

1 Darwin Project Information

Project title	Biodiversity Information in the former Soviet Union
Country(ies)	former Soviet Union, excluding the Baltic states
Contractor	Dr D.W. Minter, BioNET-INTERNATIONAL
Project Reference No.	162/8/011
Grant Value	£139,280
Starting/Finishing dates	April 1999 - March 2002

Project Background/Rationale

The collapse of the Soviet Union resulted in disintegration of the old communist infrastructure which had co-ordinated biological programmes and information. At the time of writing the original proposal for this project, each new country resulting from the fragmentation of the Soviet Union was reorganizing biological research, generally with reduced funding. Some old institutions had ceased to exist. Other new ones were coming into being. Some surviving institutions were being relocated, or their names were being changed. In many cases, the names of the countries, regions, cities and streets in which they were located were undergoing change. The result was chaotic. The proposal for the present project recognized the crisis which had developed in former Soviet Union (fSU) biological research, particularly in areas under-researched but critical for conservation and the sustainable use of biodiversity such as the fungi and invertebrates.

To respond to that disintegration, to set up a new infrastructure, and to handle information as that new infrastructure started to operate, three catalytic investments were identified as being necessary.

- A directory of fSU institutions, organizations, nature reserves and their scientists (available in Cyrillic and Latin alphabets, up-to-date and readily up-dated in the future). This investment was to be made through development of appropriate computerized databases.
- Computers for as many as possible of the scientists identified by the directory. The approach of the year 2000, with concerns about the so-called 'millennium bug' was seen as an opportunity to obtain freely donated second-hand computers to fulfil this investment.
- A forum for those institutions and scientists, where future plans for fSU biodiversity work could be discussed. The starting point for this investment was seen as a meeting organized by BioNET-INTERNATIONAL.

Need

The need was identified by Dr Minter, through earlier scientific collaboration with the fSU over the previous decade. That included: the Darwin Initiative project 162/3/54 (*Fungi of Ukraine*, 1993-1996); the 1993 conference *Saving the FSU's Botanical Institutions* (St Petersburg, sponsor UNESCO); the 1997 conference on *Steppe Preservation* (Kamieni Mohyly, Ukraine, sponsor UK Know-How Fund); the 1997 database workshop and Ukraine's first *National Conference on Conservation & Biodiversity* (Kiev & Kaniv, sponsor British Council); resolutions arising from and discussions with scientists at that conference; the 1998 *Ralph Brown Expedition* (Pripyat Marshes, Ukraine, sponsor Royal Geographical Society);

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discussions with fSU non-governmental organizations; meetings with the then Ukrainian Deputy Minister for Ecological Security & Nuclear Safety, and a representative of the Office of the President of Ukraine; many requests for help from many senior fSU scientists; the EuroLOOP meeting of BioNET-INTERNATIONAL. Most local partners were scientists already known to Dr Minter, or recommendations from scientists already well known to Dr Minter. The proposal for the present project was developed jointly by Dr Minter, his fSU partners, and Dr A.H. Thomas of NERC's Institute of Terrestrial Ecology, Bangor.

2 Project Summary

Purpose

The purpose of this project was to ameliorate the crisis, described in the previous section, which had developed in biodiversity work in the fSU. This was to be achieved through the three investments listed in the previous section of this report. The proposal giving rise to this project antedated the introduction by the Darwin Initiative monitors of "log-frames", and no "log-frame" was ever developed for this project. The objectives were, however, stated to be:

- Improve key fSU computing and communications resources for biodiversity and conservation; train project co-ordinators in maintenance and use of databases as tools for producing and running active web-sites, providing them with millennium-compliant computers and software.
- Identify fSU institutions working with biodiversity and conservation, accumulate data about them and their scientists (names, postal and e-mail addresses, 'phone and fax numbers, needs, CVs, portraits, libraries, databases, living and dried reference collections, work on *in-situ* and *ex-situ* conservation etc.), establish databases to deal with this information, protecting privacy and data rights of participants.
- Publish accumulated information about institutions and their scientists, in idiomatic English and at least one other language, often Russian, on web-sites and as a printed directory, the web-sites to be attractive, informative, pictorial, easy to use, and well-supplied with appropriate hyperlinks.
- Provide practical help to these institutions, using computers donated by western organizations, transported to suitable fSU destinations, with training of recipients in use of fSU data-entry and other software.
- Strengthen / establish national biological recording centres with new computers to receive data generated through the previous objective; use data to output checklists, conservation strategies and other scientific work on paper and the internet.
- Gather representatives from these institutions for a BioNET-INTERNATIONAL meeting examining possible future scientific networks for these fields.

Modifications

Apart from some details of timing, the original objectives and operational plan were not modified during the project, except in that Dr Minter received a request from Prof. Good, head of the Bangor Research Unit of the Institute of Terrestrial Ecology to terminate Dr Adrian Thomas' association with the project. The reasons for this request were changes within that Institute, which made it impossible for Dr Thomas to continue working on the project. Prof. Good emphasized that these changes had been implemented with great reluctance and were in no way a reflexion on the project. Relations were completely amicable

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throughout. The Darwin Secretariat was kept fully informed of this change, and raised no objections to Dr Thomas continuing an association with the project, but purely on a private basis. One other small change in the team occurred in Georgia. By the time the project began, Dr T. Svanidze had taken up a post which made it impossible for him to devote enough time to Darwin Initiative work. At his request, he was replaced by a colleague, Dr M. Gvritshvili, a mycologist well-known in fSU scientific circles, whom Dr Minter had first met in 1989. This change of personnel did not affect the project.

Three other factors influenced the progress of this project. The first occurred during late 1999 and early 2000. There were serious problems within Ukraine for scientists collaborating with western institutions in biodiversity research. In particular, Dr Sergei Piontkovsky, a marine biologist working as part of a Darwin Initiative project different from the present one, was intensively questioned by the Ukrainian police and security services under suspicion of espionage, and his laboratory and apartment were turned over with much equipment being confiscated. After an international outcry about his treatment, he was released, and no charges were brought. Although the present project was not directly affected, the incident showed how precarious biodiversity work can sometimes be in fSU countries. The incident also resulted in a decision to adopt a much more cautious policy about publishing details about individuals in electronic form on the internet.

The second and third were health problems. During 2000, Dr D.I. Samgina, the participant for Kazakhstan, was diagnosed as having cancer of the colon. Her failing health forced her to withdraw gradually from project work, although her financial support was maintained. She was unable to participate in the December 2001 meeting in Kiev, where she was replaced by her colleague Dr G.A. Nam, who very effectively represented the Kazakh viewpoint about infrastructures for biodiversity. In early 2002 the news came that Dr Samgina had died. In April 2001 Dr Minter was hospitalized with heart failure diagnosed, leading to a period of 3 months of sick leave, followed by a medical recommendation to live a less rushed life. Some disruption to the project was caused by these unfortunate events, but the overall objectives emerged more or less unscathed.

Convention on Biological Diversity, Articles Addressed

This project addressed Articles 6, 7, 13, 16 and 17 of the Convention on Biological Diversity, of which most emphasis was placed on articles 7, 16 and 17 [see Appendix I of this report].

Achievements

This project achieved all its basic objectives and, in many aspects, produced much more than was originally planned.

- Information was collected about almost 10,000 different people currently working with biodiversity and conservation in a wide range of institutions and other organizations within the whole of the fSU (including the Baltic States, not specifically funded by this project). This included preparing, distributing and collecting questionnaires, and amalgamating that data with existing data sets already identified and mentioned in the project's original proposal. Computerized databases were established to store the data in Georgia, Kazakhstan, Russia and Ukraine. Project participants were trained in accessing, editing and amalgamating data, and the information received was then keyboarded and edited. The databases were then used to produce a printed Directory of people working

Ukrainian scientists charged over transfer of data to West

London
The Ukrainian Security Service has arrested a prominent marine biologist, Sergei Piontkovski of the Institute of Biology of Southern Seas (IBSS) in Sebastopol, on charges of transferring secret information abroad and handling hard currency illegally. Four other scientists from the institute are facing arrest on the same charges.

Files and computers from the institute have been seized, and it is understood that the five scientists are being interrogated by the security service. Piontkovski, who recently returned from a period of research at Stony Brook in the United States, is due to appear in court in about a month, and could face up to 20 years in prison.

Piontkovski, an internationally known marine biologist, has received funding from international organizations and foreign governments. These include the European aid programme INTAS, the US Office of Naval Research — for a project on bioluminescence — and the British government, which paid for a plankton biodiversity project.

The British grant, funded through the Darwin Initiative, had come under particular scrutiny. The scientists are being questioned about what is being described as the "criminal transfer" of Ukrainian scientific information to the west, as well as the transfer to their institute of hard currency from Britain.

Piontkovski's work with institutions such as the Plymouth Marine Laboratory and the Royal Society in Britain, Amsterdam University in the Netherlands, and the Office of Naval Research and the Smithsonian Institution in the United States, is under scrutiny.

Robert Williams of the Plymouth Marine Laboratory, the principal scientist on the Darwin Initiative project, has expressed concern at the actions of the Ukraine authorities. He points out that all the data for the international projects was biological information collected in international waters between 1949 and 1989.

"It has no strategic importance whatever," says Williams. Piontkovski appears to have been collecting plankton species data, temperature, salinity and density data.

Meanwhile the Ukrainian Security Service has begun searches in another scientific organization, the Institute of Marine Geophysics (MIGI), situated some 300 metres from IBSS. Last Saturday (23 October) the Sebastopol scientists launched a campaign to get signatures to ask the Ukrainian president to ask



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The Ukrainian embassies in Moscow and London declined to comment. But they confirm that the sentences for spying can be up to 15 years in prison. Illegal currency operations carry a five-year sentence, with confiscation of all belongings. The US embassy in Kiev was unable to confirm rumours on Tuesday that the US ambassador was to issue a statement on the situation.

"This will knock back science a decade pre-Soviet strictures," says Williams. "People will not be prepared to collaborate." Williams has written to NATO and Ukrainian academy warning that, if attention cannot be resolved, conference as the European Marine Biology Summit, scheduled for Sebastopol in autumn, could be cancelled.

Williams confirms that Piontkovski consistently tried to direct languages in the Ukraine into grants. He says that he encouraged staff — who by the institute for two to find external source

Piontkovski is receiving hard currency from the project director Darwin Initiative for purchasing funds so has received of England.

Some of the security service came when moves Piontkovski to head of department. The IBSS deputy director, Yuri who is one of the researchers under investigation, has written to the chairman of the

The Cold War resurfaces

Biologists studying plankton stand accused of giving away Ukraine's state secrets

It hasn't been Red October that has set the hunt for glowing plankton. It is now the Ukrainian security service that is accused of spying on the scientists. The Ukrainian security service used four marine biologists of exporting secrets, leaving their Western colleagues bewildered. Now New Scientist's queries have revealed the probable reasons for the Ukrainian authorities' discomfiture: the scientists all study bioluminescent plankton, which can reveal the whereabouts of submarines.

