

Report to the Oriental Bird Club

Project Title:	Operation of Forest Restoration Research Unit for Lowland Rainforest in Krabi
Grant Amount:	GPB 10,000 (Received into Account: FORRU-CMU, Siam Commercial Bank 1-3/4/08)
Donor:	Bertram Smythies Memorial Fund
Project Period:	1/4/08 to 31/3/09
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Introduction

This project was a continuance of a previous project, “Gurney’s Pitta Research and Conservation in Thailand and Myanmar”, implemented by the U.K.’s Royal Society for the Protection of Birds (RSPB) and sponsored by the Darwin Initiative from 1/4/5 till 31/3/8. Under that project, the Forest Restoration Research Unit of Chiang Mai University was contracted to develop forest restoration techniques that could eventually be used to accelerate re-establishment of the lowland evergreen forest habitat of the highly endangered Gurney’s Pitta (*Pitta gurneyi*) in Krabi Province, S. Thailand, in and around Khao Pra Bangkram Wildlife Sanctuary. Research activities included i) a survey of indigenous forest tree species and voucher specimen collection, ii) a phenology study of flowering and fruiting of selected trees, iii) seed collection and experiments on seed germination and seedling growth in a nursery and iv) field trials to compare performance among species.

Due to financial management problems at the Darwin Initiative in 2008, it was not possible for that organization to continue to support the work during 2008-09. Therefore, we contacted Brian Sykes, who brought the matter to the attention of the OBC board. The board subsequently agreed to fund the work with a grant from the Bertram Smythies Memorial Fund for 1 year. We are happy to report that during that year, FORRU-CMU and RSPB prepared a “follow-on” grant application to the Darwin Initiative, which was successful. Therefore, the Darwin Initiative will continue to fund this work for a further two years from 1/4/08 to 31/3/10.

We are very grateful to OBC for providing funding at this critical period, in a timely and efficient manner, which prevented the collapse of FORRU-Krabi during this funding hiatus. We managed to avoid having to make the FORRU-Krabi team, in whom we had invested considerable training, redundant. Tree production and the scientific work of the unit continued and a major strategy document for the recovery of Krabi’s lowland forests was completed. The recommendations in that document will begin to be implemented in the forthcoming year, under the new Darwin follow-on project.



Staffing

The project continued to employ a local team of 2 full time and 1 half time staff at the Krabi FORRU facility, to carry out nursery work and field work. Kuhn Taweesak Polchoo (from the Reserved Forest Office) was employed by the project full time. However, he also accepted the position of community forestry liaison office in Trang with the DNP. Therefore, his salary is now shared with his wife (Kuhn Nongluk Polchoo, “Nong”), who fills in for him, on week days. Kuhn Taweesak continues to be primarily responsible for the field plots (organizing planting, maintenance and monitoring) and hosting visiting groups in the nursery. He also presented the project at the Bangkok Bird Fair.

Kuhn Theerasak Konghor has a diploma in horticulture and is member of the local community. He has developed very well as a nursery technician and has displayed a remarkable teaching ability, clearly enjoying sharing his new knowledge and skills with visiting students and school children. Theerasak is meticulous with his nursery work and data collection and he has developed into an effective nursery officer.

Kuhn Juthamart Thongtao worked half time from April 08 to February 09, whilst also studying for a degree in Plant Science. She was responsible for all paperwork related to the project and submitted monthly progress reports and receipts etc. efficiently and on time. Unfortunately she had to leave the project to devote full time to finishing her degree in March 09. Therefore, at the recommendation of the other team members, we recruited a new member of staff, Kuhn Prasert Botlor to work full time as nursery officer assistant. Although he does not have a secondary school education, he has good knowledge of local tree species. This will enable Theerasak to expand nursery production of native forest trees for planting and take over the paperwork formerly carried out by Jutamart.

During this project, a training program was run for Theerasak and Juthamart at Chiang Mai University on 18-25th August 2008. They worked with FORRU-CMU staff to improve their nursery skills and increase their knowledge of forest restoration techniques. Also included in the course were brain-storming sessions to select “candidate” framework tree species (i.e. those most likely to accelerate natural forest regeneration when planted on deforested sites) by reviewing the project data and their local knowledge. This work subsequently contributed to the tree species section of the forest restoration strategy document.

