



# *CPALI 18 month Report 2007-2008*

**CPALI Soie Sauvage**  
**Centre de Formation et Demonstration**  
 CPALI Wild Silk  
 Learning and Training Center

**Planter des Arbres  
et Reboiser**  
Plant Trees and Reforest




**Elever des Larves**  
Raise Larvae



Oeufs  
Eggs



Larve  
Larva

Cocon  
Cocoon



**Gagner d'Argent**  
Earn Income



Cocon  
Cocoons



Fil  
Yarn

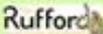


Tissu  
Textile

Demonstration: Mar, Jeu, Sam  
Tours: Tue, Thu, Sat  
16h Donation 4000Ar

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*Cover: Above the fold from clockwise from left: Host plant of CPALI target species, *Antherina suraka*; *A. suraka* larvae; collection of cocoons spun by *A. suraka*; cocoon found at base of larval host plant.*

## *CPALI Mission*

**Conservation through Poverty Alleviation, International** (<http://www.CPALI.org>) is a US-based non-profit organization that works to identify, develop and implement new means of income generation for poor farmers living in areas of high biodiversity or conservation value. We were founded in 2002, incorporated in Massachusetts in 2003 and approved as a 501(c)(3) by the US Internal Revenue Service in 2004. CPALI's mission is to contribute to natural resource conservation by developing integrated, small enterprise systems that link the livelihoods of farm families and communities to the maintenance of natural ecosystems. We are currently working in Madagascar and assisting in the revitalization of the wild silk industry. CPALI is committed to this work because we believe long-term conservation will only be achieved if people living in and near endangered sites have a vested interest in protecting them.

## *Letter from the President*

Dear Friends and Colleagues,

CPALI has had its most exciting year to date. We completed our initial field studies and we are now focusing on implementation. We have established learning and training center in Maroantsetra for the Makira/Masoala communities. Farmers visiting the center can view the entire process of silk production from egg to finished product. Our gardens contain the plant foods of three species of silk producers and by June we expect to have 6000 tree seedlings of these plants in our nursery.

Our second breeding and demonstration is in Manamby, an hour bike-ride south of Maroantsetra, and has been established and is run by a local farmer. In addition to producing moth eggs, he has intercropped silk moth food plants, *Talandoa*, with vanilla, pineapple, banana and wood crops. His goal (and ours) is to become an independent business and to sell eggs and seedlings to others in his community interested in silk production.

In April, in collaboration with WCS, we began field trials of our silk production methods in the community forest of Amboivodagny. Two new members of the CPALI team, Ranaivosolo Ravomiarana (a Malagasy student working on a PhD on wild silk moths with Dr. Olga Ramilijaona at the University of Antananarivo) and volunteer Maminirina Randrianandrasana (a Malagasy student working on PhD with May Berenbaum at the University of Illinois, Urbana- Champaign) will live in the community and monitor silk larvae growth and survival.

Our goal is to produce our two kilos of high quality, *A. suraka* cocoons (about 8000 cocoons total) by June. The cocoons that are produced by our target species are different than the cocoons produced by most species of silkworm; they are porous, have a bright metallic sheen and vary in color from deep brown to gold to white (cover picture, Figure 1). Six artists in Tana are taking advantage of the cocoons unique properties to develop new, high value, products that make use of the cocoons unique properties. We plan to test market jewelry made from cocoons and Malagasy semi-precious stones in the spring and market them during the 2008 holiday season. Please check [Rainforest Silk Cooperative](#) website, our wholesale arm for wild silk products, and let us know if you have any local stores you would like to stock them.

During January I attended an international meeting in Tana on the effects of global warming on biodiversity and livelihoods. The group discussed the possibility of working to restore forests in Madagascar, and especially along the Eastern Forest Corridor and to plant corridors linking what remains. CPALI is in the unique position of being able to offer a coherent livelihood program that could do just that. The three species on which we are focusing feed on plants that represent different stages of forest growth and succession.

