

PRELIMINARY REPORT



c/o University of the West of England
Department of Environmental Health and Science
Frenchay Campus
Coldharbour Lane
Bristol BS16 1QY

Tel: 0117 9240998

October 1998

Introduction

The Guyana Cocoa Research Initiative 1998 (GCRI) is a collaborative project between British environmental science graduates and Guyanese researchers from the National Agricultural Research Institute (NARI). The primary objective is to describe, catalogue and collect wild cocoa (*Theobroma cacao* L. Sterculiaceae), from remote forest areas of Southern Guyana which would play a key role in charting and conserving cocoa diversity for the long term benefit of Guyana and its people.

During the months of July to September 1998, the GCRI successfully undertook and completed the four main integrated stages.

Stage 1 The development of techniques in germplasm collection and curation.

Four members of the GCRI spent one week, between the 3rd and 7th of July inclusive, at the Cocoa Research Unit (CRU), Trinidad. Subjects covered included passport data collection, collection of budwood and seed material, preparation of material, grafting and sowing seeds, pruning of cocoa and flower, bean and pod descriptors.

Stage 2 Restoration of the Guyana cocoa germplasm bank.

This involved a sixteen day stay for the eleven members of the team at the NARI Plant Nursery and Horticultural Station at Timehri. Associated duties incorporated the preparation and care of rootstock material along with the restoration and management of the existing cocoa plantation. Negotiation with Governmental and Non Governmental organisations to secure permission and to establish working and ongoing links was also an important commitment during this time.

Stage 3 Collection and documentation of wild cocoa.

Two main areas of study were chosen, the first being the Marudi Mountains region and the second Primos Inlet, Essequibo, South of Apoteri. For this the project team split into two groups, a group of five plus one Guyanese national, travelled to the Marudi Mts and the other a group of four to Primos Inlet. Travel was mainly by road using Bedford trucks, however tractor-trailers, boats and ox-carts were also used to reach the more inaccessible parts of the interior.

Marudi Mts, South West. 3/8/98. Five days were spent in the Marudi Mts at two different sites looking for cocoa with the assistance of guides. The first site (MM1), the larger of the two, can be located approximately fifteen minutes South from the Marudi Compound base camp, at $2^{\circ}13'N$ $59^{\circ}10'W$ (a clearing close to tree # 655). A total of seventy six trees were located, mapped and plotted using a Global Positioning System and compass bearings. Each tree was tagged and a field descriptor sheet completed. If pods were found a photograph was taken along side some leaf material, the leaf material collected was then air dried using silica gel and stored for transportation. The second site (MM2) was reached by a thirty minute walk North from the Marudi Compound base camp along the trail to $2^{\circ}14'N$ $59^{\circ}10'W$. However only a single tree was identified which was located on the edge of a cultivated plot, the surrounding area having recently been occupied and damaged by miners. This tree was also mapped, tagged, photographed and appropriate samples removed.

Primos Inlet, Essequibo River, South of Apoteri. 14/8/98. A total of five days were spent at this site situated close to the Essequibo River at $3^{\circ}53'N$ $58^{\circ}22'W$. One hundred and thirty trees were tagged with a descriptor sheet for each completed, however due to time and supply constraints many trees remained unlabelled. Several pods were removed, along with selected leaf material, and photographed ready for transportation back to Timehri Horticultural Station.

Moca moca, near Lethem. 1/8/98. A plot of cultivated agricultural land with eighteen trees, again descriptors sheets completed along with removal of pod and leaf material with photographs.

Kurupukari Village, Essequibo River. 8/8/98. Located at $4^{\circ}39'N$ $58^{\circ}40'W$, five trees were tagged with descriptor sheets completed and photographs of pods and leaves taken.

Pomeroon District, North West. 9/9/98. Visited in connection with the Inter American Institute for Co-operation on Agriculture (IICA). A total of five trees had descriptor sheets completed and several pods were removed, photographed and taken back to Timehri Horticultural Station.

Timehri Site 2, near Timehri Horticultural Station. 16/7/98. Located North along the Georgetown Road from the station at $6^{\circ}31'N$ $59^{\circ}15'W$. Descriptor sheets were completed for four trees and leaf and pod material removed.

Stage 4 Incorporation of wild cocoa material into existing germplasm bank.

Material collected from the field investigations were incorporated into the germplasm bank at the Timehri Horticultural Station using techniques and experience gained at the CRU Trinidad.

Project Outcomes

1. Taken passport descriptors of twenty eight trees and photographs of leaves and pods at Timehri Horticultural Station.
2. Mapped and tagged all fifty seven trees of the cocoa plantation at Timehri.
3. Pruned all the trees at Timehri in accordance with Cocoa Research Unit recommendations.
4. Provided training in pruning techniques, germplasm and rootstock care for NARI staff.
5. Provided plantation shade by planting banana trees.
6. Successfully propagated four hundred seeds from existing germplasm cocoa for use as rootstock material at Timehri.
7. Successfully propagated seeds from Timehri Site 2 (104), Primos Inlet (28), Moca moca (24) and Pomeroon to incorporate into the Germplasm bank.
8. Leaf samples were taken for genetic analysis from Marudi Mts, Primos Inlet, Kurupukari, Timehri Horticultural Station and Timehri Site 2 to the School of Plant Sciences, University of Reading. Information from the analysis will be used in the identification of the different cocoa types held at the Germplasm bank and will also assist in the preliminary identification of the different cocoa types which may be resistant to fungal pathogens.
9. Photographs were taken of leaves and pods at Marudi Mts, Primos Inlet, Moca moca, Kurupukari village and Pomeroon.
10. Visited Pomeroon in connection with IICA to establish the potential for small scale community based development of cocoa farming.
11. Donated leaves of cocoa trees from Marudi Mts, Timehri Horticultural Station and Timehri Site 2 to the Herbarium at the University of Guyana to add to the collection of leaf samples.