On 15 October, the Security Bureau of Ukraine in Sevastopol. They say, "Yuri Piontkovski, a Ukrainian marine biologist, is accused of giving away state secrets to the West."

global distribution. But in releasing the results of bioluminescence studies done over the past three decades, the biologists found themselves in trouble.

Bioluminescent plankton often glow when they are physically disturbed — by a submerged submarine's wake, for example. A sub's wake can leave a hostile scar at the surface, triggering a flash of light from bioluminescent plankton that can be spotted from surface vessels, aircraft or even orbiting satellites. Peter Herring of the Southampton Oceanography Centre, president of the International Society for Bioluminescence and Chemiluminescence, says that the plankton are very sensitive to disturbance. "Even poising a mackerel produces a nice effect," he says.

Glowing plankton have a long history in the South Atlantic. On 9 November 1916, the USS Albatross (US-34) was destroyed in the Atlantic after bioluminescent plankton were used to track the ship. And last year, a former US Navy officer, who was

doing similar work with two colleagues for the defence intelligence agency, the University of Defence of

Whether or not the surface plankton depth and eye satellites that enables what

Developing a detectable activity of the this information determined to border guards (often described by bioluminescence) to a



Persecuted Ukrainian scientist appeal for help from West
Sergei Piontkovski, the Ukrainian marine biologist facing criminal charges over his role in various international research projects, is to be honoured at a reception held annually by the American Association of Science (AAAS) to scientists.

AAAS to honour 'persecuted Ukrainian marine biologist'
London
Sergei Piontkovski, the Ukrainian marine biologist facing criminal charges over his role in various international research projects, is to be honoured at a reception held annually by the American Association of Science (AAAS) to scientists.

A cold wind from the East

Charges faced by a Ukrainian scientist could have a chilling effect on the future of international collaboration. It has been difficult for scientists in states of the former Soviet Union since the fall of communism. Those who have not left to work elsewhere have often only been able to maintain active research through collaboration with Western researchers. But even this, it seems, carries its risks. As a result of his participation in various European and US programmes, Sergei Piontkovski, a Ukrainian oceanographer who works at the Institute of Biology of the Southern Seas in Sebastopol, is facing charges of communicating "secret" information to the West.

By one account, the actions against him are the result of purely local initiatives, not of a clamp-down by central government. Piontkovski's international activities have been formally approved by the Ukrainian authorities in Kiev. It is to the credit of the Ukrainian Academy of Sciences that it has spoken out in his defence, as well as that of colleagues who are also facing scrutiny by the local secret police.

Such terms include the conditions under which payment can be made, and how far as it is aware, currency has been held in accordance with signed agreements. INTAS is due to hold a meeting in mid-July to evaluate bids from newly emerging states for the 1999 funding call. "Clearly, if this is not resolved there could be consequences for the support of projects in Ukraine," says Gould. INTAS says it is continuing its "dialogue" with the science minister. Ukraine's president, Leonid Kuchma, has been reported as seeking a solution to the

Ukraine denies arresting biologist

Ukrainian government last week denied assertions that a prominent marine biologist, Sergei Piontkovski, had been arrested and charged with sending secret information abroad and handling foreign currency illegally. The statement was made by the first deputy foreign minister of Ukraine in response to concerns expressed by the open Commission over the arrest and detention of research workers from the Institute of Biology of the Southern Seas (IBSS) in Sebastopol (see Nature 401, 825 & 826, 1999). Piontkovski and colleagues are back at work, but reports suggest that they still face charges, and Piontkovski's trial is scheduled for this month. The security services intend to hold IBSS scientists and assets. A spokesperson for the European programme INTAS said the Ukrainian Academy of Sciences had been supportive in trying to persuade authorities of the innocence of IBSS staff. "It is clear to the critics that Piontkovski was arrested on legal grounds," said a spokesperson. INTAS and the British

the focus of inquiries by the security services. Last week, Yuri Tokarsky, deputy director of the IBSS, who also faces criminal charges, said charges related to bioluminescence studies. This could be connected with the awarding of a grant by the US Office of Naval Research (ONR) to the Plymouth Marine Laboratory in the United Kingdom in August, for work with which Piontkovski is involved to create a database on bioluminescence in the ocean. A US Navy spokesperson said: "This project is part of an international effort with broad participation and is expected to increase knowledge of the basic scientific properties of the ocean, including the distribution and abundance of bioluminescent animals and plants." He said it would be "inappropriate" for the navy to comment on the alleged arrest, and that ONR was a "leading supporter of oceanographic research, and sponsors many outstanding basic research and data-gathering projects around the world." The head of IBSS's laboratory of biophysical oceanography last week said his was the only laboratory in the former Soviet Union dealing with bioluminescence

INTAS, which promotes cooperation with scientists from the independent states of the former Soviet Union, said last week that it was "shocked" at Piontkovski's detention. The Ukrainian Ministry of Science and INTAS have confirmed that Piontkovski's work was done in agreement with the Ukrainian government and in accordance with the law. An official reaction from the government is still awaited. Ellen Manton, of the committee on scientific freedom and responsibility of the American Association for the Advancement of Science, says she will ask the committee's network of scientists to write to the Ukrainian authorities to request Piontkovski's unconditional release. The European Commission has requested an explanation from the same

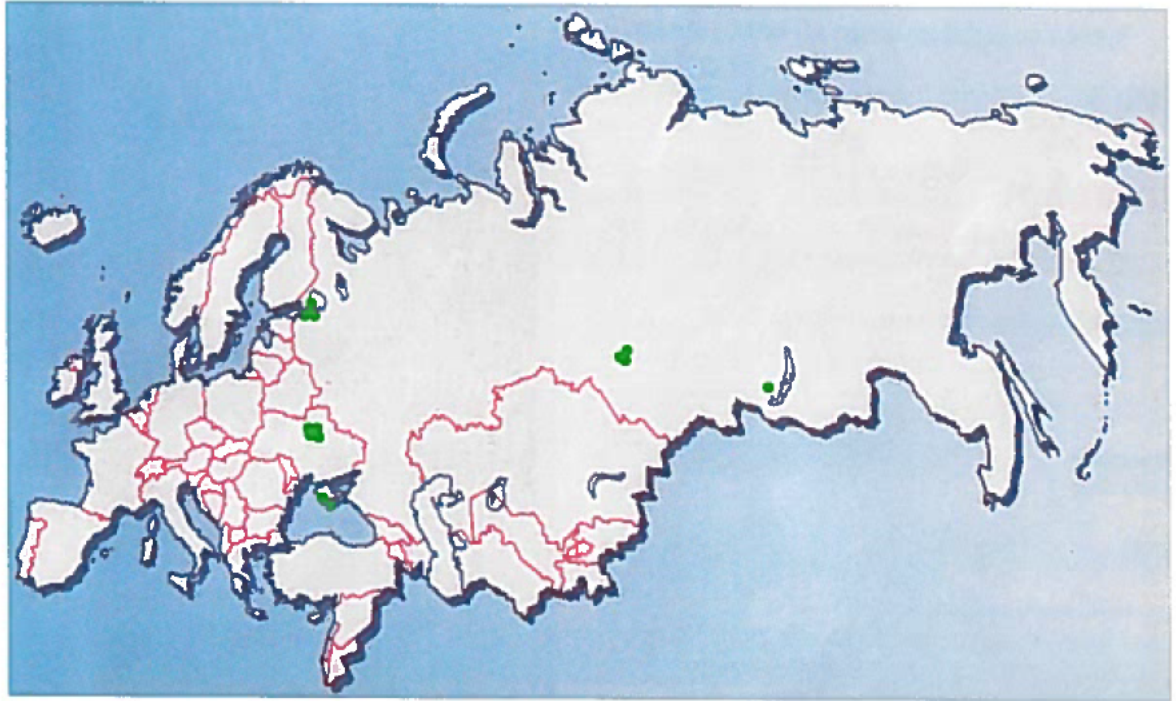


Piontkovski faces a charge of espionage.

Some newspaper reports about the Piontkovski affair

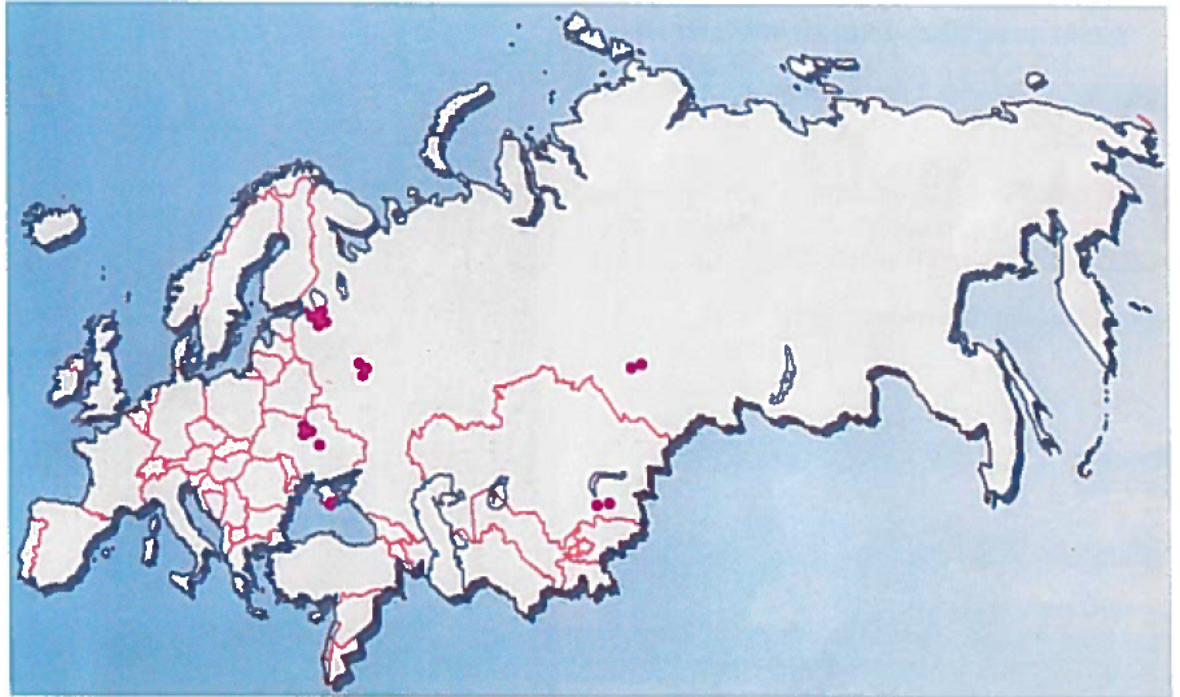
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with biodiversity in fSU countries. This was published in October 2001 (copies were supplied to the Darwin Initiative at the time of publication, and are therefore not attached to this report). Outside of Belarus, Russia and to some extent Ukraine, there was little interest in a Russian language variant, and more or less no interest in other national language variants, while throughout the fSU there was a very strong wish to see an English language version which could be used to publicize the huge resources of expertise more widely. As a result, although raw data is held in the Cyrillic alphabet, the published version was predominantly in the English language.



