Rattans: taxonomy and ecology (LIPI report 2004)

Andrew Powling

Introduction

It is important to establish which rattan species grow on Buton, and their ecology, for both scientific and commercial reasons. Knowledge of the rattan species present is necessary for their conservation and will allow sustainable production targets for different species to be set. It seems probable that rattan species exist on Buton that are not yet known scientifically, so their discovery and description are major objectives of the present work.

Rattans are the most important non-timber economic product of the forests of Buton, with many men relying on the income they receive from rattan collecting to support their families. Most rattan now collected comes from naturally occurring plants growing in forests. Future supplies will depend on extraction rates not outstripping the natural growth rates of these plants. It is therefore important to establish growth rates and densities of rattan plants in order to calculate the total length of rattan canes that may be sustainably harvested from an area of forest.

Objectives

1. To continue the investigation of rattan diversity in the Lambusango forest on Buton Island.
2. To determine habitat requirements for the various species.
3. To establish annual growth rates for some commercially important species, so that estimates of production capacities for areas of forest can be calculated.

Methods

Rattan species can be identified using Dransfield and Manokaran (1994), or by submitting them for identification by the Herbarium in Bogor. Parts of rattan plants (stems, leaves and fruits) are collected, wrapped in newspaper, put into thick polythene bags, the newspaper wetted with alcohol (to temporarily preserve the rattans), the bags sealed, packed in cardboard boxes and sent to the Herbarium at Bogor. There the rattan species can be identified by experts.

Individual plants of three different species of rattan growing in forest (Lambang, Buta and Batang) have been marked and measured in 2002, 2003 and 2004. This allows annual growth rates to be calculated. Readings of light intensity beneath and near the plants were taken using a light meter.

Initial results

Work in 2002, 2003 and 2004 has resulted in the following rattan species being found. Latin names are given where known.

Batang (*Calamus zollingeri*)
Batu (*Calamus sp*.4)
Buta (*Calamus sp*.2)
Bulu (*Calamus sp*.15)
Jaramasi (*Calamus sp*.14, probably *Calamus leiocaulis*)
Kabe (*Calamus sp*.7)
Kai Sisau (*Calamus minahassae*)
Kakiki (*Calamus sp*.5)
Lambang (*Calamus ornatus var. celebica*)
Mombi (*Calamus sp*.13)
Noko (*Daemonorops robusta*)
Pisi (*Calamus leptostachys*)
Tohiti (*Calamus sp*.3)
Torumpu (*Calamus sp*.12, possibly *Calamus koordersianus*)
Umol (*Calamus symphysipus*)
[Unknown 1] (*Calamus sp*.16)
[Unknown 2] (*Calamus sp*.17)

Efforts are continuing to identify all rattans to species level.

When rattan species are observed growing in forests, notes are made on the habitat in which they seem to prosper. For example, it is noted if the forest is mature or disturbed, if the soil is derived from limestone or ultramafic rock, and if the forest is subjected to extreme seasonal dryness due to being on a steep rocky slope. Observations of this sort reveal that Batang grows best in secondary or disturbed forest, that Torumpu is found only on soils derived from ultramafic rocks, and that Batu survives on dry, rocky slopes. Lambang grows in a wide variety of conditions and is common and widespread.

Annual growth rates for young plants (heights between 0.5m and 5.0m) of three species have been determined.

Batang:	Mean annual growth = 1.35 m/yr
	(Standard deviation = 1.26, n = 20)
Buta:	Mean annual growth = 1.42 m/yr
	(Standard deviation = 0.44, n = 6)
Lambang:	Mean annual growth = 0.70 m/yr)
	(Standard deviation = 0.33, n = 16)

Buta and Lambang were growing in mature forest with a high and rather dense canopy, whereas Batang was growing in disturbed or secondary forest with a lower and more open canopy. Batang was found to show great variability in growth rate between different plants. In an attempt to account for his variability light intensity measurements were made at 1.5m height underneath and near the plants. It was found that for Batang plants that had grown to 4m height or less there was a highly

significant correlation between the annual growth and the light intensity underneath the plant ($r = 0.899$, $p = 0.000$). It is concluded that growth of Batang plants less than 4m high is limited by the amount of light they receive. When they exceed 4m their growth rare increases, apparently because their leaves are in higher light intensities due to the low and broken canopy. Lambang plants did not show a similar relationship between growth and light intensity, possibly because the high and dense canopy limited the light received by at least some plants over 4m high. Another possibility is that growth was limited by strong competition between roots of Lambang and other forest plants, since Lambang was growing in denser forest than was Batang. A further conclusion is that Batang plantations should be situated in disturbed or secondary forests to maximise the light received by young plants and so maximise growth rates.

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Introduction

The rattans are a group within the family of palms. They form a major component of the vegetation both within the Lambusango forest conservation area and the surrounding production forest. They provide income for local people because rattan stems (canes) are collected from the forests and sold to companies which process the canes and make them into furniture for sale and export. Because of the ecological and economic importance of the rattans a study has been conducted over the last four years to investigate which rattan species are present, the ecological conditions under which they flourish and their growth rates in forest conditions. Such knowledge should allow controlled and sustainable harvesting of rattans from the production forests in future years, to the advantage of the communities surrounding the forests.

Methods

Specimens of various rattan species were collected in the forests, labelled and then sent to the Herbarium Bogoriense in Bogor, Java, for identification.

The abundance of rattan species was assessed by walking the transect lines established in the forests by Operation Wallacea. The rattan species present in each 100 metre length were recorded and also the height of the tallest rattan of each species present. This allowed the assessment of the habitat requirements of the different species.

Growth rates of rattans were assessed by measuring the height of individual plants using a tape measure. The plants had been measured in previous years, so the amount of growth could be calculated. Because the amount of growth seemed to be

determined by the amount of light reaching the plant the light intensities experienced by the plants were measured using a light meter.

Interviews were conducted with local men to record the properties of the canes of the different species, and their uses by the local people.

Provisional Results

In previous years it had been found that at least 17 species of rattan grow in the Lambusango forest and the scientific (latin) names for 11 of these species were determined by sending specimens to the Herbarium Bogoriense. This year specimens of three of the undetermined species have been collected and sent to the Herbarium. These species have the local names of Kabe, Hoa and Kakiki.

The general habitat requirements of many species have been established. Most species require soil with good moisture and relatively bright light. Batang (*Calamus zollingeri*) grows very well in such conditions. Some species are able to grow in the lower light conditions of mature forests with well established canopies. Examples include Lambang (*Calamus ornatus*) and Buta (*Calamus siphonospathus*). Two rattan species are able to grow on rocky slopes where the soil must become very dry during the dry season, these are Batu (*Calamus*, species undetermined) and Buta. Some species grow best on soils derived from ultramafic rock, for example Torumpu (*Calamus koordersianus*).

Growth rate measurements have shown that Batang can grow at rates exceeding 4 metres per year when subjected to high light. In more established forests Lambang can grow at rates up to 2 metres per year and Buta at rates of 2.5 metres per year.

Discussion

The four year programme to investigate the rattans of Lambusango has now achieved many of its primary aims. Many of the species present have been identified and the possibility of species new to science is being investigated with the Herbarium Bogoriense. Knowledge of preferred habitats of the different rattan species together with knowledge of the extent of these different habitat types (to be derived from satellite photographs in the future) will allow total amounts of the different species to be estimated. This knowledge will then be combined with the growth rate measurements to perform calculations to estimate the maximum sustainable harvest of rattans from the Lambusango forest.