasingly publishes on the internet, but the project will generate at least seven paper publications)
<b>12B</b>	3 existing databases (for nomenclature & taxonomy, observations & collections, and literature) shared as an international resource enhanced and freely available to all for interrogation on-line (team already has necessary skills); original national data	3			3	3 existing databases (for nomenclature & taxonomy, observations & collections, and literature) shared as an international resource enhanced and freely available to all for interrogation on-line (team already has

	sets freely available for participant and target countries; enormous shared scanned literature resource on-line for all					necessary skills); original national data sets freely available for participant and target countries; enormous shared scanned literature resource on-line for all
<b>14B</b>	project work presented at 1 global and 2 continental level mycological congresses	3			3	project work will be presented at 2 global and 5 continental level mycological congresses
<b>15, 16</b>	1 project website, notices in three mycological journals	4			4	press releases and electronic newsletters expected; numbers unpredictable
<b>17A</b>	3 international Specialist Groups established to conserve microfungi	3			3	3 international Specialist Groups established to conserve microfungi
<b>20</b>						£ (most budgeted equipment is for participant and target countries)
<b>23</b>						£

**Table 2 Publications**

Type * (eg journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (eg contact address, website)	Cost £
web server	<a href="http://www.cybertruffle.org.uk">www.cybertruffle.org.uk</a>		internet	free
website	<a href="http://www.cybertruffle.org.uk/cybernome">www.cybertruffle.org.uk/cybernome</a>		internet	free
website	<a href="http://www.cybertruffle.org.uk/cybernome">www.cybertruffle.org.uk/cybernome</a>		internet	free
website	<a href="http://www.cybertruffle.org.uk/cyberliber">www.cybertruffle.org.uk/cyberliber</a>		internet	free
website	<a href="http://www.cybertruffle.org.uk/darwin-microfungi">www.cybertruffle.org.uk/darwin-microfungi</a>		internet	free
website	<a href="http://www.cybertruffle.org.uk/brazfung">www.cybertruffle.org.uk/brazfung</a>		internet	free
website	<a href="http://www.cybertruffle.org.uk/chilfung">www.cybertruffle.org.uk/chilfung</a>		internet	free
website	<a href="http://www.cybertruffle.org.uk/cubafung">www.cybertruffle.org.uk/cubafung</a>		internet	free
website	<a href="http://www.cybertruffle.org.uk/dorefung">www.cybertruffle.org.uk/dorefung</a>		internet	free
website	<a href="http://www.cybertruffle.org.uk/eucafung">www.cybertruffle.org.uk/eucafung</a>		internet	free
website	<a href="http://www.cybertruffle.org.uk/pinefung">www.cybertruffle.org.uk/pinefung</a>		internet	free
website	<a href="http://www.cybertruffle.org.uk/puerfung">www.cybertruffle.org.uk/puerfung</a>		internet	free
website	<a href="http://www.cybertruffle.org.uk/querfung">www.cybertruffle.org.uk/querfung</a>		internet	free
website	<a href="http://www.cybertruffle.org.uk/trinfung">www.cybertruffle.org.uk/trinfung</a>		internet	free
website	<a href="http://www.cybertruffle.org.uk/valhalla">www.cybertruffle.org.uk/valhalla</a>		internet	free
website	<a href="http://www.cybertruffle.org.uk/venezuela">www.cybertruffle.org.uk/venezuela</a>		internet	free
website	<a href="http://www.cybertruffle.org.uk/ascos">www.cybertruffle.org.uk/ascos</a>		internet	free
website	<a href="http://www.cybertruffle.org.uk/moulds">www.cybertruffle.org.uk/moulds</a>		internet	free
website	<a href="http://www.cybertruffle.org.uk/rustsmut">www.cybertruffle.org.uk/rustsmut</a>		internet	free
website*	<a href="http://www.parliament.uk/documents/upload/stSTEuropeAnMycologicalAss.pdf">www.parliament.uk/documents/upload/stSTEuropeAnMycologicalAss.pdf</a>		internet	free

### 3.4 Progress towards the project purpose and outcomes

In general, the purpose level assumptions for this project still hold true and the indicators remain adequate for measuring outcomes.

- Three specialist conservation groups now exist.
- The list of microfungi to be evaluated now exists; mycologists with some experience in preparing IUCN compatible conservation status evaluations now exist.
- Some mycologists have been trained in conservation techniques; some equipment has been delivered; country and literature websites provide mycological information relevant to conservation.