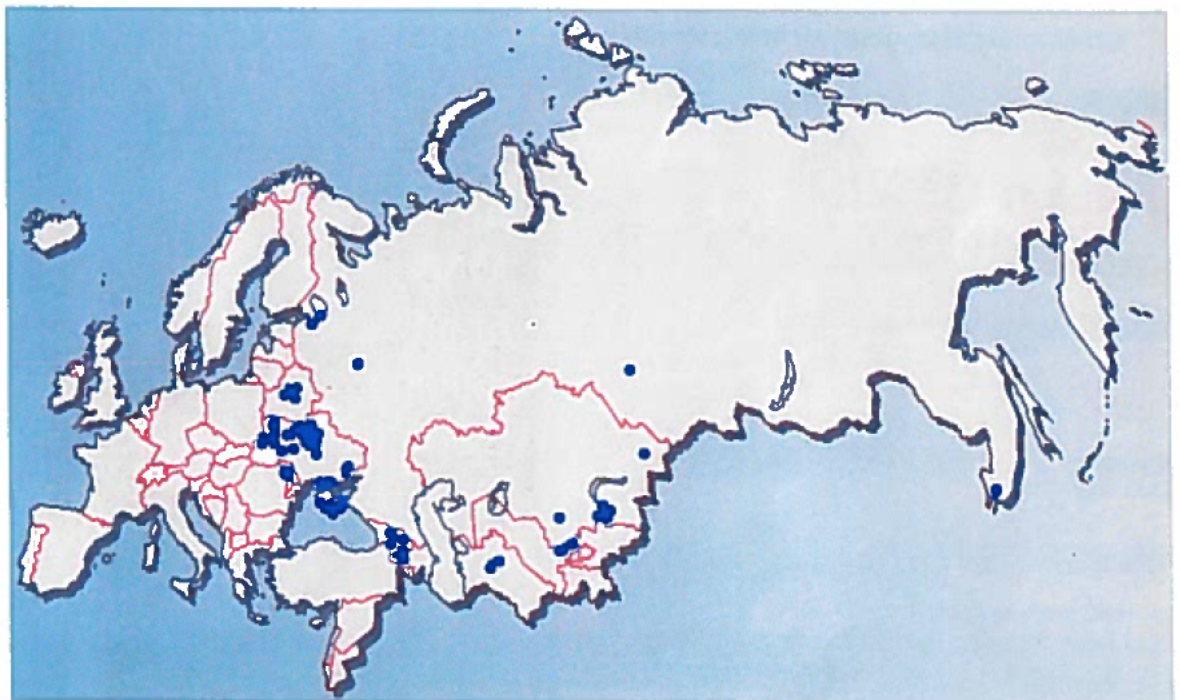
Localities covered by web-sites established during the project (semi-diagrammatic)

- The Piontkovsky affair, already mentioned, resulted in a decision not to publish extensive information about individuals on the internet. A range of web-sites was however established providing often bilingual information about a more limited range of scientists working with biodiversity in the fSU, and their institutions (examples printed from the internet accompany this report). The internet is a very fluid medium, and several web-sites produced by this project appeared and then disappeared again within the lifetime of the project (for example a fungal web-site in Irkutsk), before the project leader had understood the need to print out example copies as soon as they could be accessed.
- Scientific meetings were organized in St Petersburg (May 2001) and Kiev (December 2001), specifically to provide a forum in which future possible infrastructures for biodiversity research in the fSU could be debated. The St Petersburg meeting was attended by about 100 participants, predominantly from the Russian Federation (European and Asian parts), with additional participants from Belarus and Ukraine. A parallel scientific meeting in St Petersburg dealing with computerization of biodiversity information, also organized by this project attracted, in addition to that 100 participants, further scientists from a wide range of countries including Australia, Belgium, Canada, Cuba, New Zealand, Spain, the United Kingdom, and the USA. The Kiev meeting was attended by about 30 delegates from Armenia, Belarus, Georgia, Kazakhstan, Turkmenistan, Ukraine and Uzbekistan, plus participation from the United Kingdom [the original proposal promised to organize only 1 scientific meeting of this type].



Distribution of conferences, meetings, workshops and other training sessions organized by this project (semi-diagrammatic)

- Additional scientific meetings organized largely by others were also supported in Novosibirsk (2000, 2001) and St Petersburg (1999, 2000), and these venues were also used to debate issues regarding future possible infrastructures [the original proposal did not promise any such meetings, but did express a hope of opportunistic use of any suitable possibilities].



Distribution of donated computers in the fSU (semi-diagrammatic)

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- About 140 computers were delivered to people working with biodiversity in the fSU, together with at least 5 printers and 3 other peripheral items of equipment. Of these, about 135 were second-hand, freely donated by British organizations. The computers were distributed as follows: Armenia (2), Belarus (4), Georgia (4), Kazakhstan (7), Moldova (2), Russia (5), Turkmenistan (2), Ukraine (115), Uzbekistan (2). As can be seen, most arrived in Ukraine. The reason for this was the excellent assistance provided by one Anglo-Ukrainian trucking company, and by the British Embassy in Kiev and the Ukrainian Embassy in London, which made free transportation and large-scale import without customs duty possible. In Ukraine about one third of the computers were distributed to scientists in institutes within Kiev, with the remainder going to a wide range of nature reserves, provincial universities, NGOs and schools [the original proposal did not specify any exact numbers of computers, but suggested that by the end of the project computers would have been installed in 40 nature reserves throughout the fSU].



Two scenes from fieldwork in the Altai Mountains carried out during this project

- Six workshops were organized to train scientists in editing, in use of the computers and, particularly, in database handling. Overall these resulted in about 50 person weeks of participation, though it should be noted that in some cases the same person attended more than one workshop. These workshops occurred in Kaniv (1999 - participants from Ukraine only), Almaty (2000 - participants from Kazakhstan, Turkmenistan, Ukraine and Uzbekistan, and 2001 - participants from Kazakhstan, Turkmenistan, Ukraine and Uzbekistan), Novosibirsk (2000 - participants from Russia only) and Kiev (2000 - participants from Belarus, Moldova and Ukraine, and 2001 - participants from Armenia, Belarus, Georgia, Kazakhstan, Turkmenistan, Ukraine and Uzbekistan). Additional but more informal training sessions were held in Ukraine in at least three locations (Crimea,

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Chernivtsi and Donetsk) [the original proposal promised four workshops in Kiev, St Petersburg, Tbilisi and Almaty].

- In addition to the main achievements already listed, a range of scientific publications were produced (listed in Appendix III), large numbers of biological records (more than 160,000, mainly of fungi, but also of invertebrates) were keyboarded, some field work was carried out, and the Darwin Initiative in general, and the project in particular received publicity through support of ecological newsletters and other publications, including a bilingual Ukrainian / English guide to data-entry protocols for biological databases. Examples of some of these are attached to this report.

3 Scientific, Training, and Technical Assessment

Research and Technical Work

Research did not form a part of the present project. Some research papers were, however, written by participants during the course of this project and, where their production was helped by Darwin Initiative support, that assistance was always acknowledged. Papers and booklets published were subject to the normal procedures of peer review. Material published on the internet was not subject to peer review. The largest component of technical work lay in co-ordinating the various data-entry systems in different countries. Most of that was handled by participants in Ukraine already trained through an earlier Darwin Initiative project. Dr T.V. Andrianova was responsible for co-ordinating with Russians involved in the Directory database, and she also organized the workshop in Kiev in 2000, and the meeting and workshop in Kiev in December 2001. Dr V.P. Hayova liaised with scientists in the Caucasus, particularly Georgia, for Directory database and biological records database work. Dr Yu.Ya. Tykhonenko similarly liaised with scientists in Kazakhstan and other Central Asian countries for Directory database and biological records database work.

Training and Capacity Building Activities

Dr Yu.Ya. Tykhonenko organized the first workshop under this project, in Kaniv (Ukraine) and, jointly with Dr A.H. Thomas and Dr D.I. Samgina, two other workshops in Almaty (Kazakhstan), with participants from Kazakhstan, Turkmenistan and Uzbekistan. The politically unstable nature of the Caucasus meant that no workshops were organized there, but Dr M. Gvritshvili visited Kiev in 2000, and attended the December 2001 meeting and workshop in Kiev, while two Armenian scientists (Academician L.L. Osipian and Dr A.A. Charchoghlian), attended the December 2001 meeting and workshop in Kiev to learn database techniques. Dr T.A. Makarevich and Dr S.V. Buha from Belarus attended both the 2000 workshop and the 2001 meeting and workshop in Kiev. Dr L. Poiras from Moldova attended the 2000 workshop. Dr G.A. Nam from Kazakhstan, Dr L.A. Glukhova from Uzbekistan, and Dr K. Orazov from Turkmenistan attended the Almaty workshops, and the 2001 meeting and workshop in Kiev. The cost of attendance of some of these participants was borne by related work described more fully later and funded by INTAS (a European Union body charged with helping scientific collaboration with FSU countries).

The workshop in Novosibirsk in 2000 concentrated on improving skills in writing idiomatic English, and was led by Dr Minter, and attended by about 25 Russians already participating in the parent meeting at which this workshop was organized. Most participants in workshops were principal contacts of the project in the different countries, though where additional

scientists could participate, and wished to do so, they were welcomed and encouraged, particularly in Kazakhstan. Distribution of laptop computers to some of the more promising participants of the first Kazakh workshop brought good results when several thousand keyboarded records were brought for checking by some of these beneficiaries when they attended the second Kazakh workshop.

4 Project Impacts

The purpose of this project was to ameliorate a crisis in biodiversity research in fSU countries, by producing a Directory, distributing computers to suitable beneficiaries, and by establishing a forum where future plans for fSU biodiversity work could be discussed.

