NOTES

A NOTE ON THE SUMATRA PEAT SWAMP FOREST FIRES OF 1987

M.A. Brady

Faculty of Forestry, University of British Columbia, Vancouver, Canada V6T 1W5.

Towards the end of the extended dry season of 1987, fires destroyed areas of peat swamp forest in South Sumatra Province, Indonesia. The ecology of such peat fires, including the antecedent conditions of climate, fuel vegetation and ignition sources, and the post-fire revegetation patterns are being studied. A report on the fires is currently being produced as part of a dissertation on the ecology of peat swamp forests in Sumatra. Below is a preliminary description of the fires.

Midway through the fifth consecutive dry month with rainfall under 50 *mm*, fires destroyed two tracts of mixed peat swamp forest in South Sumatra.

One forest burn of roughly 10,000 *ha* was located between the Padang and Sugihan Rivers. The area lies within the borders of the government-sponsored Padang-Sugihan Elephant Reserve. Originally planned as a transmigration settlement, in 1983 the forest was redesignated as a wildlife reserve for elephants herded in from adjacent newly opened swampland settlements. However, one year prior to the redesignation an extensive network of primary and secondary drainage canals was excavated throughout the 77,000 *ha* forest reserve, which resulted in soil water levels underlying the entire reserve to decline up to 1.5 *m*. Also prior to becoming a reserve in the mid 1970s, the forest was logged on a highly selective basis. Since becoming a reserve, selective logging activities were continued by local settlers. Despite the effects of logging, the forest remained relatively intact up until the time of burning. Field surveys showed that stand structure and species composition were comparable to that of undisturbed mixed peat swamp forest surveyed elsewhere in Sumatra (compared to forest concession surveys and forest studies in South Sumatra, Jambi and Riau provinces). The surveys revealed an abundance of large canopy trees remaining (*e.g. Campnosperma, Gonystylus, Shorea, Dyera* and *Ganua* spp.). These were interspersed with between five and ten medium sized tree stumps per hectare from the logging.

The second, smaller burn of 2,000 *ha* is located 20 *km* east of the Sugihan River and downriver roughly 80 *km* northeast of Palembang. This forest burn area lies within an active logging concession and directly adjacent to the 40,000 *ha* Sugihan Kanan transmigration settlement. Although close to the settlement and associated canals, the effects of peat drainage have been considerably less than in the elephant reserve forest. Water levels remain high throughout the year, with the forest floor being flooded up to 1 *m* during the wet season. This forest contains tree species similar to the reserve forest. However, it had become heavily degraded prior to the 1987 fire. Wood was removed by local transmigrants for construction purposes and log sales to nearby sawmills. The logging concessionaires also used a large portion of forest for construction of an extensive railway system. Thus, prior to the fire, most large and medium sized trees had been removed. The opened canopy allowed sunlight to reach the forest floor promoting a dense growth of ferns (*Stenochlaena*), grasses (*Imperata, Saccharum*), shrubs (*Lantana*) and fast growing secondary tree species (*Macaranga, Dillenia, Blumeodendron*).

The two fires burned in peat forests which had been previously altered by human activity. It is speculated that the fires, situated close to settlements, were ignited willfully rather than by natural means. Under these particular conditions, large peat fires have been observed in other locations within the humid tropics. Fires burned large areas of peat forests in South and East Kalimantan and in Sabah during the 1982-83 drought. These forests had also been altered by human activities such as selective logging and agriculture. Interestingly, the Sumatra peat forests adjacent to the 1987 burn areas described above, did not burn during the 1982-83 drought. At this time, forest degradation through drainage and intensive logging had only recently commenced.

Preliminary analysis of the two peat forest

fires in South Sumatra reveals that there may be a large difference in pre- and post-fire conditions in this particular ecosystem. However, in each of the fire-types, modification of the characteristic hydrological and vegetation conditions unique to tropical peat forests played an important role in promoting fire. Specifically, these include annual climate extremes, drainage levels, vegetation species and forest structure. When considering fire prevention strategies in managed peat forests it is necessary to consider the interactions between the spatial and temporal properties of these characteristic conditions. As the above description of the two peat fires illustrates, an important feature of the fires is that disturbance activities in one location affect adjacent forests at points in time often well into the future. Thus, for management purposes it is clear that the peat forest cannot be easily divided into units of separate land-use activity without careful planning. Unlike most of the adjacent ecosystems in Sumatra, the strong interactions between hydrology, topography and vegetation dictate that entire peat formations must be managed as single units for landuse.

A NOTE ON THE OPTIMAL TIME FOR GROUND COLLECTION OF *GMELINA ARBOREA* ROXB. FRUITS

T.V. Eusebio, V. K. Chey, V. Newman & J. Catherinus

Forest Research Centre (Sepilok), P.O. Box 1407, 90008 Sandakan, Sabah, Malaysia.

Gmelina arborea is a fast growing sub-tropical timber species popularly grown in plantations in Malaysia. Seed stands provide the main source of seeds. The fruits of this species fall once ripened. In harvesting it is more economical to collect naturally fallen fruits from the ground, a method practised by the Forest Research Centre (FRC). When the fruits are mature, the area below the crowns of the trees are cleared of undergrowth to facilitate collecting.

A freshly fallen ripened fruit has a pale green or greenish yellow pericarp; they are preferred for planting. After a few days its colour turns yellow and then brown. Finally the colour turns blackish at which time the pericarp will rot. Brown or blackish fruits have been shown to germinate poorly (Aminuddin & Zakaria 1980).

With additional costs involved in clearing the cover under a tree, and collecting fruits at the preferred stage, we decided to determine seed germinability and occurrence of insect infestation on fruits lying on the ground for various lengths of time before collection. Two different ground conditions were used: (i) ground beneath the crown was cleared of ground cover; and (ii) the ground beneath the crowns of the tree was left untouched. The study was conducted between July 10-16, 1986.

The site used in this study was Plot 5a, a 13-year old seed stand in Gum-Gum Forest Reserve, Sabah, East Malaysia. The plot has moderately undulating terrain with good drainage and contains a total of 34 *G. arborea* trees.

All fruits found within the study area prior to Day 1 were (a) removed from cleared sites and (b) on uncleared sites fruits were not removed but labelled and excluded from assessment. Beginning with Day 1, ten fruits from each of the six trees were randomly selected from among the fruits that fell the previous 24 hours. Each was assessed for date of fall, colour of pericarp and condition of fruits in example signs of insect infestation, bore holes and other defects. After assessment, fruits were returned to their former position and labelled.

Each day, until Day 7, the same procedure as on Day 1 was followed. All fruits previously assessed were re-assessed each day to record changes in colour of pericarp and presence and extent of insect infestation.

After assessment on the seventh day all fruits were collected and grouped by date of fall and tree number. Each fruit was labelled individually. There was a total of 42 groups of ten fruits (6 trees x 7 days x 10 fruits/day).

In the laboratory, each group of fruits was randomly divided with the Seed Section retaining half and the Entomology Section retaining the other half (210 fruits each).

In the Seed Section, the fruits were depulped and the nuts were pretreated by soaking in tap water five times the seed volume for 17 hours,