

Darwin Initiative for the Survival of Species

Final Report

Summary

In almost all respects, this project exceeded its initial targets. The project aimed to equip Cuba with tools and skills necessary for conserving the country's biodiversity and to start running a *Caribbean Fungal Identification Service* by:

- training staff of at least 15 Cuban nature reserves in writing reserve management plans;
- producing new management plans for those 15 reserves;
- computerizing existing and newly generated information about neglected groups of organisms (at least 30,000 records), using that information to produce conventional and electronic identification guides;
- building Cuban institutional capacity by pouring as much donated equipment as possible (including at least 45 computers) into its system of nature reserves and biodiversity institutions;
- starting a regional fungal identification service based in Cuba.

By the end of the project, staff of more than 24 Cuban nature reserves had been trained in writing management plans, with management plans produced for 24 reserves. More than 60,000 records from neglected groups of organisms had been computerized, and various electronic guides had been produced or were nearing completion. Several tons of donated equipment (including at least 65 computers, a scanning electron microscope and a freeze drier) had been delivered to Cuba for biodiversity conservation. A substantial new field station building had been constructed. Several workshops training parataxonomists had been held. Field work had been carried out in several locations in Cuba, leading to the discovery of several new genera and species. Nearly 30 scientific papers had been published. More than 50 internet pages had been constructed, giving Cuban biodiversity sciences a much higher presence on the web. Cuban scientists were supported in attending international meetings in a range of countries including Belgium, Cuba, Mexico, Norway, Russia, South Africa, the UK and the USA. Although substantial progress was made towards a regional fungal identification service, a profoundly unsuitable political climate made its full realization within the time frame of the project impossible.

1. Darwin Project Information

Project Reference No.	162/10/001
Project title	Biodiversity Conservation in Cuba
Country	Cuba
UK Contractor	Dr D.W. Minter
Partner Organisation (s)	Jardín Botánico Nacional, Havana
Darwin Grant Value	£124,500
Start/End date	1 April 2001 / 31 March 2004
Project website	http://www.cybertruffle.org.uk/darwcuba/index.htm
Author(s), date	D.W. Minter, June 2004 [version 2.00]

2. Project Background/Rationale

Location and circumstances of the project

This project was located in Cuba. In terms of biological diversity, Cuba is outstanding with, for example, more than 50% of its plants endemic. In human terms, it is also very special compared with other countries of similar GDP: the infrastructure is excellent, with high levels of education and health. One consequence is that intellectual resources are superb: there are many able scientists working in systematics, particularly in neglected groups of organisms. Material resources are, however, poor following collapse of its historical ally, the Soviet Union, and because of the USA's almost universally condemned blockade.

The problem addressed by the project

In Cuba, the severe lack of material resources is an important limiting factor for biodiversity conservation, while growth of tourism in particular is putting new pressures on areas which were formerly untouched. For Cuba, more perhaps than for many countries, the next few years may have uncertainties, with a possible prospect of far-reaching changes in economical and political structures. Under such conditions, robust modern management plans are needed for Cuban nature reserves, national parks and other protected areas. At the same time, its able systematists, who represent a resource increasingly rare in most other countries, need equipment if they are to function effectively.

Evidence of a need for the project and of commitment from Cuban partners

The need for the project was identified by Dr Minter. Before the original project proposal was written, he was already familiar with Cuba and knew proposed participants well as a result of the earlier Darwin Initiative project *Fungi of the Caribbean*. Before the proposal for the present project was prepared, Cuban colleagues repeatedly requested such collaboration. Ideas were discussed with staff at the Cuban Embassy in London and with the late Miss Marcantonio at the Royal Society, and Dr Minter visited reserves for direct input of ideas from local staff. The thirst for this sort of work was exemplified by the enthusiasm of the young man at that time director of the *Reserva Ecológica Alturas de Banao* who, to demonstrate that an electricity supply for computers was possible at his field station, without being asked, located an old generator and, himself, brought it up the mountain by mule in the dark.

3. Project Summary

Purpose and objectives of the project

The project's original "logframe" is included as Appendix V of this report. It was never changed. The **purpose** of the project was to equip Cuba with tools and skills necessary for conserving the country's biodiversity and to start running a *Caribbean Fungal Identification Service*. Within that context, main objectives of the project were to:

- train staff of at least 15 Cuban nature reserves;
- produce new management plans for those reserves;
- computerize existing and newly generated information about neglected groups of organisms (at least 30,000 records), using that information to produce conventional and electronic identification guides;
- build Cuban institutional capacity by pouring as much donated equipment as possible (including at least 45 computers) into its system of nature reserves and biodiversity institutions;
- start a regional fungal identification service based in Cuba.

In the original proposal, these objectives were described in more detail, specifically mentioning:

- continued collaboration in mycology, including mycological surveying at three sites (*Reserva Ecológica Alturas de Banao*, *Ciénaga de Zapata*, and the *Viñales Valley*);
- computerization of biological records, prioritizing neglected groups of organisms;
- production of a guide to insects on sugar cane;
- production of a guide to Caribbean plants, to help scientists working with neglected groups of organisms such as fungi or insects to identify the substrata on which their organisms occur;
- equipment for ex situ conservation;
- an increased presence for Cuban mycologists on the internet;
- continued general support for Cuban mycologists.

All of these objectives remained unchanged during the project period.

Articles of the Convention on Biological Diversity addressed by the project

The Articles under the Convention on Biological Diversity (CBD) addressed by the project were, in order of importance within the project: 8 (In situ conservation), 12 (Research and Training), 17 (Exchange of Information), 7 (Identification and Monitoring), 9 (ex situ conservation) and 6 (General Measures for Conservation & Sustainable Use). See also Appendix 1 of this report.

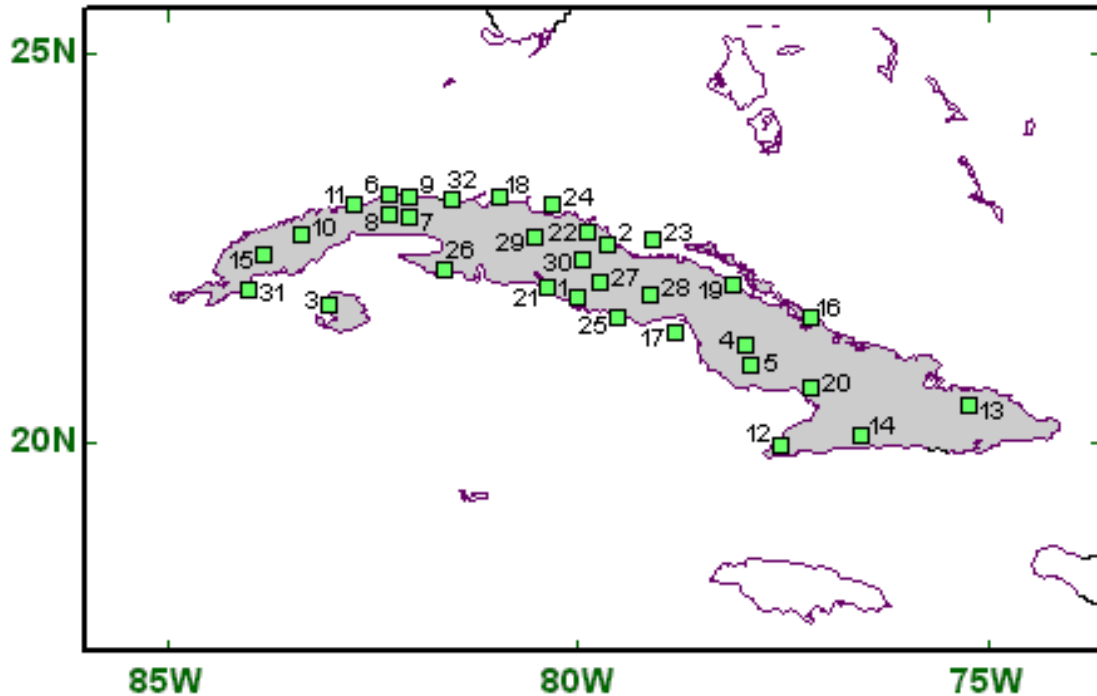
Brief evaluation of the success of the project in meeting its objectives

