



DARWIN INITIATIVE FOR THE SURVIVAL OF SPECIES

**Project Reference: 162/8/204
Formerly 162/8/113**

**Collection and Cataloguing of Algae for
the Natural History Museum of Oman**

Annual Report 2001/02

**HTS Development Ltd
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Darwin Initiative for the Survival of Species Annual Report

1. Darwin Project Information

<i>Project title</i>	Collection and Cataloguing of Algae for the Natural History Museum of Oman
<i>Country(ies)</i>	Oman
<i>Contractor</i>	HTS Development Limited
<i>Project Reference No.</i>	162/8/204 formerly 162/8/113
<i>Grant Value</i>	£167,973
<i>Start/Finishing dates</i>	June 1999 – April 2002 (extended to August and verbally approved by Darwin to November 2002)
<i>Reporting period</i>	April 2001 – March 2002

2. Project Background

The coastal waters off Oman are home to diverse macroalgal communities which until now have received little attention from taxonomists and are therefore relatively poorly understood. The macroalgae are an important natural resource that has considerable potential for commercial exploitation. Broadly the aim of the project is to identify and catalogue this marine plant diversity and establish fully referenced collections as important research and educational resources. Through a variety of media the project will also raise public awareness both nationally and internationally of the conservation value of this important ecosystem whilst training local staff in curation techniques and the management of biodiversity information.

To date the project has focused on the stretch of coastline between Salalah and Sadh in Southern Oman. It was anticipated that the information collected would feed into plans for the in-situ conservation of Oman's unique macroalgal communities.

3. Project Objectives

- Establish a fully referenced algae collection at the Oman Natural History Museum with a parallel collection at the Natural History Museum, London
- Develop an informative museum display illustrating the importance of the macroalgal communities and raising awareness of Oman's unique coastal ecology.
- Develop a website for the Oman Natural History Museum and disseminate project findings through it.
- Transfer knowledge to Omani museum staff in collection and curation techniques and the management of biodiversity information.
- Contribute to science through the publication of journal papers on Oman's macroalgae.
- Promote increased awareness of the importance of Oman's marine plants through a popular publication and poster.

- Develop a plan for the in-situ conservation of Oman's macroalgal communities.

4. Progress

This is the third annual report. The first and second annual reports described field trips to collect algae in September 1999, January 2000 and September 2000. A database was designed and used to store information on the algal specimens and to print algal labels. Algal specimens were identified and five papers were accepted for publication during this period. Taxonomic studies on the collections have revealed 47 species not previously recorded from the Sultanate of Oman (Wynne 2000 and Wynne 2001). Several of these, including five species of Rhodophyta, two species of Phaeophyta and one species of Chlorophyta were new records for the whole of the Indian Ocean (Wynne 2000). HTS staff trained counterpart staff in collection and curation techniques and the management of biodiversity information. Dissemination networks were established culminating in the publication of two popular articles and one national press release in Oman, an interview on Oman national television and the submission of press releases to UK national and regional newspapers. Reference books and a computer were donated to the partner institution and exchanges began with project partners regarding the format of the remaining project outputs. The project presented a draft website to the local partners. Approval of the design was being awaited at the end of the reporting period. The web technician was to commence work as soon as the designs were approved. The Museum display was a planned output for 2000/01 and has now been designed. However production was delayed in the reporting period pending approval by the partner institution. As planned, a draft design of the booklet was produced. A study tour to the UK for a key member of counter-part staff was organised for June or July 2001. The tour was an additional output requested by the partner institution. Approval of this tour was being awaited at the end of the reporting period.

2001-2002: In November 2001 the Project Co-ordinator, was made redundant from HTS Development Ltd. In December 2002 the Research Assistant resigned. A new project co-ordinator nominated as Scientific Advisor in the initial grant application was proposed to Darwin on 21st January and approved by Darwin on 22nd February 2002. An extension to 30 August 2002 was also approved at the same time. A subsequent extension has been requested from Darwin to end of November 2002 due to further delays in outputs.

