SHILAP Revista de Lepidopterología
ISSN: 0300-5267
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Sociedad Hispano-Luso-Americana de Lepidopterología
España

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SHILAP Revista de Lepidopterología, vol. 38, núm. 152, diciembre, 2010, pp. 451-456
Sociedad Hispano-Luso-Americana de Lepidopterología
Madrid, España

SHILAP Revta. lepid., 38 (152), diciembre 2010: 451-456 CODEN: SRLPEF ISSN:0300-5267

Sustainable butterfly farming in tropical developing countries as an opportunity for man and nature–the "Kawê Amazonica Butterfly Farm" project in Guyana as an example (Insecta: Lepidoptera)

H. Sambhu & T. van der Heyden

Abstract

The "Kawê Amazonica Butterfly Farm" project in Guyana, South America is described with its different phases and is presented as a model for sustainable butterfly farming.
KEY WORDS: Insecta, Lepidoptera, butterfly farming, sustainability, rainforests, tropics, developing countries, Guyana.

La cría sostenible de mariposas en países tropicales en desarrollo como oportunidad para el ser humano y la naturaleza–el proyecto "Kawê Amazonica Butterfly Farm" en Guyana como un ejemplo (Insecta: Lepidoptera)

Resumen

El proyecto "Kawê Amazonica Butterfly Farm" en Guyana, America del Sur se describe con sus fases diferentes y se presenta como un modelo de una cría sostenible de mariposas.
PALABRAS CLAVE: Insecta, Lepidoptera, cría de mariposas, sostenibilidad, bosques lluviosos, trópicos, países en desarrollo, Guyana.

Nachhaltig betriebene Schmetterlingsfarmen in tropischen Entwicklungsländern als Chance für Mensch und Natur–das Projekt "Kawê Amazonica Butterfly Farm" in Guyana als Beispiel (Insecta: Lepidoptera)

Zusammenfassung

Das Projekt "Kawê Amazonica Butterfly Farm" in Guyana, Südamerika wird in seinen einzelnen Phasen beschrieben und als Modell einer nachhaltig betriebenen Schmetterlingsfarm vorgestellt.
SCHLÜSSELWÖRTER: Insecta, Lepidoptera, Schmetterlingsfarm, Nachhaltigkeit, Regenwälder, Tropen, Entwicklungsländer, Guyana.

Introduction

Farming and/or exhibiting (tropical) butterflies is a worldwide business. Most of the butterflies presented to the public are bred in tropical countries while the main facilities of exhibition are located in Europe (where the first butterfly exhibition facilities were opened in the United Kingdom in the late

seventies/early eighties of the last century) (VAN DER HEYDEN, 1992), North America, Asia and Australia. But there are exhibition facilities in some (tropical) developing countries, too-e. g. in Belize, Colombia, Costa Rica, Honduras and Suriname.

These facilities in developing countries-often breeding and exhibiting butterflies at the same time-provide opportunities for local communities and for nature as well-as long as they are well-managed and focussing on sustainability. They offer a chance in the fields of research and education, too (SAMBHU & JAMES, 2009).

One of these facilities, the Kawê Amazonica Butterfly Farm-located in a tropical rainforest area in Guyana, South America (Fig. 1)-is presented in this paper.

Phases of the project

Proposal development stage

In 2006 the University of Warwick and the Iwokrama International Centre for Rain Forest Conservation and Development, with support from Matthews Payne and Bond LLP, Kew Gardens, the Natural History Museum, the University of Guyana, the Environmental Protection Agency, the Ministry of Amerindian Affairs and the North Rupununi District Development Board, submitted a proposal for a three year project to the Darwin Initiative - "Biodiversity and sustainable development of butterfly production (Lepidoptera) in Guyana" - which was successful.

This project is locally called "the butterfly project", as it was the first of its kind in Guyana. It seeks to investigate the seasonal and habitat distribution of butterflies and the possibility of using butterflies as a source of livelihood income for local Amerindians of the region.

Each project partner had/has certain strengths that were/are essential for the success of this project and were/are used in the course of the project.

Where necessary, the Natural History Museum provided identification services for the clarification of butterfly species and the classification of new species. Their involvement was essential during the biodiversity study and the writing of an identification handbook.