The project made significant progress in all aspects of the work and, in almost all, achieved significantly more than the original objectives, with additional outputs well beyond the original plans:

- reserve staff of 24 Cuban nature reserves, national parks and other protected areas were trained in production of management plans [**9 more than originally planned**];
- new management plans were produced for all 24 of those nature reserves, national parks and other protected areas [**9 more than originally planned**, see Illustration 1, page 3 of this report, with map showing places in Cuba where this project was active, and listing websites relating to those places, almost all produced through this project];
- well over 60,000 records of existing and newly generated information about neglected groups of organisms were computerized [**30,000 records were originally planned**], and that information was used to produce identification guides [a huge website of electronic distribution maps of Caribbean fungi was established; the guides to insects of sugar cane and to Caribbean plants are nearing completion, and will be made available on CD and the internet];
- Cuban institutional capacity was enhanced with more than 3 tons of donated equipment, including more than 65 computers (a mixture of new and old, desktops and laptops), plus a fully working Scanning Electron Microscope, a fully working Freeze Drier, a fully working critical point drier, compound microscopes, stereo microscopes, microscope light units, laser printers, inkjet printers, scanners, printing paper, printer cartridges, digital cameras, conventional SLR cameras, binoculars, sleeping bags, field and laboratory equipment, scientific books, long runs of scientific journals, CDs etc. [**considerably exceeding the original planned donation of 45 computers**].

The most spectacular result beyond original plans was construction of the "Darwin Building", at La Sabina field station of the *Reserva Ecológica Alturas de Banao*, coupled with a new water supply for the site. This substantial timber and tile building (with four bedrooms, two toilet and shower rooms, a large central study room, a spacious veranda and structural wood liberally treated against pests and decay) replaced the earlier structure which had been the field station's main building until it was, literally, eaten by termites.

1. Map showing the main places in Cuba where this project was active



1. Alturas de Banao [<http://www.cybertruffle.org.uk/endfyf/banao.htm>]
2. Área Protegida de Recursos Manejados Jobo Rosado [<http://www.cybertruffle.org.uk/endfyf/rosado.htm>]
3. Área Protegida de Recursos Manejados La Cañada [<http://www.cybertruffle.org.uk/endfyf/canada.htm>]
4. Área Protegida de Recursos Manejados Sierra del Chorrillo [<http://www.cybertruffle.org.uk/endfyf/chorrill.htm>]
5. Elemento Natural Destacado Bosque Fósil de Najasa [<http://www.cybertruffle.org.uk/endfyf/najasa.htm>]
6. Empresa Nacional para la Protección de la Flora y la Fauna [<http://www.cybertruffle.org.uk/endfyf/index.htm>]
7. Instituto de Ecología y Sistemática, Havana [<http://www.cuba.cu/ciencia/citma/ama/ecologia/index.htm>]
8. Instituto de Investigaciones de la Agricultura Tropical [<http://www.cybertruffle.org.uk/darwcuba/inifat.htm>]
9. Jardín Botánico Nacional, Havana [<http://www.uh.cu/centros/jbn/index.htm>]
10. Mil Cumbres [http://www.cybertruffle.org.uk/endfyf/mil_cumb.htm]
11. Paisaje Natural Protegido Guajaibón [<http://www.cybertruffle.org.uk/endfyf/guajaibo.htm>]
12. Parque Nacional Desembarco del Granma [<http://www.cybertruffle.org.uk/endfyf/granma.htm>]
13. Parque Nacional Pico Cristal [<http://www.cybertruffle.org.uk/endfyf/cristal.htm>]
14. Parque Nacional Turquino [<http://www.cybertruffle.org.uk/endfyf/turquino.htm>]
15. Parque Nacional Viñales [<http://www.cybertruffle.org.uk/darwcuba/vinales.htm>]
16. Refugio de Fauna Cayo Ballenatos y Manglares de la Bahía de Nuevitas [<http://www.cybertruffle.org.uk/endfyf/nuevitas.htm>]
17. Refugio de Fauna Cayos de Ana María [http://www.cybertruffle.org.uk/endfyf/ana_mari.htm]
18. Refugio de Fauna Cinco Leguas [<http://www.cybertruffle.org.uk/endfyf/leguas.htm>]
19. Refugio de Fauna Cunagua [<http://www.cybertruffle.org.uk/endfyf/cunagua.htm>]
20. Refugio de Fauna Delta del Cauto [<http://www.cybertruffle.org.uk/endfyf/cauto.htm>]
21. Refugio de Fauna Guanaroca-Gavilanes [<http://www.cybertruffle.org.uk/endfyf/guangavi.htm>]
22. Refugio de Fauna Lanzasillo-Pajonal-Fragoso [<http://www.cybertruffle.org.uk/endfyf/lanzpafr.htm>]
23. Refugio de Fauna Las Loras [<http://www.cybertruffle.org.uk/endfyf/loras.htm>]
24. Refugio de Fauna Las Picúas-Cayos del Cristo [<http://www.cybertruffle.org.uk/endfyf/picuas.htm>]
25. Refugio de Fauna Tunas de Zaza [<http://www.cybertruffle.org.uk/endfyf/zaza.htm>]
26. Reserva de la Biosfera Ciénaga de Zapata [<http://www.mabnetamericas.org/brprogram/Reserves/Cuba/zapata/zapata.html>]
27. Reserva Florística Manejada Alturas de Fomento [<http://www.cybertruffle.org.uk/endfyf/fomento.htm>]
28. Reserva Florística Manejada Lebrije [<http://www.cybertruffle.org.uk/endfyf/lebrije.htm>]
29. Reserva Florística Manejada Monte Ramonal [<http://www.cybertruffle.org.uk/endfyf/ramonal.htm>]
30. Reserva Florística Manejada Sabanas de Santa Clara [<http://www.cybertruffle.org.uk/endfyf/santclar.htm>]
31. Reserva Florística Manejada San Ubaldo-Sabanalamar [<http://www.cybertruffle.org.uk/endfyf/sabanala.htm>]
32. Reserva Florística Manejada Tres Ceibas de Clavellinas [<http://www.cybertruffle.org.uk/endfyf/clavelli.htm>]

The only objective not fully achieved was the effort to start a regional fungal identification service based in Cuba. The factors influencing this were totally outside the control of the project. The perception in Cuba that the USA is waging biological war against the country, combined with the world political climate following the attacks on New York, and the subsequent anthrax scares, with the US president listing Cuba as one of the countries in his "axis of evil", all combined to make it an exceptionally difficult time to propose those movements of biological materials in and out of Cuba which would be needed in setting up such a service. Real progress towards this objective was, however, made:

- scientists with the necessary skills are in place;
- the main data resources and scientific equipment necessary for such a service have been delivered;
- communication facilities have improved;
- agreement has been reached to restrict the service initially to identification of material from biodiversity surveys rather than plant pathology problems;
- the Cuban side has agreed that material should be received, screened and treated in the UK by *CABI Bioscience* before being sent on as dried preserved specimens;
- the Embassy of Cuba in London has agreed to facilitate periodic transport to Cuba of small packets containing those specimens;
- progress has been made with the administrative infrastructure, in particular clearance from Cuban organizations responsible for quarantine and biological security to import such restricted material;
- the *Instituto de Ecología y Sistemática* has agreed to be the institution fronting the work within Cuba;
- *BioNET-INTERNATIONAL* has continued work to develop this service after the project's end.