By tying the market value of the cocoons to the ecological value of the larval food plant, we may be able to provide new livelihoods that contribute to the restoration of the Eastern Forest Corridor. As

a result of the meeting, we have a proposal pending with CI and ANAE, a Malagasy environmental NGO, to initiate wild silk production as part of CI's restoration of the [Mantidia Forest Corridor](#). Sincerely,



Catherine L. Craig, President  
Conservation through Poverty Alleviation, International



CPALI HOUSE Demonstration and training  
Site Maroantsetra

Maroantsetra Team

## *Latest news from the field*

### Target species and plants

During the past year, CPALI identified 3 target species to develop for wild silk production: *A. suraka* (CPALI target species), *Hypsoides* spp, and “ginger” *Borocera* (Figure 1). These species were selected because of the potential market value of the silk they produce, the ease with which they are reared and the potential conservation value of the host plants on which they feed. Each larvae feeds on a different plant food and each plant type represents a different stage of community plant succession and hence could be integrated into forest recovery in the Makira/Maroantsetra area where we work. “Ginger” *Borocera* feeds on an aggressive, invasive species of native ginger that is common in deforested sites and that often out-competes other plant species. The silk produced by “ginger” *Borocera* is similar to the kind of silk currently used for textiles in Madagascar. *A. suraka* feeds on a fast-growing tree, *Polycias* sp. (Araliaceae), that is found at the edges of forests and in pastures. Its silk is porous, has a metallic surface and can be used for multiple products and crafts. *Hypsoides* sp. (there are two in our area) feeds on the slow-growing, endemic tree, *Rhaplocarpus* sp. (Sphaerosepalaceae). Its' silk is extremely soft and pliable. We are tying the economic value of the different types of silk produced by each species to its potential value to restore the Eastern Forest Corridor of Madagascar as well as its material properties: i.e. the highest value silk is produced by *A. suraka* that feeds on fast-growing trees, lowest value silk is produced by larvae feeding on fastgrowing, invasive plants. Our goal is to encourage farmers to raise larvae on fast growing trees that they inter-crop with food crops as well as more slowly growing forest species that could lead land and forest reforestation.

**Figure 1.** Target species – larvae, cocoon and moth. A. *Borocera* sp; food plant is *Longusa*, the common name is wild ginger. B. *Antherina suraka* male and female (CPALI target species); food plant is *Polycias*, the common name is Talandoa. C. *Hypsoides singularis* (sp?). Upper left panel shows 5<sup>th</sup> stage larvae inside group cocoon spinning outer silk shell; upper right illustrates species in transit and hence why they are called “processionary moths”; bottom panel shows



### Surveys and target sites

Our goal is to invest local farmers in protecting forest resources. We do this by adding value to border forests and disturbed sites that edge areas of high conservation value. The Community Managed Forests (COBA's organized by WCS) that border Makira and Masoala protected areas vary in soil types, degree of deforestation and elevation. Not surprisingly, they also vary in the distribution and density of food plants fed on different some types of silk moth larvae than others.

*CPALI's* approach is to survey the distribution of available food plants in specific sites and determine the availability of existing natural resources that could be used for rearing. *CPALI* 's 2007 field teams (Felipe Trabanino and Mamy Ratsimbazafy; Mia Park and Tsiresy Razafimanantsoa), spent a total of about 4 months in the field mapping the distribution of potential food plants for *A. suraka* and *Hypsoides* spp as well as collecting *Hypsoides* nests.



Mamy Ratsimbazafy

Mia Park, Tsiresy  
Razafimanantsoa

Felipe Trabanino

The *Hypsoides* project mapped and collected cocoons in the four northeast COBA's of Makira and the *A. suraka* project focused in Ambodivoagny and Marovonana. Both yielded important data. In particular, *Hypsoides* was found in all forest sites but at different densities. Furthermore, there are probably two *Hypsoides* species in the area that feed on two species of Lombiry. Lombiry is an

important mature forest tree and some species are critically endangered. Wild silk production might be a stimulus for farmers to plant these trees instead of cutting them down.