- **Establish a fully referenced algae collection at the Oman Natural History Museum with a parallel collection at the Natural History Museum, London... (80% achieved)**

A further algal sampling trip was undertaken to the southern coast of Dhofar in September 2001 to coincide with the end of the khareef. Prof Michael Wynne, phycologist, Mr Glenn Richards, Mr Henry Ford (Web site designer) and Thamer Omer Alwi accompanied the trip. Mr Thamer Omer Alwi was given on-the-job training.

The strategy specified in the 2000-2001 report to collect algae from a more diverse area and to take more photographs of algae was followed. Algae were collected at seven additional sites not visited in previous years and there was more field photography of specimens. Triplicate specimens of algae were collected and processed according to the protocols from previous sampling trips. One triplicate was deposited with the Oman Natural History Museum, one with the University of Michigan Herbarium and one with HTS Development Ltd for subsequent accession into the British Natural History Museum.

In the three years 608 algal specimens (nearly all in triplicate) have been collected of which 287 (47%) have been identified. In 1999 50 algal specimens were collected of which 38 have been identified. In 2000 461 specimens were collected of which 152 have been

identified. In 2001 97 specimens were collected and all have been identified. Identification continues. To date 111 separate species of algae have been identified and these are listed in Annex I.

All specimens have been entered into the Microsoft Access database and labels are being printed off for onward transmission to the Oman Natural History Museum. The specimens for the British Natural History Museum are being retained pending selection and scanning of specimens to be used as images for the algal handbook.

- **Develop an informative museum display illustrating the importance of the macroalgal communities and raising awareness of Oman's unique coastal ecology (delayed).**

A draft layout of the Museum display was approved in October 2001. An earlier version of the English text was translated into Arabic but the text was subsequently revised. The revised English text was submitted to the Oman Natural History Museum for translation. The translation is still being done. When the Museum was last contacted on 23rd April by 'phone it was indicated that, in view of the latest correspondence from HTS Development Ltd dated 09th and 16th April, the various outstanding issues including the translation needed to be reviewed by more senior officials. This was going to happen in the next two weeks. In the meantime the display is on hold pending the translation or an agreement to proceed without the translation.

- **Develop a website for the Oman Natural History Museum and disseminate project findings through it (80% achieved).**

An earlier draft of the website was approved in September 2001. Following this approval further work was undertaken to make edits recommended by ONHM and to add more ONHM information and expand the macroalgal section. The final complete mock-up of the site has been given to the Web Technician in Word format including the final text and images. The Web Technician is currently constructing the site.

It is proposed that the Web Technician visits Oman in September 2002 with the Project Manager to hand over the web site, provide some training and discuss issues of sustainability.

- **Transfer knowledge to Omani museum staff in collection and curation techniques and the management of biodiversity information (50% achieved, not yet sustainable).**

A member of staff of the Raysut marine lab, Thamer Omer Alwi accompanied the field team during the field phase in September 2001 and was trained in the collection and preservation of algae and the identification of common taxa. The project enrolled Thamer on a Dive training course but due to a problem with his ears he was unable to complete this.

Training was also provided to the herbarium assistant at ONHM in databases and preservation and presentation of algae.

It is proposed that training be given in use of the database and associated activities during the project handover in Oman in September 2002.

- **Contribute to science through the publication of journal papers on Oman's macroalgae (ongoing 100%).**

A list of refereed publications including three new publications in this reporting period is listed in Table 2 Section 7. There are several publications in preparation.

- **Promote increased awareness of the importance of Oman's marine plants through a popular publication and poster (20% progress).**

No popular publication has been produced during the current reporting period and none is planned. It is expected that the Web Site, Museum display and handbook will provide this publicity. In addition it is proposed that a poster be made of the Museum display once the display has been finalised.

It has been suggested to the Darwin Project Partners that the handover of these materials in September 2002 might be a public communications opportunity. This suggestion is presently under consideration by the Omani Darwin Project Partners.

- **Develop a plan for the in-situ conservation of Oman's macroalgal communities (0% progress, cancelled).**

No proposals had been made for the in-situ conservation of Oman's macroalgal communities at the time when the present Co-ordinator took over the Project in December 2001. In subsequent discussions with the Ministry responsible for implementation of the coastal zone management plan it was indicated that such plans are not appropriate within the present framework of activities. It was indicated that this framework was already stretching the available resources. This framework is specified in a report on the status of coastal zone management activities within the Sultanate of Oman prepared by Mr Ali Amer Al-Kiyumi as requested by the present Project Co-ordinator and delivered in early 2002.