In addition, Ms. Panitnard Tunjai (“Dia”), PhD candidate, from Walailuk University (Nakhon Si Thammarat), is having a major input into this project. A former field officer at FORRU-CMU, Ms. Panitnard has excellent experience in forest restoration. She visits to the site monthly to help out with staff management, set work schedules and check on data collection. She contributed to the restoration strategy document (and is now translating it into Thai) and is also carrying out experiments on direct seeding on-site as part of her PhD study.

Dr. Stephen Elliott provided on-site project development and supervision from 29th October to 1st November 2008 and from 9th to 15th March 2009. He also provided training for project staff in Chiang Mai, dealt with data collation, reporting and financial admin, prepared the restoration strategy and worked with the RSPB staff to prepare the successful application to Darwin.

Phenology

The phenology study, started under the Darwin project, continued into a third year. FORRU-Krabi staff scanned 68 local forest tree species (1 to 8 individuals per species, depending on availability) with binoculars, every 3 weeks and scored them for flowers and fruits. The primary objective of this work is to determine when each species flowers and fruits to optimize seed collection times.

Nursery

At the nursery, propagation experiments (including seed germination and growing-on from wildlings) have now been carried out on 114 local forest tree species. Over the past year, the nursery has produced a total of 7,260 seedlings of 34 tree species. Trees in excess of those required for project field trials were donated to various local tree planting events. Specimens of young seedlings are now also being collected from the nursery, to act as a reference collection for support of surveys of natural forest regeneration in the future. All specimens are lodged at the CMU herbarium.



At FORRU-Krabi, the quality and variety of the planting stock produced demonstrate the success of the capacity building, achieved by this project. The nursery has also become a learning facility for visiting students from both Walailuk and Prince of Songkhla Universities.

Table 1 Species and numbers of saplings in the nursery (March 2009)

