

Darwin Initiative: Half Year Report

(due 31 October 2008)

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| Project Ref. No. | 15-013 |
| Project Title | Biodiversity and sustainable development of butterfly production (Lepidoptera) in Guyana |
| Country(ies) | UK and Guyana |
| UK Organisation | University of Warwick |
| Collaborator(s) | Iwokrama International Centre for Rain Forest Conservation and Development, Natural History Museum, Kew Gardens, Matthews Payne & Bond LLP, The University of Guyana, Centre for studies on Biodiversity. |
| Project Leader | <i>Dr Doreen Winstanley</i> |
| Report date | <i>October 31st 2008</i> |
| Report No. (HYR 1/2/3/4) | 2008/5 |
| Project website | <i>www.guyanabutterflies.com</i> |

1. Butterfly diversity knowledge

A complete year of monthly butterfly surveys was successfully completed by the team from August 07 until July 08. This was an important first step in investigating the diversity and relative abundance of butterflies found in the Iwokrama Forest and the North Rupununi District. In addition, when analysed, these surveys will provide data relating to the ecology of these butterflies. All specimens collected from this survey have been set, dried and mounted in insect cases and most are being housed at the Centre for the Study of Biodiversity (CSBD), University of Guyana, Turkeyen Campus. Unfortunately this campus has been closed since March 2008 for the removal of asbestos and will reopen in the near future. In the meantime part of the collection has been housed in the home of the MSc student involved in this part of the project. Both the CSBD and the latter accommodation have no air conditioning and as a result the samples are deteriorating and there is an urgent need to house them in a more appropriate environment if they are to be conserved. It is hoped that duplicate sets of specimens from the collection will be prepared and archived by the Natural History Museum and the Smithsonian Institute.

Dorsal and ventral views of all specimens have been photographed and information collected in the field (date collected, time of day, location, weather conditions and collector) pertaining to each specimen recorded in an electronic excel database. In the database, each specimen has been given a unique accession number, which is linked to its photograph, field data and taxonomy. This will be placed on the website.

All specimens collected were identified to the taxonomic level of Family and several specimens were classified to species level. The identification of specimens is an ongoing process and in the time available on this project it is unlikely that the MSc student (Miss Gyanpriya Maharaj) will be able to identify many to subfamily or species level. To date 4982 specimens have been collected over the one year period of which 221 were damaged. The 4761 remaining specimens have been grouped in the following families/sub-families; Brassoliniinae, Danainae, Heliconiinae, Hesperiiidae, Ithomiidae, Lycaenidae, Morphinae, Nymphalinae, Papilionidae, Pieridae, Riodinidae and Satyrinae.

Additional information collected during the time frame in which the survey was conducted included GPS co-ordinates and elevation of each site, phenological patterns, descriptions of each habitat type and monthly rainfall data from the Guyana hydrometeorological weather stations located in each of the selected sites. Analysis of the data will be carried out with the help of biometricians at the University of Warwick. Preliminary analysis indicates exciting ecological relationships between specific butterflies in relation to elevation, phenological pattern

and vegetation types. This will be reported in the MSc thesis of Gyanpriya Maharaj (in preparation) and in peer reviewed journals.

Only one host plant (with fruit and flower) has been collected to date and is being dried for the Herbarium at Kew. This is believed to be a *Passiflora* with bat wing shaped leaves (believed to be *Passiflora nitida*). Most of the host plants in the garden have been identified in Guyana.

2. Butterfly farming (scientific)

The life cycle stages of a range of butterfly species have been observed at the butterfly farm. Photographs of the lifecycle stages and protocols are being assembled for the butterfly rearing handbook. Six species of butterflies are in production and another eight species common around the garden at the butterfly centre will be produced and added to the handbook. This will be assembled by H. Sambhu using photographs and information provided by the team, hopefully by January 2009. This is behind schedule due to the time required to acquire relevant information and its preparation is a priority for the planned training course at the centre. Experiments are being conducted to inform butterfly production methods e.g. to determine the number of eggs/female laid by different butterfly species; to confirm the host plant and oviposition sites for high value butterflies e.g. morphos and caligos and to manage the production of wet season and dry season forms of *Dryas Julia* etc.

