employed due to a lack of universally applicable primers. Here I describe a protocol that led to successful amplification and sequencing of three low copy nuclear genes for *Pelargonium* section *Myrrhidium*. First, all low copy nuclear genes available in Genbank were listed for the common garden 'geranium' *Pelargonium x hortorum*. If similar sequences were available for other angiosperm taxa, they were aligned with *P. x hortorum*. Primer pairs that would allow PCR amplification were designed in conserved region. Three loci met all these criteria and were sequenced, and cloned if necessary, for eight taxa. The resulting phylogenetic gene trees show high levels of congruence for the diploid members of *Pelargonium* section *Myrrhidium*. Two species have two copies for each locus in almost all cases and their phylogenetic placement cannot be interpreted in a straightforward way. We can conclude, however, that for *P. caucalifolium* their origin must have been through allopolyploidization. For *P. multicaule*, homoploid hybridization seems the best explanation for the observed pattern. The low copy nuclear gene trees show adequate levels of variation for subsequent evolutionary studies, in contrast to a gene tree based on plastid trnLF sequences. This approach may therefore be beneficial for other phylogenetic studies that operate at the species-level.

doi:10.1016/j.sajb.2008.01.117

Genotyping *Solanum lycopersicum* and its related wild species using Diversity Arrays Technology (DArT)

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The domesticated tomato (*Lycopersicon esculentum* Mill) is the world's most valuable commercially produced vegetable, which is largely consumed in its fresh state. Various studies have implicated the consumption of tomato and tomato-based products with the prevention of certain cancers and heart diseases. Health benefits associated with tomatoes are due to the antioxidant compounds such as lycopene, ascorbic acid, phenolics and flavonoids present in the fruit. Significant genotypic and phenotypic differences occur between domesticated and wild tomato species. The domestication of *Lycopersicon esculentum* resulted in a phenotypically desirable large, red fruit with significant shape variation, but with a tremendous loss in genetic diversity. In contrast wild tomato species exhibit a small, invariably round fruit, with significant genomic diversity. To address the problems associated with restricted genomic diversity, significant importance is placed on the generation of trait linked markers that could aid in selective breeding programs. Diversity Arrays Technology (DArT) is an innovative method that could detect whole genome variations without requiring a pre-existing knowledge of the genome sequence. This technique was applied to genotype 16 tomato accessions, which included domesticated and wild species. A total of 2024 polymorphism was identified between the species. These polymorphic clones were subsequently used to Bin map an introgression population between domesticated *S. lycopersicum* and wild *S. pennellii.* Based on the Bin mapped data clones involved in increase human health traits, lycopene and carotene, could be identified and subsequently sequence analysis were performed. The Diversity Array will be transformed into a Polymorphic array which will be used in future tomato mapping and QTL identification.

doi:10.1016/j.sajb.2008.01.118

The effects of different drying rates of some biochemical aspects of recalcitrant seeds of selected species

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While orthodox seeds can tolerate dehydration to water contents lower than 0.05 g/g, recalcitrant seeds lose vigour with relatively little drying. The ability to tolerate desiccation is dependent on the operation of an interactive suite of mechanisms, which involves *inter alia* the protection of cellular membranes and intracellular components. Within recalcitrant seeds there is some variation among species in degree of desiccation sensitivity, but the rate of water loss does affect in the extent of dehydration that can be tolerated in the short-term. With slow drying (e.g. over saturated salt solutions), seed tissues spend a longer period of time at intermediate water contents at which aqueous-based deleterious processes can occur, compared with material that is rapidly dried, which spends shorter periods at these potentially damaging water contents. Rapid drying has been shown to permit the survival of excised embryonic axes to relatively low water contents, although there is always a minimum that is higher than the water contents survived by orthodox seeds. The present study investigates the biochemical basis of the effect of drying rate on the response of recalcitrant seeds to drying. The biochemical responses measured include vigour, production of reactive oxygen species and the activity of anti-oxidant enzymes, membrane damage (assessed by electrolyte leakage and ACC-oxidase activity), rate of protein synthesis and the profile of heat stable proteins.

doi:10.1016/j.sajb.2008.01.119

Smoke treatments improve growth and yield of commercially grown tomato and onion under greenhouse conditions

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Fire plays an important role in traditional agriculture. By-products of fire such as smoke and ash are commonly used for drying and storing grains. These practices help to achieve better germination and enhanced seedling growth of the crop. The stimulatory role of smoke is therefore widely investigated. However, there is not enough information with respect to the effect of smoke on yield of crop plants. This study highlights the influence of smoke-water and a smoke-isolated butenolide on growth and yield of tomato and onion. Smoke-water (1:500 v/v) treatment yielded maximum height, number of leaves, and stem thickness of tomato plants from 57 to 78 days after sowing. The total number of marketable fruits was significantly greater ($P=0.05$) for smoke-water-treated (1:500 v/v) tomato plants (168) than the control (124). Smoke-water-treated tomato plants yielded 35% more fruits than untreated plants. In spite of achieving a greater number of tomatoes, smoke treatments did not influence fruit quality. In the case of onion, smoke-water (1:500 v/v) treatment significantly increased ($P=0.05$) bulb diameter (41.8 mm) and bulb weight (48.3 g) over the control (26.4 mm and 17.4 g respectively). The butenolide also gave a significant improvement ($P=0.05$) over the control. Onion plants treated with smoke–water and the butenolide solution had significantly greater ($P=0.05$) above ground biomass than untreated plants. There was an improvement in harvest indices of smoke–water- and butenolide-treated plants suggesting possible use of smoke-technology for tomato and onion cultivation.

doi:10.1016/j.sajb.2008.01.120

***Cryphonectriaceae* canker pathogens on native and non-native Myrtales in southern Africa**

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The *Cryphonectriaceae* includes some of the world's most important tree pathogens. Three genera occur in Africa. These include two species of