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A NOTE ON THE COPPICING ABILITY OF *SHOREA* SPECIES IN PEAT SWAMP FORESTS IN PENINSULAR MALAYSIA

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Flowering and fruiting in the family Dipterocarpaceae are gregarious and irregular. Ashton (1982) reported that the frequency of gregarious flowering and fruiting of *Shorea* species in hill and lowland dipterocarp forests varies between one to five years. It has been observed that heavy recruitment of seedlings usually occurs in hill and lowland dipterocarp forests after each gregarious fruiting season (Whitmore 1984). While regeneration from seed is the norm, little is known of coppicing of *Shorea* seedlings in these forest habitats. In contrast, *Shorea* species in peat swamp forests, especially *Shorea uliginosa* and *Shorea teysmanniana*, exhibit excellent coppicing power (Wyatt-Smith 1963). Coppicing is probably an alternative growth strategy shown by *Shorea* seedlings in peat swamp forests to effectively compensate for an infrequent flowering and fruiting habit. Ashton (1982) noted that gregarious flowering and fruiting o dipterocarp trees had not been reported in peat swamp forests but had been observed in dipterocarp forests elsewhere in the country.

During a recent visit to the Sungai Karang peat swamp forest in Selangor, it was discovered that a healthy seedling of *S. uliginosa* coppiced from a sapling that had been bulldozed and buried during the construction of a logging road (Figure 1). In another area of peat swamp forest in Kuala Langat, Selangor, coppicing was found to be a common characteristic in *S. teysmanniana* seedlings. A new coppice shoot is usually produced to replace an old shoot that has been affected by die-back. On close examination, it was discovered that young shoots of *S. teysmanniana* at Kuala Langat peat swamp forest were attacked by borers which may be the major factor that causes die-back (Figure 3). Whitmore (1984) reported an extensive damage done to *Shorea albida* in peat swamp forest of Sarawak and this damage was caused by caterpillar (Hymantridae) which

defoliated the crowns killing the trees subsequently. The process of producing new coppice shoots after each attack by borers results in a rather unique growth patterns of *S. teysmanniana* seedlings at Kuala Langat peat swamp forest as illustrated diagramatically in Figure 2.

Figure 1. A coppice shoot of *S. uliginosa*

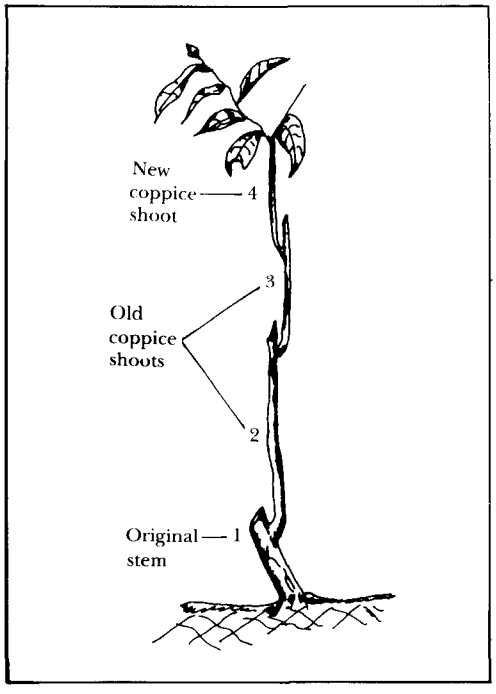

Figure 2. Growth patterns of *S. teysmanniana* seedlings at Kuala Langat peat swamp forest

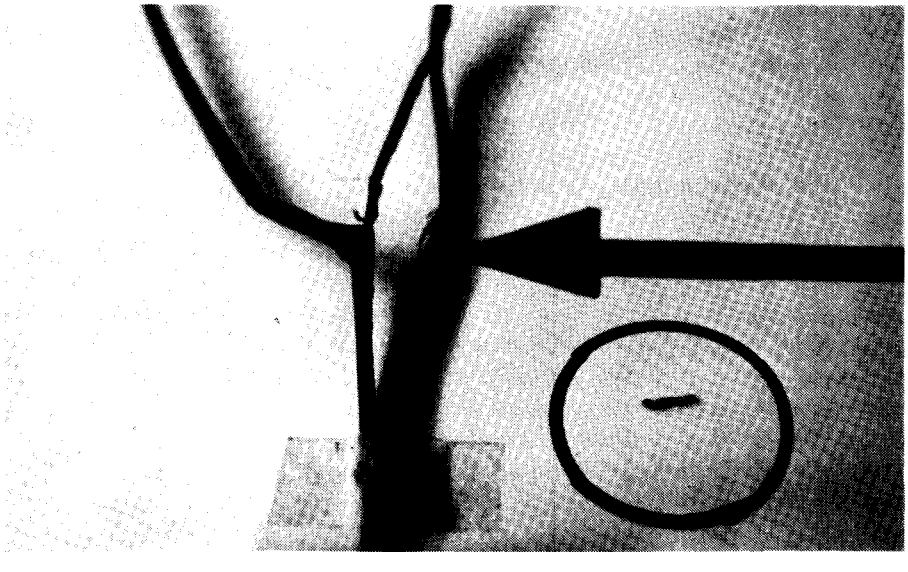

Figure 3. Borer attack on *S. teysmanniana* seedlings

For the purpose of collecting quantitative data on the occurrence of coppicing by *S. teysmanniana* seedlings, a plot 50 × 50 *m* was established at the peat swamp forest in Kuala Langat. All seedlings < 1 *cm* diameter were examined for evidence of coppicing. The results of the census are shown in Table 1. Coppicing was noted in almost 94% of the total seedlings enumerated. About 52% of the seedlings coppiced only once while 35% coppiced twice or thrice. Greater coppicing was observed in only 7% of the seedlings.

Table 1. Coppicing of *S. teysmanniana* at Kuala Langat peat swamp forest

Frequency of coppicing	0	1	2	3	4	5	6	Total
Number of individuals	5	44	18	12	4	1	1	85

The plot will be monitored to obtain further information on coppicing. Such information could include time of high incidence of die-back and the emergance of new coppice shoots. These processes may be closely related to changes in environmental conditions within the area.

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A NOTE ON GROWTH BEHAVIOUR OF BRANCH CUTTINGS OF *HOPEA ODORATA*

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Propagation by cutting is now used in forestry as an alternative method of obtaining plantlets, especially in species which have irregular seed production. In some plant species, sources of cutting material are restricted to the stem cuttings or cuttings from orthotropic shoot of coppice. This is due to the irreversible fixation of growth form of their branch cuttings as observed in *Abies* species (Kleinschmit 1977) *Araucaria hunsteinii* (Darus 1982) and *Agathis dammara* (Smits 1983). However, such phenomenon does not occur in species like *Picea abies* (Kleinschmit 1977); *Fagus sylvatica, Sorbus aucuparia* and *Tilia cordata* (Spethmann 1986). The ability of branch cuttings to develop an orthotropic growth form would facilitate the application of cutting propagation as the cutting materials could be taken from any part of the plant.

A total of 400 branch cuttings of *Hopea odorata* (Merawan siput jantan) were taken from 25 17-*mth*-old seedlings planted in an open area of the Forest Research Institute Malaysia's nursery compound. The average height of these seedlings was about 74 *cm*. The semilignified and the lignified parts of the branches were used as the cutting materials. The undeveloped apex and shoot were discarded. The length of each cutting