Local name	Scientific name	Family	Numbers of Saplings	
			Height 30-50 cm	Height < 30 cm
Tung Fa	<i>Alstonia macrophylla</i> Wall. ex G. Don	Apocynaceae	180	0
Gor Khao	<i>Castanopsis schefferiana</i> Hance	Fagaceae	300	0
Yang Kiam	<i>Dipterocarpus</i> sp.	Dipterocarpaceae	150	0
Daeng Kuan	<i>Eugenia syzygioides</i> (Miq.) Hend	Myrtaceae	0	200
Wah	<i>Eugenia oleina</i> Wight	Myrtaceae	0	60
Paega Pah	<i>Oroxylon indicum</i> (L.) Kurz	Bignoniaceae	130	200
Riang	<i>Parkia timoriana</i> (DC.) Merr.	Leguminosae (M)	380	0
Niang	<i>Archidendron jiringa</i> (Jack) I. Niels.	Leguminosae (M)	230	0
Kaeh pong	<i>Markhamia stipulata</i> (Wall.) Seem. ex K. Sch. var. <i>kerrii</i> Sprague	Bignoniaceae	90	0
Kee Non	<i>Pterocymbium macranthum</i> Kostern.	Sterculiaceae	70	0
Takien Thong	<i>Hopea odorata</i> Roxb. var. <i>odorata</i>	Dipterocarpaceae	270	120
Bok Duak	<i>Irvingia malayana</i> Oliv. ex Benn.	Irvingiaceae	50	0
Kem Pah	<i>Ixora</i> sp.	Rubiaceae	0	160
Haad room	<i>Artocarpus dadah</i> Miq.	Moraceae	250	0
Kum Chum	<i>Lepisanthes rubiginosa</i> (Roxb.) Leenh.	Sapindaceae	170	0
Sangiat lek	<i>Aglaia elacagnoidea</i>	Meliaceae	0	80
Yang pai	<i>Dipterocarpus kerrii</i> King	Dipterocarpaceae	60	0
Sumet choon	<i>Eugenia grata</i> Wight	Myrtaceae	0	160
Chamuang Bai lek	<i>Garcinia merguensis</i>	Guttiferae	0	50
Suk Pah	<i>Vatica odorata</i> (Griff.) Sym.	Dipterocarpaceae	0	140
Gradook Chang	<i>Antidesma leucopodium</i> Miq.	Euphobiaceae	120	70
Wah	<i>Garcinia hombroniana</i> Pierre	Guttiferae	200	70
Look Hua Tao	<i>Mezzettia curtisii</i> King	Annonaceae	140	0
Kia Dai	<i>Eugenia cerasiformis</i> (Bl.) DC.	Myrtaceae	360	0
Kritsana	<i>Aquilaria malaccensis</i> Lmk.	Thymelaeaceae	180	0
Payom	<i>Shorea roxburghii</i> G. Don	Dipterocarpaceae	50	0
Wai Rakam	Rattan Palm	Palmae	40	0
Grabao	<i>Hydnocarpus anthelminthica</i> Pierre ex. Lanes.	Flacourtiaceae	100	0
Tornlork	<i>Elaeocarpus stipularis</i> Bl.	Elaeocarpaceae	30	0
Mau	<i>Eugenia grandis</i> Wight var. <i>grandis</i>	Myrtaceae	120	0
Laen ban	<i>Nephelium hypoleucum</i> Kurz	Sapindaceae	50	0
Loompoa	<i>Intsia palembanica</i> Miq.	Leguminosae (C)	240	0
Kumin Reusi	<i>Diospyros venosa</i> Wall. ex A. DC.	Ebenaceae	170	0
Keean sai	<i>Anisoptera scaphula</i> (Roxb.) Pierre	Dipterocarpaceae	120	0
Dee ngoo	<i>Elaeocarpus petiolatus</i> (Jack) Wall. ex Kurz	Elaeocarpaceae	30	0
Yor Pah	<i>Morinda elliptica</i> (Hk.f.) Ridl.	Rubiaceae	60	80
Dan mee	<i>Canthium glabrum</i> Bl.	Rubiaceae	40	0
Satieou	<i>Madhuca malaccensis</i> (Cl.) Lam	Sapotaceae	0	130
Yee	<i>Dialium indum</i> L.	Leguminosae (C)	0	70
Uab Dam	<i>Chionanthus ramiflorus</i> Roxb.	Oleaceae	120	0
Yeujong	<i>Balakata baccata</i>	Euphobiaceae	70	0
Non	<i>Vitex pinata</i> L.	Verbenaceae	80	0
Kor Haeng	<i>Carallia brachtiata</i> (Lour.) Merr.	Rhizophoraceae	180	0
Assorted			840	0
Total			5,670	1,590

Planting and monitoring

In March 2008, we met with the WS Sanctuary Chief and were requested to plant a grassy valley-bottom site in between two primary forest areas, where Gurney's Pitta had previously been recorded. We visited the site with WS officers and used a GIS image at the WS HQ to agree on plot boundaries. The site was cleared of weeds and made ready for planting in May. However, this activity was inexplicably halted by a higher authority about a week before planting.

Therefore we contacted Kuhn Somprat Polchu, who is in charge of the reserved forest adjacent to the wildlife sanctuary, and he made rapid arrangements for the project to plant trees there, in a small plot, adjacent to an area planted by the previous project in 2006. Although the area was smaller than we had planned for, we managed to plant 1,000 trees, which are now generating useful growth data.

The planting event was well run on May 19th 2008. Site preparation was carried out rapidly on May 16th and 1,000 trees of 23 species were planted out to test field performance with two different fertilizer regimes – normal dose (100 gm per tree) and double dose.



Mr. Cherdsak Kuaraksa and 3 members of the FORRU-CMU team travelled to Krabi to join Ms Panitnard and the Krabi team for site preparation and planting.



Other participants in the event included the Reserved Forest rangers and chief (Kuhn Somprat), as well as Kuhn Somprat's students from the Krabi Vocational College, Walailuk University students and some local villagers. Brian Sykes represented OBC at the event.