4. Scientific, Training, and Technical Assessment

Research. The Project Leader and all Cuban participants in this project from the *Jardín Botánico Nacional*, the *Instituto de Ecología y Sistemática*, and *INIFAT* (the Humboldt Institute of Tropical Agriculture) have engaged in scientific research during this project. This research has used standard mycological techniques, and has concentrated on documenting Cuba's fungal biodiversity, and describing genera and species of fungi new for science. All publications produced with support from this project (with the exception of the websites and CDs) were subject to full peer review. These publications are listed in Appendix 3 of this report, and a list of other publications in preparation may be found on the project website. Further evidence of the quality of this team (based on outputs during the earlier Darwin Initiative project *Fungi of the Caribbean*) was provided when the team's work on diversity and conservation of Caribbean fungi was awarded one of the top annual prizes of the Academy of Sciences of Cuba for scientific excellence. The book *Fungi of the Caribbean* was judged Cuba's best scientific book of the year by the Universidad de La Havana in 2002. Reviews of this book in mycological scientific journals have also been universally positive. The team's work was also subject to scientific scrutiny at various international meetings and congresses, particularly the IV Congreso Latinoamericano de Micología in Xalapa, Mexico, and the VII International Congress of Mycology in Oslo, where Dr Minter chaired the session on mapping & databases.

Training and capacity building activities. During the life of this project, a series of workshops on preparation of protected area management plans were held in different locations throughout Cuba. Most participants were staff of different protected areas administered by the *Empresa Nacional para la Protección de la Flora y la Fauna*. Some were members of staff of other reserves and protected areas not administered by that

organization. The first, held at the *Jardín Botánico Nacional*, Havana, in November 2001 was led by Dr Minter (Project Leader) and Mr Alan Bennell, Director of External Relations, *Royal Botanic Garden*, Edinburgh, with nine participants. Subsequent workshops, in April 2002, June 2002 and other dates, in Holguín and other locations, were organized directly by the *Empresa* with Darwin Initiative support.

One of those workshops, described here as an example, was run in February 2003 at Alturas de Banao Protected Area, about 300 km east of Havana, and was led by José Miguel Rodríguez, Assistant Director of the *Empresa*. About 12 members of staff of the protected area, including the local schoolteacher, participated. The workshop took participants through each main planning stage, including such basics as SWOT analysis (Strengths Weaknesses Opportunities Threats), known in Spanish as DAFO (Debilidades Amenazas Fortalezas Oportunidades). Dr Minter, and Dr Mayra Camino (one of the Cuban co-ordinators of the project) were also present and assisted. The workshop was held in the interesting surroundings of the half-completed new Darwin Building under construction at the reserve's La Sabina field station.

An additional output from this project, not originally scheduled, was the organization of courses for parataxonomists. These were held at four locations, as follows:

- *Reserva Ecológica Alturas de Banao* (November, 2002). A five-day course, led by scientists from the *Jardín Botánico Nacional*, with 9 students from 3 protected areas (approximately 300 specimens - 62 of them fungal - were collected during this course).
- *Mil Cumbres Protected Area* (October, 2003). A five-day course, led by scientists from the *Jardín Botánico Nacional* and the *Instituto de Ecología y Sistemática*, with 8 students from 2 protected areas.
- *Ciénaga de Zapata Biosphere Reserve* (May, 2003, May). A three-day course, combined with an expedition, with 5 local staff and 6 scientists from the the *Instituto de Ecología y Sistemática*.
- *Cuchillas del Toa Biosphere Reserve* (September, 2003). A course, combined with an expedition, also partly funded through the Université Catholique de Louvaine with 7 local staff and scientists from the *Instituto de Ecología y Sistemática*.

In addition to the workshops training staff of nature reserves and other protected areas in writing management plans, and in addition to workshops for parataxonomists, the present project also provided opportunities for two Cuban scientists to visit the UK to gain further experience in database techniques and production of websites (part of this travel was also provided by the British Council).

- 2001 September. Hugo Iglesias Brito visited the UK to work on mapping information for the publications on electronic distribution maps of Caribbean fungi.
- 2002 August. Mayra Camino Vilaró visited the UK to work on mapping information for the publications on electronic distribution maps of Caribbean fungi.
- 2003 March, Hugo Iglesias Brito visited the UK to produce web pages for Caribbean mycology, but also with time to study reference collections of lichen-forming fungi in CABI Bioscience and the British Museum.
- 2003 March. Mayra Camino Vilaró visited the UK to produce web pages for Caribbean mycology, but also with time to study reference collections of myxomycetes in CABI Bioscience, Kew and the British Museum. Dr Camino's visit was synchronized so that she could go on for a further two months of separately-funded study with Prof. Gabriel Moreno at the Universidad de Alcalá de Henares in Spain, thereby maximizing benefits from several different projects.

Another important capacity-building aspect of the project was the construction of many websites providing Cuban biodiversity scientists and Cuban nature reserves with a greatly increased presence on the internet. These sites can be accessed by exploring the project's own website.

5. Project Impacts

Evidence that project achievements have led to accomplishment of the project purpose. The purpose of the project was to equip Cuba with tools and skills necessary for conserving the country's biodiversity and to start running a *Caribbean Fungal Identification Service*. Project achievements have done a great deal to accomplish both components of the purpose. Cuban scientists have several tons of equipment suitable for use in biodiversity conservation, and a suite of workshops on preparation of reserve management plans, combined with the experience of producing 24 such plans (9 more than originally expected), has given them the skills necessary to use those tools effectively. Workshops training parataxonomists, and fungal biodiversity fieldwork are stimulating new collections and significant new discoveries. The donated equipment is also suitable for use in a fungal identification service. Links have been established between Cuban scientists and BioNET-INTERNATIONAL which is now taking the identification service plans forward.

Unexpected impacts. This project has put significant investments into the *Empresa* and, in particular into the *Reserva Ecológica Alturas de Banao*. Significantly these have led to considerable interest in achieving sustainable use of that and other reserves within the *Empresa*, for education (local, national and international), for scientific study, and for ecotourism. Combined with the contacts established through this project between Cuban collaborators and the *Royal Botanic Garden*, Edinburgh (Alan Bennell, Martin Gardner) there is now considerable interest in adding British skills to the design of modular exhibitions which can be used not only centrally (in the *Jardín Botánico Nacional*, for example), but also touring round individual reserves. There is also now a very considerable interest in realizing long-dreamed of plans for visitors' centres at key reserves.

How has the project helped Cuba meet CBD obligations? Most significantly through the training of nature reserve staff in production of reserve management plans, and in the actual production of real management plans for 24 reserves. Also by giving *Empresa* central staff the experience of running workshops and communicating their knowledge of management plan writing to their colleagues. The *Empresa* is now continuing with an ambitious programme to complete production of management plans for all their reserves within the next two or three years. The Academy of Sciences prize awarded to my team for its work on fungal conservation in the Caribbean is sure evidence that the Cuban government, more than perhaps any other country with similar GDP, is taking the issues of fungal conservation seriously.

To what extent has the project improved local capacity for further biodiversity work? Cuban scientists participating in the project have gained experience of producing html format pages for internet and other electronic publications, and have used those skills to help produce an enormous website of electronic distribution maps of Caribbean fungi, currently the largest of its kind in the world. That website, together with the electronic guides produced through the project (to insects of sugar cane and to common native plants of western Cuba), combined with the donated equipment, continued presence of Cuba on the world mycological stage (through participation at congresses and other international events), all ensure that at a scientific level, biodiversity work in Cuba has been enhanced by this project. Meanwhile, at the reserve level, the training of reserve staff as parataxonomists has resulted in a heightened awareness among these workers of the importance of fungi to reserves. Biodiversity work is also furthered through education, and the new interest in visitors' centres stimulated through this project will be an important channel to realize that aspect.