The database compiled from the butterfly survey will be used to select species of butterflies that can be farmed by the different communities. Some of these species will complement those reared at the butterfly centre.

3. Butterfly farming economic

The butterfly house located at the edge of Fairview village, close to the Iwokrama Field Station, was completed in July 2008. It is an impressive netted structure (90ft in diameter), constructed in typical Amerindian style using locally sourced materials. The specialised roofing materials were donated by the British High Commission and imported from the UK. Host plant gardens were prepared during the butterfly house construction period since they take time to become established. A continuous supply of healthy host plant material is essential to pupal production. There was considerable overall progress at the butterfly farm between our visit in April 2008 and our recent visit in October 2008. The gardens had grown and more butterfly host plants had been included and were growing well. However, there were some serious problems. In particular, some food and nectar plants abundant on our last were missing or in poor condition. It was the long dry season but lack of water was not thought to be the cause for the decline of the plants. In addition, there was clear evidence of several plant pests inside the butterfly house that were in danger of causing serious problems in the future. Moth larvae inside the house had infested and destroyed all of the nectar plants, *Lantana camara* (Jamaican sage) and the plants had to be cut down and essentially started from scratch. This problem will require constant vigilance. Ants and spiders are major problems since they predate eggs and all life cycle stages, and strategies to reduce these are being developed. The well is currently 30ft deep but needs to be made deeper to supply sufficient water in the dry season.

Our last visit resulted in a leap in technical knowledge, which will allow the synchronous production of pupae, a necessary requirement for the export of pupae of the same age. This has given the team control over their production and schedules can be put in place. This was facilitated by the construction of large netted walk-in breeding cages where butterflies lay their eggs on their host plant in a short time period and "finishing cage units" where the eggs/larvae grow and develop into pupae when provided with a continuous supply of food supplied from the host plant gardens. To date two shipments of pupae, for a gregarious insect *Heliconius sara*, have been shipped to the UK to test the export route, delivery times and adequacy of the paperwork. One shipment was delayed by a UK bank holiday but 60% of the pupae in the second shipment arrived in good condition. More test batches of mixed pupae will be sent in the meantime to eliminate any potential shipping problems. We meet with EPA and the Wildlife Division on each visit to Guyana and they are working with us in the export of what is for them a new live commodity for Guyana.

Six butterfly species have been identified for production in the first instance and in addition to these eight other species common around the garden were agreed for future production trials using the same or similar production techniques. This completed the planned production list.

Food plants were already in place in the host plant garden for each butterfly species. All of the species had been reared from egg to adult at the butterfly site prior to our visit. The selected butterflies will provide an excellent variety for regular shipments planned to start early in 2009. In addition, a continuous supply of butterflies can be released into the butterfly house for display for the benefit of visitors to the house. The butterfly centre has hosted several groups of tourists and it is hoped to build a gift shop as a local enterprise. The butterfly house is already listed in the new Brand travel guide for Guyana.

The limiting step in the rate of progress and troubleshooting for the butterfly farm has been poor communication between Guyana and the UK. There seems to be a problem associated with the perceived route of communication between the community members of the team and the UK members. We are trying to encourage them to communicate directly regarding daily problems and for advice. Members of the team are capable of communicating via e-mail.

4. Business Community development

In January the Inter-American Development Bank (IDB) will fund a course introducing sustainable businesses in the North Rupununi to young people from the communities. This will be held at Iwokrama field station and they will use the butterfly business as a model. They will explore the butterfly business plan and visit the farm. It is hoped that the course will widen the horizons of the participants and even generate interest in butterfly farming directly.

Now that the sufficient expertise and knowledge is present within the butterfly team it is possible to disseminate their practical experience on butterfly production to the communities.

