and conservation action. In addition, CREW has initiated some interesting projects over the past two years including the Tulbagh Renosterveld Project and Plant Monitoring Day. Both these projects have been successfully implemented and the results will be presented.

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Chitosans in plant protection

N.E. El Gueddari, B.M. Moerschbacher
Department of Plant Biochemistry and Biotechnology, Westphalian Wilhelms-University of Münster, Hindenburgplatz 55, 48143 Münster, Germany

Partially acetylated chitosan polymers exhibit anti-microbial activities and disease resistance inducing activities in plants, indicating a potential to be used as novel plant protectants with a dual mode of action. However, reliable results were obtained in the past only when excessive amounts of chitosans were applied to crop fields. Failure to yield reproducible results at economically reasonable chitosan doses might be due to batch-to-batch differences between commercial chitosans. When series of chitosan polymers which were well characterised concerning their degree of acetylation (DA) or polymerisation (DP) were used, their physico-chemical properties clearly determined their biological activities. In order to establish more detailed structure/function relationships, we have now started to also work with series of partially acetylated chitosan oligomers. We have partially hydrolysed a chitosan polymer (av. DP_n 962) with a DA of 42%, and we have purified a series of oligomers ranging in DP from 1 to >19, all of them having DAs between 34 and 53%. These oligomers were analysed for their elicitor activities towards suspension-cultured wheat cells, and oligomers with a DP above 4 were shown to elicit a rapid oxidative burst. We are currently testing these oligomers for their antimicrobial activities. We have also prepared a mixture of fully de-acetylated chitosan oligomers with DP ranging from 3 to 9, and this mixture was then partially re-acetylated to yield a series of oligomer mixtures ranging in DA from 0 to 90%. These mixtures are now being tested for their elicitor activities in suspension cultured plant cells, and for their anti-microbial activities.

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The fly who shagged me: Drivers of floral diversity in *Gorteria diffusa*

A.G. Ellis, S.D. Johnson
School of Biological and Conservation Sciences, University of KwaZulu-Natal Pietermaritzburg, Private Bag X01, Scottsville 3209, South Africa

The spots on the ray florets of the beetle daisy are complex structures which have a clear function in the attraction of bee-fly pollinators. Intriguingly this functionally important floral trait varies considerably across the range of the species. In this talk I will uncover the morphological complexity of floral diversity within the *Gorteria diffusa* complex and then present research designed to elucidate the evolutionary drivers of floral diversification in this species. I show that floral diversity in *G. diffusa* has not arisen through pollinator shifts, but instead may have arisen through selection imposed by different behaviours within the same pollinator species. In addition I find variation between floral forms in the degree of pollinator specialization suggesting that floral diversification may occur in response to spatial variation in the relative intensity of selection imposed by the dominant bee-fly visitor.

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A potentised leaf extract of *Melianthus comosus* has higher activity than six commercial products used against plant fungal pathogens

J.N. Eloff, I. Angeh, L.J. McGaw
Phytomedicine Programme, University of Pretoria, Private Bag X04, Onderstepoort 0110, South Africa

M. comosus occurring only in southern Africa is used traditionally to treat bacterial infections although its roots contain toxic heart glycosides. A company was interested in developing an antibacterial product for the veterinary market. The antibacterial activity of extracts was not high enough to pursue any further. It, however, had excellent antifungal activity against animal pathogens, but the toxicity would have complicated the development of a product. We then evaluated the activity against plant fungal pathogens. Extracts had excellent activities against 10 plant fungal pathogens investigated (*Rhizoctonia solani*, *Fusarium oxysporum*, *Penicillium janthinelum*, *Penicillium expansum*, *Colletotrichum glocosponicales*, *Trichoderma harzianum*, *Pythium ultimum*, *Phytophthora nicotiana*, *Aspergillus niger* and *Aspergillus parasiticus*). The extract contained one major antifungal compound and this compound was isolated and characterized. By selective extraction and solvent fractionation an extract with an average MIC of 0.066 mg/ml against all ten fungal pathogens was obtained. Ignoring MIC values of 0.16 mg/ml against *Penicillium expansum* and *Aspergillus niger*, the average MIC for the other fungi was 0.04 mg/ml. The acetone extract stored at room temperature for a month did not lose activity. The dried extract was slightly soluble in water and ethanol, reasonably soluble in ethyl acetate and highly soluble in acetone. The potentised extract had a higher antifungal activity than six commercially used fungicides against some important plant fungal