The new Directory provides access to up-to-date names and addresses, plus telephone and fax numbers, e-mail addresses, and web-sites for almost 10,000 people associated with biodiversity work in the fSU. In many cases a home address is provided in addition to a work address. Each entry also has up-to-date information about that person's academic track record, their CV, and a personal statement about their specialist interests. All of this information is easily available for the first time in the Latin alphabet and the English language. Copies of the book have already been distributed to destinations in a wide range of countries, including Belarus, Canada, the Netherlands, Russia, Saudi Arabia, Ukraine, the United Kingdom, the USA. Distribution to other fSU countries has also been carried out, but at the time of writing the latest exact information is not available. Outside the fSU, distribution has been prioritized to major donor agencies and other international bodies, such as the American Association for the Advancement of Science, the British Council, INTAS, the Goethe Institute, the Royal Society and the US Civilian Research & Development Foundation, and the activity of distributing this Directory continues.

With about 140 computers successfully delivered, a very wide range of biodiversity institutions, nature reserves and other appropriate recipients in the fSU are now able to carry out computer-based conservation activities and education programmes which were impossible for them before. Examples of this include development of reserve management plans, computerization of reserve biological records, conservation strategies, preparation of reports and scientific papers, and much day-to-day administrative work. In a number of cases, where it was possible also to donate modems, e-mail access has begun or been enhanced. Where printers have been donated, it has been possible for beneficiaries to produce paper output from their work.

A future infrastructure for fSU biodiversity research was the subject of lively debate at all of the various meetings organized or supported by this project and the path was not always easy. Separate meetings were organized to hear the Russian viewpoint (St Petersburg, May 2001), and the viewpoints of other countries (Kiev, December 2001). The prevailing opinion about how fSU countries should relate to BioNET-INTERNATIONAL's structures, which was commonsensical, can be summarized very briefly thus:

- The Baltic States were felt to be a separate group fitting better, perhaps, with a Scandinavian LOOP (the abbreviated term for BioNET-INTERNATIONAL's "Locally Organized Operating Partnerships").
- A general Eastern European LOOP should be set up, including Belarus, Moldova, Ukraine and, perhaps, other countries like Poland and Slovakia.

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- Armenia, Azerbaijan and Georgia, perhaps with part of Turkey and part of Iran, should form a separate South Caucasus LOOP. A suitable centre for that LOOP was not determined.
- Southern Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan should form a Central Asian LOOP which could, perhaps, eventually include Afghanistan given suitable political stability. Almaty or Tashkent were thought to be the most suitable potential centres for that LOOP.
- A single LOOP embracing the whole of the fSU, and administered from Moscow did not seem attractive to most participants. There was a general opinion that Russia is so large that it needs to participate in at least two LOOPS.
- European Russia, west of the Urals, could fit into a general Eastern European LOOP, together with Belarus, Moldova, Ukraine and, perhaps, other countries like Poland and Slovakia. Representatives from different parts of European Russia, mainly St Petersburg and Moscow, and from Belarus and Ukraine were divided on rather predictable lines about where the organizational centre of that LOOP should be. In general, however, St Petersburg was thought to be a possible centre for that LOOP.
- Siberian Russia, east of the Urals, should comprise a LOOP all on its own or in company with Mongolia, northern Kazakhstan and, perhaps, Korea and part of China. Novosibirsk was thought to be the most suitable centre for that LOOP.

BioNET-INTERNATIONAL's third Global Biodiversity Workshop is scheduled to be held in South Africa in July 2002. That workshop is the natural location for taking this infrastructure on to its next stage. At the time of writing, efforts are being made to ensure that representatives from each of the potential future LOOPS (South Caucasus, Central Asia, Eastern Europe and Siberia), plus an additional participant from European Russia participate. Funding may, however, be a problem.

Unexpected Impacts

There were two unexpected impacts of this project. Firstly, mycologists in Ukraine have felt able, as a result of this long-term collaboration, to host the *XIV Congress of European Mycologists* in Yalta, Crimea, in September 2003. In the period of the cold war, *Congresses of European Mycologists* alternated between east and west. The harsh times of perestroika meant that the tradition was broken after the meeting in Estonia in 1989, and subsequent Congresses were held in England, the Netherlands and Spain. The *XIV Congress* is therefore the first for almost a generation to be held in Eastern Europe, and for the first time in many years mycologists from not only Belarus, Russia and Ukraine, but also Armenia, Azerbaijan and Georgia will be present. Some of the computers, and one of the laser printers donated through the present project were directed to mycologists and nature reserves in Crimea very much with this Congress in mind. Secondly, it is worth noting that these *Congresses of Mycologists* are now accompanied by a meeting of the *European Committee for Conservation of Fungi*, and that body will therefore also have its first formal assembly in Eastern Europe as a result of this project.

Impacts at a National Level

One of the project's objectives was to strengthen biological recording in different fSU countries. In Ukraine this has been done by production of a draft discussion document on establishment of a national biological records centre for the country. Furthermore, very large amounts of biological records, particularly of the fungi, but also of plants and freshwater invertebrates, have been keyboarded for Belarus, Georgia, Kazakhstan, Russia and Ukraine and, to a lesser extent for the other fSU countries. The principal sources of this information

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have been reference collections, mainly in Almaty, Kiev, St Petersburg and Tbilisi, and published literature, mainly the floras of Georgia and Kazakhstan, but also the major fSU journals (*Mikologiya i Fitopatologiya* and *Ukrainian Journal of Botany*). This accumulated information is being used to produce for the first time Latin alphabet checklists of Georgian and Kazakh fungi, the Georgian checklist being now at second draft stage and soon to be printed. A review chapter on fungal conservation in Ukraine, by Dr Minter, has been published in the British Mycological Society's recent book on fungal conservation. Work has now also started on a CD providing distribution maps of about 6000 Ukrainian fungi, together with the first meaningful red-list of Ukrainian fungi, and the first "grey list" of species for which there is not enough information to know their status. Furthermore, Ukraine, for the first time, is properly represented on the *European Committee for Conservation of Fungi*.

While the work described in the previous paragraph does not yet have a direct impact on national conservation policies, the long-term effect will be great, simply because so much more information is becoming available on which to base decisions. That information will impact not only on national and regional conservation questions, but also world-wide. Only now is abundant information of high quality becoming available about the incidence and abundance (or rarity) of fungi in this huge part of the world: previously distribution maps of plant diseases failed to treat occurrence in the fSU, or treated it in a most superficial fashion, dividing the whole area into three arbitrary regions with boundaries running north-south, so that, for example, a disease of maize from southern Ukraine could be shown as occurring all the way north to Murmansk.



Sources of computerized biological records (semi-diagrammatic). 1. Belarus (12,000 invertebrates). 2. St Petersburg (6000 coelomycetes). 3. St Petersburg (19,000 other fungi). 4. *Mikologiya i Fitopatologiya* (12,000 fungi). 5. *Ukrainian Journal of Botany* (3,000 fungi). 6. Tovtry National Park (2,000 fungi). 7. Crimea (20,000 fungi). 8. *Georgian Cryptogamic Flora* (49,000 fungi and plants). 9. Tbilisi Herbarium (6,000 fungi). 10. *Kazakh Fungus Flora* (22,000 fungi and plants). 11. Almaty Herbarium (15,000 fungi and plants). 12. Kazakh Altai Reserve (3,000 plants and animals) [numbers approximate].

Affect on Local Capacity to Further Biodiversity Work

The project had a very large effect on local capacity to conduct biodiversity work in a very widely dispersed range of places, though mainly in Ukraine. The main factors promoting this capacity were the donated computers, the workshops, and some support for keyboarding data. About 55,000 fungal and plant records were keyboarded for Georgia alone, with another about 12,000 records of freshwater invertebrates keyboarded by Dr L. Karataeva in Belarus, about 25,000 records of fungi and plants for Russia, about 40,000 records of fungi and plants for Kazakhstan, about 20,000 records of fungi and plants for Ukraine, and about 15,000 other miscellaneous records of fungi and plants keyboarded from main FSU mycological journals such as *Mikologiya i Fitopatologiya*. About 50,000 of these records have been fully edited, another approximately 50,000 are undergoing editing at the time of writing, and the remainder are waiting in a queue, but at least the raw information is now in electronic form and, significantly, is available for local use.

The workshops associated with donated computers were generally attended by rather senior scientists from national institutions in each country, who are all still in position, and who are all in more-or-less regular contact with either Dr Minter or with his colleagues in Kiev and St Petersburg. As a result, real use of the data is only likely to occur under the guidance of those specialists, with Belarus, Russia and Ukraine having the strongest ability to use the data. Nonetheless, the computers are also in use locally for a wide range of other activities related to biodiversity conservation. As already noted above, these include production of reserve management plans, computerization of reserve biological records, conservation strategies, preparation of reports and scientific papers, and much day-to-day administrative work.

Collaboration

The present work was the second Darwin Initiative project run by Dr Minter and involving Ukraine. One impact of this present work was therefore to reinforce the collaboration with Ukraine which had been already well established by the first project. In doing this, it was necessary to make a fine balance between the needs of the new work, and continuing to support an excellent team. In the event, both were achieved and, as already noted, the Kiev team have been able to expand their horizons, successfully competing for new non-Darwin projects not only in mycology, their traditional strength, but also in steppe conservation, environmental planning and other directions.

The present project also enabled Dr Minter to strengthen existing collaboration with scientists in St Petersburg, and to establish real and active collaboration with a range of scientists in other parts of Russia, and in almost all other FSU countries, but particularly Armenia, Belarus, Georgia, Kazakhstan and Uzbekistan. The strengthened collaboration with St Petersburg has been particularly valuable from a scientific point of view, since (while pursuing its main objectives) this project was also able to provide real support for the mycologists there, a team which has always been important at a world level in this discipline. Although Dr Minter did not visit Kazakhstan, Dr Tykhonenko in Kiev developed good links with scientists there, and one Kazakh mycologist was able to visit Kiev. Similarly in Georgia, Dr Hayova developed good links with Dr Gvritshvili, who was also able to visit Kiev two times.

Social Impact

This project was never expected to make a great impact socially at national and local levels,

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having instead as its aims infrastructural amelioration. Nevertheless, the computers donated to local nature reserves and, perhaps more significantly to local schools have had a positive impact on those local communities. Some of the thank-you letters received are attached to this report. It is only a pity that so few computers reached schools, when so much could be done in that direction. It is also worth noting that the "Darwin Team" in Kiev has now successfully competed for a project involving environmental planning in Balaclava, Crimea, which entails organizing a public consultation exercise to debate the new environmental plan within that town.

5 Project Outputs

All project outputs are quantified in the table in Appendix II using the coding and format of the Darwin Initiative Standard Output Measures. The only big difference between agreed and actual outputs was that the internet sites established through this project did not provide large amounts of data about individual scientists, instead concentrating more on resources within given institutions. The reason for this was that during the lifetime of this project, certain FSU scientists (none involved with the present project) were accused of espionage by the Ukrainian and (to a lesser extent) Russian security forces. These problems related to transfer of national biodiversity information to western partners, under projects funded by various



Above left: outside the British Embassy in Kiev, the Diplomatic Truck - loaded with Darwin computers. *Above right:* diplomatic bags full of donated computers.