2002/03 WORKPLAN APPENDED AT THE BACK OF THE REPORT

A workplan for 2002 is presented in Annex II of this report. The workplan takes note of the delay in deliverables due to the unforeseen departure of the Project Co-ordinator and Research Assistant in Autumn 2001 and the time it has taken for formal approval of and action on the outputs required under project.

5. Partnerships

Every effort is being made to identify a procedure for ensuring that marine algae from Oman continue to be collected and catalogued after the end of the present project. This procedure is in place but is not yet sustainable. In addition to providing necessary training this requires that the Herbarium of the University of Michigan, the British Museum of Natural History and the Oman Natural History Museum continue to build a working relationship. To this end the principal players at the University of Michigan and the British Natural History Museum have been approached for their suggestions as to how this relationship might proceed. These will be discussed and informally agreed with the Omani Darwin Project Partners and hopefully confirmed in the visit to Oman in September.

The Study Tour designed to allow the Oman Natural History Museum to explore partnerships with UK organisations and to catalyse interest in the Project did not take place due to administrative complications in Oman. This was unfortunate in view of the monitoring and evaluation assessment of the 2000-2001 annual report dated 07th September 2001. The resources for this tour have been assigned to the "handover" visit in September 2002.

6. Impact and Sustainability

It has proved difficult to maximise the impact and ensure the sustainability of project activities. This reflects limited ownership of the project by Oman as discussed further below.

The delivery of the various educational documents:- the Museum Display, the Web site, the Algal Handbook and the Poster will all have a significant impact and enhance the museum's biodiversity profile. Provided that there is agreement to a procedure for continuing the process of collecting and identifying algae and maintaining the algal collection then there will be an ongoing Project legacy. It should also be noted that the algal collections and the publications arising out of the project are a permanent record of the Project.

7. Outputs, Outcomes and Dissemination

Table 1. Project Outputs (according to Standard Output Measures)

Code No.	Quantity	Description
6a	1	An Omani national working for the Raysut Marine Research Laboratory accompanied the HTS team for the duration of the field phase
6b	2 weeks	Over the course of the field phase the HTS phycologist provided training in the identification and curation of marine macroalgae
8	15 weeks	This included a field collection phase involving three expatriates. Time was also spent labelling specimens identified from a previous collection visit, accessioning them into the herbarium, refining the species database and working jointly with the partner on designs for the museum display and website and finalising plans for a study tour.
11a	1	One paper has been published and one abstract/presentation made at a conference during the reporting period. Details are provided in Table 2.
11b	1	No formal confirmation has been received of papers submitted during the reporting period. However, several papers are in preparation.
12b	1	The species database designed for the museum continues to be used. The database cannot yet be reported as an output as it has not yet been handed over to the host country
13a/b	1	A further collection of marine algae was handed over to the host country building on the previous collection.
20	0	No equipment was handed over to the overseas partner institution during the present reporting period.

The outputs planned for the next reporting period include (outputs in italics from 2000-2001 annual report):-

Website – Website handed over in September 2002. (*2000-2001:- Designs submitted and awaiting approval – website will be launched for September 2001 field phase*).

Museum Display – Designed. Awaiting translation. Will be handed over in September 2002. (2000-2001 - Designs submitted and awaiting approval –display will be launched during September (2001) field phase).

Booklet – Format prepared. Images selected. Text being written. Awaiting agreement to foreword etc from Omani Darwin Project Partners. Scheduled for printing in July/August and hand over in September 2002. (2000-2001 - according to schedule the initial booklet design has been produced. Work will continue on this during the final year of the project).

Poster – Proposed that based on Museum Display. Printing quote obtained. Awaiting agreement/finalisation of Museum Display. Will be handed over in September 2002. (2000-2001 - A number of preliminary designs are under consideration.)

TV/Radio features – Omani Darwin project Partners have been approached to agree to a formal handover for Darwin Products in September 2002. (2000-2001 -This output was achieved during the first year of the project when an interview with a member of the project staff was broadcast on Oman TV. There have been no further opportunities for TV or Radio coverage. Encouraging Omani counterparts to give press release for launch of website and display).

