RARE FRUIT COUNCIL

OF AUSTRALIA
P.O. BOX 707,
CAIRNS Q. 4870
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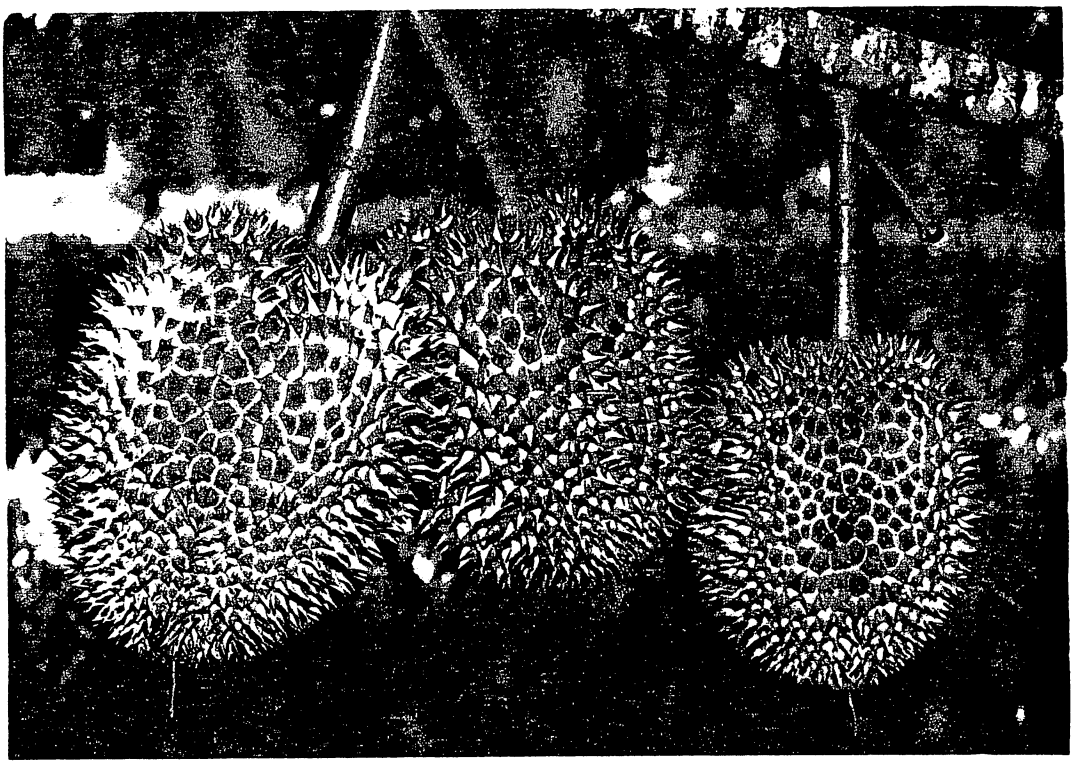
DURIAN

FACT SHEET NO. 6

B.J. Watson



BOTANICAL NAME: Durio zibethinus **FAMILY:** Bombacaceae
ORIGIN: Malaysia and Indonesia, — principally Borneo.

TREE DESCRIPTION

An attractive evergreen tree, pyramidal to dome shaped in form. Cultivars to 15 m and seedlings up to 45 m height.

FRUIT DESCRIPTION

Fruits are unique; — stalked, pendulous, round to oblong capsules, (sometimes prominently segmented), commonly 200 mm long by 175 mm wide but may be up to 400 mm in length. Weight usually in the range of 1 to 2 kg but many Thai cultivars are 3 to 6 and occasionally to 7 kg. The pericarp is olive green to yellow colour, extremely tough and covered with sharp pointed coarse spikes up to 20 mm in length. Fruit are segmented in 5 locules each containing 1 to 6 seeds surrounded by cream or yellow coloured pulp. The pulpy edible portion (aril) ranges from 14 to 28% of total fruit weight. Flavour and aroma of pulp varies from mild to strong (from thiols, thioethers, esters, hydrogen sulphide and diethylsulphide) and is distinctive and persistent. Some cultivars (eg. Ganyaow and Mon Tong) relatively mild in odour. Seeds large, brown, commonly 30 to 60 mm long and 8 to 18% of total fruit weight. Superior cultivars selected for sweet, thick, yellow, fibreless, crisp pulp and small, aborted or rudimentary seeds.

