NOTES

REHABILITATION OF LOGGED-OVER MANGROVE AREAS USING WILDINGS OF *RHIZOPHORA APICULATA*

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Planting of *Rhizophora* propagules is a routine silvicultural procedure in the Matang mangrove, Perak, Peninsular Malaysia. It is carried out two years after forest harvesting in areas that are found to be inadequately stocked. The average cost of planting propagules of *Rhizophora* amounts to about US$70/*ha* (Perak State Forestry Department, unpublished report). However, planting efforts may fail in certain areas. For example, in August 1987, the Forest Department planted about 125,000 propagules of *R. apiculata* in a compartment. Mortality was extremely high and planting was repeated in September 1987 with another 35,000 propagules. These too failed to establish.

To determine the causal factor(s) of mortality, I carried out a planting trial in Matang. Five hundred propagules each of *R. apiculata* and *R. mucronata* were planted in alternate rows of 50 each. Examinations made two and 42 days after planting revealed that mortality was due mainly to predation by long-tailed macaques (*Macaca fascularis*) and partly by sesarmid crabs (*Sesarma* spp.). Macaques damage newly planted propagules by snapping or tearing them to devour the spongy inner tissues while crabs operate by nibbling into the propagules. *R. apiculata* which suffered a mortality of 34.6 (after two days) and 99.0% (after 42 days) is much more susceptible to predation than *R. mucronata* which suffered a corresponding mortality of only 1.2 and 55.4%.

Next, to find out if established seedlings will be less prone to predation, a transplanting trials of 100 wildings of *R. apiculata* was undertaken in Matang. Wildings were collected from adjacent sites within the compartment. The technique of transplanting is simple. It essentially involves removing wildings of about 0.5-1.0 *m* in height from the substrate using a specially designed steel corer (10 *cm* in diameter). The corer is pushed into the ground in a spiral motion and then shaken to dislodge the plug of soil carrying the wilding. Penetration is aided by turning the two handles and by having a serrated edge at the bottom. The wilding together with the intact plug of oil is then removed from the corer (Figure 1). The whole extraction process requires less than half a minute per wilding.

Figure 1. A wilding of *R. apiculata* with an intact plug of soil after extraction using the corer

Collected wildings were then placed on to wooden trays and transported for planting. Transplanting of the 100 wildings was completed in two hours by a team of five workers. This would work out to about 50 mandays (US$212 currently) to establish a hectare of wildings at 2 x 2 *m* spacing. Preliminary results showed that mortality was only 8% three

months after transplanting. None of the wildings showed any signs of predation.

Although the cost of planting using wildings is much higher than that using propagules, preliminary results indicate that planting of wildings is effective in surmounting the problem of high propagule mortality in areas that are prone to predation. There is however a need to repeat the trial by planting both propagules and wildings concurrently in the same locality to confirm the above finding.

Nursery raised seedlings planted in such areas have been reported to perform well with mortality less than 10% several months after planting (Perak State Forestry Department, unpublished). However, they often require five to six months to establish before they can be planted. Sowing can only be done when propagules are available and there is a need to prepare the potting medium and to irrigate the nursery seedlings regularly. Since wildings are bountiful in the forest and are readily available, it is more cost effective to plant wildings than nursery raised seedlings.

A NOTE ON THE GROWTH OF *PTEROCARPUS INDICUS* IN A SIXTY-YEAR-OLD PLANTATION IN MALAYSIA

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Pterocarpus indicus, known in Malaysia as angsana, is a majestic indigenous roadside tree with expansive shady crown, buttresses and often fluted bole (Corner 1952). Its beautiful rich golden brown coloured timber is excellent for furniture making, panelling and flooring (Burkill 1935, Anonymous 1979, Wong 1983). In Peninsular Malaysia, the current main source of angsana timber is often scanty, derived mainly from roadside trees wherever they are felled to make way for road and highway development.

A plantation of angsana was established in the Forest Research Institute Malaysia (FRIM, Peninsular Malaysia, in 1927 to assess its potential. The angsana were planted from stumps (3.5 x 3.5 *m* and 3.5 x 7.0 *m* spacing) or from cuttings (3.5 x 3.5 *m* spacing). Although some tending in the form of line clearing, pruning and removal of unwanted trees was carried out, the plantation was left untended after 1958.

In 1987, the 60-year-old plantation was evaluated; all the remnant trees were measured for diameter at breast height and clear bole height. Of the total of about 800 cuttings and 1160 stumps initially planted only 27 trees (raised from cuttings) and 15 trees (raised from stumps) remained. The mortality 60 years after establishment is high; this could be due to neglect among other reasons. Burkill (1935) reported high mortality in angsana planted in lallang areas.