Impact of project on collaboration and links between governmental and civil society groups. This project has had an entirely positive effect on collaboration between the UK and Cuba, not only in mycology, but also in botany, entomology and other biological sciences. The project has also had a real impact within Cuba at governmental level, resulting in interest in the project from Guillermo García, one of the four surviving Comandantes de la Revolución. In the second half of 2003 and early 2004, when the Cuban government cancelled all EU government funded projects in the sciences, perhaps uniquely, this Darwin Initiative project was unaffected. The warm support of the project provided by the Scientific Attachée at the Cuban Embassy in London typifies the welcome this project has received at such levels. Within Cuba, as (at least in theory) a marxist-leninist society, links between governmental and civil society groups should be understood in different terms from those applied elsewhere. During the lifetime of this project, in continuation of efforts begun even before the earlier Darwin Initiative project *Fungi of the Caribbean*, my team has worked consistently to try to establish a Cuban Mycological Society. Certainly there are enough qualified scientists to make such a learned body viable, and the scientific arguments for an association separate from botanists and microbiologists are compelling. It is a real shame that the country which established the very successful Latinamerican Mycological Association does not have a mycological society of its own. To date, these attempts have had no success whatsoever. In Cuba, a learned society can only exist with governmental approval and, under the current conditions of blockade, that approval has so far not been forthcoming. At present, one last possible avenue, to rename an existing but defunct scientific society which previously had a not too distant remit, is being explored. If that avenue proves impossible, it is hard to see what, short of a letter to Fidel himself, will bring about this society.

Impacts of project on individuals and communities within Cuba. No negative impacts of this project are known. The project has positively affected the lives of Cuban scientists working in biodiversity sciences, through provision of equipment and literature with which they can work, and through ensuring that they do not become isolated from the rest of the scientific community. The project has also positively affected their day-to-day lives through the modest financial support the Darwin Initiative provides to Cuba. Reserve staff and local people living in and around reserves where the project has been particularly active have also benefitted, most notably at Alturas de Banao. One of the most positive pieces of work there has been the installation of a much improved supply of fresh water and disposal of waste water at La Sabina field station.

6. Project Outputs

Differences in actual outputs against those in the agreed schedule. With the exception of the establishment of a regional fungal identification service, all agreed outputs were either achieved or significantly exceeded. The very difficult political climate of the so-called "war on terrorism" was the main reason why realization of the identification service was not possible. Additional outputs were also achieved, detailed elsewhere in this report and in Appendix 2, most notably the construction of a new four-bedroom, two-bathroom "Darwin Building" with a large communal room and a substantial verandah, at La Sabina in the Reserva Ecológica Alturas de Banao.

Dissemination of project information. The main instrument of information dissemination in this project has been the internet. The target audience is people with internet access interested in Cuban biodiversity conservation in general and in particular *Empresa* reserves and fungal diversity in the Caribbean. A key stage in ensuring the future of these websites has been the establishment in early 2004 of a new server purely for Dr Minter's Darwin Initiative and related projects. This is now hosting more than 50 web pages relating to Cuban biodiversity conservation and its scientists. These web pages can be explored

through this project's website (address at the start of this report). In addition, a huge internet site has been established elsewhere for electronic distribution maps of Caribbean fungi. Dr Minter hopes to relocate this website to the dedicated server, and restructure it, so that it becomes possible to click on each map to zoom in and obtain data about records giving rise to points on the map. The technology for this already exists and has been applied to the related website for distribution maps of Ukrainian fungi produced through Dr Minter's other Darwin Initiative project [<http://www.cybertruffle.org.uk/ukramaps/index.htm>]. In general, internet access is still very problematical in Cuba and, to compensate for that, the electronic distribution maps have also been produced and distributed in Cuba as bilingual English / Spanish CDs. Further information about this project has also been provided in Cuba through special issues of *Flora y Fauna* (the magazine of the *Empresa*) and the *Revista del Jardín Botánico Nacional*. Cuban presence on the internet can be maintained at a minimal cost, but an improved and dynamic version of the electronic distribution maps would need further funding.

7. Project Expenditure

The project was completed within on time and within the original budget of £124,500. Project expenditure information was as follows:

	Oct.01-Dec.02	Jan.-Dec.03	Jan-Mar04	Total
Staff costs				
Overheads				
Contract labour				
Travel & subsistence				
Printing				
Capital equipment				
Other (postage, stationery etc.)				
Total Expenditure				

The figures in the above table are as received from the finance department of CABI Bioscience and are **provisional**. The accounting system used in *CABI Bioscience* works by calendar not financial years, and **this may affect direct comparability with original budget**. Salary costs and overheads for Cuba, together with Cuba's share of postage & stationery etc., have been lumped together in the table above under the term "Contract labour", whereas they are separate in the original budget. No changes to the budget were requested by the Project Leader. It is believed that, at no point has there been any expenditure variation greater than $\pm 10\%$ of the budget.

8. Project Operation and Partnerships

Local partners. The initial plans involved six Cuban scientists as local partners, with varying numbers of reserve staff also contributing. In general terms this pattern was borne out in practice, but with slightly higher numbers. The main partners were Dr Miguel Rodríguez Hernández (until his untimely death in November 2003), Dr Mayra Camino Villaró (who took over) and Dr Julio Mena Portales, all senior scientists working with biodiversity particularly of fungi. José-Manuel Rodríguez, Deputy Director of the *Empresa*, not listed among the original partners, played an increasing rôle as the project progressed. All main partners and, indeed the other partners too, were fully involved in project planning and implementation: the Project Leader enjoyed warm, friendly, interactive, stimulating and fertile collaboration, particularly with the main partners. The happy result of this was a lively evolution of plans as the project progressed, leading to not only realization of existing objectives, but also striving for many additional targets.

Collaboration with similar projects elsewhere in the host country. The USA's isolated position with regard to Cuba has meant that US scientists are not permitted to set up projects in Cuba. The result is very few international biodiversity and conservation projects in Cuba, and fewer still following diplomatic rifts between Cuba and the EU in the latter part of 2003. The present project was believed to be the only Darwin Initiative project operating in Cuba between 2001 and 2004.

Within those constraints, the present project made every effort to collaborate with the few other relevant projects also active in Cuba. These included collaboration with the universities of Alcalá de Henares and Reús in Spain, and of Louvaine in Belgium. Collaboration was also achieved with Cuban national projects, and with other projects run by the present team. Further connexions were maintained through participation in various international congresses and workshops, and by facilitating Dr Martin Gardner's visit in November 2003, links were also forged with the *International Conifer Conservation Programme* run from the *Royal Botanic Garden* of Edinburgh. Cuba's "Biodiversity Strategy Office" is located in the *Instituto de Ecología y Sistemática*, the same institution where Dr Julio Mena Portales works. It was therefore his responsibility to maintain contact with that office on behalf of this project.

International participation. In addition to the Project Leader, several other scientists from outside Cuba were involved in this project's activities, most visiting Cuba at least once in association with this project. From the *Royal Botanic Garden* of Edinburgh, Alan Bennell (Director of External Relations) and Martin Gardner (*International Conifer Conservation Programme*) both visited Cuba two times, both carrying out field work and one (APB) participating in a workshop. Paul Kirk (*CABI Bioscience*) visited Cuba once, helping to train Cuban scientists in management of internet sites. Randy Darrah (USA), Arturo Estrada-Torres (Mexico), Tanya Krivomaz (Ukraine), Carlos Lado (Spain) Steve Stevenson (USA) and Diana Wrigley de Basanta (UK) participated in a myxomycete workshop at the Reserva Ecológica Alturas de Banao organized through this project [[http://www.msafungi.org/54\(1\).pdf](http://www.msafungi.org/54(1).pdf)]. Judi Durber (UK) participated in one expedition to provide feedback on ecotourism. Apart from costs of hosting the myxomycete workshop, and some travel for Tanya Krivomaz, all these visits were funded from non-Darwin sources.

Continued local activity after project end. Local partners have remained very active after the end of the project. The following are examples current at the time of writing this report, José Manuel Rodríguez of the *Empresa* is currently pushing along production of management plans for more reserves, and work to prepare the Reserva Ecológica Alturas de Banao for sustainable tourism is moving forward, although in all of these activities, there are very severe resource limitations. Julio Mena is hosting a visit from Dr Richard Smith of BioNET-INTERNATIONAL to take forward Cuba's membership of CARINET, its Caribbean LOOP, and to negotiate further aspects of the regional fungal identification service. Mayra Camino is participating in an expedition in eastern Cuba organized through project contacts. As a result of his project work on Cuba's fungal conservation strategy, Mycology has now been recognized as a separate division within his institution, and Julio Mena is now Director of that division, and representing mycology within the national biodiversity conservation process. More community participation at individual reserves of the *Empresa* would be highly desirable, with for example the formation of stakeholder groups, but as with involvement of the private sector, there are limits to what can be achieved in these areas within a marxist-leninist political framework.

