

Activity Document V

PROJECT ABSTRACT

TITLE: Developing DNA Database for *Gonystylus bancanus* in Sarawak.

SUMMARY

This project addresses the establishment of a DNA database for *Gonystylus bancanus* (Ramin) in Sarawak with a view to develop a tracking system for the trade of Ramin timber. The overall objective is to ensure international trade in CITES-listed timber species is consistent with their sustainable management and conservation. The objectives of this project are (i) to study the genetic variation and differentiation of *G. bancanus* population in Sarawak, and (ii) to develop a DNA database for *G. bancanus* to enhance efforts for tracing and tracking of *G. bancanus* timber. The expected outputs are (i) DNA for population of the PSF with Ramin trees extracted, (ii) genetic variation and genetic differences within and among population determined, and (iii) genotype profile of sampled trees for each population established.

EXECUTING/IMPLEMENTING AGENCY: Forest Department Sarawak and Sarawak Forestry Corporation.

COLLABORATING AGENCY: Forest Research Institute Malaysia (FRIM).

DURATION: 12 months.

START DATE 2008.

BUDGET AND PROPOSED SOURCES OF FINANCE:

| | | |
|-----|--|-------------|
| (a) | ITTO Contribution | US\$ 52,670 |
| (b) | Government Contribution (direct and in-kind) | US\$ 59,213 |
| (c) | Other Sources Contribution (specify) | US\$ - |

Total US\$ 111,883

This activity is submitted to ITTO for consideration under its Work Program activity "Ensuring international trade in CITES-listed timber species is consistent with their sustainable management and conservation," with primary funding provided by the European Commission and additional support from the USA, Japan, New Zealand and Norway.

PART I: CONTEXT

Background

Gonystylus bancanus commonly known as Ramin belongs to the family Thymelaeaceae. The species is widely distributed in Malaysia and Indonesia but confined only to the Peat Swamp Forest (PSF). The wood of Ramin is highly sought after because of its durability and is suitable for various wood products ranging from sawnwood for house construction to furniture. Sarawak Forest Department statistics record of Ramin exported from the State revealed that the highest volumes exported were in the 1960s and 1970s ranging from 602,480 m³ to 779,651 m³. However, the production declined to its lowest record in 2000 at 27,042 m³. It is exported to countries such as Japan, China, Taiwan and Hong Kong (Anon, 2000).

The decline in Ramin production from Sarawak indicates the reduction of Ramin population in the PSF. As the demand for Ramin increases, Sarawak imported Ramin logs and timber from Indonesia, Brunei and Sabah. Records showed that from 1970 to 1978 Sarawak imported a total of 578,989 m³ of logs and 412,370 m³ of sawn timber from these places. As a control measure to protect the Ramin population in the PSF, the Sarawak Government has imposed a ban on Ramin logs which was enforced on 10 May 1980 (Anon, 1980). However, this does not affect the export of Ramin timber products. To date, two national parks consisting of PSF have been gazetted as Totally Protected Areas, namely, the Maludam National Park and the Loagan Bunut National Park.

Ramin is listed under Appendix II in CITES. However, the control measures for species conservation and CITES rules and regulations may not be strong enough to prevent illegally harvesting the protected areas and to prove that there was no import of Ramin logs or timber from neighbouring countries, including Sabah. Hence, a tracing and tracking system is necessary to enhance any conservation and protection effort for Ramin in Sarawak. The system will also provide verification for any legal or illegal activities involving Ramin.

PART II: THE PROJECT

1.0 Project Objectives

The two objectives of the project are to study the genetic variation and differentiation of *G. bancanus* population in Sarawak, and to develop a DNA database for *G. bancanus* to enhance efforts for tracing and tracking of *G. bancanus* timber.

2.0 Justification

2.1 Problems to be addressed

The reduction of Ramin population in the wild has put this species at risk. As a control measure, the Sarawak Government has set aside two areas of peat swamp forest as Totally Protected Areas and ban the export of Ramin logs. Despite the control measures being implemented, there is no guarantee that there will be no illegal encroachment into the protected areas and the possibility of smuggling of Ramin timber from Indonesia as the demand for Ramin wood increases internationally. As reported by an international non-governmental organizations (NGOs), (i.e. Telapak and the Environmental Investigation

Agency, London) Malaysia was accused of being involved in the smuggling of Ramin. The report entitled "Profiting from Plunder: How Malaysia Smuggles Endangered Wood" was released on 12 February 2004 at the "Seventh Meeting of the Conference of Parties to the Convention on Biological Diversity (COP-7)" that was held in Kuala Lumpur, Malaysia. Though Malaysia had through a press conference denied the accusation, it is pertinent for Malaysia to show her commitment in preventing the illegal trade of Ramin, and hence, scientific evidence would be required in the future to prove the legality of her Ramin export.