The mean diameter and clear bole height of the remnant angsana stand are 48.6 *cm* (range 12.7 - 104.0 *cm*; sd = 22.7) and 7.1 *m* (range 2.1 - 14.8; sd = 3.3), respectively. About 81% of the trees have a clear bole height more than 5 *m*, and this constitutes about 95% of the total stand volume (Table 1). In terms of clear bole height, angsana trees of the FRIM plantation are superior to the wayside individuals which rarely exceed 2 to 3 *m* (Figures 1 & 2). Wayside trees often have an open spreading crown and a short bole. Plantation angsana trees in the Philippines have also been reported to have long straight boles (Anonymous 1979). Therefore, angsana raised in the plantation have potential to produce logs which could yield luxury veneer and plywood. Further studies on angsana plantations are worth pursuing.

Acknowledgements

I would like to thank H.T. Chan for his useful comments in preparation of this note.

Figure 1. An angsana within FRIM (clear bole 7.8 *m* diameter at breast height, 56.6 *cm*)

Figure 2: A wayside angsana (clear bole 2.1 *m*)

Table 1: The clear bole height classes of Angsana trees within the FRIM plantation

Clear bole height (*m*)	No. of trees	Volume (m^3)
< 5.0	7 (16.7%)	1.95 (4.5%)
5.1 - 12.0	30 (71.4%)	34.00 (76.0%)
12.1 - 19.0	4 (9.5%)	7.55 (16.8%)
> 19.1		1.42 (2.7%)
Total	42 (100%)	44.92 (100%)

References

BURKILL, H. 1935. *A dictionary of the economic products of the Malay Peninsula.* Volume 2. 1829-1833. Publisher City.

CORNER, E.J.H. 1940. *Wayside trees of Malaya.* Vol. 1, Government Printing Office, Singapore. 772 p.

NAS. 1979. *Tropical legumes: Resources for the future.* National Academy of Sciences. 332p.

WONG, T.M. 1983. Lesser known timber IX - Sena. *Timber Digest* No. 53, Forest Research Institute Malaysia.

ANNOUNCEMENTS

THIRD INTERNATIONAL CONFERENCE ON PLANT PROTECTION IN THE TROPICS

DATE: MARCH 20 - 23, 1990

VENUE: KUALA LUMPUR, MALAYSIA

OBJECTIVES:

To provide another opportunity for further interchange of the latest advancements and technologies in plant protection in tropicaal zones.

TENTATIVE PROGRAM:

The program will be conducted in English and

will address a wide range of topics relevant to tropical situations. Plenary sessions and contributed papers are expected to encompass the following:

1. Biology and ecology of plant pathogens, pests and weeds
2. Crop loss assessment
3. Novel approaches in tropical plant protection
4. New pesticides and application technologies
5. Impact of chemicals on the agricultural environment
6. Pesticide resistance in the tropics
7. Host resistance in pest and disease management
8. Integrated pest management in practice
9. Transnational pest and disease problems - surveillance and regional management strategies
10. Regulatory aspects in plant protection
11. Plant protection in tropical forestry.

Efforts are being made to get IUFRO to hold a symposium on tropical forest protection in the session on plant protection in tropical forestry.

For more information, contact:
The Honourary Secretary
Third International Conference on Plant Protection in the Tropics
c/o Central Research Laboratories
Malaysia Agricultural Research and Development Institute
P. O. Box 12301
50774 Kuala Lumpur, Malaysia.

OSBORN CENTRE FORESTRY POLICY GRANTS

OBJECTIVES:

(i) To support forestry policy research by developing country specialists and forums for forest policy dialogue in developing countries.
(ii) To support policy-making processes such as the creation of effective channels for disseminating research findings and sharing information to stimulate further cooperative work.

AWARD:

US$ 5,000 upwards for the preparation of analytical studies of practical value to decision makers from governmental and non-governmental organizations concerned with equitable and sustainable management of tropical forest resources.

RECIPIENTS:

Open to foresters, planners, social scientists and other scholars and practitioners from developing countries in Asia, Africa and Latin America. Preference will be given to applicants who have completed their formal training and who currently hold positions in developing countries. Grantees may conduct work in conjunction with host-country organizations such as universities, non-governmental organizations, research institutes or government agencies.

Formal guidelines for 1989 grant applications will be available in April 1989.

Interested applicants are requested to make inquiries regarding the scope of the program before making formal proposals.

Letters should be directed to:
Osborn Center Forestry Policy Grants
World Wildlife Fund/The Conservation Foundation
1250, 24th Street, N.W.
Washington, DC 20037 USA
(Attn: Matthew Perl)

REGIONAL SEMINAR ON TROPICAL FOREST HYDROLOGY

DATE: SEPTEMBER 4-9, 1989

OBJECTIVES:

i) To assess the experiences of countries of the region that have embarked on hydrological research.
ii) To share and discuss information regarding the effects of human activities on the hydrological processes.
iii) To evaluate the adequacy of the present knowledge needed and simultaneously recommend future areas of research.

PROGRAMS:

The Seminar will consist of lectures on hydrol-

ogy monitoring activities, quantification of effects on hydrological variables, prediction models of hydrological responses and computer application in forest hydrological research activities. A visit to hydrological research site will also be arranged.

For more information, contact:
Secretary
Malaysian National Committee for IHP
c/o Drainage and Irrigation Department
Jalan Sultan Salahuddin
50626 Kuala Lumpur Malaysia
Telex: TANIAN - MA - 33045

Closing date for application: June 15, 1989.

