Establishing a medicinal incubator at the Agricultural Research Council — Vegetable and Ornamental Plant Institute

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Millions of people in South Africa rely on medicinal plants as their primary source for treatment of diseases. The demand on medicinal plants coupled with the poor control of harvesting from natural environments has resulted in a large number of these species to become endangered or threatened. It is therefore important to conserve these medicinal plants by propagation and cultivation in a controlled environment. However, it is known that medicinal plants tend to change in chemical composition when they are transplanted from one region to another. The medicinal incubator at ARC–VOPI addresses both issues of conservation and propagation of medicinal plants by attempting to establish efficient methods of multiplication of medicinal plants. The chemical composition is monitored throughout the process to ensure that usable medicinal plants are propagated. Training is also provided to traditional health practitioners and small scale farmers in cultivation of medicinal plants to secure a sustainable income. The long term objective of the project is to duplicate this incubator in other provinces in order to reduce the pressure on natural harvesting and to ensure that these plants do not become extinct.

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The conservation status of the South Africa's plants with a special focus on plants from the Fynbos Biome

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SANBI’s threatened species programme has been responsible for updating the red list for South Africa’s plant species. This list will be published in 2007. The results from the Red List indicate that there has been a significant increase in the numbers of plants threatened with extinction over the past decade. This presentation will explore reasons for this increase and provide an analysis for threats to plant species in the country. It will also focus on the almost 70% of threatened plant taxa that occur in the Fynbos Biome by providing the latest statistics on how many of the Fynbos plants are threatened, what are the predominant threats affecting Fynbos species, which new threats have appeared in the past decade and which are the species newly listed due to these threats. Trend data for a

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Anti-HIV activity of a cardiac glycoside isolated from Elaeodendron croceum

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HIV/AIDS threaten more than 40 million people worldwide and more than 5 million in South Africa alone. There is no cure for the disease yet, and novel drugs need to be discovered to make any progress in combating the disease. Twelve extracts from indigenous South African plants were analysed, of which one, Elaeodendron croceum, showed exceptionally good inhibition of transcription factors and a recombinant HIV strain in the HeLa-TAT-Luc and MT-2 VSV-pseudotyped recombinant virus assays. The isolated compound, digitoxigenin–glucoside showed toxicity of only 20% at a concentration of 25 μg/ml on Vero cells. The active concentration of the compound against HIV is much lower at 100 ng/ml with an inhibition of approximately 90% of the recombinant virus. The semi-purified extract showed similar results, but with lower toxicity against the Vero cells. The anti-HIV activity of this terpenoid could result in a new application for cardiac glycosides as they are normally used in the treatment of heart conditions. The therapeutic index of 250 for digitoxigenin–glucoside makes it a promising possibility to be studied further in in vivo experiments.

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few species where accurate abundance and distribution over time exist will also be presented.

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Aerial or substrate salinity: Does it matter?

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The effect of saline spray and saline irrigation on the growth and chemical composition of two varieties of *Di- 
delta carnosa* (an indigenous West coast daisy) was studied. Variety *tomentosa* is largely littoral, and variety *carnosa* mainly distributed inland. Plants were grown under greenhouse conditions and subjected to nine treatments that resulted from the combination of three levels of saline spray, and three of saline irrigation: 0, 10 and 90% seawater were used. Growth was reduced at high salinity, but stimulated at 10% sea water concentrations. There were variations in element concentrations with treatments. However, for these plants, aerial or root applied salinity made very little difference overall, and are not sufficient on their own to explain distribution patterns.

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Bark anatomical descriptions of *Lannea schweinfurthii* var. *stuhlmannii* (Engl.) Kokwaro

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Bark samples of *Lannea schweinfurthii* were collected, provided that they displayed a mature bark pattern. Bark samples were taken at breast height from mainly vertical boles in South Africa. Incisions were made up to cambium – just beyond it. The harvested bark samples were immediately fixed and preserved in formalin–acetic acid–alcohol (FAA, Johansen 1940) contained in numbered bottles. Bark samples were collected from at least three individuals per natural stand, to assess variation and consistency of bark characters. After bark samples were fixed for at least 48 h in FAA, standard procedures for wood anatomy were used to prepare bark slides for the light microscope. Anatomical features were studied in transverse, radial and tangential section. Care was taken to make tangential sections in the portion before the dilatation zone. In this study, the DELTA computer programme was used for taxonomic descriptions. This was one species of the 29 species representing ten genera of the southern African Anacardiaceae. The conclusion arrived at was that bark anatomical descriptions of *Lannea schweinfurthii* can be employed successfully to separate the species from the rest in the family.

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*Ophiostoma* species from *Protea* infructescences: Four way interactions between plants, fungi, mites and beetles

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Species of *Ophiostoma* include some of the world’s best known fungal pathogens of trees. Most members are vectored by arthropods. One of the most unusual niches in which *Ophiostoma* species have been found is within the infructescences of *Protea* species in South Africa. Recent molecular phylogenetic reconstructions on *Ophiostoma* s.l. suggested that the three *Ophiostoma* spp. specifically found in *Protea* infructescences, form a strongly supported monophyletic lineage within *Ophiostoma* s.s. In this study, new collections of *Ophiostoma* from *Protea* infructescences were subjected to molecular phylogenetic reconstructions based on large subunit, ITS and beta-tubulin sequence data. Using these techniques, at least five undescribed species of *Ophiostoma* have been identified from these plants. Intriguingly, our results also suggest a polyphyletic origin for the *Protea*-associated *Ophiostoma* spp. This indicates multiple invasions of this unusual niche, by these fungi. Our results also revealed the first case of an *Ophiostoma* sp. jumping hosts between a native *Protea* sp. and the non-native tree genus *Eucalyptus*. The second aim of this study was to identify putative vectors of the *Ophiostoma* spp. inhabiting *Protea* infructescences using both molecular and direct isolation methods. The presence of reproductive propagules of *Ophiostoma* spp. was confirmed on four *Protea*-associated mite species (*Oodinychus* sp., two *Tarsonemus* spp. and *Proctolaelaps vandenbergi*) at high frequencies. The *Oodinychus* sp. mite showed significantly higher reproductive rates when fed exclusively on *Ophiostoma splendens* than when it was fed on various other fungi. This suggests a mutualistic association between the *Oodinychus* sp. and *O. splendens*. Long distance dispersal of these mites was restricted to vectored dispersal via *Protea*-infructescence inhabiting beetles (e.g. *Genuchus hottentottus*). Mites collected from