

**Sustainable Management of the Black Land Crab,  
*Gecarcinus ruricola*, Colombia (162/11/015)**



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## 1 Darwin Project Information

<i>Project title</i>	Sustainable Management of the Black Land Crab ( <i>Gecarcinus ruricola</i> )
<i>Country(ies)</i>	Colombia
<i>Contractor</i>	Heriot-Watt University
<i>Project Reference No.</i>	162/11/015
<i>Grant Value</i>	£148,393
<i>Start/Finishing dates</i>	April 2002 – March 2005
<i>Reporting period</i>	April 2002 – March 2003

## 2 Project Background

The Black Land Crab, *Gecarcinus ruricola*, is overexploited, yet understudied in the Caribbean, particularly in San Andres, Colombia where it is a symbol of cultural identity as well as a major source of protein and economic subsistence. The project aims to conserve, recover and ensure sustainable use of this species, involving local community participation.

## 3 Project Objectives

The general objective of the project is to conserve, recover and ensure future sustainable exploitation of the black land crab by developing management initiatives and education tools in the San Andres Archipelago, providing a model for sustainable management of this resource for the Caribbean. Specific objectives occur in 4 key work areas: 1) Information gathering. The information base on *G. ruricola* will be improved, under the direction of the UK's leading land crab expert, by carrying out the biological and socio-economic research needed for management planning and to determine the validity of terraculture, including strengthening information management systems and developing an experimental terraculture site, if viable; 2) Management planning. A management plan to conserve and recover *G. ruricola* will be completed along with a socio-economic analysis that includes the feasibility of terraculture; and 3) Implementation. Initiatives defined in the management plan will be put into place including strengthening of the policy and regulatory framework, initiation of a monitoring program for species conservation and recovery, establishment of a Black Crab Conservation Unit, and design of a model terraculture project, if proved viable; and 4) Training and education. CORALINA personnel/local community groups will be trained in resource management techniques, with the development of a public awareness campaign based on the habits, needs, and sustainable management of *G. ruricola*.

The objectives and plan of operations have not changed significantly. However, a delay was caused to the start of the project (August 2002) as a result of the adoption of different approaches to the contractual arrangements for all Darwin projects, most notably funding, by DEFRA. The resultant minor changes in the timetable, which have been approved by the Darwin Secretariat, are highlighted in Section 4.

## 4 Progress

The aforementioned delay to the start of the project unfortunately resulted in the research team being unable to study the 2002 annual migration of the crab, which occurs in May. There remain, however, 2 annual migrations to study in 2003 and 2004 with ecological data being collected on crabs throughout the year. The delay has also resulted in the postponement of training on "Community Based Resource Management" and "Collection and Analysis of Biological Data" from December 2002 until May 2003. This will not affect the progress of the research, and indeed the training will occur at a most appropriate time, just prior to the migration event.

Despite this delay, the project holds firm in realising its objectives. The remainder of the year's work has proceeded as expected. This is summarised below:

- (1) An initial project meeting was held in San Andres between 7-9 September 2002, with Dr Mark Baine from Heriot-Watt University and Dr Richard Hartnoll from the University of Liverpool both attending. A more detailed project calendar for the research was produced at this time taking into account constraints placed on the project team by the delay. This project calendar is reproduced on the next page. At present it is adhered to strictly.
- (2) A reference collection on land crab biology, exploitation, management and terraculture has been completed. This comprises over 50 papers, manuscripts and books. These are available in both San Andres and Old Providence. This collection will continually be updated.
- (3) Public awareness of the crab and its importance has been increased throughout the first year, through a number of educational activities. The curriculum in 32 schools on San Andres Island was evaluated to assess the degree to which the land crab was addressed, the results indicating that very few relayed information on the crab, its ecology or cultural importance. A plan to include crab issues in school curricula is currently being finalised, as is a proposal to enhance community participation in local management. Activities highlighted in the educational plan are being organised in line with school schedules. Educational materials have been developed for school children, including stories, theatre productions and drawing materials and activities. Eight presentations have been given to institutions such as the Secretary of Agriculture and Fisheries, the Christian University and the Red Cross. A total of 100 and 180 children also participated in a 1-week vacation programme in Old Providence and San Andres Island respectively. The project and its objectives have also been the subject of 1 press release in the UK, 1 news article in San Andres, 2 radio programmes and 5 local TV shows in San Andres. The collection of land crab lore is proceeding.
- (4) Biological surveys have been initiated including analyses of ovarian maturity (5 months of data) and population structure. Small-scale experiments have also taken place on possible methods of trapping crabs, including the use of bait. The reproductive structures of 20 large females on each island have been analysed since October 2002, and classified as small, medium or large. Measurements have also been collated on carapace width, carapace length and cheliped length. There was a tendency for carapace size to increase with time until reaching a peak in January. It is surmised that the dry season may inhibit crab growth. Smaller size classes dominated the ovaries of females in Old Providence during October 2002, increasing with time. In San Andres Island, the 3 size classes were found throughout the 5 months.
- (5) A total of 57 crab sellers have been interviewed to determine information on crab presentation, market price, seasonal changes in quantities sold etc. 70% were females. Crabs are sold on a regular basis, 30% of sellers indicating that this takes place daily. In San Andres Island it is mainly sold "cooked", while in Old Providence, the meat claw is the most popular product. Raw crab-meat is cheaper (and the market price more stable) in Old Providence at a cost of \$4.500 per pound of raw meat, compared with \$5.000 to \$7.000 in San Andres Island. Crab demand is generally greater during April.
- (6) A total of 50 crab catchers were also interviewed to determine information on catch areas, effort, quantity, market price, seasonal differences in effort, and catch methods. This family activity is a sideline for many individuals who also work as government employees, farmers, fire fighters etc. Around 40% of the catchers on both islands devote over half of each month to catching crab. Captures vary in the region of 3-8 dozen per expedition, which normally lasts for 5 hours.

### *Project Calendar*

<b>Month/Year</b>	<b>Activities, Milestones, Outputs</b>
Aug – Dec 02	Develop and produce a reference collection
Oct 02	Initial project meeting in San Andres (MB 1wk, RH 2wks)
Aug 02 – Mar 05	Continual promotion of project within the archipelago including press releases and radio interviews, production of educational material such as leaflets and posters
Aug 02 – Mar 05	Press releases and radio interviews in the UK.
Aug 02 – Mar 05	Collection of crab lore and production of a booklet. Computer database maintained. Contact with other Caribbean organisations and creation of a network.
Oct 02 – Mar 03	Trials of possible biological survey techniques.
Oct 02 – Apr 03	Identification of crab catchers and crab outlets. Development of questionnaires for crab catchers and crab outlets to identify catch areas, quantities of catch, indicative effort, frequency of collection, timing of collection, methods of collection, market price, destination of crab, processing etc. Conduct of questionnaires.
Oct 02 – Mar 03	Discussions with crab collectors to enlist their participation in the collection of catch information. Development of a data sheet for collectors to record such aspects as level of effort, catch area, catch, method etc.
June 03 – Oct 04	Conduct of trials and experiments related to terraculture.
Oct 02 – Oct 04	Assess ability to fund and produce a documentary video including approaches to BBC, national Geographic etc. Production of a documentary video.
Apr – May 03	Training of CORALINA and Christian University personnel in the collection and analysis of biological data and aspects of community based resource management (1-2wks). Visit of RH (3wks) and MB (3wks) to San Andres for training and progress assessment.
May 03 – Nov 04	Biological/Ecological surveys during and out with the seasonal migration. Crab catcher surveys undertaken.
Oct 03 – Oct 04	CORALINA staff member undertakes MSc in Marine Resource Management, including a dissertation in San Andres on the land crab related to the feasibility of terraculture.
Oct/Nov 03	Progress visit to San Andres by RH and MB (2wks)
Mar 04	Spatial distribution maps produced.
May 04	Project meeting in San Andres. Visit of RH (3wks), JS (2wks) and MB (2wks).
Oct 04	Training of representatives from NGOs, local government, CORALINA, crab catchers and other interested parties in land crab sustainable management, and terraculture rationales. RH visit (2wks).
Oct – Dec 04	Management plan produced. Recommendations made with respect to regulations and terraculture. Economic feasibility study and action plan (if required) for terraculture produced. Papers compiled and submitted to peer review journals (at least 3).
Oct 04 – Mar 05	Production of a field manual on ecological and biological information on the land crab, including terraculture rationales.
Oct 04 – Mar 05	Black Crab Conservation Unit established.
Mar – May 05	Final Darwin Initiative report produced.