Kew Gardens botanists were consulted with regard to the identification of unfamiliar host plants.

Dr Katharine Payne, a consultant from Matthews Payne and Bond LLP, had direct experience working in Guyana, particularly within the Iwokrama forest and the Amerindian communities in their environment. Her experience helped to bridge the gaps between the UK based and Guyanese partners and the local conditions in Guyana's rainforest.

The Iwokrama International Centre for Rain Forest Conservation and Development has assisted proposal development and project implementation.

The University of Guyana has an established team of entomologists specialized in the Guyanese fauna as well as ecologists, sociologists and anthropologists. The University of Guyana has strong renowned natural sciences and agricultural and forestry departments which have confirmed that they will give support if there are any changes in staff during the lifespan of the project. The University of Guyana and the Iwokrama International Centre for Rain Forest Conservation and Development have provided in-country supervisors for the two MSc students working on the project. These students were registered at the University of Warwick. The University of Guyana has also provided access to the comprehensive collection of Guyanese Lepidoptera and the plant collection, which are housed in the Centre for the Study of Biological Diversity, to the partners of the project.

The North Rupununi District Development Board (NRDDB) is a community-based organization consisting of village leaders and other community representatives which represents approximately 5000 individuals in the 16 communities of the Rupununi region. For the success of the project it was essential for the NRDDB to give their support and to provide local knowledge of the area and the people.

The Ministry of Amerindian Affairs supported and approved this project prior to the commencement of work in the region. According to the laws of Guyana any organization/project/group

that wants to work in an Amerindian community must be approved by the Ministry of Amerindian Affairs and the community/ies that they intend to work in.

The British High Commission in Guyana provided support for the project in the construction of a resource building and technical assistance to the UK based project partners working on the social conditions of Guyana.

The Smithsonian Institute also has a comprehensive database on Guyanese Lepidoptera which was made available to the project and in addition, they could assist with identifying potentially new species.

The Environmental Protection Agency (EPA) supported the project by permitting processing and providing necessary linkages with other organizations.

The University of Warwick provided the technical expertise in the fields of butterfly identification and farming techniques.

Project implementation stage-biological and social data collection

With the approval of the proposal by the Darwin Initiative, work on the premises began in November 2006 by selecting staff/team members. Candidates had to apply to the MSc program at the University of Warwick. Two successful applicants were hired for the project, two Iwokrama Rangers were appointed and two community representatives were also designated. The primary team of six received on the job training in butterfly collecting and setting as well as in identification techniques.

There was also the process of site selection. Sites were chosen to represent the different habitats (forest, savannah and intermediate) while at the same time allowing easy logistic access during the different seasons of the year. The Rupununi region is a seasonally flooded landscape and modes of transport change from road to river. Eight sights-three in the forest, two in the intermediate and three in the savannah-were selected and monitored on a monthly basis.

Specimens that were collected were shipped to the University of Guyana (Centre for the Study of Biological Diversity) for setting, identification and storage. The biological collection was conducted over a period of 18 months, in order to make a statistical survey of the seasonal representation and habitat distribution.

After the first six months of biological data collection, the social data collection was initiated. Social surveys were conducted in all 16 communities of the North Rupununi district with the intention of capturing the local community's knowledge and use of butterflies and their aquaintance with them. These surveys were also conducted over a period of 18 months, after an initial six months training session in social data gathering techniques.

Farm development

With knowledge gained from the biological and social data, work commenced with the development of the Kawê Amazonica Butterfly Farm. The initial steps involved discussions with several villages and the NRDDB about the allocation of land space for the construction of the farm site. Fair View Village was eventually selected for the farming site, based on its butterfly diversity, its proximity to the Lethem to Georgetown road (transport access) and access to support systems (infrastructure, internet and human resources).

The farming site consists of a host plant garden, a caterpillar rearing facility and a butterfly house (Fig. 2). This location has a triple purpose-it is intended to be (a) a butterfly pupae production and export hub, (b) a tourism attraction site and (c) a training facility for persons interested in farming butterflies.

In late 2007 the construction of the farming site, with the conversion of an old community farming plot to the present day butterfly farm, was initiated. It took approximately seven months to complete the infrastructural work at the farm. In September 2008 the doors of the butterfly farm and all its exhibits were opened to the viewing/visiting public.

