stock plants have several advantages compared to a single rooted plantlet: (1) they produce a faster and a higher rooting percentage; (2) they give a higher survival rate after potting into polybags; and (3) they are easier to handle during the subculturing process.

Future work will be directed towards the study of the competition among the shoots within the clusters and on the induction of increased number of shoots per cluster.

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A NOTE ON TREE SPECIES AND PRODUCTIVITY OF A NATURAL DRYLAND MANGROVE FOREST IN MATANG, PENINSULAR MALAYSIA

H.T. Chan

Forest Research Institute Malaysia, Kepong, 52109 Kuala Lumpur, Malaysia

Dryland mangroves denote the final stage of mangrove forest succession and the transition to inland forests. They are often found at the landward side of mainland mangroves or in the interior of island mangroves and are only occasionally inundated by exceptional or equinoctial tides (Watson 1928).

In the Matang mangroves, Perak, Peninsular Malaysia, the extent of dryland mangroves was reported to be about 2,205 *ha* or 5.3% of the total area (Haron 1981). Under Matang Mangrove Forest Working Plan (1980 - 1989), dryland mangroves have been classified as unproductive forests (Haron 1981).

A survey was undertaken to determine the species composition and productivity of this mangrove forest type. Nine (50 X 50 *m*) plots were randomly established within a natural dryland mangrove in compartment 84 of the Matang Mangrove Forest Reserve. All trees $\geq$5 *cm* dbh in each plot were tagged, identified and measured for their dbh.

A total of 2,012 stems belonging to 30 species and 24 genera was recorded (Table 1). Very common and widespread species (> 100 stems ha^{-1} and found in all plots) are *Rhizophora apiculata, Heritiera littoralis* and *Ficus microcarpa.* Common species (50-100 stems ha^{-1}) are *Flacourtia jangomas, Oncosperma tigillarium, Bruguiera gymnorrhiza* and *Teijsmanniodendron hollrungii.*

R. apiculata and *B. gymnorrhiza* are com-

mercial fuelwood species. They are represented by an average of 141 and 67 stems ha^{-1} and basal areas of 2.63 and 8.75 m^2 ha^{-1}, respectively. A noteworthy feature of this natural mangrove forest type is the presence of very large trees of *B. gymnorrhiza* which form the emergent stratum of the forest canopy (27-30 *m* height). About 31% of trees of this species have dbh 50 *cm* and above (9% having dbh $\geq$ 70 *cm*). Together, these two commercial fuelwood species accounted for 23.2% of the total number of stems and 58.5% of the total basal area.

Table 1. Density and basal area (m^2) per hectare of tree species$\geq$5 *cm* dbh in a dryland mangrove forest in Matang, Peninsular Malaysia

Species	Density	Basal Area (m^2 ha^{-1})
Rhizophora apiculata	140.9	2.625
Heritiera littoralis	130.2	1.284
Ficus microcarpa	123.1	2.401
Flacourtia jangomas	76.9	0.586
Oncosperma tigillarium	70.7	0.809
Bruguiera gymnorrhiza	66.7	8.750
Teijsmanniodendron hollrungii	53.3	0.248
Barringtonia asiatica	48.9	0.345
Ilex cymosa	31.1	0.264
Planchonella obovata	28.4	0.450
Petunga roxburghii	23.6	0.229
Intsia bijuga	18.7	0.545
Euodia roxburghii	18.2	0.240
Canthium didymus	15.9	0.219
Polyalthia sclerophylla	9.8	0.144
Cynometra ramiflora	8.0	0.030
Terenna fragrans	7.6	0.030
Ardisai elliptica	4.9	0.020
Pittosporus ferrugineum	3.6	0.028
Ficus sundaica	2.2	0.062
Glochidion perakensis	1.8	0.017
Vitex pinnata	1.8	0.022
Eugenia kunstleri	1.8	0.036
Eugenia leuxylon	1.3	0.007
Ficus annulata	0.9	0.020
Polyalthia glauca	0.9	0.002
Ficus obscura v. borneensis	0.9	0.002
Ficus bracteata	0.4	0.002
Xylocarpus granatum	0.4	0.008
Ficus crassiramea	0.4	0.015
Total	894.3	19.440

Of special importance is the presence of high quality timber species, namely, *O. tigillarium* and *Intsia bijuga*. These species are unique only to the dryland mangroves. They are represented by an average of 71 and 19 stems ha^{-1} and basal areas of 0.81 and 0.55 m^2 ha^{-1}, respectively. Poles of *O. tigillarium* are commonly used as fishing and boat docking stakes and for constructing houses, jetties and footbridges. The timber of *I. bijuga* is similar in properties as the inland *Intsia palembanica* and is excellent for quality furnishing, panelling and flooring (Wong 1982). *Xylocarpus moluccensis* is another dryland mangrove species which produces high quality timber for furniture (Watson 1926) and wood carv ings (Chan & Salleh 1987). Although it was not recorded in the nine 0.25 *ha* plots, it has been observed in other dryland mangrove areas in Matang.

Dryland mangroves in Matang yield both commercial fuelwood and high quality timber. They can be managed as productive forests such as those in Jugra, Selangor, Peninsular Malaysia where poles of *O. tigillarium* are harvested commercially. The productivity of these forests can be further enriched by raising plantations of high quality timber species such as *O. tigillarium*, *I. bijuga* and *X. moluccensis*.

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