### 3.5 Progress towards impact on biodiversity, sustainable use or equitable sharing of biodiversity benefits

At the time of writing this report, a quick search was made of the websites of some leading British organizations working with biodiversity. The numbers of hits for animals, fungi and plants were as follows.

Organization	hits for animals	hits for fungi	hits for plants
Darwin Initiative	2987	50	3001
Natural Environment Research Council	335	56	536
Natural History Museum	2461	500	2975
Royal Botanic Gardens, Kew	N/A	285	3465

Given that the fungi have long been recognized as a separate kingdom no less different and no less important than animals and plants, there is clearly a significant imbalance. The imbalance revealed by similar searches of biological resources in other countries is often far greater. Preliminary analysis of the national biodiversity action plans resulting from the CBD has also shown a huge imbalance. **Fungi are the orphans of Rio.**

This project is the first real attempt to raise a voice for conservation of microfungi - a group of organisms with virtually no explicit protection anywhere in the world. It is often said that real conservation of biodiversity can only be achieved through protection of habitats. To identify habitats, however, it is necessary to take into account the fungi: in short, areas of high fungal diversity do not necessarily coincide with areas of high animal or plant diversity, and defining habitats worthy of conservation purely on the basis of animal or plant information will not guarantee adequate conservation of the fungi. The information being made available on the *Robigalia* website through this project is a huge step towards permitting analyses of this type. The *Cybertruffle* websites covering individual countries (*Fungi of Cuba*, for example) significantly provide a first attempt at listing potential fungal endemics (this is currently only available in the English language versions). It is starting to become possible to assess biodiversity from a fungal rather than an animal or plant viewpoint. The long-term impacts of this project are therefore large: there is the possibility of starting to challenge entrenched, often ill-informed "flora and fauna" views of biodiversity in favour of a properly balanced and scientific standpoint.

## 4. Monitoring, evaluation and lessons

**Monitoring.** Internet use of the *Cybertruffle* websites is monitored (see statistics under *Dissemination* below). It is already clear that these websites are enormously valuable to and very frequently visited by the mycological community. The *Cybernome* and *Robigalia* websites are the only major internet resources for mycology which are truly international in scope and which provide full services in languages other than English.

**Evaluation.** The evaluations of the conservation status of fungi using IUCN criteria are currently being made only at the level of individual countries, particularly Cuba, the UK and Ukraine. The quality of these evaluations is, at present, being assessed by peer groups of mycologists. When the global level evaluations planned for this project begin, a more formal team of assessors will be put in place.

**Lessons.** The imbalance noted in 3.5 above carries important lessons for funds seeking to support biodiversity and for mycologists seeking to conserve fungi.