9. Monitoring and Evaluation, Lesson learning

Monitoring. Many aspects of this project were easily monitored in numerical terms, and for much of the project, these numerical tests were used to monitor progress.

- Donated materials can be assessed through the range of equipment acquired, transported and delivered to beneficiaries (books, cameras, compound microscopes, desktop computers, digital cameras, dissecting microscopes, a freeze drier, herbarium deep-freeze, laptop computers, printers, printing paper, scanners, a scanning electron microscope, scientific journals etc. etc.). Numbers of items donated and delivered also provide an index of the effectiveness of equipment donations (the original target of only 45 computers was considerably exceeded).
- Staff from 24 reserves and protected areas of the *Empresa* and from other reserves not under their administration were trained in production of reserve management plans (against an original target of 15 reserves).
- Management plans were produced for 24 reserves and protected areas of the *Empresa* (against an original target of 15 reserves).
- Keyboarding of biodiversity data exceeded original targets by tens of thousands of records.
- There were many additional achievements by the project not in the original plan, including workshops to train parataxonomists, participation in international meetings, and construction of a new field station building.

Qualitative monitoring is always much more difficult. Given that the plans produced through this project are a first attempt to organize computerized management of these reserves, it is perhaps inevitable that they are not perfect. The Project Leader and the Cuban participants alike could point out many deficiencies. Nevertheless, they represent a very creditable effort which would reflect well on reserve staff in many a richer country.

Problems. This project experienced several severe problems, most of them impossible to overcome.

- The bombing of New York and subsequent political difficulties atrocity were a reminder of how vulnerable scientific work of Darwin Initiative projects is to international events. Certainly the political difficulties between the USA and Cuba and, towards the end of the project between Cuba and the EU have caused many problems for this project.
- Within the project, the worst event was the death in 2003 of Miguel Rodríguez Hernández, a close and trusted friend and very able Cuban project co-ordinator.
- The diagnosis of severe heart failure in Dr Minter in April 2001, near the start of the project, was fortunately followed by a very positive response to medication, and proved to be less of a problem for the project than was initially feared.
- Two Cuban project participants suffered some ill-health, mostly poisoning from toxins in meals of seafood within Cuba.
- The project lost two Cuban participants who emigrated to the USA, one legally, the other illegally. In both cases the project was at no point involved in the emigration.
- Transport within Cuba. With the death of Miguel, and the (legal) emigration of Hugo to the USA, collaborators lost use of the only private car within the team and of the "Darwin motorbike" which did so much ferrying of visitors and equipment around Havana.
- While there was generally no problem in acquiring donated equipment for Cuba, transporting and delivering it was always tricky and required considerable imagination and lateral thinking.

Evaluation. There was no formal external evaluation of the project's work. The only internal evaluation was carried out by the Project Leader and Cuban Co-ordinators. The fact that project participants as a team won two very prestigious prizes for earlier work, and the fact that individuals of that team chaired or otherwise led sessions in major international meetings are however objective external indications of satisfactory work quality.

Key lessons. Such results as this project has achieved can be attributed to several key factors (in no particular order):

- encouragement by the Darwin Initiative of an ethos of independence and imagination in its project leaders, without an intolerable burden of report-writing;
- the energy, enthusiasm and good humour of a talented team of collaborators within Cuba;
- the trust, mutual understanding and goodwill built up through this and the earlier project;
- forbearance of the Darwin Initiative in tolerating unorthodox solutions to transferring money to a marxist-leninist country;
- a scientific and social infrastructure within Cuba making productive work possible;
- effective e-mail links;
- the Project Leader's communication with Cuban collaborators in Spanish rather than English.

If this project is judged successful, the broader lesson for the Darwin Initiative may perhaps be to maintain confidence in its bold and liberating approach to projects. I am anxious that already report-writing for these projects is a far greater exercise than it was ten years ago. I am not convinced that this burden should be increased: perhaps it should even now be lessened. It is hard to fit non-standard but very real results into standard "Darwin outputs".

10. Actions taken in response to annual report reviews (if applicable)

Reviewers of annual reports of this project have very generously written kind words about the work, and no major issues have been raised. All reviews were however discussed with collaborators.

11. Darwin Identity

Publicising the Darwin Initiative. The Darwin Initiative logo appears on 36 separate web pages produced as a result of this project (most of these can be accessed by exploring the project website address at the top of this report). Darwin Initiative support through this project is also acknowledged on at least two other websites independent of this project. In addition, the Darwin Initiative logo appeared on the front of one issue (vol. 6, no. 1) of *Flora y Fauna*, the magazine of the *Empresa* and, with an editorial reviewing Darwin Initiative collaboration, of one issue (vol. 23, no. 2) of the *Revista del Jardín Botánico Nacional*. The Darwin Initiative logo has also appeared on the two CDs already published, and is planned to appear on planned future CDs and websites. The logo also appears on a commemorative plaque on the "Darwin Building" at La Sabina, Reserva Ecológica Alturas de Banao (bottom left picture on the front page of this report). Lastly, support from the Darwin Initiative was acknowledged in all scientific papers produced as a result of this work.

Understanding of Darwin identify within Cuba. The Darwin Initiative is well known within Cuba, even at the highest levels and is very well regarded everywhere. Guillermo García, one of the four surviving Comandantes de la Revolución, personally facilitated collaboration within the *Empresa*; the Cuban Embassy in London has on several occasions stepped in to help with, for example, transport of equipment; the National Academy of Sciences of Cuba and the University of Havana have recognized work of this team in the present and the earlier Darwin Initiative projects with awards; the Darwin Initiative is well known in Cuban

national institutions working with biodiversity (*Instituto de Ecología y Sistemática, INIFAT, Jardín Botánico Nacional*); a two-page editorial in Spanish and English in vol. **23**, no. 2 of the *Revista del Jardín Botánico* was entitled "The Darwin Initiative in Cuba: a good example of collaboration"; staff of the *Empresa* headquarters and of many of their reserves know of the Darwin Initiative through the work of this project.

Status of the project within Cuba. This Darwin Initiative project was recognized as a distinct project with clear identity.

12. Leverage

During the lifetime of the project, additional funds were found which significantly increased the amount it was possible to achieve. The following list is not exhaustive:

- a separate but related British Council project provided some additional money for travel
- the *Empresa* contributed equipment (for example vehicles) and staff time for workshops and management plan preparation and, in the construction of the "Darwin Building" provided transport and everything which could be purchased with Cuban pesos rather than hard currency (including for example labour and timber);
- donated equipment (as listed elsewhere in this report) far exceeded original expectations, and that equipment was transported from the UK to Cuba free of charge, either by British trade union organizations, or with support from Cubana, the national airline of Cuba;
- in addition to the Project Leader, four other different British scientists and computer specialists visited Cuba to contribute to the work of this project without any cost to the project;
- using support from my Darwin Initiative project in Ukraine, a Ukrainian mycologist was able to visit Cuba to gain valuable tropical experience and participate in an international workshop, and a Cuban mycologist was able to visit Russia to attend a meeting on use of computers in biodiversity science;
- Darwin Initiative support for Cuban scientists to participate in the various international meetings, such as the mycological congresses in Mexico and Norway was frequently matched by funds from those meetings or through the goodwill of other scientists participating in those meetings.

For Cuban scientists to participate in international projects, it is a rule within their country to have an equivalent or matching national project on the same or a very close topic. Dr Minter made every effort to assist his Cuban colleagues in securing several matching national projects which were necessary to make the international project acceptable. Towards the end of the present project, efforts were made to attract funds from international donors. The results are not yet known, but as many such funds have strong connexions with the USA, success for Cuban work can be rather elusive.