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western institutions, including the Darwin Initiative (see Modifications, Section 2 of this Report). The possible and, in some cases certain vulnerability of fSU scientists working on biodiversity led to a decision not to publicize their names on the internet. All the information does, however, exist in electronic form and, it is hoped, will eventually be published on CD.

In general outputs were achieved on, or ahead of schedule. In many, perhaps most cases, actual outputs were greater, sometimes much greater than what was originally agreed. With the exception of the internet sites discussed in the preceding paragraph, no output was smaller than agreed. Various additional outputs were also achieved. All outputs are listed in Appendix II. Appendix III contains a list of all publications and material that can be publicly accessed, produced from this project, including some of the websites expected to be more long-lasting. Dr Minter's main website is expected to continue to provide information about the present and other Darwin Initiative projects for the foreseeable future, the modest costs of this being subsumed into other project activities.

6 Project Expenditure

The following table is a summary of expenditure of Darwin Initiative money by this project.

Category in original application	Expenditure agreed in contract	Actual expenditure
Staff		
Rents, rates, heating, lighting, cleaning		
Postage, telephone and stationery		
Travel and subsistence		
Printing		
Conferences, seminars etc.		
Capital items		
Other		
Total		

The largest variation in expenditure (less than 2.5% of the budget), can be seen between "Travel and subsistence" and "Conferences, seminars etc.", where the apparent overspend in one is cancelled out by the apparent underspend in the other. This variation can be explained by the circumstances of the meeting in Kiev in December 2001, which entailed big costs in air fares for participants from other fSU countries, but not large costs in organizing the meeting itself.

7 Project Operation and Partnerships

Initial plans for this project envisaged one partner in Georgia, Kazakhstan and Russia, and three partners in Ukraine. As already indicated in *Modifications* in Section 2 of this Report, Dr T. Svanidze was replaced by Dr M. Gvritshvili in Georgia, and with the death of Dr D.I. Samgina, Dr G.A. Nam took over in Kazakhstan. In Russia, Dr V.A. Mel'nik remained a partner throughout the project, but Dr I.Yu. Bakloushinskaya (Moscow), Dr. A.Ye. Kovalenko (St Petersburg) and Mrs O.N. Krasilnikova (St Petersburg) also played very important rôles in production of the Directory, computerization of biological records, and website development respectively. The three partners in Kiev were Dr T.V. Andrianova, Dr V.P. Hayova and Dr L.P. Vakarenko, but as in Russia additional scientists were active,

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particularly Dr V.P. Heluta, Dr Yu.Ya. Tykhonenko, Ms T.I. Krivomaz, Prof. I.O. Dudka and Dr V.P. Isikov. Scientists in other countries were also supported, including Dr T.A. Makarevich and Dr S.V. Buha (Belarus), Dr L. Poiras (Moldova), Dr A.A. Charchoglian and Academician L.L. Osypian (Armenia), Dr L.A. Glukhova (Uzbekistan) and Dr K. Orazov (Turkmenistan), but they did not play a sufficiently prominent rôle to describe them as partners.

All of these people are scientists working in various universities and institutions of their national academies, some being directors, others heads of department or laboratory, and some rank and file scientists. One or two, such as Dr K. Orazov (Turkmenistan) are in influential positions close to government, though the experience of this project co-ordinator is that people tend to come and go from such positions rather rapidly in fSU countries. Others, such as Dr L.P. Vakarenko (Ukraine) have a happy ability to keep close to whoever is in such an influential position. The most active partners, in general, were those from Ukraine and Russia. Two of the Ukrainian partners were involved from a very early stage in planning and implementation of the present project, since they helped draft the first version of the proposal from which it arose. Plans were not modified significantly subsequent to that proposal's success in attracting funding.

The present project collaborated with other similar projects within the host countries. The best example of this was collaboration with an INTAS Infrastructure Action, led in the fSU by Dr T.V. Andrianova of this project. That INTAS Infrastructure Action provided complementary support for similar work concentrating in Armenia, Belarus, Moldova, Turkmenistan and Uzbekistan, where the present project concentrated in Georgia, Kazakhstan, Russia and Ukraine. For more information about that and other collaboration, see Section 10 of this Report. In most countries, no effort was made to contact any Biodiversity Strategy Office, but some efforts are thought to have been made by Dr A.H. Thomas and Dr Yu.Ya. Tykhonenko during their visits to Kazakhstan. Their approach to the Kazakh Biodiversity Strategy Office (or it may have been some similar body, but with a different name) produced disappointing results. It is possible that the lack of uptake may have been related more to ignorance of the importance of fungi than to a perception that our team had no money to offer. Apart from British involvement through the Darwin Initiative, no other international partners participated from outside the fSU.

Activity after the end of the Project

Russia. Dr V.A. Mel'nik is currently collaborating with Dr Minter in producing biographies of Soviet mycologists as a contribution to the CD being produced for the *XIV Congress of European Mycologists*. Dr A.Ye. Kovalenko, Head of the Mycological Laboratory, is actively leading work keyboarding the fungal herbarium of the Komarov Botanical Institute (work begun by the present project), and has asked Dr Minter to help in an attempt to re-house the mycological collections. Dr Yu.K. Novozhilov, the Komarov's myxomycete specialist will attend the *Third International Congress for Myxomycetes* in Belgium (August, 2002), and will present a paper in Dr Minter's symposium on databases for biodiversity recording in mycology at the *Seventh International Mycological Congress* in Oslo (August 2002). Dr A.Y. Ryss, who organized this project's St Petersburg meetings in 2001 jointly with Dr Minter, is expected to attend the BioNET-INTERNATIONAL *Third Global Workshop* in South Africa (July 2002). At the time of writing Dr E.V. Bogomolova, a bright young postdoc from St Petersburg, is spending two months in Dr Minter's laboratory under an INTAS fellowship developed through connexions established during the Darwin Initiative project.

Ukraine. Dr Minter has been awarded a new Darwin Initiative project, centred around steppe conservation in Crimea, with Dr V.P. Isikov as principal collaborator. Work on this project is

expected to begin shortly. Dr T.V. Andrianova continues as fSU Co-ordinator for the INTAS Infrastructure Action being run jointly with Dr Minter, and will participate in the *Seventh International Mycological Congress* in Oslo (August 2002). Dr V.P. Hayova is working on a UK DFID Small Environmental Projects Scheme project for environmental planning in Balaclava. Dr V.P. Heluta is currently completing a UK FCO Environment Project Fund project reintroducing horses to graze steppe in Donetsk Oblast. Dr Yu.Ya. Tykhonenko and Prof. I.O. Dudka are organizing the *XIV Congress of European Mycologists* (Dr Minter is on the Organizing Committee). Dr Tykhonenko is also organizing the CD of Ukrainian mycology to be issued at that Congress, funded by the Royal Society. Ms T.I. Krivomaz is studying for a Candidate Degree at the M.G. Kholodny Institute of Botany under the joint supervision of Dr Minter and Prof. I.O. Dudka (apparently the first time in Ukraine's National Academy of Sciences that a foreigner has supervised such a degree), and will participate in the *Third International Congress for Myxomycetes* in Belgium (August, 2002).

Georgia. Dr M. Gvritshvili is currently keyboarding last-minute additions to the biological records database, and making corrections, for production of "*Fungi of Georgia, an annotated checklist*", which is currently at second draft stage and will soon go to press.

Kazakhstan. Dr G.A. Nam is currently keyboarding further additions to the biological records database, for production of "*Fungi of Kazakhstan, an annotated checklist*". A considerable amount of editorial work is still needed before this can be produced.

The foregoing paragraphs indicate the main (but not all) lines of work continuing. It will clearly be difficult to maintain all of these initiatives. The biggest limitation is the time of the British collaborator. So much time is spent writing proposal for new awards (and increasingly helping to tidy up locally written proposals), and writing reports for existing awards that it is difficult to do any real science. This is, however, the universal experience of scientists in Britain at present.

8 Monitoring and Evaluation, Lesson Learning

Strategy for Monitoring and Evaluation

Every entry in the fSU Directory of people working with biodiversity was checked by Dr Minter or some other native English speaker with suitable editorial experience. Certain data elements, such as dates of birth, names of countries and oblasts, were checked mechanically. Other elements, mainly textual items such as CVs or personal statements of interest, received personal editorial attention. The preference of each individual represented in that book for transliteration of their name from the Cyrillic to Latin alphabet was respected. In every case, however, a mechanical check was made to identify names where that transliteration was not standard. In that way, it was possible to ensure that all transliterated names had a form at least reasonably close to the Cyrillic original. Indexing terms, such as scientific names of organisms, indicating taxonomic expertise, were particularly closely checked, with considerable debate needed to reconcile fSU taxonomic views with those of the west. The result of this editorial work was that tens of thousands of improvements were made to the data. The Directory itself was, of course, baseline information for future use. It simply did not exist in a Latin alphabet format before, and the fact of its present existence amply demonstrates the value of this part of the project.

To ensure a high quality donation for each beneficiary, every donated computer was checked by a competent person in the UK before being packed, and the specifications of each

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computer were noted. Efforts were then made to ensure that, when distributing these machines, the more powerful ones went to people likely to be able to use them more fully. Freely-donated laptop computers have been at a premium throughout the life of the project, and they have generally been allocated to the more distant destinations, since they are easier to transport by air, usually as hand-luggage.

The biological data keyboarded under this project, as with Dr Minter's other Darwin Initiative projects, is subject to a very extensive series of editorial checks. The design of database in which all of this information is stored is, moreover, able to protect and distinguish the original information from the current opinion of what that information means. Thus, the scientific name used in each incoming record is checked against Dr Minter's *Nomenclatural & Taxonomy Database* (itself with almost 500,000 records), to ensure that the name is known to the computer. Similarly, locality names at continent, country, oblast (state, county) and raion (parish) level are all checked against Dr Minter's *Locality Database*. Dates are checked to ensure that they are meaningful. People's names (as collectors, identifiers etc.) are edited to ensure a consistent and search-friendly format, and every other data element is proof-read, to ensure consistency of style. Where original information is in the Cyrillic alphabet, transliterations or translations, as appropriate, are made. No records are transferred to the main *Biological Records Database* for long-term storage until this editorial process is complete.