On our last visit the team demonstrated general butterfly production techniques to four communities, including Fairview village which is adjacent to the butterfly centre. The three other communities were selected on the basis that members of the team originate from there and they visit home for one week in each month and would be able to support the local butterfly production. The community satellite producers will act as mini-businesses receiving payment for pupae and will be important to the success of the community business. It is important that these producers, together with the team at the business centre, receive adequate business training, particularly in book keeping, business plans and business management if a successful business is to emerge from this project. At least one to two years of business support and dissemination post-project will be required.

5. Capacity building

Over the period of two and a half years the team has received continual "on the job training" as well as formal training courses. The emphasis has shifted to the production of butterfly pupae for a wide range of high value species and development of business skills. The community team members require business training and this will be delivered partly by IDB (Interamerican Development Bank) funded training courses through Iwokrama, planned for the final stages of the project. The four community team members will learn to drive, essential for pupae collection and supplies. They still have to develop more self-confidence if they are to run a business. Capacity has been built in butterfly identification and ecology through Ms Gyanpriya Maharaj at the CSBD, University of Guyana. She is on target to get a MSc. H. Sambhu has increased his knowledge in butterfly production and an export business. He is a valuable source of socioeconomic information having worked in this region for many years and because of his experience gained as "in country" leader on this project. The butterfly centre is established but still requires facilities e.g. office, toilet and shop. We are trying to raise funds from the British High Commission for this purpose. The centre will be used for production, export, training and ecotourism.

6. Dissemination

Dissemination of butterfly farming techniques has been dependent on the butterfly survey results, the development of production techniques and construction of the central farm. We are now ready to train the local communities either through team visits or training courses at the centre. On our last visit the community members of the team demonstrated training methods to four communities including Fairview, Aranaputa, Surama and Toka. These latter three communities were selected because team members originate from these villages and training can be reinforced on their week at home each month. Fairview was also selected since they will

have the holding licence and will act as the exporters for the communities. The team will follow up this visit and help interested individuals to get started. It is far easier to demonstrate farming methods at the butterfly centre and interested members from all sixteen communities will be given an opportunity to attend Fairview for training and they will see butterflies in production, budget permitting. The two handbooks will be available at this time to aid dissemination. The wild life clubs have received “hands on” training in butterfly collecting and appreciation of butterfly biodiversity. This has been reinforced by butterfly life cycle studies on their school curriculum.

In the last six months presentations have been given in Guyana to Iwokrama and the NRDDB to Darwin scholarship fellows in the UK.

2. Give details of any notable problems or unexpected developments that the project has encountered over the last 6 months. Explain what impact these could have on the project and whether the changes will affect the budget and timetable of project activities.

We have had problems inside the butterfly house with a moth infestation which attacked the nectar plants as well as other plant pests. This is now under control. A of lack of well water in our first long dry season affected the plants in the host plant garden however, remedial action is being taken. Members of the team have been affected by ill health and H. Sambhu was out of the field for one month and Ryan Roberts contracted malaria (common in the local area). The butterfly preparation and storage was affected by closure of the University of Guyana over six months for asbestos removal, including the CSBD. The collection is deteriorating due to lack of air conditioning and requires suitable storage conditions.

Have any of these issues been discussed with the Darwin Secretariat and if so, have changes been made to the original agreement?

No. No changes have been made.

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| Discussed with the DI Secretariat: | no/yes, in..... (month/yr) |
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| Changes to the project schedule/workplan: | no/yes, in.....(month/yr) |
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3. Are there any other issues you wish to raise relating to the project or to Darwin’s management, monitoring, or financial procedures?

If you were asked to provide a response to this year’s annual report review with your next half year report, please attach your response to this document.

Please note: Any planned modifications to your project schedule/workplan or budget should not be discussed in this report but raised with the Darwin Secretariat directly.

Please send your **completed form email** to Eilidh Young, Darwin Initiative M&E Programme at Darwin-Projects@ectf-ed.org.uk . The report should be between 1-2 pages maximum. **Please state your project reference number in the header of your email message eg Subject: 14-075 Darwin Half Year Report**