group of flies with moderate proboscis lengths and their association with *Plectranthus*.

doi:10.1016/j.sajb.2007.02.100

The origins of humic-coloured waters of the South Western Cape

S.C. Power, M.D. Cramer, J.J. Midgley
Department of Botany, University of Cape Town, Private Bag, Rondebosch 7701, South Africa

Darkly coloured rivers and lakes are a common feature of the landscape in the Cape Floristic Region (CFR) of South Africa. The colouration of the water varies within the region, but is generally considerably darker than in areas outside the CFR. We addressed the question of why the CFR, in particular, has dark coloured waters. We analysed the chemical constituents of rivers in the region, the quantities of humic compounds in leaf leachates of CFR vegetation and other vegetation types and the effects of nutrients on the capacity of CFR soil micro-organisms to degrade humic compounds. The concentrations of total organic carbon, humic compounds, Fe and pH were all positively correlated with water colouration. The concentration of Fe was positively correlated with the concentration of humic compounds ($r^2=0.3173$, $p<0.05$). This may indicate that Fe was bound to humic compounds. Leaves of CFR vegetation produced significantly greater concentrations of humic acid in leachates than in leaves from other vegetation types. However, the concentration of humic compounds leached from CFR leaves were only 1.4 fold greater than those from other vegetation types. The release of humic compounds from CFR soils on average increased by 113 mg L^{-1} when incubated with 0.2 mM K_2HPO_4, probably because P displaced humic acid from the soil. In contrast, 0.5 mM NH_4NO_3 lowered the humic acid concentrations, possibly indicating N facilitated microbial breakdown of humic carbon. We conclude that, although the large amount of humic compound in the leachates of CFR vegetation contributes to the dark colouration of the river waters, the oligotrophic nature of the soils restricts humic decomposition. The humic compounds likely complex with metals, particularly Fe, causing the loss of Fe from the soils.

doi:10.1016/j.sajb.2007.02.101

The Vegetation of South Africa, Lesotho and Swaziland. Wall Map, Book and CD. How was that done? Behind the scenes of the VEGMAP

L.W. Powrie
Kirstenbosch Research Center, South African National Biodiversity Institute, Private Bag X7, Claremont 7735, South Africa

Some of the technical tricks that were used are presented for the GIS work, for data extraction from PRECIS, ACKDAT, climate, and other sources to create the tables, text and figures in the VEGMAP book. Various tools from the computer toolbox were used, including ArcView, ArcGIS, MSAccess, MSWord, Excel, Visual Basic, Avenue, SQL and other applications in concert with each other. The talk is aimed at you. Whether you be GIS professional or GIS ignorant, technically minded, technologist or technophobe. Hopefully everyone will go away feeling that they learned something of value. Some of you will learn a little about how things were done. But more importantly, it is hoped that each of you will go away aware that many things were done — some novel or new innovations. That means that they are possible to do and thus your own team can accomplish many things perhaps not previously considered. I demonstrate how the Biomes and Bioregions maps were dissolved from the Vegetation map; the creation of some of the images — map strips; GIS layers; biomes collage; climate diagrams; highlighting small vegetation patches on a national map; altitude profiles; decision tree; overlaying maps such as 'old and new'; species lists from raw to polished, and candidates for species lists; mail merge tricks. Hopefully your horizons will be broadened as were the horizons of the members of the VEGMAP team as they invented new ways to combine and use data and techniques to produce the VEGMAP wall map, book and CD. Enjoy this peek behind the scenes of this exciting set of products.

doi:10.1016/j.sajb.2007.02.102

Acclimation of the maize transcriptome to CO_2 enrichment

A. Prins [a,b], P. Verrier [a], K.J. Kunert [b], C.H. Foyer [a]
[a] *Rothamsted Research, Harpenden, Hertfordshire AL5 2JQ, United Kingdom*
[b] *Department of Botany, University of Pretoria, Pretoria 0002, South Africa*

Atmospheric change presents multiple challenges for the sustainable management of agricultural ecosystems. We have examined the physiological and genetic responses of C_4 plants to rising atmospheric CO_2. Maize plants benefit from growth with CO_2 enrichment. Moreover, photosynthesis is regulated differently on the adaxial and abaxial sides of the leaf in response to increasing CO_2. While one side of the maize leaf shows classic C_4 type response to changes in CO_2 availability, the other displays responses that are indicative of C_3 photosynthesis. The leaf transcriptome was compared in young and senescent maize leaves from plants grown to maturity either in air (350 ppm) or with CO_2 enrichment (700 ppm) to identify novel proteinases and proteinase inhibitors that control

senescence and high CO_2 responses. The effect of CO_2 enrichment on the transcriptome was small compared to that of senescence. High CO_2 induced a change in the abundance of only 90 transcripts in young fully developed green leaves while 142 transcripts were modified in senescent leaves subjected to the same treatments. Of these, 18 high CO_2-modified transcripts were identical in both young and senescent leaves. We conclude that these sequences are specifically affected by CO_2 enrichment rather than plant development. In contrast, over 3000 transcripts were differentially expressed in senescent leaves compared to young leaves regardless of the CO_2 enrichment. Moreover, nearly 2500 of these sequences were identical in plants grown in air and with CO_2 enrichment. We conclude that these transcripts are specifically regulated by development, regardless of the CO_2 environment. The high CO_2 transcriptome displayed a signature indicative of oxidative stress.

doi:10.1016/j.sajb.2007.02.103

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

G. Prinsloo, E. Van der Heever, M. Mofokeng
Agricultural Research Council (ARC) — Vegetable and Ornamental Plant Institute (VOPI), Roodeplaat, Private Bag X293, Pretoria 0001, South Africa

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.

doi:10.1016/j.sajb.2007.02.104

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

G. Prinsloo [a], J.J.M. Meyer [a], A.A. Hussein [b]
[a] *Department of Botany, University of Pretoria, Pretoria 0002, South Africa*
[b] *National Research Center, Dokki Cairo, Egypt*

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.

doi:10.1016/j.sajb.2007.02.105

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

D. Raimondo, W. Foden, J. Victor, L. Agenbag, R.C. Turner, N. Helme
Threatened Species Programme, SANBI, Pretoria Botanical Gardens, 2 Cussonia Avenue, Brummeria 0184, South Africa

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