Beyond such tests for quality (internal evaluation), and the usual peer-review (external evaluation) to which all scientific papers going to reputable journals are submitted, other monitoring and evaluation was not felt necessary, particularly in view of the good track record of the already known fSU participants, and the care already made in selecting new participants. Database design and data standards are reviewed periodically by the scientific community itself, not least through symposia at major international meetings. Dr Minter is chairing the symposium on this topic at the *Seventh International Mycological Congress* in Oslo (August 2002).

Lessons

The Piontkovsky affair (referred to earlier) dominated biodiversity work in Ukraine in late 1999 and early 2000. The present project, although very active in Ukraine, was not directly affected; but it was necessary to keep a low profile for a while, and there was some anxiety lest colleagues in Kiev had problems. Fortunately none materialized. A large part of Piontkovsky's problems seem to have arisen because he opened a bank account. This experience, and other experiences in the present and other Darwin Initiative projects run by Dr Minter suggests that, when working in fSU and similar countries as they are at present, strict application of the highest western accounting standards is not always practical, possible or perhaps even desirable. Transportation of funds into fSU countries through the present project was, of necessity, ad hoc, but no monies went astray at any time during the present work.

During the lifetime of this project, the only practical currency to pay fSU collaborators was the US dollar. It is, for example, possible to convert sterling into Ukrainian hryvna in Kiev after some searching, but outside the capital such exchanges are generally impossible. Throughout the project, therefore, it was necessary to change all sterling amounts in dollars. At the start of the project, the rate was higher than 1.6 dollars to the pound. During the project, this rate steadily declined, and by the end of the project it was about 1.4 dollars to the pound. Maintaining income levels for fSU collaborators under those conditions was a difficult and rather stressful responsibility.

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The problematic financial situation in Ukraine can sometimes have other unexpected negative impacts on scientific work. A good example was encountered during the present project. A different Darwin Initiative project, working from the University of Dundee, and with the topic of peat-bog conservation, organized an excellent workshop in the Scotland. Through the kind co-operation of that project's leader, it was possible for two members of Dr Minter's "Darwin Team" in Kiev to attend this meeting, with very positive results. All parties understood that such collaboration between different Darwin Initiative projects was encouraged, and all were grateful for that encouragement.

It was a requirement of that peat-bog project that workshop participants then went on to organize subsidiary workshops in their own country, thereby passing on the knowledge gained. The costs of such workshops were included in the budget of the Dundee project. The Kiev participants were therefore anxious to fulfil this obligation. The only problem was to transfer the monies from Dundee to Kiev. Dr Minter offered to assist in this, but the accounting procedures in Dundee made it impossible to release any money unless he personally took responsibility to ensure the workshop was organized. Clearly this was a considerable extra demand, since everyone understood Dr Minter's proposed rôle was simply to transfer the money to those responsible for organizing the workshop. Not surprisingly he felt unable to give such a commitment. The result seems to have been that no money was transferred, and no workshop took place.

Foreigners at Kiev's Borispol Airport have sometimes been hassled for not having correctly registered as visiting Ukraine (the leader of the present project tried, once, to register in the officially approved manner and found the procedure, frankly, more or less impossible). Such police actions received very unfavourable comment from English language newspapers in Kiev, including *Kiev Post*. This problem has now, however, largely vanished, as the Ukrainian authorities themselves recognized that registration of foreigners was proving impractical, and removed the requirement. Similar problems were experienced from time to time in other FSU countries. Another event at Borispol Airport may also be worth recall: when Ukrainian customs officers tried to levy import duty on an old laptop, the laptop was promptly re-exported and delivered soon after to an institute in Argentina!

The character of the Internet means that many web-sites are rather ephemeral, particularly in FSU countries like Ukraine. As a result, projects may deliver real web-sites, which may then equally rapidly vanish. While web-sites contribute a great deal to publicizing biodiversity information in these countries, it is important to understand their limitations. Project leaders should develop the habit of printing out examples as soon as they appear, so that there is real evidence that, at least at some point, they existed.

Broader Lessons for the Darwin Initiative

It has always been an honour to work on Darwin Initiative projects, but when the Darwin Initiative began, a particular joy was that report writing was minimal, and it was possible simply to get on with the job. This is gradually changing, and the size of expected reports is becoming larger and larger. To this project co-ordinator, the present evaluators are a great improvement on their predecessors, whose questions sometimes revealed a remarkably poor understanding of how projects work. One had the feeling sometimes that questions in the report forms were more to give the impression that the evaluators were doing their job than to get real information for the Darwin Initiative. The author of this report knows he is not the only project co-ordinator to have held this view, and he is aware of a strong feeling at this level that reports should be kept simple.

9 Darwin Identity

Publicity

At the start of the project, various press-releases were issued. An example of one is attached. As a result of these press-releases the project was covered by programmes on BBC Digital Television and the BBC World Service radio. Exact details of the broadcast dates were, however, never obtained. The work of the project was also publicized in *Kiev Post*, Ukraine's leading English language newspaper.

NATION

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Y2K bug a boon to Ukraine's nature reserves

By LILY OVIDE
Special to the Post

A disaster for the West is an opportunity for the East: That's Dave Minter's view of the millennium bug.

As Western companies spend millions employing legions of programmers to combat the problem, which is predicted to wreak havoc on older systems, Minter is busy collecting the cast-off computers for an unusual project in Ukraine.

Minter, a researcher from the British-based Center for Agriculture and Biosciences International (CABI), plans to install the computers in nature reserves in Ukraine and throughout the former Soviet Union.

"We're using the opportunity of the millennium bug," he explained. "In the middle of a remote nature reserve, who cares what date it is?"

Less than a month ago images of mad scientists marooned in the wild unaware of the onset of the next millennium, the aim of the project is in fact to bring the reserves into closer contact with the rest of the world. The computers will be reset to 1980 and used to transfer the reserves' data to a computerized database of former Soviet institutions where scientists are engaged in biodiversity research.

Ukraine has more than 30 reserves, national parks and "biosphere reserves," of which only two can be called sufficiently equipped, according to Ukrainian project coordinator Lyudmila Vakharenko, from Kyiv's Botany Institute. Those two reserves — one in the Carpathian Mountains and the other in the Danube Delta — are supported by grants from international organizations. The rest, especially those under the auspices of the Ukrainian Academy of Sciences, have fallen on hard times along with the academy.

"Many of our reserves are unfortunately very poor, and without computers it's impossible for them to keep up communications," Vakharenko said. "Now several are even very hard to contact by phone."

The three-year project will provide computer training for the reserves' staff, so they can transfer reams of written data to a more modern medium. Since the collapse of the Soviet Union, the changes in the names of countries, cities, streets and institutions has rendered the old Soviet directories of nature conservation and research unusable, Minter says. The new directory, which will be available on the internet, will be in English and Russian, with regularly updated information on projects, institutions and sources. There will also be biographies and contacts for scientists, which Minter hopes will facilitate cooperation between East and West.

The project has already established coordinators in St. Petersburg, Tbilisi and Almaty as well as Kyiv, and meetings are planned to bring together participants from even farther afield to plan future developments in the field of biodiversity.

The territory of the former Soviet Union, ranging from steppe to tundra, mountains to deserts, could contribute enormous information and resources to the world, Minter says.

"We need to know what's going on east of the old Iron Curtain," he said.

David Minter stands next to the Land Rover that he uses to deliver hundreds of used computers from the West — all castoffs of the Y2K problem — to nature reserves throughout Ukraine. (Courtesy photo)

The information is useful for monitoring the origin and spread of plant diseases, while research in mycology — the study of fungi — is invaluable to the development of new medicines.

The three-year project is paid for by the Darwin Initiative, a British government fund meant to assist countries rich in biodiversity but poor in resources. But Minter is using his own contacts to collect the cast-off computers, starting with his CABI employers, who are tossing out over 300 of them.

While he is still working out the logistics of getting them to Ukraine, once in the country he has already planned for a distribution method that is close to his heart: The vehicle will be a decrepit 1970s Land Rover named Mir, which was introduced to Ukraine last year for a research trip to the Pripyat marshes. Faced with the prospect of selling it after the trip was over, Minter dreamed up the computer project with the future of his beloved Land Rover in mind. Although Mir seems to spend as much time in the shop as on the road, the undaunted Minter intends to put it to good use delivering the computers to the out-of-the-way reserves around Ukraine.

Article about project in Kiev Post (1 July 1999)

The Darwin Initiative logo appeared on several issues of *Zhiva Ukraina*, Ukraine's main ecological newsletter, which also contained various articles about the work of the "Darwin Team" in Kiev. The Darwin Initiative logo also appeared on the June 2001 issue of *BioNET-INTERNATIONAL News* as part of a report on the project's May 2001 St Petersburg meeting. The project was also cited in CAB International's 1999 *Annual Review*, and *BioNET-INTERNATIONAL's* July 1999 *Business Plan*. In addition, the Darwin Initiative logo has appeared on a range of web-sites, and on various publications, including the main Directory of fSU scientists working with biodiversity. The Darwin Initiative logo also appeared on the proceedings of several of the meetings and conferences organized or supported by this project, and on all of the boxes of donated computers and other equipment sent to fSU beneficiaries. Many of the computers themselves had "Darwin Initiative" written on their sides by beneficiaries. Support from the Darwin Initiative was acknowledged in a range of papers and other smaller publications produced as a result of this project (examples of some

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are attached to this report), and on posters presented at various meetings, including the Royal Society's ten-year retrospective on scientific collaboration between the west and FSU countries (October 2001). Furthermore, the Darwin Initiative was thanked in oral presentations at various meetings.

Impact

The present project was active to a greater or lesser extent in twelve countries. Understanding of the Darwin identity as a result of the activities of this project varies between different host countries. In Azerbaijan, Kyrgyzstan and Tajikistan, where activity was least, the project made little impact. In Armenia, Belarus, Moldova, Turkmenistan and Uzbekistan activity and impact were greater but more support came from the parallel INTAS Infrastructure Action. In Georgia, Kazakhstan, Russia and Ukraine, the four countries originally prioritized, activity and impact were high, particularly in Russia and Ukraine. With the Directory and other publications as evidence, many scientists in those countries are familiar with the Darwin Initiative and its aims, through this project. In general the donated second-hand computers made a very positive impact with beneficiaries, and examples from the many letters of thanks are included in the annexes to this report.

It may be worth noting that, on at least four occasions, the present project was able to interact with other Darwin Initiative projects. Dr N. Yermakov, a Darwin Fellow in Novosibirsk, trained at Lancaster University, was helped in the purchase of a computer. Two members of the Kiev "Darwin Team" were able to attend a course on peat bog conservation in Scotland organized by a Darwin Initiative project based at the University of Dundee. One member of the Kiev "Darwin Team" was able to travel to Cuba to make collections and gain experience of tropical ecosystems. One member of the "Darwin Team" in Cuba was able to travel to St Petersburg to participate in the BioNET-INTERNATIONAL meeting held in May 2001.

