4.4.1 DURIAN INTRODUCTION AND CULTIVAR TRIAL

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Durian varieties and *Durio* species have previously been introduced from Thailand, Malaysia, Sarawak and Queensland. The trees were established at Berrimah Agricultural Research Farm or Coastal Plains Horticultural Research Farm as seedling trees, or as grafted trees. Finding high-yielding and more adaptable species to the Darwin environment prompted these collections.

During November 1998, Yan Diczbalis and Mark Hoult visited Sabah and collected several plant species and clones, including *Durio kimabatuensis* and *Durio sp.*, possibly *D. zibethinus*. The species were brought back to Darwin as seed and germinated successfully. The trees will be established at BARC or CPHRF when they are a suitable size.

Grafted and seedling plants from previous collecting trips were planted into the remaining rows of the durian variety block at CPHRF form 1996 until November 1998. Many trees were severely stressed or died from the subsequent flooding of the block during the wet season. The larger, established trees showed only minor water stress, but all small trees were severely affected by the water.

A paper entitled Seasonal Changes in Durian Leaf and Soil Mineral Nutrient Element Content, was published in the *Journal of Plant Nutrition*. The paper reports the results and recommendations for the Darwin area from the durian leaf and soil monitoring study conducted over several years.

Table 1. Durian Species and Varieties Planted at BARC and CPHRF

Botanical Name	Variety/Common Name	Location
Durio kimabaluensis		BARC shade house
Durio kutejensis	Isuramia	BARC
Durio oxleyanus		BARC
Durio zibethinus	BARC Gumpun	BARC/CPHRF
Durio zibethinus	Chanee	CPHRF
Durio zibethinus	Chanee Gob	CPHRF
Durio zibethinus	Chompoosri	CPHRF
Durio zibethinus	D 10	CPHRF
Durio zibethinus	D 24	CPHRF
Durio zibethinus	D 96	CPHRF
Durio zibethinus	D 98	CPHRF
Durio zibethinus	D 123	CPHRF
Durio zibethinus	Gaan Yaow	CPHRF
Durio zibethinus	Gob	BARC/CPHRF
Durio zibethinus	Gumpun	CPHRF
Durio zibethinus	Hew 2	CPHRF
Durio zibethinus	Luang	BARC/CPHRF
Durio zibethinus	MD 79	CPHRF
Durio zibethinus	Mon Thong	CPHRF
Durio zibethinus	Mon Thong (True)	CPHRF
Durio zibethinus	Mon Thong Gob	CPHRF
Durio zibethinus	Seedling	CPHRF
Durio zibethinus	Sunun	CPHRF
Durio zibethinus (?)		BARC shade house

Durian Multiplication using Cuttings

Demand for durian fruit is increasing in Australia and the number of seeds available for sale are limited. Seed from South East Asia can be difficult and expensive to source. A rapid method for multiplication of material for rootstocks is required to overcome the shortage of seed.

Cuttings are quite easy to establish in many ornamental and temperate fruit species, but have a low success rate for tropical, woody fruit-tree species (Wong and Lamb, 1993). A trial was started in the wet season and continued into the dry season using young material or from lower branches, various rooting hormones and rates, misting and bottom heat, leaves and no leaves, different branch thicknesses, and different media.

A literature search revealed many techniques to produce rooted cuttings. Only one PhD paper (Hasan, B M, 1983) referred to durian cuttings. In the paper, only seedling trees were used to obtain rooted cuttings. The trees were less than two years of age in a controlled environment glasshouse. Cuttings were treated with an alcohol dip with or without IBA, and some were wounded at the base in this paper.

Other papers mentioned tree pruning to encourage new growth, pre-treatment of the branches prior to removal, length of cuttings and thickness, bleach and fungicide dips, and IBA and NAA dips. Most papers recommended perlite or vermiculite media, and storage in a misting unit with bottom heat. For the various species in the papers, time to form roots was from two weeks to twelve months.

The trial commenced in February, using new growth from the lower branches of the trees at BARC, and continued until April, where the branches were defoliated several weeks prior to removal. No cuttings were collected after this due to the dry season conditions. The cuttings received various treatment methods and were stored in a bottom heated misting unit at CPHRF. The final trial was relocated to an enclosed fish tank in a shade house at BARC due to the low success rate at CPHRF

Leaves or new shoots were retained on cuttings prepared during the wet season, and also cuttings in the final trial, which were kept in an enclosed fish tank. The cuttings and the media in the misting unit became very damp and fungal growth was noted on the cuttings. Bottom heat induced callous tissue rapidly when plastic covered metal trays were used rather than open plastic seedling trays, but the plastic bags used to enclose these trays did not retain enough moisture to sustain the cuttings. The vermiculite in the fish tank was damp before sealing, and this enabled the cuttings to receive a constant high humidity. The cuttings were sprayed once with fungicide inside the fish tank, but fungal growth still occurred in the high humidity.

Using a very low concentration of bleach or an alcohol dip did not damage the cuttings. The hormone treatment using a powder, liquid, or powder dissolved in alcohol, is not showing any differences at this stage. Wounding the base of the cutting before the hormone treatment does appear to induce a faster callous formation. Thicker cuttings are surviving better in the misting unit as the thin cuttings dehydrate rapidly. Thin cuttings in the enclosed fish tank did not dehydrate as quickly.

Defoliation prior to removal did encourage new buds to swell on the branches. Two leaves retained at the top of other cuttings remained attached while the humidity level was above 95%. Seedling trees also appear to have faster callous formation than grafted trees.

Although the results do not look promising at this stage, the success may be better once the dry, cold conditions have gone. While the cuttings are not actively growing, the bark on the lower half of the cuttings is still green and hydrated. Further assessment in the wet season may reveal a successful treatment for obtaining rooted durian cuttings.

4.4.2 AVOCADO CULTIVAR EVALUATION

S McAlister and R Renfree

A lowland tropical environment, such as Katherine, presents considerable problems in terms of avocado production. Most importantly, many cultivars recognised by the market and consumers simply fail to flower under the warm conditions. It is only cultivars from the West Indian avocado race, or hybrids derived from them, that are considered to possess the ability to fruit under conditions at Katherine. Although the