- An important consequence of the imbalance is that there are many projects and initiatives bearing general titles such as "Biodiversity Heritage Library" or "Forestry and Climate Change" where the organizers have not involved mycologists and the fungi are totally ignored. This is extremely damaging because the titles give a false impression that all organisms are being treated.
- Funding bodies with a remit to support general biodiversity work may wish to consider insisting that projects with general titles (e.g. "Community-based sustainable management of forest resources in Amazonian extractive reserves", "Conservation of the Cerrados of Eastern Bolivia...", "Biodiversity inventorying and monitoring for conservation of threatened Sumatran forest", "Capacity building for temperate rainforest biodiversity conservation in Chile", "A biodiversity monitoring system for Trinidad and Tobago", "Biodiversity monitoring in forest ecosystems in Bale Mountains National Park Ethiopia", "Facilitating Forest Restoration for Biodiversity Recovery in Indochina" etc.) explicitly include the fungi and, preferably, at least one mycologist as a member of the project team or, if that is not possible, that the titles of such projects are adjusted to indicate clearly that their work does not include the fungi (perhaps "Community-based sustainable management of animal and plant forest resources in Amazonian extractive reserves", "Conservation of the animals and plants of the Cerrados of Eastern Bolivia...", "Biodiversity inventorying and monitoring for animal and plant conservation in threatened Sumatran forest", "Capacity building for temperate rainforest biodiversity conservation of animals and plants in Chile", "An animal and plant biodiversity monitoring system for Trinidad and Tobago", "Biodiversity monitoring of animals and plants in forest ecosystems in Bale Mountains National Park Ethiopia", "Facilitating forest restoration for animal and plant biodiversity recovery in Indochina" etc.).
- Funding bodies with a remit to support general biodiversity work may wish to consider earmarking funds specifically for neglected groups such as the fungi. Systematic mycology - critically important for biodiversity - is highly likely to become extinct in the UK in less than ten years. It is critically endangered. Management plans for protected areas containing critically endangered species prioritize those species. The same could be done in biodiversity sciences for mycology.
- The very small number of mycologists and the very large number of fungi mean that problems in the evaluating conservation status of species are of an order of magnitude greater in mycology. These are compounded by the current rapid changes in information technology. Even two years ago, when the proposal for this project was being developed, it was possible to imagine the preparation of conservation status reports for microfungi without significant use of the internet. That is no longer the case. Since many of the mycologists with the experience to make those reports are in countries where internet access is poor or even non-existent, this is a major problem. Furthermore, fungi are organisms of unsettled taxonomy. That means there are likely to be several different scientific names in use for the same organism. If each fungus name has on average four synonyms any one of which might be correct (not an unrealistic estimate), it means that someone trying to evaluate the conservation status of that species must search in each information source under all five names. Supposing for the sake of argument that, for each species, the standards for consulting general sources of information require the evaluator to look at material in three main reference collections, ten main websites, the first twenty other websites identified by a search engine, and every volume of the four main mycological journals (approximately 100 volumes each journal) - and such a list would be a bare minimum - it means that for every species, the evaluator must look in  $(5 \times 3) + (5 \times 10) + (5 \times 20) + (5 \times 4 \times 100) = 3065$  places. To evaluate 900 species, that means more than 2.75 million different checks. It is clear that there is a need to mechanize this search as much as possible. To do that, the project is now concentrating on digitizing the cumulative indexes of main mycological journals and as many other indexes as possible. If those indexes are in machine-readable form, it will be possible to derive lists of relevant information sources for each species (and all the synonyms) mechanically. The result of this effort will be a delay in the start of preparing the global evaluations, but the benefit will be that the later start will mean much easier access to source material.

## 5.Actions taken in response to previous reviews (if applicable)

Not applicable.

## **6. Other comments on progress not covered elsewhere**

None.

## **7. Sustainability**

To date, the biggest single result from this project is the huge enlargement of the *Cybertruffle* server websites. This website is very sustainable, although the high level of traffic resulting from its popularity means that a lot of the time, the current bandwidth is being fully used. This is likely in turn to mean that alternative arrangements will need to be found for the server within the next year. The 900 conservation status evaluations planned through this project will serve as base-line information and, as such, have potentially an unlimited lifespan. The sustainability of the three specialist committees cannot yet be evaluated. Sustainability of expertise in fungal systematics is totally dependent on governmental support (see attached report to the House of Lords).

## **8. Dissemination**

See list of websites above. Statistics for October to December 2007 showed that an average of about 500 different users were accessing *Cybertruffle* websites every day, with numbers rising. More recent statistics are not yet available. The *Cyberliber* website on the *Cybertruffle* server and the *IndexFungorum* website are particularly closely linked so that users of one very frequently go on to access the other. Together, they probably comprise the single most important resource for systematic mycology on the internet.

## 9. Project Expenditure

**Table 3 Project expenditure during the reporting period (Defra Financial Year 01 April to 31 March)**

Item	Budget (please indicate which document you refer to if other than your project application)	Expenditure	Balance
Rent, rates, heating, overheads etc			0
Office costs (eg postage, telephone, stationery)			0
Travel and subsistence			0
Printing			0
Conferences, seminars, etc			0
Capital items/equipment			0
Others			0
Salaries (specify)			0
TOTAL			0

Highlight any agreed changes to the budget and explain any variation in expenditure where this is +/- 10% of the budget.

