example, or more, that you did at one time?

DR. TSAI CHENG: No, we did thousands, tens of thousands.

## SOME ASPECTS OF NURSERY PRODUCTION IN QUEENSLAND

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Queensland is a very large state of Australia, stretching from New Guinea in the north to approximately 1,500 miles south. So we have very tropical areas in the northern half and sub-tropical in the south. There are, of course, some areas with a temperate climate because of altitude.

We have a dividing range of mountains running north to south. On the eastern side of this range we have a very fertile coastal strip, with rainfalls ranging from 50 inches in the south to over 200 inches in the tropical coastal zone in the north. To the west of the range the rainfall decreases inland and a large area of the western region has less than 10 inches of rain per year and is subject to very bad drought periods at times.

The major part of our population of 2½ million lives along the coastal region, with about one million of these living in the state capitol, Brisbane, which is in the southeast corner of the state. Most of the nursery production takes place in this area. Nurseries in the north of the state produce a wide range of tropical fruit trees, some exotics, bedding plants and house plants, all without any heating costs.

As one moves to the southern part of the state a little heating becomes necessary during a period of about three months during mid-winter, but glasshouses are not used extensively unless for special crops such as ferns, crotons, dieffenbachia and other house plants. Sarlon shade houses are used to a very large extent because of the rather intense sunlight that we experience for most of the year. Most of the better nurseries use the most modern methods of production and disease control available and mechanize operations as much as possible to reduce labor costs, which are quite high in our country.

**A Method of Propagating *Lagerstroemia indica* 'Mathewsii.'** Traditionally this cultivar and, indeed, all *Lagerstroemia* cultivars have been propagated by hardwood cuttings taken during the dormant period of growth at the end of winter in Queensland. Results were always rather variable and rooting

percentage averaged about 30% for 'Mathewsii', so we looked for a more reliable method.

Initially the stock plants were pruned back hard in late winter. New growth developed very quickly during early spring after fertilization of the plants. When the new shoots were 2 to 3 feet in length and semi-ripe they were taken off and used as propagating material. We found that the very soft tips, about 3 to 4 inches, did not root very well, but the rest of the new semi-matured wood was ideal, giving an average of 98% rooting.

The method used was as follows: cuttings were made 3 to 4 inches long and with at least three nodes. The bottom cut was made ¼ inch below the bottom node, the lower leaves removed, then the cutting was wounded with a sharp scalpel 1 to 1½ inches in 2 to 3 places around the cutting. The cuttings were dipped in a powder containing 0.1% indolebutyric acid and planted 1 to 1½ inches deep in propagating tubes and placed under automatic mist with a bottom heat of 75°F.

These cuttings commenced to root at 10 days, and at 21 days were gradually weaned off and removed to shade house under 70% shade for 2 weeks prior to potting.

These rooted cuttings were potted into a U.C. type mix containing 4½ lbs 8 to 9 month Osmocote, 3 lbs superphosphate, 1½ lbs GU49, 3 oz fritted trace elements, and 9 lbs dolomite per cubic yard. The plants grew rapidly and 21 days after potting, had shoots 6 to 8 inches in height. These were tip pruned to induce branching; they developed rapidly to saleable size 16 weeks after planting of the cuttings. An added bonus was very good flowering of the plants in the container.

This resultant crop was much superior to any crop of *Lagerstroemia indica* 'Matthewsii,' previously produced by the traditional method.

**A Method of Tissue Culturing Nephrolepsis Fern.** In our laboratory we use the following method: stolon tips approximately 1 in long are taken from stock plants grown in the greenhouse in hanging baskets. These tips are first placed in a beaker under gauze and placed under running water for one hour. Then the pieces are removed and placed in McCartney bottles of 5% calcium hypochlorite solution for twenty minutes followed by three rinses of sterile water. After the above treatment the pieces are placed onto damp filter paper in petri dish in a laminar flow cabinet and dissected. Only the apical ⅛ to ¼ in is used. These small pieces are planted upright in agar medium in polycarbonate culture tubes which have been autoclaved at 15 pounds pressure for 15 minutes.

The medium used is a modified Murishige fern medium. Culture tubes are placed under Gro-Lux fluorescent tubes in a 16 hours light/8 hours dark regime at 80°F. Originally we used Murishige fern medium, but we found that we were getting too much differentiation during the multiplication stage which made division for subculturing rather tedious. To overcome this, we made adjustments to the auxin and cytokinin balance. In our medium we use 2 mg indoleacetic acid, 0.04 mg kinetin, 1.126 mg $N^6$-benzyl amino purine (BAP) per litre. We found that, using this balance instead of only 2 mg kinetin per litre, the resultant multiple bud development was rapid and much easier to subdivide for the next two sub-cultures prior to transfer to a pre-transplanting medium. In the pre-transplant stage we delete the kinetin and BAP from the medium. The clumps of multiple buds are divided and planted approximately 30 per jar. These start to differentiate in 2 to 3 weeks and at about 6 weeks we transplant into tubes of sterile U.C. type medium under mist in shaded greenhouse.

The resultant plants develop fairly rapidly and have a very bushy habit which fills the container much better than when traditional propagation methods are used, possibly because of a slight carryover of BAP in the plant system.

| Components | mg/Litre | Components | mg/Litre |
|---|---|---|---|
| $CaCl_2$ | 332.00 | $NH_4NO_3$ | 1,650.00 |
| $CoCl_26H_2O$ | 0.025 | $MgSO_4$ | 181.00 |
| $Na_2MoO_42H_2O$ | 0.25 | $MnSO_4H_2O$ | 16.9 |
| $NaH_2PO_4H_2O$ | 255.00 | $ZnSO_46H_2O$ | 8.60 |
| $CuSO_4$ | 0.025 | Sucrose | 30,000. |
| $KH_2PO_4$ | 170.00 | Inositol | 100.00 |
| KI | 0.83 | IAA | 2.00 |
| $KNO_3$ | 1,900.00 | Kinetin | 0.04 |
| FeNa EDTA | 36.7 | BAP | 1.126 |
| $H_3BO_3$ | 6.20 | Thiamine | 0.4 |
| Agar | 8,000.00 | | |

Note: Delete kinetin and BAP for pre-transplanting.

## SPRING COLOR PRODUCTION

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Spring has always been a magic time for gardeners, bringing an influx of buyers to nurseries for flower and vegetable plants. Plants providing immediate color play a very important role in spring sales for nurseries and mass merchandisers. In re-