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In vitro shoot tip culture of Red Sandalwood (*Pterocarpus santalinus* L.)

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Red Sandalwood (*Pterocarpus santalinus* L.) is an endangered woody plant species of family Leguminosae with high medicinal value. According to some assessments (Arunakumara *et al*, 2005) trees of this species are available in Southern parts of Sri Lanka. However seed propagation of red sandalwood has some constraints like low germination of seeds, dormancy of seeds, fungal growth inside the seed coat, scarcity of plants, seasonal fruit bearing habit of trees (Kumarasinghe *et al*, 2003). Therefore *in vitro* shoot tip culture can be applied as an alternative propagation technique for conservation and multiplication of Red sandalwood plants in Sri Lanka.

Shoot tips were excised from field grown and plant house grown plants. Experiments were carried out to identify proper surface sterilization procedures for explants and to identify proper establishment media for sterilized explants. NaOCl (10, 15, 20%) with different exposure times (10, 15, 20 minutes) were tested and Murashige and Skoog (MS) and Mccown woody plant (WPM)) media were used as establishment media with and without activated charcoal (1g/l). Completely Randomized Design (CRD) with twenty replicates was applied for the study.

Results revealed that, usage of 10% NaOCl for 20 minutes exposure time showed highest survival percentage (100%) for shoot tips detected from plantlets grown in the plant house where contamination were controlled up to zero level. Promotion of auxiliary buds within two weeks after culture initiation and appearance of new leaves within a month were observed in survived cultures. For explants detected from field grown plants 10% NaOCl for 15 minutes exposure time showed 70% survival where promotion of auxiliary buds within two weeks time and appearance of new leaves within a month was observed. Among the two media tested both MS medium and WPM medium were well suited for culture establishment of plant house derived explants where 1.0 gl^{-1} activated charcoal was incorporated or not as an absorbent. However MS medium with 1.0 gl^{-1} activated charcoal was the best medium for explants from field grown plants. Of well established explants, 10% showed adventitious root formation in MS charcoal free medium. Immature stem cuttings showed best growth performances where semi hard wood stem cuttings showed enlargement of stem diameter and callus formation at cut ends.

Further studies are needed to identify proper shoot proliferation and rooting media for established shoot tips of red sandalwood. Finally there is a need to identify a suitable acclimatization procedure for *in vitro* derived plantlets to resume independent growth in the field.

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Screening of coconut (*Cocos nusifera* L.) for drought tolerance

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Drought causes a substantial reduction in national yield of coconut and also a loss of coconut palms in severe droughts thus resulting in serious economic consequences in the coconut industry in Sri Lanka. Therefore, it is a prime importance to identify some putative drought tolerant genotypes for the use in drought prone areas. The long generation and maturation periods of coconut restrict the selection of genotypes based on yield. Therefore, in this study the effects of drought on stomatal conductance (g_s) and water potential (Ψ) of four coconut genotypes (the accession Clovis [CL] is believed to be tolerant to drought while the rest Dwarf Green [DG], Dwarf Brown [DB] and Cameron Red Dwarf [CRD] are sensitive) were measured to develop an index for stomatal performances (ISP) using ISP $= \sum^{t}_{x=1} X.FX$ equation. Where, t, X and F are the number of genotypes, grade point obtained by the genotype for recordings of g_s and Ψ during drought and frequency of the corresponding grade point respectively. All palms were about 15 years of age and managed according to the recommended

practices, in adjacent plots at the Potthkkulama Research Station, in IL_1 Agro-Ecological Region. Eight adjacent palms from each of four genotypes were selected. Palms were monitored throughout the 80-day natural drought experienced in early 2005. DB showed the highest ISP (24) while DG (22.5) and CL (21.5) were next with minor differences and CRD (19), being the lowest of all. Thus, CRD can be identified as a drought sensitive genotype compared to the rest. Therefore, four genotypes can be ranked according to drought tolerance in terms of ISP as DB>DG>CL>CRD. However, these results are substantially different from known conditions at the field level. Therefore, more careful observations on much harsher and prolonged drought are needed to verify the applicability of this method.

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Effect of bio control agent *Trichoderma* (*T. viride* and *T. konnigii*) on basal rot of *Cloropytum comosum* 'laxum' caused by *Sclerotium rolfsii*

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At present, the biological control of soil borne fungal diseases is becoming popular in foliage industry of Sri Lanka, which is a nature-friendly ecological approach to overcome the problems caused by standard chemical methods of plant protection. With a suitable bio control agent pathogen can be suppressed and reduced the disease incidence could be reduced effectively. This experiment was conducted over a period of six months in polytunnel to identify a potential bio control agent for basal rot of *Cloropytum comosum* 'laxum' caused by *Sclerotium rolfsii* with five treatments of *Trichoderma viride*, *Trichoderma konnigii* and combination of *Trichoderma viride* and *Trichoderma konnigii*, Pormarsol forte 80% wp and control. The mean disease incidences of above treatments were 1.75, 2.75, 1.5, 1.75 and 10.75 respectively. It was revealed that *Trichoderma viride* and combination of *Tricoderma* spp. are suitable for the highly effective control of plant diseases caused by *Sclerotium rolfsii*.

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In vitro callus induction of *Spilanthes calva* DC [*Spilanthes acmella* auct. non L,.] (Maha Akmella)

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Spilanthes calva DC. (Maha Akmella) is a valuable medicinal plant belongs to Family Asteraceae. It is widely used in indigenous medicine to treat toothache in most of the Asian countries. Not only it has anesthetic properties, but also contain secondary metabolites, with the insecticidal properties, which could be used as potential bio insecticide. This is an annual plant, which grows to a height about 30 cm. After flowering mother plant is dried off. Four to six weeks later seeds are germinated and new seedlings are produced. Viability of seeds loses within short period of time. Even though seeds are germinated percentage of germination is low (about 30%). Rooting of cuttings is also not possible. This is a limitation in using this valuable medicinal plant for commercial production. Therefore it is very important to develop a protocol for mass propagation through tissue culture and establishing cell cultures will be useful for large-scale chemical extraction in industrial purposes.

Leaf discs were used as explant for callus initiation. In order to identify the suitable maturity stage for callus initiation, leaves were harvested at different maturity stages i.e first, second and third fully opened leaf.

Leaves were washed with Dettol™ soap and soaked in a solution of Teepol™ for 5 minutes. After that leaves were washed with running tap water for 45 minutes. In order to surface sterilize. Leaves were washed with 10% Clorox™ (5.25% Sodium hypochlorite v/v) for 5 minutes and then with 70% alcohol for 30 seconds each followed by three successive washings in sterile distilled water. These operations were carried out inside the laminar airflow cabinet before inoculation. Basal media tested for the