13. Sustainability and Legacy

Sustainability. Cuba is approaching a challenging time: no-one within the country dares to talk about life after Fidel, but it must now be getting closer. What happens in Cuba then will strongly affect the partners of this project, and will test the endurance of this project's achievements. If - one possible picture - the full impact of US economic interest hits the island, individual partners may rapidly find themselves in the same impossible economic straits which hit scientists in the former Soviet Union fifteen years ago. We may fear an exodus of talented and dedicated scientists becoming taxi drivers, MacDonald's employees and street vendors of pirate CDs. In that case, the most important enduring achievements of this project may be that individual reserves already have in place plans with which to try to resist this onslaught, and that a real base of computerized information about Caribbean fungal diversity exists. If, however, Cuba can resist these worst excesses, a great team of scientists, recognized internationally for their work in mycology, may survive and more project achievements may endure. Since the partners have already collaborated continuously for eight years, they are in any case likely to remain in touch.

Legacy. The project's outputs have been applied throughout Cuba (see map on page 3 of this report), with every prospect that the same philosophy for reserve management plans will be extended to other *Empresa* sites. Within the project, I cannot see how the legacy could have been further improved except, perhaps that greater interest should have been taken in the movement of the one batch of freely donated computers, transported via Manchester, which never arrived. With further funding, a lot could be done to strengthen the legacy of this project.

Further funding. At present, it is exceptionally difficult to find funding for any work in Cuba. The Representative of the British Council in Havana has advised that their very limited work supporting scientific collaboration in Cuba (the Havana office of the British Council is their smallest operation) has now recommenced, following an hiatus in 2003 and early 2004. All funds for 2004 have already been allocated, though there may be a little funding available to showcase Scottish science in Cuba and efforts are being made to follow up this small possibility through Alan Bennell at the *Royal Botanic Garden*, Edinburgh. In other respects, no further funding source has been located which could permit the work of this project to continue.

14. Post-Project Follow up Activities (*max. 300 words*)

This section should be completed ONLY if you wish to be considered for invitation to apply for Post Project Funding. *Each year, a small number of Darwin projects will be invited to apply for funding. Selection of these projects will be based on promising project work, reviews, and your comments within this section. Further information on this funding scheme is available from the Darwin website.*

Follow-up activities. Everywhere I go in Cuba, possible biodiversity conservation work jumps out at me. **Conservation.** Cuba has a fungal conservation strategy better than that of most first-world countries. Support is needed for "fuel" to run its internal motor. The next tranche of management plans for the *Empresa's* reserves could be so much better. **Capacity building.** Cuba is one of very few countries with real skills in mycology; as Director of a new separate division for mycology within the *Instituto de Ecología y Sistemática*; Julio Mena Portales has agreement to use a building on site as a new centre of excellence and has fully costed architect plans for its renovation together with some, but not enough, seed funding. **Sustainability.** The *Empresa* wants to develop visitors' centres in reserves, many of which are in the poorest areas, as part of its drive to **reduce rural poverty** through development of sustainable tourism. **Education.** The *Jardín Botánico*

Nacional wants to develop modular exhibits, and regards very positively the opportunity of sending those exhibits on tour to visitors centres of the *Empresa* outside Havana. **Science.** Following the success of the *Flora of Cuba* series, Dr Minter and Dr Camino have been invited by the *Jardín Botánico Nacional* to oversee the first real mycological equivalent. Electronic distribution maps of Caribbean fungi, suitably up-dated and up-graded will make a superb platform to realize that work. **Internet presence.** The fifty or so web-pages produced through the present project for Cuban biodiversity science are merely a beginning: a huge amount more can potentially be done. **Such work is at the heart of Darwin Initiative aims.** It leads to survival of species through sound and thorough science, with education, relief of poverty and sustainability all receiving high priority. It would be realized by a team with a track record of enthusiasm, imagination and an ability for problem solving through lateral thinking.

What evidence is there of strong commitment and capacity by host country partners to enable them to play a major role in follow-up activities? This report is offered as that evidence.

15. Value for money

This project considerably exceeded targets in most of its objectives (staff from 24 rather than 15 reserves trained; management plans written for 24 rather than 15 reserves; tons rather than kilos of equipment acquired through donations, transported and delivered (including a scanning electron microscope and a freeze drier); more than twice the predicted number of biodiversity records computerized); electronic identification guides to insects on sugar cane and to common Cuban plants (nearing completion).

The one original objective which the project did not fully achieve (a regional fungal identification service) was thwarted by an impossibly difficult political climate. Even in this objective, solid progress was and continues to be made.

The project achieved many important additional outputs: websites for Cuban nature reserves and scientists; an enormous website of distribution maps of Caribbean fungi; participation by Cuban mycologists in international meetings in Belgium, Cuba, Mexico, Norway, Russia, South Africa, the UK and the USA; a steady flow of published new research; contacts established with other projects and institutions; the construction of a new field station.

Considering these costs and benefits of the project, I believe the project was rather successful in terms of value for money.

16. Appendix I: Project Contribution to Articles under the Convention on Biological Diversity (CBD)

Please complete the table below to show the extent of project contribution to the different measures for biodiversity conservation defined in the CBD Articles. This will enable us to tie Darwin projects more directly into CBD areas and to see if the underlying objective of the Darwin Initiative has been met. We have focused on CBD Articles that are most relevant to biodiversity conservation initiatives by small projects in developing countries. However, certain Articles have been omitted where they apply across the board. Where there is overlap between measures described by two different Articles, allocate the % to the most appropriate one.

Project Contribution to Articles under the Convention on Biological Diversity		
Article No./Title	Project %	Article Description
6. General Measures for Conservation & Sustainable Use	5	Develop national strategies that integrate conservation and sustainable use.
7. Identification and Monitoring	10	Identify and monitor components of biological diversity, particularly those requiring urgent conservation; identify processes and activities that have adverse effects; maintain and organise relevant data.
8. In-situ Conservation	40	Establish systems of protected areas with guidelines for selection and management; regulate biological resources, promote protection of habitats; manage areas adjacent to protected areas; restore degraded ecosystems and recovery of threatened species; control risks associated with organisms modified by biotechnology; control spread of alien species; ensure compatibility between sustainable use of resources and their conservation; protect traditional lifestyles and knowledge on biological resources.
9. Ex-situ Conservation	5	Adopt ex-situ measures to conserve and research components of biological diversity, preferably in country of origin; facilitate recovery of threatened species; regulate and manage collection of biological resources.
12. Research and Training	20	Establish programmes for scientific and technical education in identification, conservation and sustainable use of biodiversity components; promote research contributing to the conservation and sustainable use of biological diversity, particularly in developing countries (in accordance with SBSTTA recommendations).
17. Exchange of Information	20	Countries shall facilitate information exchange and repatriation including technical scientific and socio-economic research, information on training and surveying programmes and local knowledge
Total %	100%	Check % = total 100

17. Appendix II Outputs

Please quantify and briefly describe all project outputs using the coding and format of the Darwin Initiative Standard Output Measures.