Up till now the identification of illegal timber is done by wood anatomy specialists. However, the identification of the timber to species level is always very difficult. This may raise doubt during court proceeding. The DNA fingerprinting can be used in timber identification, and thus, useful for tracing and tracking of wood in the production chain (Koopman & Diemont, 2004) and legally logged wood (from specific sites or plantations) can be distinguished from illegally logged wood (Smulders *et al.*, 2007).

The development of DNA database of Ramin is a necessity and is useful for tracing and tracking of illegal timber activities in Sarawak. Using the microsatellite markers (SSRs), genetic diversity and differentiation derived from specifically described origins will enable the determination of the original source of Ramin timber and its legality. It will be useful to the local enforcement units to enhance their effort to control illegal trade of Ramin. In addition, the genetic information will be useful as a guideline to foresters and biologists for the development of conservation strategies. Structure of genetic population will provide information such as level of genetic variation (high to low) in each population and the genetic differences among population. Thus, the information can be useful to evaluate good stock for conservation efforts, such as in undertaking reforestation program.

2.2 Intended situation after Project completion

The DNA database for Ramin is necessary for the development of a tracing and tracking system for Ramin wood in the supply and production chain. The SSRs developed from this species will enable the study on the genetic diversity and population differentiation of the Ramin population in Sarawak. The complete Ramin DNA database will be useful as future references for detecting the source and legality of timber from specifically described origins.

2.3 Target beneficiaries

The target beneficiaries of this project include:

- (i) The State Government of Sarawak which will be recognized internationally for the enforcement of legal trade of Ramin.
- (ii) The Forest Department of Sarawak and the Sarawak Forestry Corporation will have a reliable DNA database for Ramin for the development of a tracking system for Ramin.
- (iii) The private operators from the timber industry who have a stake in the Ramin trade.
- (iv) Scientists and non-governmental organizations (NGOs) interested in the conservation and legal trade of Ramin

The information from this project will be disseminated through various types of publications and communication media.

2.4 Risks

There is no risk involved for this project as the molecular markers have been developed. The only problem that may arise is in the laboratory where the extracts obtained from the leaf and bark samples may not meet the required level of purity. However, this can be overcome by engaging experienced researchers and through the strict adherence to the protocols.

3.0 Outputs

The expected outputs of the project are as follows:

Objective 1: To study the genetic variation and differentiation of *G. bancanus* population in Sarawak.

Output 1.1: DNA for population of PSF with Ramin trees extracted.

Output 1.2: Genetic variation and genetic differences within and among population determined.

Objective 2: To develop a DNA database for *G. bancanus* to enhance efforts for tracing and tracking of *G. bancanus* timber.

Output 2.1: Genotype profile of sampled trees for each population established.

4.0 Activities

Output 1.1: DNA for population of PSF with Ramin trees extracted.

Activity 1.1.1: Sampling of Ramin populations where leaf and/or inner bark samples will be collected from different populations in the PSF.

Activity 1.1.2: Extraction and purification of DNA where the DNA will be extracted from the samples collected and purified using the standard established laboratory protocols.

Output 1.2: Genetic variation and genetic differences within and among population determined.

Activity 1.2.1: Microsatellite analysis where the genetic variation and differentiation will be studied using microsatellite markers developed from this species.

Activity 1.2.2: Data analysis where a special computer software program for genetics will be used to analyse the genetic diversity and population genetic structure.

Output 2.1: Genotype profiles of sampled trees for each population established.

Activity 2.1.1: Generation of genotype profiles where genotype profiles will be compiled according to individual populations to create the DNA database.

Activity 2.1.2: Dissemination of project findings where the results of the project will be presented through publications, seminars or conferences.

5.0 Work Plan

The project will be carried out over a period of 12 months according to the Work Plan as shown in **Table 1**.

