communities. Preliminary results reveal that no species could be directly linked to the uranium-rich soils. However, certain species present in the control area were found to be absent from the study area. It was found that most of the study area is covered by quaternary alluvium which probably acts as a barrier, preventing any direct influence on the vegetation of the study area.

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Phylogenetic re-assessment of generic boundaries in South African Campanulaceae with an emphasis on *Roella*, *Merciera* and *Prismatocarpus*

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A phylogenetic hypothesis based on morphological and DNA sequence data is proposed for the South African members of the Campanulaceae *sensu stricto*. This hypothesis is used to re-assess the questionable generic boundaries in the family, focusing on the closely related genera, *Roella*, *Merciera* and *Prismatocarpus*. Parsimony analysis revealed a well supported clade (bootstrap 100%) comprising all representatives of these three genera. Within this group, *Roella* is paraphyletic compared to the other two. Several options of translating the phylogeny into a classification are explored. This process was guided by the primary principle of monophyly followed by stability in nomenclature, strong statistical support for recognised taxa, maximum phylogenetic information and ease of identification and diagnosis. The results obtained favour the inclusion of all species of *Merciera* and *Prismatocarpus* in *Roella* to obtain a monophyletic, well supported genus with three informal subgroups.

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Taxonomic study of *Nananthus vittatus* (N.E. Br.) Schwantes

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Nananthus vittatus is a member of the family Aizoaceae, which contains about 126 genera and 1100 species of which 96% occur in South Africa. This species is endemic to southern Africa. It is a small plant with succulent leaves and roots; the leaves are generally bright green with white spots (idioblasts) covering the adaxial and abaxial surfaces. The flowers are yellow with a central red stripe on the corolla lobes. The mechanism of seed dispersal is through a higrochastic fruit and the seed is only dispersed in the immediate environment, which results in local small communities. In the past identification of the genus *Nananthus* and especially *N. vittatus* was problematic. The main aim of this study was to improve the previous description of the species by providing new information. All aspects of the plant growth were studied but in depth studies were done on the external morphology of the plant using a scanning electron microscope for leaf surfaces, pollen and seeds. Specimens from the Potchefstroom city area and Wolmaranstad area were used in this study. The plants were monitored for a period of 10 months (November 2005–September 2006) and the different growth phases were recorded, which is important for this species because its appearance can change dramatically throughout the year and under different growing conditions. This is one of the reasons why identification in the past proved to be troublesome. The end result was a complete description of the species. The population growing in the Potchefstroom city area is under threat of local extinction because of the general ignorance of the governing bodies that are unknowingly destroying its natural habitat. With this study more awareness can be created of this species that is a precious part of our natural heritage.

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Managing roads, rivers and power line servitudes as biodiversity corridors through the landscape

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National and Provincial road verges are managed to promote road safety and conserve biodiversity. In most cases the management is carried out by contractors and funded by the Extended Public Works Programme. In some cases, over zealous management or poor training appears to be damaging roadside vegetation and promoting weeds without necessarily improving road safety. Similarly, the clearing of vegetation below power lines can cause damage to vegetation or soil or result in introduction and establishment of invasive alien plant species. A related

issue is the clearing of invasive alien plants from river corridors to conserve indigenous vegetation and improve river flow and water yield. However, depending on the density and nature of the alien vegetation and the clearing method, such management sometimes results in erosion that defeats the clearing objectives. The roads and rivers workshop in June 2006 brought together road safety managers, conservation managers and other interested parties to develop "best practice" guidelines acceptable to all parties.

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Factors controlling denitrification in a southern African semiarid savanna: Kruger National Park

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Nitrous oxide is an important greenhouse gas which is involved in the catalytic destruction of stratospheric ozone. The importance of denitrification in semi-arid savannas, particularly those in southern Africa, in terms of their contribution to global N_2O emissions is not certain due to the paucity of data. This study aimed to determine the potential denitrification rates of soils at five positions along a toposequence on the granitic soils of the Kruger National Park using a laboratory based denitrification enzyme assay as well as determining the factors that affect denitrification in this system. Field N_2O measurements were taken to establish the relationship between potential denitrification and the actual emissions of N_2O, although the field N_2O emissions are likely to under represent the actual denitrification levels in the soil as N_2O is not the only product of denitrification. The potential denitrification rates were found to be low and ranged from 0.05 ± 0.05 μg N kg^{-1} h^{-1} to 32.97 ± 29.36 μg N kg^{-1} h^{-1}, with the uplands having the lowest potential for denitrification and the lower parts of the slope the highest potential. The field N_2O emissions were three orders of magnitude lower than the potential denitrification rates, due to the fact that the soils were never wet enough for denitrification to occur at optimal levels. In fact it is thought that the N_2O detected in the field in this study may be from nitrification and not denitrification as the maximum WFPS measured was 42%. The WFPS was found to have the strongest relationship with the potential denitrification rate ($R^2 = 0.3027$, $p < 0.01$) of all the potential controlling factors. It was concluded that due to low potential denitrification rates, the potential contribution of semi-arid savannas to the global N_2O emissions is very low.

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Sweet Aromas: Electronic olfaction of post-harvest sugarcane deterioration

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Post-harvest sugarcane deterioration in the South African sugar industry results in revenue loss estimated to be ZAR 6 million per annum. This loss is incurred through in-field sucrose breakdown, caused by post-harvest stalk metabolism and microbial proliferation, and reduced milling efficiencies that result from elevated levels of the by-products of such biological activity. Consequently, the South African Sugarcane Research Institute (SASRI) has embarked on a major project to model the factors and effects of post-harvest cane deterioration, with a view to formulating better management practices to reduce deterioration-associated losses. Factors that influence the severity of deterioration are the length of the harvest-to-crush delay and ambient temperature. Harvesting practices also have a strong effect, primarily through harvest-associated stalk damage, the extent of which influences the degree of microbial colonisation of the stalk. Post-harvest management strategies under development at SASRI encompass the exploration of novel ways to determine the severity of deterioration prior to cane entry through the mill-gate. To this end, the capacity of an electronic olfaction device (Cyranose® 320) to detect and distinguish amongst cane at various stages of deterioration has been assessed. Internode 11 from harvested stalks of 18 month-old *Saccharum* spp. hybrid cv. N19 were inoculated with 1×10^4 colony forming units of *Leuconostoc mesenteroides*, a major causative agent of post-harvest deterioration, and incubated individually within one litre glass bottles for varying time periods (2 to 10 days) at 28 °C. Variations of this basic experimental design were used for the pre-training, training and cross-validation of the instrument. During pre-training, user settings of the device were optimised, including the pump setting, head-space development time and sample draw time. Based on these settings, four separate methods were used to train the instrument on ten replicate inoculated cane samples that were incubated at 28 °C for ten days, with sampling every