In San Andres Island, 59% of catchers catch crab for sale and later consumption, 28% for family consumption. In Old Providence only 5% catch crab for subsistence needs. In Old Providence the catchers generally also double as the sellers. 69% of catchers on San Andres Island are aware of CORALINA resolutions on crab catching, while on Old Providence this figure drops to 22%.

- (7) A total of 37 crab consumers have been interviewed to gather details on dietary importance and recipes/crab presentation. Crab-meat represented 11% of their diet, with chicken and fish more dominant. Crab recipes range from rondon and stew to soup and patties.

## **5 Partnerships**

Heriot-Watt University and CORALINA have collaborated on past research projects, so there is considerable familiarity between both organisations on work ethics and in professional relationships. To date there have been no difficulties between partners. It is important to highlight, however, that CORALINA is subject to strict regulations concerning use of funds. It is difficult for CORALINA to spend money that it does not hold in an account and it is not allowed to borrow from other accounts. Although this problem is being worked around, it is necessary to flag this issue to the Darwin Initiative, as partner organisations in developing countries do not have a similar degree of financial freedom, as with UK institutions, in terms of being able to purchase equipment etc in advance of the reception of funds.

The project also involves the Christian University (CU) in San Andres. Strong relationships are being fostered between Heriot-Watt and the CU, with the active involvement of CU staff and students in the project.

## **6 Impact and Sustainability**

Please refer to point (3) of Section 4. In a forthcoming visit to San Andres in May 2003, UK researchers will also be meeting with a documentary team to discuss the production of a documentary entitled "Stop, Crabs On The Road" which aims to illustrate the dangerous circumstances that the Black Crab face during their annual migration on Old Providence.

With the future completion of a management plan and the enacting of legislation with respect to black land crab exploitation, the project will ensure continued regulation after the Darwin period. In addition, the completion of the experimental terraculture phase along with the socio-economic analysis, and economic feasibility study and action plan will determine the viability and potential of this economic development alternative, forming the basis for a model project that is integrated with the principles of the management plan. This plan will include strategies that identify a clear pathway, over 3 years, for the transfer of training, implementation of full-scale sustainable use projects and introduction of immediate practical actions that result in species conservation and recovery. British expertise on land crabs, shared in the course of the project, will greatly improve the knowledge base and local capabilities for future long-term management of this species. An examination of funding opportunities, both within and outside Colombia, will be included. A Black Crab Conservation Unit with members from CORALINA, the Christian University, the Agriculture Secretariat, trainees and participating community organisations will be established to collaborate in development and long-term implementation of the management plan and terraculture project. Heriot-Watt University will continue to be involved in an advisory context. The management plan and results of the terraculture experiments will be distributed throughout the region, thus ensuring as wide a relevant audience as possible for this model approach to the sustainable management of land crab resources.

## 7 Outputs, Outcomes and Dissemination

**Table 1. Project Outputs (According to Standard Output Measures)**

<i>Code No.</i>	<i>Quantity</i>	<i>Description</i>
8	3	<i>MB and RH visit for initial project meeting</i>
15 b	1	<i>Press release in San Andres</i>
15d	1	<i>Press coverage in The Orcadian</i>
18c	5	<i>Television coverage</i>
19c	2	<i>Radio interviews</i>
20	1	<i>Reference collection</i>

The above table does not include additional time for UK researchers in San Andres, and training personnel/weeks, which were originally recorded for year 1. This is because of the delay in the start of the project and a subsequent transfer of training to May 2003. The project has also enjoyed considerably more press coverage than first envisaged.