Study tour – This did not take place due to administrative problems. (2000-2001 - this additional output is a study tour for a senior member of the partner institution and has been added to the programme at the request of host country government. The arrangements are in place and it is anticipated that the tour will go ahead in June or July 2001).

Publications: - these are detailed below. Several drafts are in preparation

Table 2: Publications

Type	Detail
Journal	M.J. Wynne and F. Leliaert. 2001. <i>Pedobesia simplex</i> (Kutzing) comb. nov. (Chlorophyta), a new name for <i>P. lamourouxii</i> and its first report from the Indian Ocean. <i>Cryptogamie, Algologie</i> 22: 3-14.
University Journal	Wynne, M.J., 1999. New records of Benthic Marine Algae from the Sultanate of Oman. <i>Contr. Univ. Michigan Herb.</i> 22:189-208.
Journal	M.J. Wynne. 2000. Further interesting connections between the marine algal floras of Japan and the Arabian Sea. <i>Phycological Research</i> 48: 211-220.
Journal	M.J. Wynne. 2001. <i>Stirnia prolifera</i> gen. et sp. nov. (Rhodymeniales, Rhodophyta) from the Sultanate. of Oman. <i>Botanica Marina</i> 44: 163-169.
Journal	M.J. Wynne 2001. New records of benthic marine algae from the Sultanate of Oman, northern Arabian Sea. II. <i>Nova Hedwigia</i> 72 3-4:347-374.
University Journal	Wynne, M. J. 2001. New records of benthic marine algae from the Sultanate of Oman, northern Arabian Sea. III. <i>Contributions University Michigan Herbarium</i> 23:389-346
Conference abstract	Wynne, M.J., 2001. The Benthic Marine Algal Flora of the Sultanate of Oman. Abstract 72. 7 th International Phycological Congress, Thessaloniki, Greece, 18-25 August 2001.
Journal	Wynne, M. J., & Y. S. D. M. de Jong. 2002. <i>Dipterocladia arabiensis</i> sp. nov. (Dasyaceae, Rhodophyta) from the Sultanate of Oman. <i>Botanica Marina</i> 45: 77-86

Copies of the above are available from Professor Mike Wynne, from the journal in which they were published or in scanned electronic format from HTS Development Ltd under project number 201029.

Dissemination networks/activities – Explore system for ongoing collaboration between Oman Natural History Museum, British Natural History Museum and University of Michigan Herbarium. (2000-2001 - Apart from the website and museum display being the project's main dissemination outlets the exploration of possible dissemination networks is an ongoing feature of the project. The project is working towards establishing two potential networks in the host country but more work will be required in order to explore these further).

8. Project Expenditure

Table 3: Project Expenditure in £STG during the Reporting Period

<i>Item</i>	<i>Budget</i>	<i>Expenditure (balance)</i>
<i>Salaries (specify)</i>		
<i>Rent ,rates heating lighting etc</i>		
<i>Office administration costs</i>		
<i>Travel and Subsistence</i>		
<i>Printing</i>		
<i>Capital items/equipment</i>		
<i>Others</i>		
<i>Total</i>		

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

Budget expenditure lines, except for rent etc are not within the 10% variation figure. A total of £XXX has been deferred to 2001-2002 in order to cover the costs of the museum display and biodiversity booklet and a hand-over visit. The hand over visit replaces the cancelled study tour. Darwin has agreed to a carry-over of the balance to the next year. The letter dated 22nd April states:-

“Considering the reasons behind the project delay and the fact that all the project deliverables can be achieved within the existing budget, we agree that the delivery of the final report can be delayed until 30th August 2002”

In view of advice from the Omani Darwin Project Partners that a handover of materials will not be possible in the period June-August a subsequent request for a delay in submission of the final report to end of November 2002 has been proposed to Darwin.

9. Monitoring, Evaluation and Lessons

In view of the change in management of the project it has been extremely difficult for the present Co-ordinator to evaluate progress. In addition objectively verifiable output indicators can lack soul and “Success” and “Progress” are relative.