Code	Total to date (reduce box)	Detail (←expand box)
Training Outputs		
1a	Number of people to submit PhD thesis	0
1b	Number of PhD qualifications obtained	0
2	Number of Masters qualifications obtained	0
3	Number of other qualifications obtained	0
4a	Number of undergraduate students receiving training	0
4b	Number of training weeks provided to undergraduate students	0
4c	Number of postgraduate students receiving training (not 1-3 above)	10 (postgraduate workshop participants / visits to UK)
4d	Number of training weeks for postgraduate students	20
5	Number of people receiving other forms of long-term (>1yr) training not leading to formal qualification(i.e not categories 1-4 above)	0
6a	Number of people receiving other forms of short-term education/training (i.e not categories 1-5 above)	more than 50 (estimate of local reserve workers attending workshops)
6b	Number of training weeks not leading to formal qualification	more than 10 (estimate)
7	Number of types of training materials produced for use by host country(s)	0
Research Outputs		
8	Number of weeks spent by UK project staff on project work in host country(s)	8 (estimate)
9	Number of species/habitat management plans (or action plans) produced for Governments, public authorities or other implementing agencies in the host country (s)	24
10	Number of formal documents produced to assist work related to species identification, classification and recording.	5 (4 CDs, 1 website)
11a	Number of papers published or accepted for publication in peer reviewed journals	more than 40 (includes papers accepted but not yet published)
11b	Number of papers published or accepted for publication elsewhere	1 (article in magazine)
12a	Number of computer-based databases established (containing species/generic information) and handed over to host country	Cuban colleagues share a huge fungal database with Dr Minter & others
12b	Number of computer-based databases enhanced (containing species/genetic information) and handed over to host country	see above
13a	Number of species reference collections established and handed over to host country(s)	see below
13b	Number of species reference collections enhanced and handed over to host country(s)	at least 400 fungal collections were made during this project

Dissemination Outputs		
14a	Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work	10 (estimate)
14b	Number of conferences/seminars/ workshops attended at which findings from Darwin project work will be presented/ disseminated.	15 (estimate)
15a	Number of national press releases or publicity articles in host country(s)	2
15b	Number of local press releases or publicity articles in host country(s)	0
15c	Number of national press releases or publicity articles in UK	0
15d	Number of local press releases or publicity articles in UK	0
16a	Number of issues of newsletters produced in the host country(s)	1
16b	Estimated circulation of each newsletter in the host country(s)	3,000
16c	Estimated circulation of each newsletter in the UK	0
17a	Number of dissemination networks established	0
17b	Number of dissemination networks enhanced or extended	0
18a	Number of national TV programmes/features in host country(s)	0
18b	Number of national TV programme/features in the UK	0
18c	Number of local TV programme/features in host country	0
18d	Number of local TV programme features in the UK	0
19a	Number of national radio interviews/features in host country(s)	0
19b	Number of national radio interviews/features in the UK	0
19c	Number of local radio interviews/features in host country (s)	0
19d	Number of local radio interviews/features in the UK	0
Physical Outputs		
20	Estimated value (£s) of physical assets handed over to host country(s)	more than £20,000
21	Number of permanent educational/training/research facilities or organisation established	1 ("Darwin Building")
22	Number of permanent field plots established	0
23	Value of additional resources raised for project	more than £30,000 (estimate)

18. Appendix III: Publications

With the exception of the book *Fungi of the Caribbean, An Annotated Checklist* (which represents the work of my previous Darwin Initiative project in the Caribbean), the following publications were all produced by participants of the current project with the support of this project. Information about other works still in preparation at the time of writing this report can be found on the project website [<http://www.cybertruffle.org.uk/darwcuba/index.htm>].

CDs

CAMINO VILLARÓ, M.C.; IGLESIAS BRITO, H.; MENA PORTALES, J.; MINTER, D.W.; RODRÍGUEZ HERNÁNDEZ, M. (2003). *Electronic Distribution Maps of Caribbean Fungi*. compact disk containing 11951 HTML-format pages & 11755 GIF-format maps. UK, Middlesex, Isleworth; PDMS Publishing. ISBN 0-9540169-4-7 [also available freely on the internet: <http://www.biodiversity.ac.psiweb.com/carimaps/index.htm>]

CAMINO VILLARÓ, M.C.; IGLESIAS BRITO, H.; MENA PORTALES, J.; MINTER, D.W.; RODRÍGUEZ HERNÁNDEZ, M. (2003). *Mapas Electrónicos de Distribución de Hongos del Caribe*. compact disk containing 11951 HTML-format pages & 11755 GIF-format maps. UK, Middlesex, Isleworth; PDMS Publishing. ISBN 0-9540169-7-1 [also available freely on the internet: <http://www.biodiversity.ac.psiweb.com/carimaps/index.htm>]

Books and parts of books

MINTER, D.W. (2001). Fungal Conservation in Cuba. In D. Moore, M.M. Nauta, S.E. Evans & M. Rotheroe [eds] *Fungal Conservation. Issues and Solutions*. A special volume of the British Mycological Society. pp. 182-196. UK, Cambridge; Cambridge University Press. ISBN 0-521-80363-2.

MINTER, D.W.; RODRÍGUEZ HERNÁNDEZ, M.; MENA PORTALES, J. (2001). *Fungi of the Caribbean, An Annotated Checklist*. 946 pp. UK, London, Isleworth; PDMS Publishing. ISBN 0-9540169-0-4.

Articles in serial publications, journals and periodicals

CASTAÑEDA RUÍZ, R.F.; ITURRIAGA, T.; MINTER, D.W.; SAIKAWA, M.; VIDAL, G.; VELÁZQUEZ NOA, S. (2003). Microfungi from Venezuela. A new species of *Brachydesmiella*, a new combination, and new records. *Mycotaxon* **85**: 211-229.

CASTAÑEDA RUÍZ, R.F.; MINTER, D.W.; CAMINO VILLARÓ, M.C.; SAIKAWA, M.; VELÁZQUEZ NOA, S.; DECOCK, C. (2003). *Arachnospora insolita*, a new genus and species, and some other hyphomycetes from Banao, Sancti Spíritus Province, Cuba. *Mycotaxon* **87**: 385-393.

CASTAÑEDA RUÍZ, R.F.; MINTER, D.W.; RODRÍGUEZ HERNÁNDEZ, M. (2001, publ. 2002). *Digitoramispora caribensis*. *IMI Descriptions of Fungi and Bacteria*. Set 149 No. 1483. 2 pp.

CASTAÑEDA RUÍZ, R.F.; MINTER, D.W.; RODRÍGUEZ HERNÁNDEZ, M. (2001, publ. 2002). *Kylindria obesispora*. *IMI Descriptions of Fungi and Bacteria*. Set 149 No. 1485. 2 pp.

CASTAÑEDA RUÍZ, R.F.; MINTER, D.W.; RODRÍGUEZ HERNÁNDEZ, M. (2001, publ. 2002). *Myrothecium setiramosum*. *IMI Descriptions of Fungi and Bacteria*. Set 149 No. 1487. 2 pp.

CASTAÑEDA RUÍZ, R.F.; MINTER, D.W.; RODRÍGUEZ HERNÁNDEZ, M. (2001, publ. 2002). *Paraceratocladium silvestre*. *IMI Descriptions of Fungi and Bacteria*. Set 149 No. 1488. 2 pp.

CASTAÑEDA RUÍZ, R.F.; MINTER, D.W.; RODRÍGUEZ HERNÁNDEZ, M. (2001, publ. 2002). *Sporidesmium bifasciatum*. *IMI Descriptions of Fungi and Bacteria*. Set 149 No. 1489. 2 pp.

CASTAÑEDA RUÍZ, R.F.; MINTER, D.W.; RODRÍGUEZ HERNÁNDEZ, M. (2001, publ. 2002). *Venustosynnema ciliatum*. *IMI Descriptions of Fungi and Bacteria*. Set 149 No. 1490. 3 pp.

DECOCK, C.; HERRERA FIGUEROA, S.; RYVARDEN, L. (2001). Studies in *Perenniporia*, *Perenniporia contraria* and its presumed taxonomic synonym *Fomes subannosus*. *Mycologia* **93** (1): 196-204.

MERCADO SIERRA, Á. (2003). *Monodictys desquamata*, a new mitosporic fungus from a Cuban rain forest. *Nova Hedwigia* **72**: 201-207.

MERCADO SIERRA, Á.; CALDUCH, M.; GENÉ, J.; GUARRO, J.; DELGADO, G. (2003). *Digitosporium*, a new

genus of hyphomycetes with cheiroid conidia. *Mycologia* **95** (5): 860-864.