The word “Kawê” means “butterfly” in the local Makushi dialect and “Amazonica” is an allusion to the butterflies of the Amazon region.

Involvement of local people

As mentioned above, all 16 communities within the North Rupununi region were consulted during the development of this project and also provided information to help with the development of the project.

At present there are five local community members working at the butterfly farm, conducting the day to day activities with the supervision of a management team, which consists of a representative from Fair View Village, a representative from the NRDDB and a representative from the Iwokrama International Centre for Rain Forest Conservation and Development.

There are future plans to expand the pupae production with satellite producers in several communities in the North Rupununi region and with the Kawê Amazonica Butterfly Farm acting as an export hub, as they are the holder of a commercial export license.

Impact of the project on the local economy and ecological / conservation aspects

It is a bit early to comment on the local economy, as only the Kawê Amazonica Butterfly Farm is exporting butterfly pupae and entertaining tourists. Since the farm is a young business, it has been agreed by all project partners that revenues from pupae sale will be invested in the development of the farm and that revenues from the tourist entrance fees will be divided among the NRDDB, Fair View Village and the butterfly farm.

As it is related to the ecological/conservation effects of the project, there have been great strides in this section. During the social surveys it was discovered that butterflies were not an integral part of the community’s activity and as such not much attention was given to these species and there was very limited knowledge.

However, with the implementation of this project and its communication outreach component, people are now learning about butterflies and their roles in the environment. They are no longer killing the “agricultural pest” - caterpillars, instead, they bring them to the farm for the staff to rear them and help to educate the residents about the species. There is also a growing interest in the Wildlife Clubs within the communities to do butterfly monitoring.

Wildlife Clubs consist of children from the communities and they conduct monthly bird surveys, phenology and rainfall observation within their respective communities. The Wildlife Club initiative is supported by the Iwokrama International Centre for Rain Forest Conservation and Development with supervision of the children by community elders.

Species collection, farming and export

More than 100 butterfly species have been documented in the region. However this list is not extensive, as there are still some specimens undergoing identification as well as the method of collection was biased. Specimens were collected with fermenting fruit baited traps-so these traps excluded all the non-fermenting fruit feeding butterflies-that were set approximately two to three meters off the ground-which excluded all of the canopy flying butterflies as well. On top of that the traps were set between 50 to 250 meters above sea level, thus excluding the high altitude butterflies. These biased data were due to accessibility during the different seasons as well as to human and time limitations.

At present the Kawê Amazonica Butterfly Farm has the potential to breed 19 species (Table I), but not all of these species are farmed at one given time. The production is dependent on the demands of the market. This list is also expanding as new markets are coming on board.

Papilionidae	*Battus polydamus*	**Heliconiinae**	*Agraulis vanillae*
	Eurytides euryleon		*Dryadula phaetusa*
	Papilio anchisiades		*Dryas julia*
	Papilio thoas		*Eueides lybia*
	Papilio torquatus		*Heliconius burneyi*
Pieridae	*Phoebis argante*		*Heliconius doris*
Nymphalinae	*Hamadryas amphinome*		*Heliconius numata*
	Hamadryas arinome		*Heliconius sara*
	Hamadryas feronia		*Philaethria dido*
		Morphinae	*Morpho helenor*

Table I.– List of butterfly species bred at the Kawê Amazonica Butterfly Farm.

Conclusion

Sustainable butterfly farming in tropical developing countries helps to preserve rainforests by offering local communities opportunities to generate an income-thereby reducing activities involving forest clearance. As rainforests are the preferred habitat of an important number of bred butterfly species, butterfly farming depends on conserving that habitat.