In all countries where it operated, the present project was recognized as a distinct entity with a clear identity. The work which was being carried out by this project did not form part of any larger programme, and was accordingly not dwarfed.

10 Leverage

Apart from the very significant value of all the donated computers additional to those originally estimated, and apart from the value of the free transport, and duty-free import of those computers, the project attracted various other additional funds during its lifetime. The largest element came from INTAS through its Infrastructure Action scheme, for more intensive work in Armenia, Belarus, Moldova, Turkmenistan and Uzbekistan, countries covered but not prioritized by the present project. Some additional support came from the Global Environment Facility to certain Russian partners for work collecting and editing Russian language contributions to the Directory database. Other additional funding from various sources, including BioNET-INTERNATIONAL, supported different aspects of the various meetings with which this project was associated, particularly the meetings in St Petersburg. It was also possible to attract support for biodiversity work not specifically associated with the project, but relevant to the general aims of Dr Minter's team. This included support through the British Foreign Office's Environment Project Fund for work on steppe conservation in Donetsk oblast' of Ukraine.

Over the past eight years of collaboration with scientists in Ukraine, significant attention has been given to helping partners in that country learn how to secure funds from different

donors, with some success. Dr Andrianova played a very important role in attracting the INTAS funding referred to in the previous paragraph, while Dr Hayova made valuable contributions to the work of obtaining the steppe conservation funding, and was instrumental in attracting funding for a small scheme to make an environmental plan for Balaclava. Dr Hayova also managed to win a one-month scholarship to Cambridge University through its Hospitality Scheme. Significantly, when the British Council in Ukraine was asked for views about their future role in science, Dr Hayova was approached for comments. Another member of the Darwin Team in Ukraine, Dr Heluta, has independently attracted funding for his steppe conservation work at Traktemyr, a nature reserve south of Kiev.

11 Sustainability and Legacy

Endurance of Achievements

The Directory is in its nature an ephemeral product, since the people it lists are constantly changing. That product can only be enduring if resources are put into its periodic updating. The effect of its publication, however, is likely to be more enduring, since for the first time it is possible to identify fSU scientists with suitable expertise, and contact them. One small detail, not noted elsewhere in this report, is that, inside the Directory, access is provided to an e-mail address providing a help-line in good idiomatic English for people experiencing difficulties in making contact with scientists. That help-line is still functioning, and is expected to continue functioning for at least a couple of years.

The work of producing the Directory, and the practice of English which it has entailed, will also endure rather longer than the Directory itself. Together with all the keyboarding of biological records, that work has provided a lot of experience of good database design, and of database handling. In addition, the pool of scientists and nature reserve staff now with access to computers is significantly larger than before, particularly in Ukraine. Systems, once computerized, rarely revert to paper, and the work of many nature reserves has been computerized through this project.

The most long-lasting legacy, however, will be the computerization of all the biological records, which are now already residing in, or are sitting in an editorial queue for incorporation to an enormous integrated database which at the time of writing contains more than half a million records. This database is now, probably, large enough to survive long-term, and the records contributed by the present project will appear in various different outputs over forthcoming years. Outputs currently in preparation include a book *Fungi of Georgia, an annotated checklist*, a *Checklist of Fungi on Pines*, and a CD of fungal distribution maps of Ukraine. Further outputs are being planned.

At the time of writing, all project staff are still in place, and are using the resources donated through this project. In general, the donated equipment was deliberately largely restricted to computers, because these tend to be independent of resources apart from electricity, whereas laser printers, for example, need periodic charging with toner cartridges. One very enduring benefit from this project, which could easily be missed, is the great improvement in spoken and written English by many of the fSU participants and, for the first time, some evidence of improvement in Dr Minter's colloquial Ukrainian. The excellent team spirit which exists in the group of scientists working on this project suggests that they are all likely to keep in touch, not only with Dr Minter, but also with each other. Regarding the question of whether additional funds are being sought to continue aspects of the project, see *Activity after the end of the Project*, in Section 7 of this Report.

12 Value for Money

The total money disbursed to this project by the Darwin Initiative was £139,280. The resulting benefits included: one major book (a Directory containing almost 10,000 entries of up-to-date information about biodiversity specialists in one-sixth's of the world's land area); more than 160,000 biological records computerized; about than 140 computers delivered to beneficiaries across two continents; at least two major meetings and six workshops organized, and a string of others significantly supported; a range of websites established; several other publications and newsletters; several examples of interaction between this and other Darwin Initiative projects; a small amount of field work. All this has been achieved without fuss at a time when the Ukrainian secret service was persecuting participants of other biodiversity projects.

Computerization of biological records is usually costed at between £1.50 and £2 per record as a minimum for data which is already in an accessible format ready for keyboarding. Costs are more if significant editorial work is also necessary. The keyboarding of more than 160,000 biological records through this project (with significant editorial work, because of dealing with the Cyrillic alphabet), quite apart from the other outputs, would more than justify the whole cost of the project. Computerization of the almost 10,000 records of scientists, an altogether more complex data set requiring a lot of verification, editing and translation, can be supposed to have a real cost of much more than £2 per record. Acquiring 140 donated computers, checking them, packing them, and delivering them safely to various far-flung parts of the fSU at almost no cost at all is not easily achieved, and several scientific meetings were also organized. Virtually all outputs were achieved on time, or ahead of time, and on budget, in spite of an approximately 10% fall in the value of the pound against the dollar during the life of the project. On that basis, the author of the present Report hopes this project will be judged as having been good value for money.

Author(s) / Date

D.W. Minter, 21 May 2002

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

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 which integrate conservation and sustainable use.
7. Identification and Monitoring	30	Identify and monitor components of biological diversity, particularly those requiring urgent conservation; identify processes and activities which have adverse effects; maintain and organise relevant data.
8. In-situ Conservation		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		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.
10. Sustainable Use of Components of Biological Diversity		Integrate conservation and sustainable use in national decisions; protect sustainable customary uses; support local populations to implement remedial actions; encourage co-operation between governments and the private sector.
11. Incentive Measures		Establish economically and socially sound incentives to conserve and promote sustainable use of biological diversity.
12. Research and Training		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).
13. Public Education and Awareness	15	Promote understanding of the importance of measures to conserve biological diversity and propagate these measures through the media; cooperate with other states and organisations in developing awareness programmes.
14. Impact Assessment and Minimizing Adverse Impacts		Introduce EIAs of appropriate projects and allow public participation; take into account environmental consequences of policies; exchange information on impacts beyond State boundaries and work to reduce hazards; promote emergency responses to hazards; examine mechanisms for re-dress of international damage.
15. Access to Genetic Resources		Whilst governments control access to their genetic resources they should also facilitate access of environmentally sound uses on mutually agreed terms; scientific research based on a country's genetic resources should ensure sharing in a fair and equitable way of results and benefits.
16. Access to and Transfer of Technology	20	Countries shall ensure access to technologies relevant to conservation and sustainable use of biodiversity under fair and most favourable terms to the source countries (subject to

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		patents and intellectual property rights) and ensure the private sector facilitates such assess and joint development of technologies.
17. Exchange of Information	30	Countries shall facilitate information exchange and repatriation including technical scientific and socio-economic research, information on training and surveying programmes and local knowledge
19. Bio-safety Protocol		Countries shall take legislative, administrative or policy measures to provide for the effective participation in biotechnological research activities and to ensure all practicable measures to promote and advance priority access on a fair and equitable basis, especially where they provide the genetic resources for such research.
Total %	100%	Check % = total 100

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Appendix II Outputs

Code	Total to date (reduce box)	Detail (←expand box)
Training Outputs		
1a	Number of people to submit thesis PhD qualification	1 (Ms T.I. Krivomaz began study of a Candidate degree in Kiev during this project)
1b	Number of PhD qualifications attained	0
2	Number of Masters qualifications attained	0
3	Number of other qualifications attained	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)	0
4d	Number of training weeks for postgraduate students	0
5	Number of people receiving other forms of long-term (>1yr) training not leading to formal qualification(i.e not categories 1-4 above)	4
6a	Number of people receiving other forms of short-term education/training (i.e not categories 1-5 above)	30
6b	Number of training weeks not leading to formal qualification	30
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)	24
9	Number of species/habitat management plans (or action plans) produced for Governments, public authorities or other implementing agencies in the host country (s)	0
10	Number of formal documents produced to assist work related to species identification, classification and recording.	1
11a	Number of papers published or accepted for publication in peer reviewed journals	38
11b	Number of papers published or accepted for publication elsewhere	0
12a	Number of computer-based databases established (containing species/generic information) and handed over to host country	21
12b	Number of computer-based databases enhanced (containing species/genetic information) and handed over to host country	3
13a	Number of species reference collections established and handed over to host country(s)	0
13b	Number of species reference collections enhanced	3
Dissemination Outputs		
14a	Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work	12
14b	Numbers of conferences/seminars/workshops attended at which finding from Darwin project work have been presented/disseminated	14
15a	Number of national press releases or publicity articles in host country(s)	1
15b	Number of local press releases or publicity articles in host country(s)	0

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Code	Total to date (reduce box)	Detail (← expand box)
15c	Number of national press releases or publicity articles in UK	2
15d	Number of local press releases or publicity articles in UK	0
16a	Number of issues of newsletters produced in the host country(s)	6
16b	Estimated circulation of each newsletter in the host country(s)	2000
16c	Estimated circulation of each newsletter in the UK	0
17a	Number of dissemination networks established	0
17b	Number of dissemination networks enhanced/extended	0
18a	Number of national TV programmes/features in host country(s)	0
18b	Number of national TV programme/features in the UK	1
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	1
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)	
21	Number of permanent educational/training/research facilities or organisation established	0
22	Number of permanent field plots established	0
23	Value of additional resources raised for project	0

Appendix III: Publications

The following is a list of works already published as a result of support from the project. More are already accepted for publication or in press.