Table 1: Work Plan – Developing DNA Database for *Gonystylus banacus* in Sarawak

| OUTPUT/ACTIVITIES | RESPONSIBLE PARTY | SCHEDULE (IN MONTHS) | | | | | | | | | | | |
|--|------------------------------|----------------------|---|---|---|---|---|---|---|---|----|----|----|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Output 1.1: DNA for population of PSF with Ramin trees extracted. | | | | | | | | | | | | | |
| Activity 1.1.1: Sampling of Ramin populations where leaf and/or inner bark samples will be collected from different populations in the PSF. | Sarawak Forestry Corporation | ■ | ■ | ■ | | ■ | ■ | ■ | | | | | |
| Activity 1.1.2: Extraction and purification of DNA where the DNA will be extracted from the samples collected and purified using the standard established laboratory protocols | Sarawak Forestry Corporation | | ■ | ■ | ■ | | ■ | ■ | ■ | | | | |
| Output 1.2: Genetic variation and genetic differences within and among population determined. | | | | | | | | | | | | | |
| Activity 1.2.1: Microsatellite analysis where the genetic variation and differentiation will be studied using microsatellite markers developed from this species. | Sarawak Forestry Corporation | | ■ | ■ | ■ | | ■ | ■ | ■ | | | | |
| Activity 1.2.2: Data analysis where a special computer software program for genetics will be used to analyse the genetic diversity and population genetic structure. | Sarawak Forestry Corporation | | | | | ■ | ■ | | ■ | ■ | ■ | | |
| Output 2.1: Genotype profiles of sampled trees for each population established. | | | | | | | | | | | | | |
| Activity 2.1.1: Generation of genotype profiles where genotype profiles will be compiled according to individual populations to create the DNA database | Sarawak Forestry Corporation | | | | ■ | ■ | ■ | | | ■ | ■ | ■ | |
| Activity 2.1.2: Dissemination of project findings where the results of the project will be presented through publications, seminars or conferences. | Sarawak Forestry Corporation | | | | | | | | | | ■ | ■ | ■ |

6.0 Budget

6.1 Total Project Budget by Activity

The detail project budget by activity is as shown in **Table 2**.

Table 2: Detail project budget by activity

(US \$)

| | | Total |
|----|--|----------------|
| 10 | Project Personnel | |
| | 11. Labour | 21,400 |
| | 12. Fellowships and Training | 3,000 |
| | Component Total | 24,400 |
| 20 | Sub-contracts | |
| | Component Total | - |
| 30 | Duty Travel | |
| | 31. Daily Subsistence Allowance | 13,000 |
| | 32. Transport Costs | 2,000 |
| | Component Total | 15,000 |
| 40 | Capital Items | |
| | 41. Capital Equipment | 15,200 |
| | Component Total | 15,200 |
| 50 | Consumable Items | |
| | 51. Raw material | 17,000 |
| | 52. Spares | 1,000 |
| | 53. Fuel and Utilities | 6,500 |
| | 54. Office Supplies | 3,000 |
| | Component Total | 27,500 |
| 60 | Miscellaneous | |
| | 61. Sundry | 2,500 |
| | 62. Contingencies | 12,690 |
| | Component Total | 15,190 |
| 70 | Executing Agency Management Costs | 14,593 |
| | 79. Component Total | 14,593 |
| | Grand Total | 111,883 |

6.2 Project Budget by Source

The project budget by source is as summarized in **Table 3**.

Table 3: Project budget by source

(US \$)

| Budget Components | Sources | | | |
|---|---------------|----------------------------------|-----------------|----------------|
| | ITTO | Government of Malaysia (in-kind) | Other Source(s) | Total |
| 10. Project personnel | 14,800 | 9,600 | - | 24,400 |
| 20. Sub-contracts | - | 0 | - | 0 |
| 30. Duty travel | 12,000 | 3,000 | - | 15,000 |
| 40. Capital items | - | 15,200 | - | 15,200 |
| 50. Consumable items | 17,000 | 10,500 | - | 27,500 |
| 60. Micellaneous | 8,870 | 6,320 | - | 15,190 |
| 70. Executing Agency Management Costs (15% of Total of Overall Project Budget by Activity) | - | 14,593 | - | 14,593 |
| Total | 52,670 | 59,213 | - | 111,883 |

PART III: OPERATIONAL ARRANGEMENTS

1.0 Management Structure

The project will be implemented by the Forest Department Sarawak and the Sarawak Forestry Corporation. A Technical Committee will be established to oversee the execution of the project. The Technical Committee will provide guidance on technical matters and ensure that the activities are progressing towards achieving the goals as proposed in the Work Plan. The members of the Technical Committee will comprise staff from the Forest Department Sarawak and the Sarawak Forestry Corporation.

2.0 Monitoring, Reporting and Evaluation

The progress of the project will be monitored by the Technical Committee. Monthly progress reports based on the achievements of project outputs/activities of the Work Plan and a final completion report will be prepared within 2 months of the project completion for submission to ITTO.

References

Anon. 1980. Annual Report of Forest Department Sarawak, Forest Department, Sarawak, Kuching, Sarawak.

Anon. 2000. Annual Report of Forest Department Sarawak, Forest Department, Sarawak, Kuching, Sarawak.

Koopman W.J.M., Diemont H. (2004). Prospects for the molecular identification of CITES-protected timber species and origins. North-South Policy Brief 2004-3. <http://www.wi.wur.nl/NR/rdonlyres/FADBC382-F7C9-4D2E-B39D-E209AF3C2D2/8814/Policy20043.pdf>.

Smulders M.J.M., van 'T Westende W.P.C. *et al.* (2007). Development of microsatellite markers in *Gonystylus bancanus* (Ramin) useful for tracing and tracking of wood of this protected species. *Molecular Ecology Research* 8(1):168-171.