## 10. OPTIONAL: Outstanding achievements of your project during the reporting period (300-400 words maximum). This section may be used for publicity purposes

I agree for ECTF and the Darwin Secretariat to publish the content of this section

*Cybertruffle* ([www.cybertruffle.org.uk](http://www.cybertruffle.org.uk)), a new internet resource for the fungi. The *Cybertruffle* web server, developed with support from the UK Darwin Initiative project *Conservation of Microfungi: a voice for unprotected and vulnerable organisms*, is one of the world's largest internet resources for people interested in fungi. The server supplies free information from the *Cybertruffle* databases through three main websites which are fully interconnected, with great flexibility in the searches they offer. *Cyberliber* ([www.cybertruffle.org.uk/cyberliber](http://www.cybertruffle.org.uk/cyberliber)) is a virtual library for mycology, with scanned images of over 150,000 individual pages of scientific literature about fungi. *Cybernome* ([www.cybertruffle.org.uk/cybernome](http://www.cybertruffle.org.uk/cybernome)) provides information about over 560,000 scientific names of fungi and other organisms with which they are associated. *Robigalia* ([www.cybertruffle.org.uk/robigalia](http://www.cybertruffle.org.uk/robigalia)) provides information about when and where fungi occur, worldwide, using a database of more than 685,000 records, with dynamically created distribution maps. *Cybernome* and *Robigalia* are fully functional in Chinese, English, French, Georgian, German, Polish, Portuguese, Russian, Spanish and Ukrainian. The *Cybertruffle* server also provides websites for the International Specialist Committees for *Ascomycete Conservation* ([www.cybertruffle.org.uk/ascos](http://www.cybertruffle.org.uk/ascos)), *Mildew, Mould & Myxomycete Conservation* ([www.cybertruffle.org.uk/moulds](http://www.cybertruffle.org.uk/moulds)) and *Rust & Smut Conservation* ([www.cybertruffle.org.uk/rustsmut](http://www.cybertruffle.org.uk/rustsmut)).

## Annex 1 Report of progress and achievements against Logical Framework for Financial Year: 2007/08

Project summary	Measurable Indicators	Progress and Achievements April 2007 - March 2008	Actions required/planned for next period
<p><b>Goal:</b> <i>To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but constrained in resources to achieve</i></p> <p><i>The conservation of biological diversity,</i></p> <p><i>The sustainable use of its components, and</i></p> <p><i>The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources</i></p>		<p>This project is the first real attempt to raise a voice for conservation of microfungi - a group of organisms with virtually no explicit protection anywhere in the world. The information being made available on the <i>Robigalia</i> website through this project is a huge step towards permitting the assessment of biodiversity from a fungal rather than an animal or plant viewpoint</p>	<p><i>(do not fill not applicable)</i></p>
<p>Purpose To initiate a global conservation movement for endangered microfungi</p>	<p>Three specialist conservation groups exist, with conservation action plans prepared for fungi of each group; evidence of activity advocating and assisting in conservation of microfungi.</p> <p>Sampled red lists of microfungi exist, prepared in collaboration and compatible with the <b>IUCN Sampled Red List</b> project, providing baseline for <b>CBD 2010</b> objective.</p> <p>Mycologists trained in conservation techniques; equipment delivered; country and literature websites provide mycological information relevant to conservation.</p>	<p>Three specialist conservation groups now exist.</p> <p>The list of microfungi to be evaluated now exists; mycologists with some experience in preparing IUCN compatible conservation status evaluations now exist.</p> <p>Some mycologists have been trained in conservation techniques; some equipment has been delivered; country and literature websites provide mycological information relevant to conservation.</p>	<p>Three specialist conservation groups will prepare conservation action plans for fungi of each group; they will also be active advocating and assisting in conservation of microfungi.</p> <p>Sampled red lists of microfungi will be prepared in collaboration and compatible with the <b>IUCN Sampled Red List</b> project, providing baseline for <b>CBD 2010</b> objective.</p> <p>Mycologists will receive further training in conservation techniques; more equipment will be delivered; country and literature websites providing mycological information relevant to conservation will be enhanced and enlarged.</p>
<p>Output 1. Three special.ist conservation groups (for [1] non-lichen-forming ascomycetes &amp; conidial fungi, [2] rusts &amp; smuts, and [3] chromistans, chytrids, myxomycetes &amp; zygomycetes), with conservation action plans prepared by each group for their fungi.</p>	<p>Group websites fully functional, with visible history of activity by each group. Groups recognized by <b>IUCN</b> or mycological societies. Action plans for each group available on internet. Evidence of work begun to implement action plans.</p>	<p>Three specialist conservation groups now exist.</p>	