FOREST GROWTH DATA MEETING: CAPTURE, RETRIEVAL AND DISSEMINATION

DATE: APRIL 3-5, 1989

AIM:

To bring together people who have experience with data collection and processing methods for growth and yield studies, with a view to exploring the opportunities for free exchange of information and methods.

For further information, contact:
Prof. J. Rondeux
Department of Forestry
Faculte des Sciences Agronomiques
B-5800 GEMBLOUX
Belgium

SYMPOSIUM ON STATE OF THE ART METHODOLOGY OF FOREST INVENTORY

DATE: JULY 30 - AUGUST 5, 1989.

OBJECTIVES:

To review the theory and practice of the state of the art methodology of forest inventory through invited and contributed papers, posters and workshops modules on new developments and practical applications.

For further information, contact:
Prof. T. Cunia
Faculty of Forestry
College of Environmental Science
State University of New York
Syracuse, NY 13210
United States of America

INTERNATIONAL CONFERENCE ON ARTIFICIAL INTELLIGENCE AND GROWTH MODELS FOR FOREST MANAGEMENT DECISIONS

DATE: September 18 - 22, 1989

CALL FOR PAPERS:

Please send the title, abstract and preference for paper, poster, or computer demonstration, along with your address and telephone number, by May 1, 1989, to:

Dr. Harold E. Burkhart
Department of Forestry
Virginia Polytechnic Institute and
State University
Blacksburg, VA 24061
United States of America

NEWS

WORKSHOP ON SOCIAL SCIENCES IN ASIAN FORESTRY CURRICULA

DATE: NOVEMBER 27 - DECEMBER 2, 1988

VENUE: KHON KAEN, THAILAND

OBJECTIVES:

To support the integration of the social sciences in university forestry programs, and to strengthen the role of the forestry and social science professions in improving existing and future farm, community, and other forestry programs throughout Asia.

THEMES OF DISCUSSIONS:

1. Substantive/conceptual aspects of integrating the social sciences in forestry curricula
2. Ways and means to introduce forestry concerns, and relevant concepts and methods from that profession, into social science education
3. Institutional opportunities and constraints to the integration of the social sciences in farm, community, and other forestry education and research programs
4. Ways to improve understanding of the curriculum design process and ways to improve teaching methods that integrate the social sciences in forestry
5. Means to evaluate and implement curricular change
6. Ways to integrate academic theories and practices with applied theories and practices and to better link research with professional application in the field
7. Promising ways to identify a relevant core of integrated concepts and skills with the flexibility to be adapted to a range of different and changing institutional contexts
8. Mechanisms for exchange of knowledge between disciplines, institutions, and countries within the Asia region.

RECOMMENDATIONS:

1. A survey of sources for catalytic funding for integrated research that also can be used as a tool for university training
2. Exploration of opportunities for formal and informal interactions with existing and emerging networks
3. Wider dissemination of materials by donor agencies, universities, and others
4. Improvement of the methods universities use to evaluate curriculum quality.

For more information, contact:

1. US Agency for International Development
   Office of Science & Technology/Rural Development
   Room 608, SA - 18
   Washington DC 20523 - 1814, U.S.A.

2. Winrock International - F/FRED
   P. O. Box 1038
   Kasetsart Post Office
   Bangkok 10903, Thailand.

3. Winrock International - F/FRED
   1611 N. Kent Street, Suite 600
   Arlington, VA 22209, U.S.A.

4. Tropical Resources Institute
   Yale School of Forestry & Environmental Studies
   205 Prospect Street
   New Haven, CT 06511, U.S.A.

MEETING ON GROWTH AND YIELD IN TROPICAL MIXED/ MOIST FORESTS

VENUE: KUALA LUMPUR, MALAYSIA

DATE: June 20 - 24, 1988

RECOMMENDATIONS AGREED UPON:

i) Strict adherence to IUFRO standards of acronyms, units and terms.
ii) Workshops should be set up for studying the techniques of growth modelling.
iii) An attempt should be made to consolidate all available documentation on data collection procedures and to recommend data norms as a basis for growth modelling of the TMF. Proceedings of the meeting will be published around June 1989.

PROCEEDINGS

INVENTORY AND MONITORING FORESTS.

Proceedings for the 18th IUFRO World Congress held in Ljubjana, Yugoslavia, September 7-21, 1986.

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Association Silva Abres, Forest et Societes
21 rue Paul Bert, 94130 Nogent S/Marne
FRANCE

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BAWA, K.S. & OPLER, P.A. 1975. Dioecism in tropical forest trees. *Evolution* 29: 167 - 179.

LONGMAN, K.A. & JENIK, J. 1974. *Tropical forest and its environment,* Longmans, London. 196 pp.

NG, F.S.P. 1983. Ecological principles of tropical lowland rain forest conservation. Pp. 359 - 375 in Sutton, S.L., Whitmore, T.C. & Chadwick, A.C. (eds.). *Tropical rain forest: ecology and management.* Blackwells, Oxford. 498 pp.

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