FLOWERING AND FRUIT DEVELOPMENT

Inflorescences arise from floral cushions in cauliflorous fashion on laterals, main branches and even trunk of the tree. Each cluster may contain up to 25 long-stalked, pendulous white petaled flowers opening successively over a period of 2 to 3 weeks. The fleshy epicalyx splits into halves during the day and full anthesis occurs between 3 p.m. and 7 p.m. (varying with cultivars) when flowers emit nectar and characteristic sweet odour. The 5 distinct bundles of stamens emerge in late afternoon and pollen shed (specific period varying with cultivars) between 6 p.m. and midnight. The majority of Indonesian, Malaysian and Philippine durian trees are self incompatable and cross pollination between different cultivars necessary to achieve fruit set. Partial or incomplete pollination affects seed/aril development and gives irregular fruit shape. Fruit growth is sigmoidal (increasing rate with time) and maturity reached in 90 to 150 days, — varying with cultivars and temperature. Main flowering period in north Queensland October/December and maturity January/April.

FRUITING AGE

Seedlings unpredictable, up to 10 years to first flowering. Grafted trees flower in the 4th to 8th year in Malaysia/Thailand but may not set fruit initially. In north Queensland first flowering recorded at 5 years on D96 cultivar.

CLIMATIC SUITABILITY

The tree grows best in a wet tropical climate with 1,500 to 3,000 mm of rain well distributed throughout the year, preferably within 16° north and south of the equator. Grown up to 800 m altitude in tropical areas (temperature permitting). Durian may be fruitful to 18°S in north Queensland in warmer sites with mean June and July minimum temperatures above 14°C.

COLD TOLERANCE, SUN AND SHADE

Intolerant of frost at any age. Some defoliation at air (screen) temperatures below 8°C and probable death of juvenile trees at below 5°C. 30 to 50% shade necessary till trees achieve 0.8 m of new growth (height) following planting and then reduction to full sun over following 12 months.

SOIL PREFERENCE AND DRAINAGE

Deep sandy to clay loams derived from basalt or granite preferred. Excellent drainage required. Very intolerant of poor aeration and soils/sites conducive to infestation by the fungus *Phytophthora palmivora.* Soil pH 4.5 to 5.5 desirable.

WATER

Supplementary irrigation essential in spring and summer months with less than 150 mm rainfall. Desirable to keep soil moist but some stress (June to August in north Queensland) essential to induce prolific flower bud initiation. Irrigate heavily following onset of flower bud growth, but lesser amounts for Thai cultivar Chanee.

MULCHING

Light mulching with compost, straw, peanut shells, etc. to 100 mm depth immediately following each wet season beneficial for juvenile trees. Permanent legume cover crops between rows desirable.

FERTILIZING

At planting 15 g of P in and around planting hole.
Growth Mix — Immature trees years 0 to 6 years, — 150 g N, 30 g P and 100 g K total per tree per year of age applied in split dressings — August, November, February and April.
Fruiting Mix — From first flowering, — 130 g N, 15 g P and 180 g K total per tree per year of age to rate constant at year 15 onwards, split ⅓rd at first signs of flower bud growth and ⅔rds immediately following harvest. If trees lack vigour, apply additional 5 kg of chicken manure per tree per year of age following harvest. If Ca, Mg and Zn deficient, apply gypsum, magnesium oxide and zinc sulphate respectively.

FLORAL INDUCTION AND POLLINATION

Moisture stress induces floral formation. Cincturing effect yet unknown. For best pollination mix cultivars or at least place different cultivars in adjacent rows. Pollen transfer is mainly from small nectarivorous bats at night. Species *Macroglossus minimus* and *Syconycteris australis* are likely pollinators in north Queensland.

(N.B. Hand pollination can be carried out at convenience; — detach opening flowers in late afternoon and stand stems in water. Stamens with viable pollen will still be intact next morning. Then select flowers on a different cultivar which would normally open during the following 24 to 36 hours and cut these to expose the rudimentary stigma. Even before elongation of the style, the stigma is receptive and the stamen anther lobes can be rubbed on the stigma to effect pollination.)

FIELD PLANTING

In north Queensland best sites 3 to 20° slopes facing north to north west. Avoid wind exposure. Deep rip and construct gently sloping mounds full-width at least 500 mm high to crown. Avoid moving sub soil. Dig in 20 kg of chicken manure or compost in planting site 6 to 12 months prior to planting. Planting hole only to size of plant container. Shade and tree support essential initially. Wind breaks very beneficial. Spacing 15 m between rows, 7 m in-the-row and remove every second tree when merge together. Hedging not desirable.

PRUNING

Allow only a central leader. Remove dominant upright side branches, weak growth, water shoots and excessive branching to allow even spaced strong main branch development. Ensure pruning cuts made flush to main branches/trunk. Heavy crops require propping or limb tying to central stem.

YIELD

Peak production in Malaysia and Thailand between years 12 to 15 with average of 50 to 100 fruit per tree per year (4.5 to 12 tonnes per hectare).