2008 CPALI Field team initiating field trials in COBA of Ambodivoagny

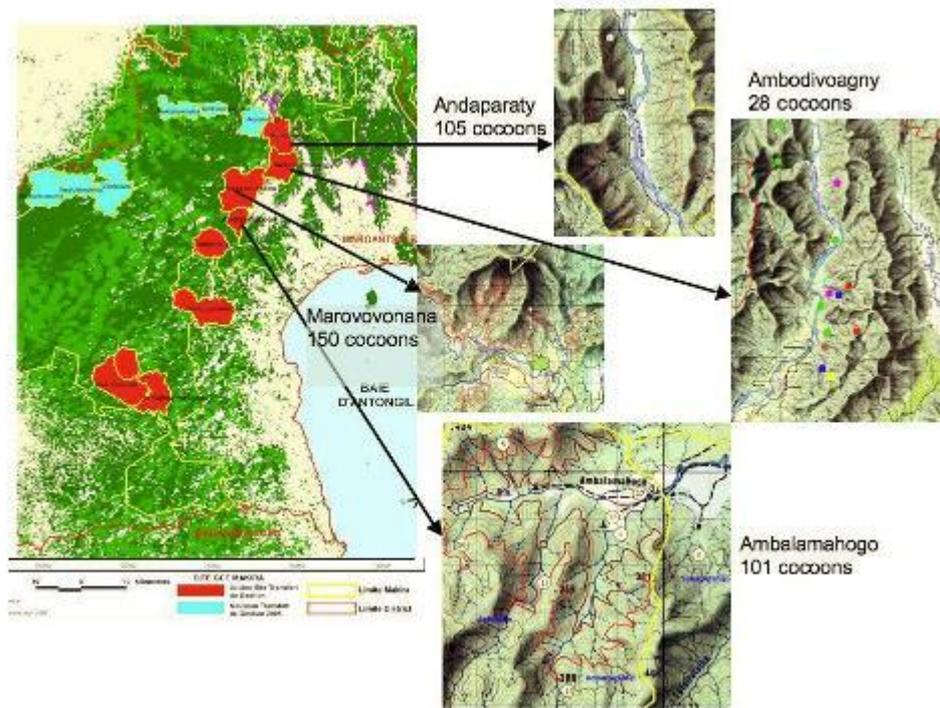


Figure 3. Maps of four COBAs surveyed for *Hypsoidea* cocoons and Lombir trees. The detail maps show the GPS sites where cocoons were collected. The area inside of the red outline line indicates the search area. The yellow line indicates the border between the Makira Protected Area (outside) and the COBA (inside). Bubbles indicate cocoon collection sites; total number of cocoons given in figure.

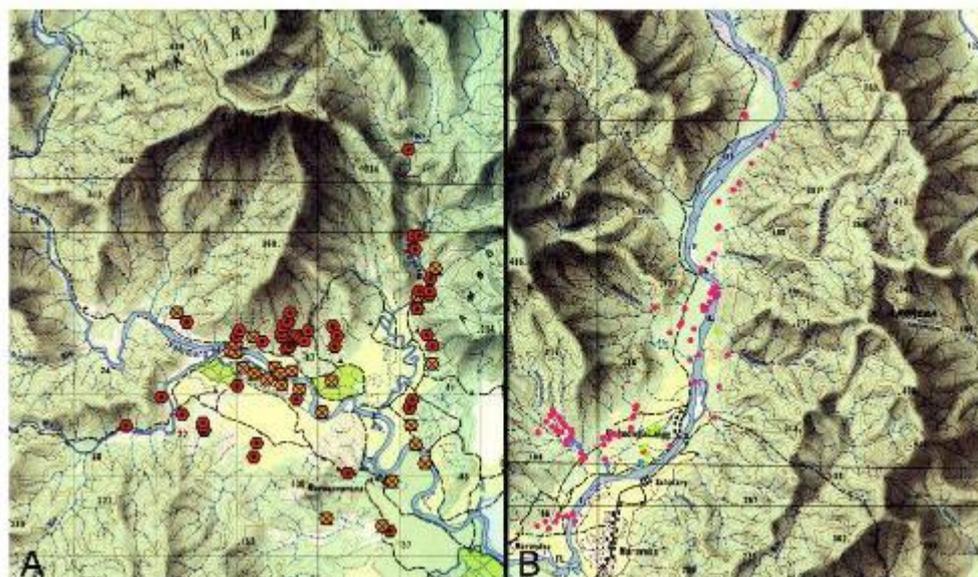


Figure 4. Maps of host plants. A. Map of Talandoa (orange circle black dot) and Antafana (orange circle with cross) in the CO BA of Marovovonanana. B. Map of Talandoa (pink dot), Antafana (green dot), and Hintzina (blue dot) in the COBA of Ambodivoahangy.

As a result of this work, and the interest of the communities, CPALI, in collaboration with WCS, will begin its first field trials in Ambodivoahangy in April 2008. The goal of these experiments is to collect information on the viability of our rearing techniques in the field as well as the amount of time a farmer will have to invest to farm larvae on one hundred Talandoa trees.