Kuhn Somprat, WU students, school kids and FORRU-CMU staff joined the event. Brian Sykes represented OBC (above)



Theerasak and Taweesak (right) teach local school children how to plant trees at the May 19th planting event. Cardboard mulch mats (upper left) were applied to protect the planted trees from weed competition.

Maintenance operations on planted trees (weeding and fertilizer application) were applied three times during the rainy season as follows:-

Plot 2007	Weeding	Fertilizer Application
	11/7/08	13/7/08
	3/9/08	5/9/08
	16/3/09	18/3/09
Plot 2008	9/7/08	12/7/08
	1/9/08	3/9/08
	3/11/08	10/11/08

Labelled trees were also monitored, at planting time (to provide baseline data) and at the end of the rainy season to calculate growth performance. Initial results from the 2008 plots suggest that the double dose fertilizer regime resulted in better growth performance of the seedlings by the end of the first rainy season. Most species had lower mortality rates and higher growth rates with the double dose fertilizer regime.

Table 2 Results of planting in 2008 plots (after 1st rainy season)

SPECIES	Mean RCD		Mean HEIGHT		%MORTALITY	
	single dose	double dose	single dose	double dose	single dose	double dose
<i>Elaeocarpus petiolatus</i> (Jack) Wall. ex Kurz	3.58	4.84	37.88	51.16	40.91	13.64
<i>Eugenia syzygioides</i> (Miq.) Hend	3.11	3.67	39.56	42.03	59.09	18.18
<i>Shorea roxburghii</i> G. Don	5.62	5.52	50.17	45.42	18.18	13.64
<i>Salacca wallichiana</i> Mart.	9.53	11.57	34.29	30.46	68.18	36.36
<i>Eugenia grandis</i> Wight var. <i>grandis</i>	3.62	3.71	41.20	37.76	22.73	22.73
<i>Antidesma leucopodium</i> Miq.	4.96	7.79	46.00	51.79	45.45	36.36
<i>Madhuca malaccensis</i> (Cl.) Lam	3.75	5.57	34.82	43.84	36.36	13.64
<i>Parkia timoriana</i> (DC.) Merr.	3.05	3.57	38.25	43.54	81.82	31.82
<i>Alstonia macrophylla</i> Wall. ex G. Don	5.28	6.29	45.93	41.79	36.36	36.36
<i>Schima wallichii</i> (DC.) Korth.	2.99	3.58	30.85	28.00	40.91	13.64
<i>Azadirachta indica</i>	4.28	4.91	36.59	43.63	22.73	13.64
<i>Diospyros venosa</i> Wall. ex A. DC.	4.52	5.96	48.11	53.24	18.18	27.27
<i>Hopea avellanea</i> Heirn	4.40	4.71	44.60	53.50	13.64	18.18
<i>Radermachera pinnata</i> (Blanco) Steen. ssp. <i>acuminata</i> (Steen.) Steen	5.80	7.14	51.50	53.14	31.82	4.55
<i>Sandoricum koetjape</i> (Burm. f.) Merr.	4.99	5.75	53.31	59.61	18.18	13.64
<i>Eugenia muelleri</i> Miq.	3.96	4.75	46.45	56.33	50.00	45.45
<i>Pajanelia longifolia</i> (Willd.) K. Sch.	6.53	7.63	39.19	33.55	36.36	18.18
<i>Hydnocarpus anthelminthica</i> Pierre ex. Lanes.	4.61	4.36	33.02	31.53	27.27	18.18
<i>Pterocymbium macranthum</i> Kostern.	3.96	5.57	48.23	52.81	50.00	18.18
<i>Archidendron jiringa</i> (Jack) I. Niels.	5.03	6.11	28.33	59.33	86.36	18.18
<i>Mezzettia curtisii</i> King	5.24	5.51	56.90	55.47	31.82	31.82
<i>Pauia javanica</i> , <i>Parkia speciosa</i> Hassk.	3.60	4.74	34.90	42.81	77.27	27.27
<i>Elaterospermum tapos</i> Bl.	6.28	6.28	41.50	45.19	72.73	40.91
Mean	4.73	5.63	41.81	45.91	42.89	23.12
SD	1.45	1.77	7.59	9.25	21.96	10.78

In addition we continued to monitor an “accelerated natural regeneration” experiment, which was established in 2007. This involved laying mulch and fertilizer around seedlings and saplings already present in a site that had been encroached and cleared for rubber trees and subsequently re-claimed by the reserved forest ((who removed most of the rubber tree saplings). In addition, we under-planted the regeneration with a few climax forest tree species, and experimented with mulching and fertilizer treatments.