- MERCADO SIERRA, Á.; DELGADO RODRÍGUEZ, G.; MENA PORTALES, J.; GUARRO, J. (2002). Some Hyphomycetes (Mitosporic Fungi) from "Ciénaga de Zapata" Biosphere Reserve, Cuba. *Boletín de la Sociedad Micológica de Madrid* **26**: 183-188.
- PÉREZ, J.M.; RODRÍGUEZ HERNÁNDEZ, M.; MINTER, D.W. (2002). *Sporisorium culmiperdum*. *IMI Descriptions of Fungi and Bacteria*. Set 153 No. 1523. 2 pp.
- PÉREZ, J.M.; RODRÍGUEZ HERNÁNDEZ, M.; PIEPENBRING, M.; MINTER, D.W. (2002). *Leucocintractia scleriae*. *IMI Descriptions of Fungi and Bacteria*. Set 153 No. 1521. 2 pp.
- PÉREZ, J.M.; RODRÍGUEZ HERNÁNDEZ, M.; PIEPENBRING, M.; MINTER, D.W. (2002). *Rhamphospora nymphaeae*. *IMI Descriptions of Fungi and Bacteria*. Set 153 No. 1522. 2 pp.
- PÉREZ, J.M.; RODRÍGUEZ HERNÁNDEZ, M.; PIEPENBRING, M.; MINTER, D.W. (2002). *Sporisorium everhartii*. *IMI Descriptions of Fungi and Bacteria*. Set 153 No. 1524. 2 pp.
- PÉREZ, J.M.; RODRÍGUEZ HERNÁNDEZ, M.; PIEPENBRING, M.; MINTER, D.W. (2002). *Sporisorium paniculeucophaei*. *IMI Descriptions of Fungi and Bacteria*. Set 153 No. 1525. 2 pp.
- PÉREZ, J.M.; RODRÍGUEZ HERNÁNDEZ, M.; PIEPENBRING, M.; MINTER, D.W. (2002). *Sporisorium paspali-notati*. *IMI Descriptions of Fungi and Bacteria*. Set 153 No. 1526. 2 pp.
- PÉREZ, J.M.; RODRÍGUEZ HERNÁNDEZ, M.; PIEPENBRING, M.; MINTER, D.W. (2002). *Sporisorium sorghi*. *IMI Descriptions of Fungi and Bacteria*. Set 153 No. 1527. 3 pp.
- PÉREZ, J.M.; RODRÍGUEZ HERNÁNDEZ, M.; PIEPENBRING, M.; MINTER, D.W. (2002). *Thecaphora amaranthi*. *IMI Descriptions of Fungi and Bacteria*. Set 153 No. 1528. 2 pp.
- PÉREZ, J.M.; RODRÍGUEZ HERNÁNDEZ, M.; PIEPENBRING, M.; MINTER, D.W. (2002). *Ustanciosporium neomontagnei*. *IMI Descriptions of Fungi and Bacteria*. Set 153 No. 1529. 2 pp.
- PÉREZ, J.M.; RODRÍGUEZ HERNÁNDEZ, M.; PIEPENBRING, M.; MINTER, D.W. (2002). *Ustilago dieteliana*. *IMI Descriptions of Fungi and Bacteria*. Set 153 No. 1530. 2 pp.
- RODRÍGUEZ HERNÁNDEZ, M.; MINTER, D.W. (2002). Los hongos en el Caribe. *Flora y Fauna* **6** (1): 45.
- RODRÍGUEZ HERNÁNDEZ, M.; MINTER, D.W.; CASTAÑEDA RUÍZ, R.F. (2001, publ. 2002). *Ascopolyporus polychrous*. *IMI Descriptions of Fungi and Bacteria*. Set 149 No. 1481. 2 pp.
- RODRÍGUEZ HERNÁNDEZ, M.; MINTER, D.W.; CASTAÑEDA RUÍZ, R.F. (2001, publ. 2002). *Cerebella andropogonis*. *IMI Descriptions of Fungi and Bacteria*. Set 149 No. 1482. 3 pp.
- RODRÍGUEZ HERNÁNDEZ, M.; MINTER, D.W.; CASTAÑEDA RUÍZ, R.F. (2001, publ. 2002). *Eudarluca caricis*. *IMI Descriptions of Fungi and Bacteria*. Set 149 No. 1484. 4 pp.
- RODRÍGUEZ HERNÁNDEZ, M.; MINTER, D.W.; CASTAÑEDA RUÍZ, R.F. (2001, publ. 2002). *Leptoxyphium axillatum*. *IMI Descriptions of Fungi and Bacteria*. Set 149 No. 1486. 3 pp.

19. Appendix IV: Darwin Contacts

To assist us with future evaluation work and feedback on your report, please provide contact details below.

Project Title	Biodiversity Conservation in Cuba
Ref. No.	162/10/001
UK Leader Details	
Name	Dr D.W. Minter
Role within Darwin Project	Project Leader
Address	BioNET-INTERNATIONAL, Bakeham Lane, Egham, Surrey, TW20 9TY, UK
Phone	
Fax	
Email	
Other UK Contact (if relevant)	
Name	
Role within Darwin Project	
Address	
Phone	
Fax	
Email	
Partner 1	
Name	Dr Mayra C. Camino Vilaró
Organisation	Jardín Botánico Nacional
Role within Darwin Project	Cuban Co-ordinator
Address	Departamento de Micología, Jardín Botánico Nacional, Carretera El Rocío km 3.5, Calabazar, CP19230, Ciudad de la Habana, Cuba
Fax	
Email	
Partner 2 (if relevant)	
Name	Dr Julio Mena Portales
Organisation	Instituto de Ecología y Sistemática
Role within Darwin Project	Cuban Co-ordinator
Address	Carretera de Varona km 3.5, Capdevila, Boyeros, Ciudad de la Habana, Cuba
Fax	
Email	

20. Appendix V: Logical Framework

19. Logical framework. Please enter the details of your project onto the matrix using the note at Annex B of the Guidance Note.

Project summary	Measurable indicators	Means of verification	Important assumptions
<p>Goal</p> <p>To assist countries rich in biodiversity but poor in resources with the conservation of biological diversity and implementation of the Biodiversity Convention</p>	<p>Cuba helped with conservation of biological diversity and implementation of the Biodiversity Convention through equipment, training and new management plans; other Caribbean countries helped through the identification service</p>	<p>political feedback from Cuba evaluating long-term effect of project on Cuba's conservation work</p>	<p>Cuba and the UK maintain good relations; Darwin Initiative continues to receive funding</p>
<p>Purpose</p> <p>To equip Cuba with tools and skills necessary for conserving the country's biodiversity; to start running a <i>Caribbean Fungal Identification Service</i></p>	<p>reserve employees trained; plans implemented; computerized data used for biodiversity conservation; effective operation of identification service</p>	<p>scientific feedback from Cuba with evaluation of effectiveness of programme, and from other Caribbean countries with evaluation of effectiveness of identification service</p>	<p>Cuban collaborators able to use provided resources effectively; issues of biosecurity can be resolved in running the identification service</p>
<p>Outputs</p> <p>Trained and equipped reserve employees; reserve management plans; computerized biodiversity data; scientific publications; fungal identifications</p>	<p>physical copies of plans; numbers of records keyboarded; copies of scientific publications; copies of identification reports</p>	<p>periodic reports to the Darwin Initiative from the Project Leader</p>	<p>equipment arrives intact; reserves able to cope with 220 volt computers (not a problem in the past); potential clients of the identification service can be reached, and respond; requests for identification work can be received in a timely fashion</p>
<p>Activities</p> <p>Organizing workshops to train Cuban participants; producing reserve management plans; keyboarding biodiversity data; using that data in scientific works; gathering and delivering donated equipment; starting the <i>Caribbean Fungal Identification Service</i></p>	<p>participants; workshops; equipment for producing plans and computerizing data; identification service operational plans, project budget</p>	<p>lists of workshops participants; photos of workshops; statistics of keyboarded data; lists of donated equipment; photos of piles of boxes, publicity material for the identification service</p>	<p>donated equipment will be forthcoming, and can be transported and delivered</p>