<p>Activity 1.1 Form each expert group; debate activities; formalize web-sites; accumulate in-formation and ideas for action plans; produce plans; communicate aims through media.</p>	<p>Trawls for group members (done). Members named on websites (done). Publicise websites (done); debate activities (in progress); main activities agreed (in progress); action plans format established (in progress); work communicating aims through media starts (started); first drafts (expected March 2009); presentation of groups and their work at international conservation meetings and scientific congresses (in progress).</p>
<p>Output 2. Sampled red lists of microfungi, prepared in collaboration and compatible with the <b>IUCN Sampled Red List</b> project, providing baseline for <b>CBD 2010</b> objective.</p>	<p>Red list websites with sampled red lists as described in proposal, compatible with the <b>IUCN Sampled Red List</b> project.</p> <p>The list of microfungi to be evaluated now exists; mycologists with some experience in preparing IUCN compatible conservation status evaluations now exist.</p>
<p>Activity 2.1. Establish list of red list sample species; prepare standards guide; commission suitable mycologists to work on each species; edit resulting work and publish on internet.</p>	<p>List of sample species established (done); standards guide prepared (at first draft stage), mycologists contracted (done); first red list workshops to prepare mycologists (done); mycologists begin work on species (done); locations of second phase red list workshops established (in progress); first editorial workshops (planned for 2008); over 800 sample species assessed and all edited and published on internet (planned for end of project).</p>
<p>Output 3. Enhanced capacity for microfungi conservation, prioritizing Africa, by training mycologists, delivering equipment and enhancing web-based informational resources.</p>	<p>Reports of training through workshops, courses and meetings; names of mycologists so trained; equipment delivered; country websites exist for fungi.</p> <p>Some mycologists have been trained in conservation techniques; some equipment has been delivered; country and literature websites provide mycological information relevant to conservation.</p>
<p>Activity 3.1. Courses, workshops, meetings; sourcing and transporting resources; database &amp; internet work.</p>	<p>first training course (behind schedule because of political problems in Kenya, now planned for later in 2008); second training course (planned for later in 2008); data capture of new records for African country websites (started); country websites for Cuba and Ukraine established with working database interface (done); similar country websites for Argentina, Armenia, India, Saudi Arabia and South Africa (expected later in 2008); target African countries for further country websites selected (expected for later in 2008); other activities on course for completion by end of project.</p>

## Annex 2 Project's full current logframe

Project summary	Measurable Indicators	Means of verification	Important Assumptions
<p><b>Goal:</b> To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising out of the utilisation of genetic resources</p>			
<p><b>Purpose</b> To initiate a global conservation move-ment for endangered microfungi.</p>	<p>Three specialist conservation groups exist, with conservation action plans prepared for fungi of each group; evidence of activity advocating and assisting in conservation of microfungi.</p> <p>Sampled red lists of microfungi exist, prepared in collaboration and compatible with the <b>IUCN Sampled Red List</b> project, providing baseline for <b>CBD 2010</b> objective.</p> <p>Mycologists trained in conservation techniques; equipment delivered; country and literature websites provide mycological information relevant to conservation.</p>	<p>Group websites fully functional, with plans and visible history of activity by each group. Groups listed by <b>IUCN Species Survival Commission</b> or recognized by mycological societies; evidence of advocacy in media and internet.</p> <p>Red list websites with sampled red lists as described in proposal, compatible with the <b>IUCN Sampled Red List</b> project.</p> <p>Reports of workshops, courses and meetings; names of African (and other) trained mycologists; photographs of delivered equipment; country and literature websites functional.</p>	<p><b>IUCN Species Survival Commission</b> / mycological societies remain willing to welcome / recognize new specialist groups for microfungi.</p> <p>Enough expert mycologists still exist to produce red lists; there is access to sufficient information; uniform quality standards can be enforced.</p> <p>Suitable African (and other) trainee mycologists can be found; they remain in the science after training; donated equipment can be sourced.</p>
<p><b>Outputs</b> Three specialist conservation groups (for <b>[1]</b> non-lichen-forming ascomycetes &amp; conidial fungi, <b>[2]</b> rusts &amp; smuts, and <b>[3]</b> chromistans, chytrids, myxomycetes &amp; zygomycetes), with conservation action plans prepared by each group for their</p>	<p>Group websites fully functional, with visible history of activity by each group. Groups recognized by <b>IUCN</b> or mycological societies. Action plans for each group available on internet. Evidence of work begun to implement action</p>	<p>View group websites; view websites of <b>IUCN</b> / mycological societies. View action plans.</p>	<p>Specialist mycologists willing to form groups can be found. <b>IUCN Species Survival Commission</b> / mycological societies remain willing to welcome / recognize new specialist groups for microfungi.</p>