Left - Experimental ANR plot - May 2007, just before applying fertilizer and mulching treatments and under-planting with selected climax forest tree species.

Below – the same site showing healthy, rapidly regeneration in March 2008.



Table 3 Results from the 2007 ANR plots (after 2nd rainy season) (CB = cardboard mulch, F=fertilizer, RCD = root collar diameter)

PLANTED TREES	Mean RCD (mm)				Mean Height (cm)				Mortality			
	CB + F	CB no F	No CB + F	Control	CB + F	CB no F	No CB + F	Control	CB + F	CB no F	No CB + F	Control
<i>Eugenia syzygioides</i> (Miq.) Hend.	5.50	4.75	4.40	3.67	78.33	80.83	75.80	57.00	20.00	20.00	33.33	20.00
<i>Lepisanthes rubiginosa</i> (Roxb.) Leenh.	7.33	4.00	5.17	2.90	54.08	44.78	74.50	25.20	20.00	40.00	60.00	33.33
<i>Salacca wallichiana</i> Mart.	36.18	28.00	22.58	18.42	288.31	302.33	225.63	104.33	0.00	13.33	26.67	20.00
<i>Eugenia grandis</i> Wight var. <i>grandis</i>	37.00	5.11	8.20	3.54	302.07	77.78	91.70	46.23	26.67	40.00	33.33	13.33
<i>Pometia pinnata</i> J.R. Forst. & G. Forst.	5.71	5.25	5.50	5.50	69.14	64.63	72.17	56.33	53.33	46.67	60.00	60.00
<i>Hopea avellanea</i> Heim	41.92	5.75	5.33	4.50	344.73	102.25	69.33	50.00	33.33	46.67	60.00	20.00
<i>Sandoricum nervosum</i>	43.44	33.99	28.93	4.86	347.57	375.44	299.62	65.50	20.00	20.00	26.67	6.67
MEAN	25.30	12.41	11.45	6.20	212.03	149.72	129.82	57.80	24.76	32.38	42.86	24.76
SD	18.07	12.83	10.02	5.46	137.32	132.08	93.48	24.10	16.20	14.10	16.27	17.52
NATURALLY ESTABLISHED TREES												
<i>Anthocephalus chinensis</i> (ญ)	44.86	62.17	-	-	360.56	618.33	-	-	33.33	60.00	100.00	100.00
<i>Aporosa dioica</i> (คฺวอญ)	33.36	26.55	22.67	22.29	243.29	294.27	321.50	309.57	6.67	26.67	60.00	46.15
<i>Callerya atropurpurea</i> (แฉะ)	31.69	29.00	46.67	17.60	308.00	294.55	372.22	251.30	13.33	26.67	40.00	33.33
<i>Cinnamomum iners</i> (เขียค)	41.33	17.00	33.55	21.58	237.47	247.75	320.48	261.42	0.00	0.00	12.50	20.00
<i>Crypteronia paniculata</i> (สอม)	38.00	29.00	28.50	55.00	405.25	242.50	264.83	495.00	33.33	33.33	0.00	0.00
<i>Dillenia obovata</i> (ล้าน)	52.60	35.17	36.88	34.63	410.00	321.50	384.63	332.63	33.33	60.00	46.67	46.67
<i>Ficus hispida</i> (เคือปล้อง)	30.60	29.09	42.00	-	400.00	344.18	520.00	-	28.57	26.67	87.50	100.00
<i>Garcinia hombroniana</i> (วา)	25.17	20.00	8.00	10.42	185.67	180.00	88.00	136.08	0.00	50.00	50.00	20.00
<i>Macaranga denticulata</i> (หลอ)	75.73	53.50	27.80	27.75	571.82	613.33	387.00	482.50	26.67	20.00	50.00	73.33
<i>Peltophorum pterocarpum</i> (นนทรี)	72.78	39.00	35.80	29.00	608.89	544.00	388.20	391.25	40.00	33.33	66.67	73.33
<i>Schima wallichii</i> (มั่งตาล)	48.80	-	-	18.00	362.00	-	-	320.00	54.55	-	-	0.00
<i>Trema orientalis</i> (พ้งแหว)	86.33	67.50	56.67	18.00	613.33	668.33	490.00	290.00	60.00	60.00	80.00	86.67
MEAN	48.44	37.09	33.85	25.43	392.19	397.16	353.69	326.97	27.48	36.06	53.94	49.96
SD	19.84	16.83	13.43	12.47	143.48	177.14	120.40	107.89	19.53	19.37	30.05	36.35

