Antiplasmodial and antibacterial agent(s) from Vernonia angulifolia DC

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Because of its use in traditional medicine Vernonia angulifolia was investigated for antiplasmodial and antibacterial activity. The acetone leaf extract was tested against a chloroquine sensitive (CQS) strain of Plasmodium falciparum (D10) and Staphylococcus aureus. The Minimum Inhibitory Concentration (MIC) of the crude extract was 0.391 mg/ml, while the antiplasmodial activity gave an IC50 of 3 μg/ml. Using activity guided fractionation, antibacterial and antiplasmodial compound(s) were isolated from the acetone leaf extract and subsequently identified.

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Pollen as a reward for birds. The unique case of weaver bird pollination in Strelitzia reginae

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★ Awarded Van Staden Prize for best oral presentation by a MSc student

The pollination of the iconic Strelitzia reginae flowers has long been assumed — birds land on the fused blue petals which enclose the anthers. While standing on this structure and probing for nectar, the two petals are opened and the pollen dusted onto the feet or breast of the visiting bird. In most cases these deductive interpretations have assumed that the ubiquitous and glamorous Sunbirds are the primary pollinators of S. reginae. We confirm Skead’s observations that S. reginae is in fact pollinated by Cape Weavers that not only utilize nectar as a reward, but also eat substantial amounts of the pollen compliment of each flower. In contrast, sunbirds were never observed to make contact with the reproductive parts of the flowers suggesting that these birds are nectar thieves. Using pollen staining techniques, we are able to estimate the fates of pollen and show that the majority of the pollen is lost from the system and presumed to be eaten by the pollinators. Much smaller fractions are deposited on self stigmas or exported to other stigmas. These observations shed light on the unique floral morphology of Strelitzia reginae.

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Grass competition induces N2 fixation in some species of African Acacia

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Indigenous species of Acacia are very common in African savannas that have N-rich soils. This raises some doubt regarding the extent of plant dependence on N2-fixation. Do Acacia spp. enjoy an advantage over other tree species on N-replete soils? We tested the hypothesis that competition by grass for nutrients would induce increased nodulation of Acacia
How many species of conservation concern will be conserved if we conserve threatened ecosystems?

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South Africa’s Biodiversity Act (2004) stipulates that species may only be listed as threatened if they are threatened by activities listed in chapter 4 of the Act. Threats such as agriculture and the effects of invasive aliens are not listed as one of these restricted activities even though agriculture is one of the main threats to plant biodiversity in the Cape Floristic Region (CFR). As a result a large proportion of the Red Listed plant species in the CFR are not listed on the Department of Environmental Affairs and Tourism’s (DEAT) national list of threatened species. The rationale for not listing species threatened by habitat transformation is that they will be protected by the listing of threatened ecosystems. Justification for the reasoning that threatened species should be protected by listing threatened ecosystems is however non existent. This paper will therefore investigate these two key questions: a) How many species of conservation concern (CR, EN, VU, R, NT, and DD) and threatened species (CR, EN, and VU) will be conserved if we conserve threatened ecosystems. b) How many species of conservation concern and threatened species are conserved in and out of protected areas? Data used in this analysis includes historical and recent records from geo-encoded herbarium specimens as well point locality observation data from CREW, the Lowlands project, the Protea Atlas and the Little Karoo project. Collectively these data amount to more that 80,000 plant locality records in the CFR. Preliminary results show that 65% of species of conservation concern will be protected in at least one location if plants are conserved in protected areas (category one) and Critically Endangered ecosystems. However, 61% of species of special concern outside of category 1 protected areas will have no protection if we conserve only threatened ecosystems.

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Biochemical changes in soybean root nodules during development and senescence — effects of dark chilling

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The infection of soybean roots by Bradyrhizobium japonicum bacteria leads to the formation of root nodules in which symbiotic nitrogen fixation (SNF) occurs. This process requires sucrose obtained from the leaves. Sucrose is hydrolysed in the nodules by sucrose synthase (SS) and in return N2 is fixed into export products known as ureides. Even under optimal conditions root nodules have a limited lifespan and certain environmental extremes often leads to premature nodule senescence. Despite this agricultural problem the precise mechanisms underpinning these events remain poorly characterised. The main aim of this study was to obtain information regarding the mechanisms involved in premature nodule senescence in response to low night temperatures (dark chilling). Soybean genotypes of contrasting tolerance, PAN809 (chilling sensitive) and Highveld Top (chilling tolerant), were grown in pots under optimal day/night temperatures in a glasshouse. Root nodules were harvested weekly during a growth period of ten weeks to determine SS activity and ureide content. In addition, changes in levels of key nodule proteins (e.g. leghaemoglobin) were determined. Results demonstrated that SS activity was the highest during the early stages of development where after it decreased slightly to stable activity levels during maximal SNF. Eight weeks after sowing SS activity and leghaemoglobin content decreased considerably indicating the onset of the senescence phase. An unexpected finding was that nodule ureide content actually increased and that this increase preceded the