<p>fungi.</p> <p>Sampled red lists of microfungi, prepared in collaboration and compatible with the <b>IUCN Sampled Red List</b> project, providing baseline for <b>CBD 2010</b> objective.</p> <p>Enhanced capacity for microfungi conservation, prioritizing Africa, by training mycologists, delivering equipment and enhancing web-based informational resources.</p>	<p>plans.</p> <p>Red list websites with sampled red lists as described in proposal, compatible with the <b>IUCN Sampled Red List</b> project.</p> <p>Reports of training through workshops, courses and meetings; names of mycologists so trained; equipment delivered; country websites exist for fungi.</p>	<p>View websites; check compatibility with <b>IUCN</b> criteria, and value for the <a href="#">CBD's 2010 Biodiversity Target</a>.</p> <p>View assessments of trained mycologists and lists of delivered equipment; read reports of workshops, courses and meetings; assess country websites for fungi.</p>	<p>Expert mycologists exist to produce lists; access to sufficient information possible; quality standards can be enforced.</p> <p>Suitable African (and other) trainee mycologists can be found; they remain in the science after training; donated equipment can be sourced.</p>
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<p><b>Activities</b></p> <p>Form each expert group; debate activities; formalize web-sites; accumulate information and ideas for action plans; produce plans; communicate aims through media.</p> <p>Establish list of red list sample species; prepare standards guide; commission suitable mycologists to work on each species; edit resulting work and publish on internet.</p> <p>Courses, workshops, meetings; sourcing and transporting resources; database &amp; internet work.</p>	<p><b>Activity milestones (summary of project implementation timetable)</b></p> <p>Jul. 2007: trawls for group members. Sep. 2007: members named on websites. Autumn 2007: publicise websites; debate activities. Mar. 2008: main activities agreed; action plans format established; work communicating aims through media starts. Mar. 2009: first drafts. Nov. 2009: second drafts. Apr. 2010: plans published. Sep. 2007 - Apr. 2010: presentation of groups and their work at international conservation meetings and scientific congresses.</p> <p>Aug. 2007: list of sample species established; standards guide prepared, mycologists contracted. Sep. 2007: first red list workshops to prepare mycologists (Kiev, Havana). Oct. 2007: mycologists begin work on species. By Jul. 2008: 350 sample species assessed; locations of second phase red list workshops established. Sep. 2008: first editorial workshops (Kiev, Havana); second phase red list workshops. By Jul. 2009: 700 sample species assessed. Sep. 2009: second editorial workshops. By Apr. 2010: over 800 sample species assessed and all edited and published on internet.</p> <p>May 2007: trawl for first training course candidates. Aug. 2007: first training course candidates identified and selected. Nov. 2007: first training course held. Jan. 2008: trawl for second training course candidates. Mar. 2008: second training course candidates identified and selected. Jul. 2008: second training course held. Sep. 2008: trawl for third training course candidates. Nov. 2008: third training course candidates identified and selected. Jan. 2009: third training course held. Jun. 2009: fourth training course candidates selected from most able students of earlier courses. Oct. 2009: fourth training course held. May 2007: data capture of new records for African country websites started. Sep. 2007: country websites for Cuba and Ukraine established with working database interface. Jul. 2008: similar country websites established for Argentina, Armenia, India, Saudi Arabia and South Africa; target African countries for further country websites selected (probably Egypt, Ghana, Kenya, Libya, Malawi, Nigeria, Sierra Leone, Sudan, Tanzania, Uganda and Zambia). Nov. 2009: similar country websites established for selected target African countries. Apr. 2010: at least 100,000 African records keyboarded, edited and assimilated into databases and country websites. <a href="#">Cyberliber</a> website providing free access to scanned images of over 200,000 pages of mycological literature (125,000 more than in January 2007).</p>	<p><b>Assumptions</b></p> <p>As above; also viruses don't destroy data; internet remains a valid, effective and independent medium for dissemination of data; international air travel not seriously affected by terrorism; political problems don't prevent collaboration.</p>
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# Annex 3 onwards – supplementary material (optional)

### ***Checklist for submission***

	Check
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