**Table 2: Publications**

<i>Type *</i> <i>(e.g. journals, manual, CDs)</i>	<i>Detail</i> <i>(title, author, year)</i>	<i>Publishers</i> <i>(name, city)</i>	<i>Available from</i> <i>(e.g. contact address, website)</i>	<i>Cost £</i>
<i>N/A</i>				

Details of dissemination activities in Year 1 have been provided in point (3) of Section 4. Section 6 details some future dissemination activities. Results of the project will be disseminated in the final project report, scientific literature, further press releases, seminars, educational and publicity material, and a documentary video. The findings of the research will also be reported to the Sub-commission of the Intergovernmental Oceanographic Commission for the Caribbean and Adjacent Regions (IOCARIBE), under the auspices of the United Nations Educational, Scientific and Cultural Organisation (UNESCO), an organisation with the general purpose of furthering scientific research on the oceans, through studies of its natural processes and living organisms in order to gain deeper understanding. IOCARIBE promotes and develops regional co-operation for marine sciences, involving member states from the Caribbean, Gulf of Mexico, Bahamas and the mid western region of the Atlantic Ocean. Heriot-Watt University and CORALINA will seek to develop a regional approach to the management of land crab populations, including contacting regional organisations such as Island Resources Foundation (IRF) and the Caribbean Conservation Association (CCA), examining the potential for a regional network.

## 8 Project Expenditure

*Table 3: Project expenditure during the reporting period*

Item	Budget	Expenditure
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\* *Heriot-Watt University, on CORALINA's behalf, have requested that this money be made available for the remainder of the project to cover any additional staff time that may be required as a result of unforeseen circumstances or problems caused by the initial delay of the project's start.*

\*\* *Heriot-Watt University have agreed with the Darwin Initiative Secretariat that £3,000 will be carried on to Year 2 as a result of the movement of training to May 2003, caused by the delay in the project's start.*

The under spend in CORALINA salaries and rent, rates etc was a result of the delay to the project, which did not start until August 2002. Again, the under spend in travel and subsistence occurred because training had to be moved to Year 2. The remaining funds for salaries and T&S from year 1 are to be made available in Year 2, as agreed with the Darwin Initiative Secretariat.

Other under spends by more than 10% also relate to the delay in project initiation. Field-work consumables, for example, were unable to be fully utilised as the annual crab migration in May 2002 was missed.

## 9 Monitoring, Evaluation and Lesson

Monitoring and evaluation has not played a significant part in the first year, mainly as a result of the delay of the project's start. The first year has seen a team building exercise backed with considerable promotion of the project among the local community. The collection of biological data has been initiated and interviews have been held with 107 crab collectors and sellers. Discussions are also underway for the production of a documentary video. Comprehensive biological survey work on crab distribution, numbers, migratory behaviour etc will be initiated in May 2003. The project team will also be working more closely with crab catchers in gathering data on effort and catch.

The general interest and willingness to participate in the research, shown by the local community and crab catchers in particular, is a significant measure of the success of the first year's research and this will continue to be built upon. The establishment of a database on ecological information and interview results has also been initiated.

In terms of measurable indicators for the project meeting its objectives, this will include:

- Distribution of the species management plan;
- Enactment of regulations;
- Submission of a terraculture project for funding, if deemed viable; and
- Resource managers and stakeholders applying training.

Measurable indicators of outputs will include references, biological and socio-economic data, culture experiments, database establishment, management plans, economic studies, regulations, training activities, MSc qualification and education awareness materials.

**10 Author and Date**

Dr Mark Baine, Heriot-Watt University, 4 April 2003