Recommendations

Several recommendations are suggested to allow the ongoing success of the project along with further areas of study of other cocoa sites.

Germplasm Development

1. Continue pruning of established trees in the cocoa plantation at Timehri Horticultural Station.
2. Planting of the selected material collected from the sites in Guyana for incorporation into the germplasm bank.
3. Planting of selected rootstock material taken from existing germplasm material at the Timehri Horticultural Station.
4. Planting of banana trees for any new material to provide shade.
5. Possible exchange of material with farmers in the Pomeroon district in collaboration with NARI and IICA.

Collection of Genetic material

Further areas of study include the following cocoa sites for future research;

1. Apiqua Falls, Mazaruma River. One hundred and thirty miles upstream from Bartica.
2. Black Rock and Banana Succur Landing, Rewa River.
3. Cocoa Creek, Essequibo River. Two days South of Primos Inlet.
4. Kassikaityu and Kuyuwini Rivers, Essequibo, South West. Numerous cocoa trees.
5. Kwitaro River, upstream of Rewa River.
6. Mabaruma, Hosororo Hills, North West District seventy acres of cocoa.
7. Macushi, near Lethem, South West. Approximately thirty trees.
8. Mapari Creek, Rupununi River. Leaving Yupukari village upstream.
9. Marudi Mts, upstream at 2nd Bridge and at Peas and Toucan Creek.
10. Shea Village, Kwitaro River tributary.

Follow-up Phase

The suggested follow-up phase would involve a smaller number of participants, ideally three from the U.K plus guides, during a shorter time frame and consisting of two main objectives.

The first would be to revisit the Timehri Horticultural Station to review and update the staff procedures on selection, planting and tagging of cocoa rootstock and germplasm material, and to assist in the ongoing management of the cocoa plantation

The second would involve the collection of cocoa material from selected sites, the most notable and worthwhile example being the Kuyuwini and Kassikaityu Rivers. The time period being carefully selected to allow for the rainy seasons and availability of the material. The rivers need to be high enough to allow ease of access along them but low enough to permit entry to the river systems by land through the Parabara swamps.

Additionally, it is strongly recommended that a member of staff from NARI should undergo further training at the Cocoa Research Unit at Trinidad.

Outline of Final Report

The Final Report will follow the outline below and be completed by September 1999.

1. Abstract
2. Acknowledgments
3. Introduction/Background
4. 1 Restoration of the Timehri cocoa germplasm bank.
4. 2 Collection and description of cocoa material.
4. 3 Identification of cocoa genotypes.
4. 4 Recommendations for future development.
5. Conclusion
6. Logistics and budget
7. References
8. Appendices
 - A. Full list of known cocoa localities
 - B. IPGRI descriptors for all individual trees

Budget**Total Income:**

Biscuit, Cake, Chocolate and Confectionery Alliance	£5,000
Royal Geographical Society (IBG)	£1,000
Gilchrist Educational Trust	£500
Adrian Ashby-Smith Memorial Trust	£70
Personal sponsorship	£2,927
Personal contribution	£5,000
TOTAL	£14,497

Total Cost:**Pre-departure:**

Flights	£6,912
Insurance	£720
Administration	£235
Equipment	£695
TOTAL	£8,562

Field Costs: Trinidad

Accommodation	£244.50
Food	£84.38
Equipment	£19.75
TOTAL	£348.63

Field Costs: Guyana

Accommodation	£567.13
Food	£1,002.80
Equipment	£985
Travel	£2,176.26
Expenses	£225.45
Evacuation	£124.70
TOTAL	£5,081.34

Post Field Costs

Administration	£10
Film Developing	£40
TOTAL	£50

TOTAL	£14,041.97
--------------	-------------------

Funds Remaining:

TOTAL	£455.03
--------------	----------------

Acknowledgments

The GCRI 1998 would especially like to thank the following Guyanese counterparts for their full co-operation and support, Professor N. Ahmad of the National Agricultural Research Institute (NARI), the Environmental Protection Agency (EPA), the Committee of Bio Diversity (CBD), the Ministry of Amerindian Affairs, the Inter American Institute for Co-operation on Agriculture (IICA) and the Regional Executive Offices at Lethem. Thanks also go to the numerous people in Guyana for their help, without which this initiative would not have been as successful.

The GCRI 1998 would like to thank the following sponsors for their financial assistance and support; the Biscuit, Cake, Chocolate and Confectionery Alliance (BCCCA), the Royal Geographical Society (with the Institute of British Geographers) (RGS/IBG), the Gilchrist Educational Trust and the Adrian Ashby-Smith Memorial Trust.

Contact:

Vic Jennings (co-ordinator),
214 Kellaway Avenue,
Bristol.
BS6 7YL.

Tel: 01179 240998

Fax: 01732 862254

E-mail: cocoaresearch@hotmail.com