

# BRUNEI DARUSSALAM

**Project Title: Vegetation Rehabilitation of Burnt over Forests of the University of Brunei Darussalam Campus**

**Study Leader: Dr. Kamariah Abu Salim, University of Brunei Darussalam, Brunei**

Heath or kerangas forest is the most easily recognised of all lowland rainforest formations. The greatest extent of heath forest in the Far East is found in Borneo. The original areas of Bornean heath forests is estimated at 66,882 km<sup>2</sup>, with only 48% remaining today. A broad swathe of these forests, approximately 24,759 km<sup>2</sup>, runs diagonally through Central and East Kalimantan while the rest is distributed between Sabah, Sarawak and Brunei.

In Brunei, there are 3,455 ha of undisturbed heath forests in addition to the 1,339 ha and 2,814 ha, which are classed as exploited and remnant kerangas, respectively. These forests are found mainly in the coastal zone where most of the development is taking place. Hence, there has been much degradation of the kerangas forests here through a relatively long period of disturbance such as frequent forest fires that retard and overcome the recovery of the vegetation through normal regrowth. The drought-fueled fires of 1992 and 1998 have continued to erode this much-endangered vegetation type, thus, the objectives of this project.

The project aims to rehabilitate the biodiversity of burnt-over kerangas forests around the University of Brunei Darussalam campus and make the campus more aesthetically pleasing and attractive to staff, students, and visitors; to minimise the occurrence of natural forest fires; and to set up permanent plots for education, teaching and research.

It would take two years to complete the project's planned major activities on the selection of plant species, establishment of nursery and fire breaks, enumeration of trees, preparation of sites, planting and monitoring, and maintenance of study sites.

Although the first year of project implementation was reportedly slow moving because of many problems, some sub-major activities have been accomplished. These included the establishment of the nursery, which had a size of 13m x 30m x 2.8m, as well as 12 stand water pipes. In terms of selection of plant species, the project encountered problems in the available supply of seedlings and seeds in the locality. Hence, alternative species will be studied. Firebreaks

were also established and regularly maintained. One firebreak has a size of 0.8 length and 5 m wide. Site planting involved the participation of the different schools and universities. Other activities included the subdivision of plots for study with an individual size of 0.5 ha, and removal of unwanted trees in each identified study plot.

The project will end in November 2003. From this time onwards, the University of Brunei Darussalam will be able to continuously maintain and monitor the initiated activities for the future conduct of study and research.

**Project Title: Collection, Establishment, Conservation and Documentation of Durio Species of Brunei Darussalam and Brunei Bay Region**

**Study Leader: Mr. Jumat Hj. Alim, Department of Agriculture, Brunei Darussalam**

In Brunei Darussalam and the neighbouring state of Sabah and Sarawak, the genus *Durio* is widely appreciated, particularly *Durio* species other than *D. zibethinus*. There are 27 known species of *Durio* out of which 7 produce edible aril. All the seven species are found in Brunei and the neighbouring Malaysian states. Durian Kuning (*Durio graveolens*), Durian Pulu (*Durio kutejensis*) and Durian Suluk (*Durio* sp.) are among the popular species highly esteemed in Brunei for their special flavour, unique aroma and lingering aftertaste.

Most durian trees found in Brunei and the Brunei Bay Region originated from seeds and many trees are at least more than 50 years old. Studies and observations conducted in various durian-growing areas indicated that early settlers in search of fertile land for rice cultivation planted these trees. The settlers moved in family or community groups to establish settlements. Their main crop was rice for their staple needs. As the land became exhausted from continuous cropping, they moved to new plots leaving the fruit seedlings that grew by the house compounds to grow into trees. Collectively, these clusters of fruit trees are called "pulau buah". The settlers planted seeds from the best fruits they ate. As the trees grew into maturity the fruit trees segregated into multitude of non-descript trees that now constitute the genetic diversity of fruits found in Brunei and the Brunei Bay Region. *Durio* species are common probably because the fruit are delicious and the seeds planted received special care during their early growth and were able to compete and grow into huge trees in the abandoned settlements. Some *durio* species are common as under-storey trees in "pulau buah".

Brunei Darussalam has an immense diversity in



**Durian**

tropical fruits. *Durio* species are important and a number of indigenous species have special affinity to Bruneians and the people in the states of Sabah and Sarawak. The primary objectives of the project are to study the genetic diversity of the species, mount programmes to collect these fruits, evaluate the quality and establish the seeds in two research stations to conserve the genetic diversity.

This two-year project is divided into four interrelated phases. *Durio* species shall be conserved in two research stations in Brunei for future durian fruit improvement studies. Studies will generate more data and information on *Durio* species especially on graft compatibility between *D. zibethinus* as scion and indigenous species as rootstocks. Furthermore, collection and sensory evaluation will identify indigenous species with good eating quality and to be promoted as special Borneo durians. Data and information will be processed into annual reports and published in the proposed book on Durians of Brunei Bay Regions. In its first year of implementation, the project's summary of progress results are as follows:

- Study on the phenology of *Durio* species (flowering, fruiting, and distribution) was carried out during the fruiting season. From June to September, six *Durio* species were observed: *Durio zibethinus*, *D. graveolens*, *D. oxleyanus*, *D.*

*testudinarium*, *D. kutejensis*, and *D. dulcis*.

- Seeds were collected since February 2002 and then raised at the Birau Agriculture Research Station. As of June 2003, there are now 1,644 seedlings of *Durio* species, of which *D. graveolens*, *D. kutejensis* and *D. zibethinus* have the greatest number.

As part of the conservation effort of durian species of the project, a 12-ha land located at Birau Agriculture Research Station has been devoted as the "conservation site". The site was completely cleared for the establishment of terraces and planting holes before the planting activity. As of this report, work contracting for the preparation of planting holes is being processed.

- There are no specific recommendations yet on agronomic practices cited for the establishment of selected species having commercial potential but there is an ongoing study of the pest and diseases.

The study involves monitoring and observation of pests and infestation in the nursery. So far the insects identified were: scale insect (*Asterolecanium unguatum*), mealy bug (*Pseudococcus* spp.) and white fly (*Aleurodicus* spp.).

Leaf blight, leaf spot and anthracnose caused by the fungus *Rhizoctonia solani*, *Phymopsis durionis* and *Colletorichum gloeosporioides* respectively were the common disease observed. These incidences of pest and disease problems were kept under control with the use of recommended pesticides.

Based on recorded data of pest and diseases on investigated durian, the major pests are: *Durio* seeds borer, yellow weevil, scale insects and bark borer weevils. The major diseases are stem canker or patch canker, leaf blight, leaf spot and anthracnose. Practicing appropriate control measures through integration of cultural, physical and chemical control can minimise the problems.

- The objective is a compatibility study on different types of durian rootstocks on *Durio graveolens*, *D. zibethinus*, and *D. pulu*. It aimed at observing the effect of rootstocks of *Durio* species on the scions of three different species of durian: *Durio graveolens*, *D. zibethinus* and *D. kutejensis*.

At present, only 10 out of 28 grafted plants are growing successfully as a result of the grafted clones, BD104, on seven different species of durian rootstocks: *Durio graveolens*, *D. zibethinus*, *D. kutejensis*, *D. oxleyanus*, *D. testudinarium*, *D. dulcis*, and *D. species*.

The project proposes to publish a book on the "Durians of Brunei Bay Region". ■