Both fertilizer application and mulching increased growth performance of the trees; dramatically so for the planted trees and less so for the naturally established ones. Mortality rates (after 2 growth seasons) were around 25% for the mulching + fertilizer treatment, which is acceptable and therefore that treatment is recommended for future restoration work.

Planning for planting in 2009 is proceeding. The position is that FORRU-CMU will “sponsor” tree planting to be carried out by the Wildlife Sanctuary office (by providing saplings of framework tree species and money for planting and maintenance from the new Darwin budget). That way, the permission request is submitted by the WS (not FORRU) to the DNP HQ. A permission document has been prepared (by WS staff, Khun Pinyo Tinan) to plant the area around Ton Tiew waterfall trail (the same place as we planned last year). The document requires 8 signatures. Dr. Stephen Elliott and the WS Chief (Kuhn Worawut Sono) have signed already, during a meeting during our last site visit. The document then passed to the regional Wildlife Conservation Unit in Nakorn Sri Thammarat, headed by Khun Prasarn Premree. We were able to meet him in Nakorn Sri Thammarat to run through details of the project in March. He has returned the document to the KPBK WS HQ for technical changes. Furthermore, Steve Elliott was able to meet Khun Chatchawan Pisdamkham, Director of the Wildlife Conservation Office in Bangkok, to explain the project. Kuhn Chatchawan will take the document to the DNP chief when it arrives at his office.

Community

The project nursery has supplied many trees for other planting events this year. One hundred and fifty trees were donated to local villagers to plant along the road October 2008. The provincial officer also joined this event and 6,000 baht was donated for maintenance of the planted trees. Five hundred trees were planted by the police in November 2008. Furthermore, we gave 80 seedlings for local government officers to present to HRH Princess Srirasmi at Lamdhab district, Krabi (photo right).



HRH Princess Srirasmi planted a tree from the FORRU-Krabi nursery at Lamdhab district, Krabi during her visit.

We are also supported the WS to display an exhibition on forest restoration in the new information centre, at the front entrance to the emerald pool. FORRU-Krabi staff joined a planting event at Khao Sam Nuay, Klong Thom district with local people in December 2008.

During the last field site visit we developed the idea to include local kids in seed collection, which has subsequently been called the “Treasure Tree Program”. This will serve the dual purposes of involving the local community in forest restoration and providing a regular supply of seeds to the nursery. The FORRU-Krabi staff designed a logo which will be placed on “treasure trees” i.e. framework tree

species. School children will watch these trees for fruit production and collect the seeds when ripe, bring them to the nursery and receive a reward.

Education

Five students from the Ecology and Biodiversity Program, Walailak University spent a weekend at the project to learn about forest restoration in March 2009 for their Conservation Biology course. They learnt how to collect phenology data and nursery techniques. At the same time, Dr. Sara Bamrungsri brought 10 students from Prince of Songkla University to follow the same program. Obviously, this link with WU and PSU will develop highly qualified and motivated students as potential future staff for the project.

Furthermore, Ms. Panitnard Tunjai, a PhD student from WU, has established experiments on direct seeding at the site (comparing performance of trees established by direct seeding with conventional nursery-raised trees) as part of her PhD program. This will generate useful additional information for the forest restoration strategy for the area.