## *Designing Sustainable Methodologies for Rearing*

### **Demonstration site, experimental gardens and nurseries**

Based on the experience of a local villager, we estimate that it takes about 84 hours to raise 300 larvae (100 g of silk) to pupation. Based on our laboratory experiments, we estimated that a single individual can rear 5000 larvae in 6-7 hours a day over about 25 days. Both cases include 1-2 hours of travel time spent to collect leaves and the remaining time change leaves for larvae reared in captivity. This process is clearly too labor intensive to be adapted by a single family or even a group of families. As a result, we planted an experimental garden at the CPALI House to see if moth food plants could be grown “at home” and if larvae could be reared by putting them directly on the host plant. What started out as our experimental area is now a learning and demonstration site where Talandoa are intercropped planted with manioc, greens tomatoes, sweet potatoes and peppers in small “kitchen garden” (Figure 5). The Talandoa are planted close enough together that larvae can move from tree to tree. Our first project in Ambodivoahangy will be to convince villagers to plant Talandoa as fence posts as well as intercrop the trees in family gardens. We are planning to offer a contract production plan where CPALI will ensure a markets for cocoons produced by farmers using our methods. Cocoons will not be purchased from farmers with whom we have not prior agreement.



CPALI House May 2007



CPALI Demonstration Site April 2008

Figure 5. CPALI House has been converted from a living facility into a training and demonstration site. In 2009, we plan to turn what is currently the “laboratory” into a crafts center where we can teach villagers how to make products from silk cocoons.

### **A farmer’s success and CPALI’s second demonstration site**

One of the most exciting events of the year was when a local farmer came to CPALI headquarters and requested that we help him start rearing larvae. Denis, an extremely skilled horticulturist, farmer and Lepidoptera enthusiast, raises plant seedlings for sale to other farmers in his area. He has now added moth food plants to his nurseries. In addition, Denis has inter-cropped *Talandoa* with pineapple, sweet potatoes, vanilla, coffee, mangos and trees to be used for wood. He has germinated both *Talandoa* and *Lombiry* seeds in his nurseries and refurbished his rearing chamber and house with CPALI’s assistance. Last year, Denis started off with about 500 eggs from them and produced 300 cocoons. This year he is now working under contract for CPALI to produce 3000-4000 cocoons by June. He is planning to produce more than we have contracted and hopes to develop his own products for local markets. Our mutual goal is that Denis’ farmer will serve as a second breeding center and experimental site for CPALI projects. As soon as CPALI is producing papers, we expect Denis will want to do the same!



Figure 7. Denis has established an independent, silk moth breeding center on his farm. *Talandoa*, the host plant of *A. suraka* has been inter-cropped with sweet potatoes, coffee, pineapple, vanilla, mango, papaya, and wood. Denis and CPALI are working together to establish a second demonstration and training center for COBAs located at Makira’s south eastern border.

## *Marketing wild silk*

We have taken an innovative approach to production and marketing of wild silk cocoons. We combine conservation with a scaleable, profit-making enterprise whose markets are sequential, large and rich. Other enterprise-based conservation efforts have chicken/egg economics (no market until there is significant production; no interest in production if the market is small). Over 4 years we have assembled production techniques, designers, designs, distributors and logistics for high end products made from wild silk that can be farmed sustainably in border forests near protected areas. Initial products (jewelry) exploit the beauty of unprocessed cocoons whose metal-like surfaces can be incorporated into products that retail for more than \$100 per piece in a \$570 billion/year target market.

Later products (luxury fabrics) offer the scale (~1 T/ha; 500 workers/T; ~\$300/family, according to our model) required to achieve our conservation and poverty alleviation goals. By producing semi-finished products at multiple sites, we expect to achieve higher market volumes, and higher returns than have been delivered to rural farmers previously.

## *Collaborations and partnerships*

### **Wildlife Conservation Society**

The Wildlife Conservation Society, and in particular Christopher Holmes and Helen Crowley, have been providing logistical and institutional support to CPALI's mission in Madagascar. We are also grateful to the WCS-Marantsetra team who have assisted us in working in the COBAs as well as with the Marantsetra community. In return, CPALI is working to directly support WCS's mission and will be implementing its first production the Ambodivoahangy COBA. We hope for a continued and mutually productive association.