Objectively speaking the majority of concrete deliverables specified in the proposal still have to be met although there is only limited risk that they will not be met by the end of November 2002. There are two reasons for the delay:-

The first is the difficulty in achieving closure of a project which, by definition, is process driven and open ended. For example the last period of fieldwork in September 2002 is still producing materials that could be included in the products. There is the desire to wait for delivery of "breaking news" to include in an even better product. Waiting and then revising outputs to meet this desire causes delays.

The second is that the emphasis has been on raising awareness of the algal diversity of Oman through identification and publication of materials regarding this diversity. This emphasis on material outputs is easier to justify and to control than an emphasis on developing ownership of the project by the Omani Darwin Project Partners. However, ownership of the project by these partners is necessary not only to maximise sustainability but also to provide a proactive approach to the delivery of products. The Partners are likely to be much more responsive to a process they own than one they do not own. Unfortunately ownership is limited.

Efforts have been made and will continue to be made to encourage ownership of the Project in the Partners but this is difficult at the end of a telephone. The site visit in September 2002 will endeavour to ensure the maximum ownership of the project at project handover. It should have had a much higher priority earlier in the project. If a lesson is to be learned from this process it is that project design should involve the Partners to the maximum extent possible and include objectively verifiable commitments from these Partners.

10. Author(s) / Date

Dr Alec Dawson Shepherd, HTS Development Ltd 29/04/02

Annex I: List of Identified Algae

Confirmed Species Name
<i>Acrosorium venulosum</i> (Zanardini) Kylin
<i>Ahnfeltiopsis pygmaea</i> (Kützing) P. Silva &
<i>Amphiroa beauvoisii</i> Lamouroux
<i>Amphiroa misakiensis</i> Yendo
<i>Antithamnion cruciatum</i> (C. Agardh) Nägeli
<i>Asparagopsis taxiformis</i> (Delile) Trev.
<i>Asparagopsis taxiformis</i> (Delile) Trevisan
<i>Botryocladia wynnei</i> Ballantine
<i>Bryopsis plumosa</i> (Hudson) C. Agardh
<i>Carpopeltis maillardii</i> (Montagne & Millardet)
<i>Caulerpa elongata</i> Weber-van Bosse f. <i>disticha</i> W.
<i>Caulerpa lentelligera</i> J. Agardh
<i>Caulerpa mexicana</i> Sonder ex Kützing
<i>Caulerpa peltata</i> Lamouroux
<i>Caulerpa peltata</i> Lamouroux var. <i>macrodisca</i>
<i>Caulerpa peltata</i> Lamouroux var. <i>macrodisca</i>
<i>Caulerpa racemosa</i> (Forssk.) J. Agardh var.
<i>Caulerpa racemosa</i> (Forssk.) J. Agards var.
<i>Caulerpa scapelliformis</i> (Turner) C. Agardh
<i>Caulerpa scapelliformis</i> (Turner) C. Agardh f.
<i>Caulerpa scapelliformis</i> (Turner) C. Agardh var.
<i>Caulerpa serrulata</i> (Forssk.) J Agardh var.
<i>Centroceras clavulatum</i> (C. Agardh) Montagne
<i>Ceramium paniculatum</i> Okamura
<i>Chaetomorpha antennina</i> (Bory de Saint-Vincent)
<i>Champia compressa</i> Harvey
<i>Champia gigantea</i> M.J. Wynne
<i>Champia indica</i> Børgesen
<i>Chondria crassicaulis</i> Harvey
<i>Chrysomenia grandis</i> Okamura
<i>Cladophora ohkuboana</i> Holmes
<i>Codium arabicum</i> Kützing
<i>Codium indicum</i> Dixit
<i>Coelothrix irregularis</i> (Harvey) Borgesen
<i>Colpomenia sinuosa</i> (Roth) Derb. & Solier
<i>Dasya scoparia</i> Harvey
<i>Dermonema abbottiae</i> Afaq-Husain, Nizamuddin
<i>Dictyopteris divaricata</i> (Okamura) Okamura
<i>Dictyopteris hoytii</i> W. R. Taylor
<i>Dictyota bartayresiana</i> Lamouroux
<i>Dictyota ceylanica</i> Kützing
<i>Dictyota friabilis</i> Setchell
<i>Dipterocladia arabiensis</i> M.J. Wynne & Y.S.D.M.
<i>Distromium decumbens</i> (Okamura) Levring
<i>Dudresnaya japonica</i> Okamura