- ANDRIANOVA, T.V.; MINTER, D.W. (1999, publ. 2001). *Septoria chelidonii*. *IMI Descriptions of Fungi and Bacteria. Set 142* No. 1411. 3 pp.*
- ANDRIANOVA, T.V.; MINTER, D.W. (1999, publ. 2001). *Septoria convolvuli*. *IMI Descriptions of Fungi and Bacteria. Set 142* No. 1412. 3 pp.*
- ANDRIANOVA, T.V.; MINTER, D.W. (1999, publ. 2001). *Septoria elaeagni*. *IMI Descriptions of Fungi and Bacteria. Set 142* No. 1413. 3 pp.*
- ANDRIANOVA, T.V.; MINTER, D.W. (1999, publ. 2001). *Septoria gladioli*. *IMI Descriptions of Fungi and Bacteria. Set 142* No. 1414. 3 pp.*
- ANDRIANOVA, T.V.; MINTER, D.W. (1999, publ. 2001). *Septoria hyperici*. *IMI Descriptions of Fungi and Bacteria. Set 142* No. 1415. 3 pp.*
- ANDRIANOVA, T.V.; MINTER, D.W. (1999, publ. 2001). *Septoria lavandulae*. *IMI Descriptions of Fungi and Bacteria. Set 142* No. 1416. 2 pp.*
- ANDRIANOVA, T.V.; MINTER, D.W. (1999, publ. 2001). *Septoria lepidii*. *IMI Descriptions of Fungi and Bacteria. Set 142* No. 1417. 2 pp.*
- ANDRIANOVA, T.V.; MINTER, D.W. (1999, publ. 2001). *Septoria oenotherae*. *IMI Descriptions of Fungi and Bacteria. Set 142* No. 1418. 3 pp.*
- ANDRIANOVA, T.V.; MINTER, D.W. (1999, publ. 2001). *Septoria paeoniae*. *IMI Descriptions of Fungi and Bacteria. Set 142* No. 1419. 3 pp.*
- ANDRIANOVA, T.V.; MINTER, D.W. (1999, publ. 2001). *Septoria scutellariae*. *IMI Descriptions of Fungi and Bacteria. Set 142* No. 1420. 2 pp.*
- BAKLOUSHINSKAYA, I.YU.; MINTER, D.W. (2001). *Voronitsov's Who's Who in Biodiversity Sciences*. In Azerbaijan, Armenia, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan. i-vii, 755 pp. Russia, Moscow; KMK Scientific Press [redacted] [copy already provided via Darwin Initiative]
- BAKLOUSHINSKAYA, I.YU.; ANDRIANOVA, T.V.; MINTER, D.W.; LYAPUNOVA, E.A.; PIMENOV, M.G. (2001). *Voronitsov's Who's Who in Biodiversity Sciences*. In Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan. 464 pp. England, Isleworth; PDMS Publishing. I [redacted] [copy already provided via Darwin Initiative]
- DUDKA, I.O. [as Дудка, I.O.] (2000). Нові для України види нівальних міксоміцетів з Криму [Snowline mycomycete species from Crimea, new for Ukraine]. Український Ботаничний Журнал [Ukrainian Botanical Journal] 57 (1): 57-61.*
- HAYOVA, V.P.; MINTER, D.W. (1998, publ. 2000). *Leucostoma cinctum*. *IMI Descriptions of Fungi and Bacteria. Set 137* No. 1361. 3 pp.*
- HAYOVA, V.P.; MINTER, D.W. (1998, publ. 2000). *Leucostoma niveum*. *IMI Descriptions of Fungi and Bacteria. Set 137* No. 1362. 3 pp.*
- HAYOVA, V.P.; MINTER, D.W. (1998, publ. 2000). *Leucostoma persoonii*. *IMI Descriptions of Fungi and Bacteria. Set 137* No. 1363. 3 pp.*
- HAYOVA, V.P.; MINTER, D.W. (1998, publ. 2000). *Valsa ambiens* subsp. *ambiens*. *IMI Descriptions of Fungi and Bacteria. Set 137* No. 1364. 4 pp.*
- HAYOVA, V.P.; MINTER, D.W. (1998, publ. 2000). *Valsa ambiens* subsp. *leucostomoides*. *IMI Descriptions of Fungi and Bacteria. Set 137* No. 1365. 3 pp.*
- HAYOVA, V.P.; MINTER, D.W. (1998, publ. 2000). *Valsa ceratosperma*. *IMI Descriptions of Fungi and Bacteria. Set 137* No. 1366. 5 pp.*
- HAYOVA, V.P.; MINTER, D.W. (1998, publ. 2000). *Valsa cypri*. *IMI Descriptions of Fungi and Bacteria. Set 137* No. 1367. 3 pp.*
- HAYOVA, V.P.; MINTER, D.W. (1998, publ. 2000). *Valsa malicola*. *IMI Descriptions of Fungi and Bacteria. Set 137* No. 1368. 3 pp.*

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- HAYOVA, V.P.; MINTER, D.W. (1998, publ. 2000). *Valsa salicina*. *IMI Descriptions of Fungi and Bacteria*. Set 137 No. 1369. 3 pp.*
- HAYOVA, V.P.; MINTER, D.W. (1998, publ. 2000). *Valsa sordida*. *IMI Descriptions of Fungi and Bacteria*. Set 137 No. 1370. 3 pp.*
- HAYOVA, V.P.; TYKHONENKO, YU.YA.; MINTER, D.W. [as Гайова, В.П.; Тихоненко, Ю.Я.; Мінтер, Д.В.] (2001). Електронні Баси Даних у Біології. Electronic Databases for Biological Recording. 84 pp. Київ [Kiev]; Фітосоціоцентр [Phytosociocentre].
- HELUTA, V.P.; MINTER, D.W. (1998, publ. 2000). *Arthrocladiella mougeotii*. *IMI Descriptions of Fungi and Bacteria*. Set 138 No. 1371. 3 pp.*
- HELUTA, V.P.; MINTER, D.W. (1998, publ. 2000). *Erysiphe convolvuli*. *IMI Descriptions of Fungi and Bacteria*. Set 138 No. 1372. 3 pp.*
- HELUTA, V.P.; MINTER, D.W. (1998, publ. 2000). *Leveillula cylindrospora*. *IMI Descriptions of Fungi and Bacteria*. Set 138 No. 1373. 3 pp.*
- HELUTA, V.P.; MINTER, D.W. (1998, publ. 2000). *Leveillula duriaei*. *IMI Descriptions of Fungi and Bacteria*. Set 138 No. 1374. 3 pp.*
- HELUTA, V.P.; MINTER, D.W. (1998, publ. 2000). *Microsphaera palczewskii*. *IMI Descriptions of Fungi and Bacteria*. Set 138 No. 1375. 3 pp.*
- HELUTA, V.P.; MINTER, D.W. (1998, publ. 2000). *Microsphaera sparsa*. *IMI Descriptions of Fungi and Bacteria*. Set 138 No. 1376. 3 pp.*
- HELUTA, V.P.; MINTER, D.W. (1998, publ. 2000). *Phyllactinia mali*. *IMI Descriptions of Fungi and Bacteria*. Set 138 No. 1377. 3 pp.*
- HELUTA, V.P.; MINTER, D.W. (1998, publ. 2000). *Podosphaera myrtilina*. *IMI Descriptions of Fungi and Bacteria*. Set 138 No. 1378. 3 pp.*
- HELUTA, V.P.; MINTER, D.W. (1998, publ. 2000). *Savadaea tulasnei*. *IMI Descriptions of Fungi and Bacteria*. Set 138 No. 1379. 3 pp.*
- HELUTA, V.P.; MINTER, D.W. (1998, publ. 2000). *Uncinula adunca*. *IMI Descriptions of Fungi and Bacteria*. Set 138 No. 1380. 4 pp.*
- MEL'NIK, V.A. (2000). Key to fungi of the genus *Ascochyta* Lib. (Coelomycetes). *Mitteilungen aus der Biologischen Bundesanstalt für Land- und Forstwirtschaft Berlin-Dahlem* 379: 192 pp.*
- MINTER, D.W. (2000). The Rhytismatales of Ukraine. 1. Key to the genera. Key and diagnosis of *Lophodermium* Chevall. Український Ботаничний Журнал [Ukrainian Botanical Journal] 57 (1): 62-77.*
- MINTER, D.W. (2000). The Rhytismatales of Ukraine. 2. Keys to other genera. Український Ботаничний Журнал [Ukrainian Botanical Journal] 57 (5): 561-585.*
- MINTER, D.W. (2001). Fungal Conservation in Ukraine. 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. 162-176. UK, Cambridge; Cambridge University Press.*
- RYSS, A.Y.; MINTER, D.W. (2001). *Information Technology in Biodiversity Research*. Proceedings & Abstracts of the 2nd International Symposium. 172 pp. UK, Middlesex, Isleworth; PDMS Publishing.*

Websites

The following is a selection of some web-addresses developed as a result of, or with support from this project. These pages have been printed out, and are attached to this report.

- <http://binras.newmail.ru/index.html>
- <http://binras.newmail.ru/rbo.html>
- <http://binras.newmail.ru/eng/about.html>
- <http://binras.newmail.ru/eng/collections.html>
- <http://binras.newmail.ru/eng/institutes.html>
- <http://binras.newmail.ru/eng/journal.html>
- <http://binras.newmail.ru/eng/links.html>
- <http://binras.newmail.ru/eng/rbo.html>
- http://binras.newmail.ru/eng/rbo_history.html

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<http://www.biodiversity.ac.psiweb.com/14cem/index.htm>
<http://www.biodiversity.ac.psiweb.com/people/andriano.htm>
<http://www.biodiversity.ac.psiweb.com/people/dudka.htm>
<http://www.biodiversity.ac.psiweb.com/people/hayova.htm>
<http://www.biodiversity.ac.psiweb.com/people/heluta.htm>
<http://www.biodiversity.ac.psiweb.com/people/tykhonen.htm>
http://www.bionet.nsc.ru/meeting/bdne2001/index_eng.html
<http://www.bionet.nsc.ru/meeting/bdne2001/sponsors.html>
<http://www.nbu.gov.ua/herbar/>
http://www.nbu.gov.ua/herbar/index_e.htm
<http://www.zin.ru/conferences/itbd/index.html>

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Appendix IV: Darwin Contacts

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

Project Title	Biodiversity in the former Soviet Union
Ref. No.	162/8/011
UK Leader Details	
Name	Dr D.W. Minter
Role within Darwin Project	Project leader
Address	[REDACTED]
Phone	[REDACTED]
Fax	[REDACTED]
Email	[REDACTED]
Other UK Contact (if relevant)	
Name	Dr A.H. Thomas
Role within Darwin Project	Deputy leader [later Consultant, following withdrawal of NERC from project]
Address	[REDACTED]
Phone	[REDACTED]
Fax	[REDACTED]
Email	[REDACTED]
Partner 1	
Name	Dr T.V. Andrianova
Organisation	M.G. Kholodny Institute of Botany, National Academy of Sciences of Ukraine
Role within Darwin Project	Ukrainian partner
Address	[REDACTED]
Fax	[REDACTED]
Email	[REDACTED]
Partner 2 (if relevant)	
Name	Dr V.P. Hayova
Organisation	M.G. Kholodny Institute of Botany, National Academy of Sciences of Ukraine
Role within Darwin Project	Ukrainian partner
Address	[REDACTED]
Fax	[REDACTED]
Email	[REDACTED]