### **Conservation International**

CPALI is working to expand its program through developing a partnership with Conservation International. Our goal is to demonstrate that wild silk products can be used as a tool to maintain as well as reestablish the Eastern Forest Corridor of Madagascar. In particular, James MacKinnon and Jeannicq Randrianarisoa of Conservation International, and Minombolanoro Razakafoniaina from (National Agency for Environmental Action). (ANAE) are facilitating this work in the [Mantidia Forest Corridor](#). ANAE, with funding from CI, has facilitated the establishment of 7 local associations, developed extensive nurseries and begun forest restoration. While CPALI target species, *A. suraka* is found in the area, its host plant is not known. Our goal is to initiate studies in March 2009 to determine the host plant and assist ANAE in introducing wild silk production in the areas where it works. CPALI will provide training and technical services for production and product transformation as well as access to markets where goods can be sold. Through this partnership we hope to scale-up production to meet commercial market needs.

### **Ny Tanintsika**

CPALI continues to work closely with the Malagasy non-profit Ny Tanintsika. We continue to market Ny Tanintsika textiles in the United States and Europe on our new, wholesale only, website, [www.rainforestsilk.org](http://www.rainforestsilk.org).

## *The Rainforest Silk Cooperative*

The Rainforest Silk Cooperative is a web-based, nonprofit business, founded by CPALI to develop a market for wild silk productions in the United States and Europe. Our secondary goal is to assist other nonprofit wild silk producers to achieve sustainability and provide a forum for information exchange among them. Our partners include Ny Tanintsika (fabric), AtIndia (yarns), Royal Silk Project (papers) and CPALI (jewelry). We would be pleased to provide ordering information to your favorite, local businesses should you like them to carry wild silk products. Please contact [ccraig@cpali.org](mailto:ccraig@cpali.org) or visit our website, [www.rainforestsilk.org](http://www.rainforestsilk.org).

## *Education and Outreach*

CPALI has been working to encourage its staff to continue in school as well as provide opportunities students from Madagascar and overseas. Maminirina Randrianandrasana, a PhD student working with Prof. May Berenbaum at the University of Illinois Urbana- Champaign is considering working at CPALI's sites for her doctoral studies.

Maminarina and Ravo Ranaivosolo will initiate CPALI's first field trials in April 2008. Allison Van, a student at Harvard University's Kennedy School of Government won 2 summer fellowships to work and to travel in Madagascar July-August 2007. Her goal was to determine current production volume of wild silk, identify the types of silk produced and locate the sites where wild silk is currently produced.

Abby Wolf, Oberlin College Senior, spent the 2007 summer developing product catalogues for CPALI to send to interested buyers as well as interviewing local store and boutique owners as to their interest in selling wild silk products.

## *Board of Directors*

The current board members are:

May Berenbaum, PhD. Swanlund Professor at the University of Illinois Champaign- Urbana and Head of the Department of Entomology

Leslie Brunetta. Free-lance writer

Jack Croucher, PhD. Founder of ATIndia Wild Silk Project, Independent consultant

Catherine Craig, PhD. *CPALI* founder and President, Research Associate, Harvard University

Matthew Hatchwell, PhD. European Coordinator for the Wildlife Conservation Society (WCS)

Jacob Mulegetta, PhD. Kirby Laing Lecturer in the School of Engineering at Surrey University

Robert Wolf, PhD. Independent consultant.

Walter Simons. Founder of Industry Council for Development.

Robert Weber, PhD. Independent consultant.

## *CPALI Publications*

Portese, J., C.L. Craig and R.S. Weber (to be submitted with article below). Conservation through Social Enterprise I: Site selection for Wild Silk Production in Madagascar.

Weber, R.S. and C.L. Craig. (in prep.). Production of wild silk textiles to support Madagascar's conservation and poverty alleviation goals.

2006 Razafimanantsoa, T., O. Ramilijaona, and C. L. Craig. 2006. Indigenous silk moth farming for communities surrounding Ranomafana National Park: report on a feasibility study. *Madagascar Conservation and Development* . 1:34-37.

## *Thanks to our partners and supporters*

CPALI is grateful to the National Geographic Foundation for funding our research for a second year, to the International Resources Group for its support of CPALI's community work and students, and to the Wildlife Conservation Society for logistical support and personnel to our field expeditions.

The Fulbright Foundation has greatly extended the CPALI program by providing an 8- month Fellowship to C.L. Craig. The Kenney Family and Norvig Family both provided substantial support to CPALI's Learning and Demonstration Site. We thank Art for the Animals for working to generate donations for our work and Catherine Musinsky for continuing to update our website.

The law firm of Covington and Burl provides legal advice regarding the development of the Rainforest Silk Cooperative and the Tonnesson Company provides financial advice and prepares CPALI's IRS filings. Harvard University has provided substantial in-kind support to C.L. Craig for which we are grateful.