Erythrotricha vexillaris (Montagne) Hamel
Euptilota fergusonii Cotton
Exophyllum wentii Weber-van Bosse
Galaxaura marginata (Ellis & Solander)
Galaxaura obtusata (Ellis & Solander)
Galaxaura obtusata (Ellis & Solander) Lamouroux
Gelidiopsis intricata (C. Agardh) Vickers
Gelidiopsis variabilis (J. Agardh) Schmitz
Gelidium micropterum Kützing
Gracilaria canaliculata Sonder
Gracilaria corticata (J. Agardh) J. Agardh
Gracilaria gracilis (Stackhouse) Steentoft, L.Irvine
Halimeda tuna (Ellis & Solander) Lamouroux
Halymenia formosa Harvey ex Kützing
Halymenia maculata J. Agardh
Halymenia porphyriiformis Parkinson
Herposiphonia secunda (C. Agardh) Ambronn var.
Heterosiphonia dubia (Suhr) Falkenberg
Hypnea boergesenii T. Tanaka
Hypnea charoides Lamouroux
Hypnea japonica T. Tanaka prox.
Hypnea musciformis (Wulfen) Lamouroux
Hypnea pannosa J. Agardh
Hypoglossum barbatum Okamura
Hypoglossum nipponicum Yamada
Iyengaria stellata (Borgesen) Borgesen
Jolyna laminarioides Guimarães
Kallymenia crassiuscula Okamura
Laurencia filiformis (C. Agardh) Montagne f.
Lobophora variegata (Lamouroux) Womersley ex
Lyengaria stellata (Børgesen) Børgesen
MARKED AS LABELLED BUT NO NAME
Martensia fragilis Harvey
Meristotheca papulosa (Montagne) J. Agardh
Myriogramme marginifruca R. Norris & M.J.
Neurymenia fraxinifolia (Mertens ex Turner) J.
Nitophyllum adhaerens M.J. Wynne
Nizamuddiniana zanardinii (Schiffner) P. Silva
Padina dubia Hauck
Padina glabra Galliard
Pedobesia simplex (Kütz.) MJ Wynne & F Leliaert
Pedobesia simplex (Meneghini ex Kützing) M.J.
Platysiphonia delicata (Clem.) Cremades
Polysiphonia ferulacea Suhr ex J. Agardh AND
POOR SPECIMEN
Portieria hornemannii (Lyngbye) P. Silva
Portieria hornemannii (Lyngbye) Silva in Silva et
Portieria hornemannii (Lyngbye) Silva
Pseudocodium devriesii Weber-van Bosse

Rhodymenia dissecta Borgesen
Sarcodia dentata (Suhr) R. Norris in Wynne
Sarconema filiforme (Sonder) Kylin
Sarconema scinaoides Borgesen
Sebdenia flabellata (J. Agardh) Parkinson
Spatoglossum asperum J. Agardh
Spatoglossum variabile Figari & DeNotaris
Sphacelaria brachygona Montagne
Sporochnus pedunculatus (Hudson) C. Agardh
Spyridia hypnoides (Bory de Saint-Vincent)
Stirnia Prolifera M.J. Wynne
Stoechospermum polypodioides (Lamouroux) J.
Turbinaria ornata (Turner) J. Agardh f.
Ulva fasciata Delile
Ulva rigida C. Agardh
Valonia macrophysa Kützing
Valoniopsis pachynema (Martens) Børgesen
Ventricaria ventricosa (J. Agardh) Olsen & J.

Annex II Work Programme 2002

	2002									
	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	
Website	---	---	---	---	---					
Museum Display	---	---	---	---	---					
Omani counterparts visit UK for Training (cancelled)										
Collection and photography of specimens (completed)										
Labelling and archiving identified specimens	---	---	---	---						
Identification of Algae (ongoing after project)	---	---								
Label and archive remaining specimens (ongoing after project)	---	---	---	---						
Booklet design and production	---	---	---	---	---					
Poster			---	---	---					
Development of coastal management plan (cancelled)										
Handover of project outputs to host country and exit							---			
Reporting	☐									☐