Eucalyptus dunnii exhibits good growth, and suitable wood properties that are desirable for pulp production by the paper industry. It is, therefore, a promising candidate for hybridisation with species known to perform well in SA conditions. However, E. dunnii produces limited seeds, and as vegetative propagation methods have not been optimized, cutting yield is at present limited due to poor rooting. This study investigated procedures for rooting, as well as the characteristics of roots produced from germinated seeds, in vitro shoots, and cuttings from greenhouse parent plants. Shoots were established in culture from greenhouese material and multiplied. The induction of roots was attempted by placing in vitro shoots onto multiplication medium with a pH range of 4.5–5.8. However, no roots were produced by this treatment. An Indole-3-butyric acid (IBA) range (0.1–1.0 mg/l) was also tested, but produced no roots. Of the in vitro derived shoots placed in a peat:vermiculite (1:2) substrate and watered with liquid rooting medium containing 0.5 mg/l IBA, only 5% rooted. Cuttings (from greenhouse parent plants) underwent six treatments (including exposure to IBA at various concentrations and to commercial rooting powder) before placement into inserts. Untreated cuttings had approximately the same percentage success (25%) as those treated with Seradix-1 (25%), whilst cuttings that underwent a 200 mg/l IBA pulse treatment showed the greatest percentage success (30%). Seeds were germinated under standard greenhouse conditions used at Trahar Technology Centre, Mondi South Africa, and allowed to develop. The roots produced by these seedlings are being examined along with those produced by cuttings, and in vitro shoots, in terms of their architecture and shoot to root mass ratio.

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**The genus Cordia L. (Boraginaceae: Cordioideae) in southern Africa**

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The genus Cordia, established by Linnaeus (1753), is the largest genus in the family Boraginaceae s.l. It comprises ≥350 species and Boraginaceae (including Hydropylaceae s.str.) includes about 2600 species, classified in some 150 genera. Members of Cordia are widespread in tropical and subtropical regions of both hemispheres and strongly centred in the Neotropics. Thirty-seven species of Cordia are listed for Sub-Saharan Africa, seven of which are recognised in southern Africa and occur on the periphery of the region, mainly in savanna. Cordia is predominantly a genus of evergreen, variously pubescent trees and shrubs with watery latex. The taxa differ remarkably in leaf blade outline, blade size (varying from 30 × 20 mm to 130 × 123 mm) and petiole length (differing from long to very short). Leaf trichome complements of the members of Cordia in southern Africa consist of various types of setae, unbranched multicellular trichomes, unbranched glandular trichomes, unbranched standard hairs and branched multicellular hairs. Leaf surfaces among the species vary considerably, from ‘glabrous’ characterised by undeveloped setae to a ‘sandpaper texture’ due to the presence of short, sharp-pointed setae. The fruit of Cordia is drupaceous, usually orange–red with one stone and surrounded at the base by the calyx. Within Cordia three major pollen types are distinguished that represent main evolutionary lineages; the southern African members of the genus are characterised by pollen 3-collporate with a striate–reticulate tectum or 3-colporoidate with a spinulate tectum.

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**Chemical analysis of five Hypoxis species**

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The rootstocks of Hypoxis species are well-known to be used in traditional medicine for the treatment of different ailments, e.g. urinary tract infection, epilepsy, prostate cancer etc. However, it was discovered that different Hypoxis species are harvested and sold under the same name as African potato. It is a concern where plant preparations are taken orally and the information about the plants used not being correct, and it might also be dangerous in the event where poisonous plants are used. The aim of this study is to evaluate the chemical constituents associated with different species within the genus. Five different Hypoxis species namely H. argentina, H. hemerocalleida, H. interjecta, H. iridifolia and H. rigidula were analysed to determine the difference in the chemical composition of the rootstocks. Four different extracts were made for each species collected. Ethanolic water, ethyl acetate, methanol and petroleum ether extracts were prepared from fresh and stored (60 day) material and were analysed using high performance liquid chromatography (HPLC) and thin layer chromatography (TLC). The results from the HPLC indicate that the chemical compositions of the Hypoxis species differed between the species that were analysed. The methanol extracts seems to indicate major differences when compared to other solvents used. After the material was stored, the results showed that there was a chemical breakdown of certain compounds.

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**Mild psychoactive constituents of Mentha aquatica L.**

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*Mentha aquatica* is used in Zulu traditional medicine as treatment against colds, respiratory problems and protection against evil spirits. It is a perennial herb growing in marshes and damp places from the South-western Cape to tropical Africa and Europe. Six extracts of varying polarity of *M. aquatica* were tested in a photometric peroxidase linked MAO bioassay. The 70% ethanol extract gave highest inhibitory activity. (S)-naringenin was isolated from the extract by bioassay guided fractionation using VLC and preparative TLC. The structure of the compound was verified by 1H, 13C and DEPT NMR and measurement of the optical rotation. The IC50 values for MAO inhibition by naringenin were 342 ± 33 µM for the rat liver mitochondrial fraction, 955 ± 129 µM for MAO-A and 288 ± 18 µM for MAO-B. Monoamine oxidase B inhibitors have potential therapeutic application in the treatment of the symptoms of Parkinson’s disease. The ethanolic leaf extract has previously shown strong affinity to the GABA-β2-z benzodiazepine receptor. Viridiflorol from the essential oil and (S)-naringenin from an ethanolic extract was isolated by bioassay-guided fractionation using the 3H-Ro 15-1788 (Flumazenil) GABA-β2-z benzodiazepine receptor binding assay. Viridiflorol had an IC50 of 0.19 M and (S)-naringenin of 2.6 mM. Compounds that bind to the GABA-β2-z benzodiazepine receptor have a suppressive effect on the central nervous system.

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**Linking chilling-induced inhibition of N2 fixation to photosynthetic response in soybean by means of fast fluorescence rise kinetics**

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Dark chilling affects growth and yield of warm-climate crops such as soybean [*Glycine max* (L.) Merr.]. Several studies have investigated chilling stress effects on