PROPAGATION

Modified Forkert budding, wedge graft, modified bottle graft and approach graft all used in Asia. Most consistent results in north Queensland from side veneer grafts (scions with plump lateral buds, 6 to 10 mm diameter by 150 mm length and precinctured 3 to 5 weeks) between August and April. Approach grafting the most reliable but time and space consuming. Benefits also from field planting seedlings and inarching grafted nursery trees 2 to 3 years later. Addition of inarched rootstocks (up to 3 or 4 total) reduces seedling vigour variation effects, increases tree stability and reduces potential root rot death. *Durio mansoni, D. malaccensis* and *D. lowianus* are *Phytophthora palmivora* root rot resistant and increasingly used as rootstocks in Thailand.

HARVESTING

Maturity gauged by local experience for each cultivar, indicated by cessation of fruit growth, odour and resonance when tapped. The Thais cut fruit from the tree leaving a full length peduncle attached which is often wrapped with paper or banana leaf, — ostensibly to prolong fruit life. Shelf life ranges up to 8 days at ambient temperatures. Malaysians and Indonesians mainly wait till fruit drop and thus full maturity, but some fracture and generally shelf life is only 2 to 4 days.

PACKAGING, TRANSPORT & STORAGE

Fruit accommodating due to tough pericarp, — can be bulk loaded in bins or truck trays without significant damage. Shelf life of picked fruit can be extended to 14 days if held at 10 to 15°C. Whole fruits or arils store for up to 3 months at – 10 to – 24°C without loss of flavour although texture is degraded on thawing.

MARKETING AND PROCESSING

Fresh fruit the principal demand. The penetrating odour may present problems for the marketing chain in Australia. Other relevant uses, — cakes, durian sausage from dehydrated arils with added sugar, canned aril in agar, and spray or drum dried product utilized as flavouring for ice cream, beverages, confectionery and pastry.

PESTS AND DISEASES

Rhyparida beetles (mainly *R. nitida* and often in plague proportions) principal pests in north Queensland but also *Monolepta australis* (beetle) and odd lepidopterous larvae damage leaves. Occasional unspecified borers infest limbs and longicorn beetles damage branches. The fungus *Macrophomina phaseoli* has initiated decline and death in weak growing cultivar D24. *Phytophthora palmivora* and *Pythium* spp. not yet identified as problems in north Queensland.

SEED VIABILITY

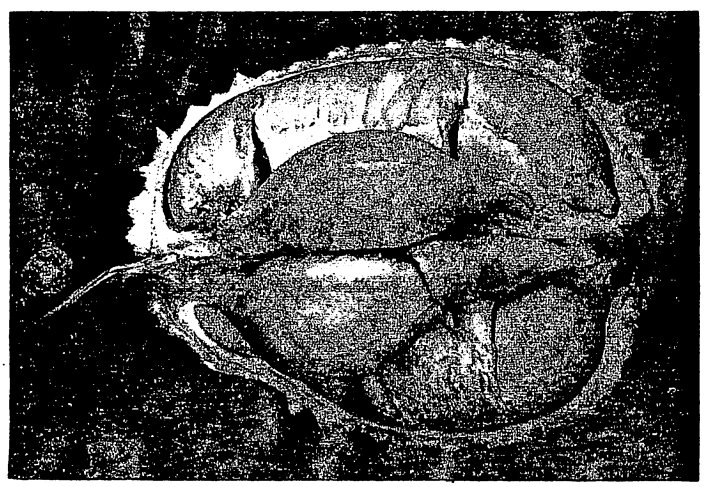
Three days for air dried seeds but up to 30 days for fungicide treated seed stored at 15 to 25°C in damp peat moss. Half bury seeds, side up in a light medium. Germination in 2 to 30 days depending on temperature.

POPULAR CULTIVARS

Thailand — Mon Tong, Ganyaow, Chanee, Gob Mataow, Luang, E-Nak.
Indonesia — Mas, Bakul, Sitokong, Parung, Sitebel, Bojol, Badak.
Malaysia — D2, D8, D16, D24, D96, D98, D102, D123, Hew 3.
Singapore — Tan Chye Siam, DF201.
In north Queensland, 17 introduced cultivars are currently being screened, but yield data is not yet available. Local selection Limberlost has excellent flavour but only average aril thickness.

COMMERCIAL POTENTIAL IN AUSTRALIA

Imported fruit currently retail at very high prices and indicate a substantial ethnic Asian market. Durian flavouring powder could be used in ice cream and confectionery to provide an introduction to the product for the average Australian. Those already 'addicted' can consider few fruit more appealing and are prepared to pay very highly. Long term market prospects for northern Australian production are good due to seasonal difference from northern hemisphere production. However profitability hinges on price and more importantly productivity of the tree, — which is not yet proven. Return of investment not likely until at least 10 to 12 years after planting.



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