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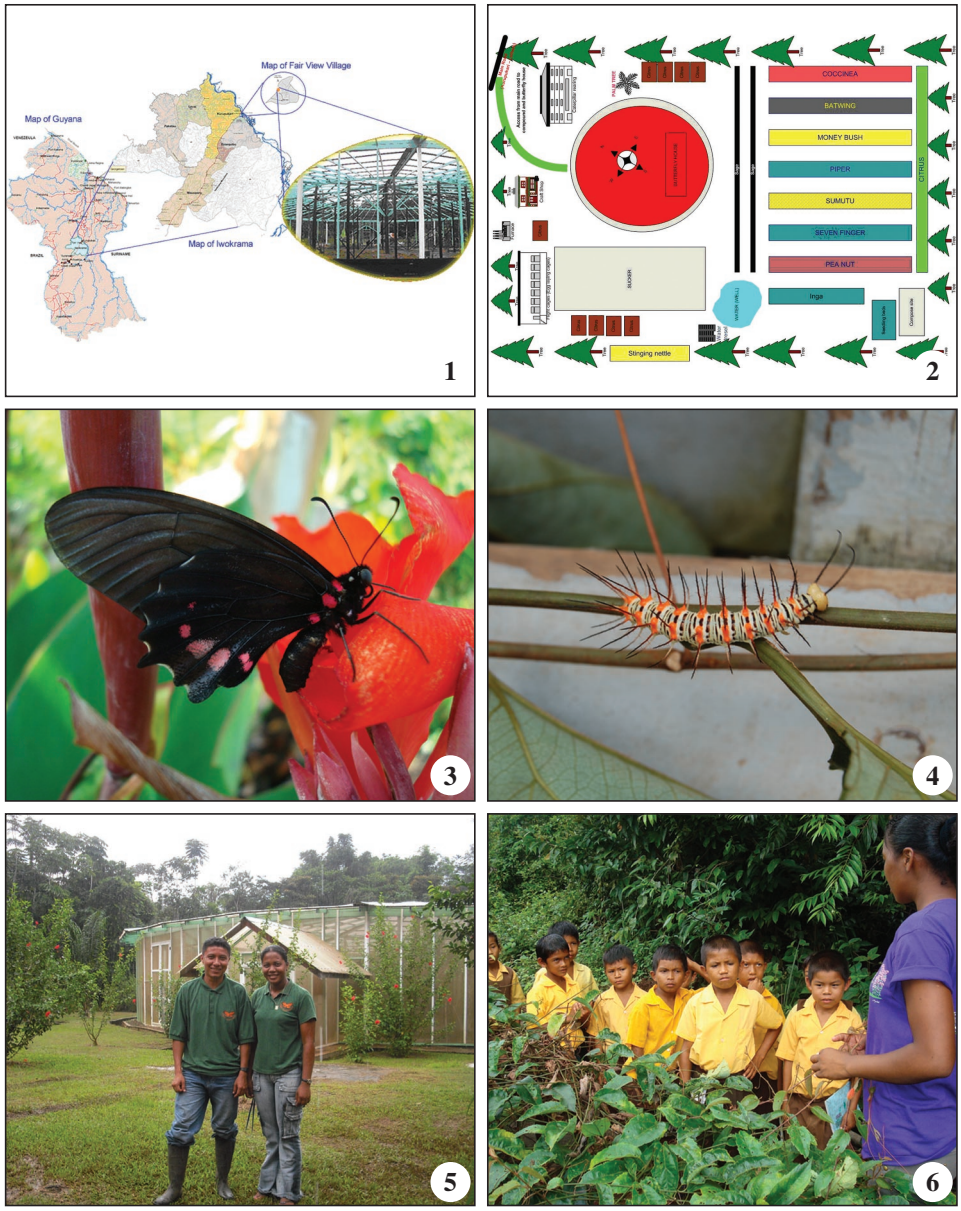
(Recibido para publicación / *Recieved for publication* 3-X-2010)
(Revisado y aceptado / *Revised and accepted* 13-XI-2010)
(Publicado / *Published* 30-XII-2010)



Figures 1-6.– 1. Map of Guyana, Iwokrama and the location of the Kawê Amazonica Butterfly Farm. The picture shows the butterfly house of the farm under construction. **2.** Diagram of the Kawê Amazonica Butterfly Farm. **3.** *Eurytides euryleon* Hewitson, 1855 (Lepidoptera: Papilionidae) at the Kawê Amazonica Butterfly Farm. **4.** A caterpillar of *Philaethria dido* Linnaeus, 1763 (Lepidoptera: Nymphalidae, Heliconiinae) at the Kawê Amazonica Butterfly Farm. **5.** Two team members of the Kawê Amazonica Butterfly Farm in front of the butterfly house. **6.** Educating pupils is one of the aims of the Kawê Amazonica Butterfly Farm.