flower colour differences between them. We found that foreign pollen drastically reduces female fitness through decreased seedset. Post-mating barriers were very strong between species and no hybrid seeds were formed. *Oxalis* species were also unable to self and as such are heavily dependent on their pollinators for seedset. Some species were pollen limited and could experience even stronger pollinator-mediated selection. Despite the clear benefits of divergence in flower colour between sympatric species, we found a clustered pattern of flower colour within communities. This was determined by comparing the observed flower colour composition in 24 *Oxalis* communities to that of random communities generated through null models. Many of the observed *Oxalis* species were relatively rare in their communities and the clustered pattern could be a result of facilitation acting to increase pollinator availability to them. It seems that balanced selection through facilitative and competitive processes may be operating within communities of co-flowering *Oxalis*.

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A phylogenetic study of the genus *Cussonia* (Araliaceae) based on morphological, anatomical and molecular data

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The Araliaceae are relatively poorly represented in Africa, with five genera indigenous and one naturalised. The genus *Cussonia* Thunb. comprises 21 species and is endemic to Africa, the Arabian Peninsula (Yemen) and the Comoro Islands. The genus is well known and is widely distributed in the tropical forests, woodlands and savannahs of Africa. No recent taxonomic study of the entire genus is available and infrageneric relationships are still obscure. *Cussonia* and the related genus *Seemannaralia gerrardii* (Seem.) Harms, together with *Schefflera* J.R. & G. Forst., are critical to an understanding of the evolution and diversity of Araliaceae in the Old World. This is demonstrated by recent evidence, based on plastid (*trn*L-*trn*F) and nuclear (ITS) data, indicating that these three African genera form part of a broad polytomy at the base of the core Araliaceae. Sequence data of 15 *Cussonia* species and several other species representing the Araliaceae basal polytomy, namely *Seemannaralia gerrardii* (1), *Osmoxylon* species (3), *Astrotricha* species (3) and members of *Schefflera s. str.* (17) were used. The genus *Hydrocotyle* was used as polarizing outgroup. The nuclear sequence data of the internal transcribed spacer (ITS) and the external transcribed spacer (ETS) were investigated for phylogenetic resolution. The ETS region, unfortunately, showed a rather unconvincing phylogeny, as some species were obviously misplaced. The ETS data set is incongruent with the ITS region and consequently the two data sets were not combined. The ITS region, however, produced a useful result. It showed that 1, the *Schefflera* species from Africa and Madagascar form a clade separate from those of the Pacific islands; 2, *Cussonia, Seemannaralia* and Malagasy *Schefflera* are successively sister taxa; 3, *Cussonia* is monophyletic; 4, three distinct clades are observed within the genus, namely the *C. paniculata*-, *C. arborea*- and *C. spicata* groups. The morphological and anatomical data were analyzed cladistically and consisted of 15 discontinuous characters, with *Seemannaralia gerrardii* and *Schefflera umbellifera* used as outgroups. This result partially supports the same groupings as seen in the ITS phylogeny.

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Endophytic fungi in native and exotic *Acacia* species in South Africa – Friend or foe?

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Fungal endophytes are asymptomatic colonizers of virtually every plant species for all, or at least a significant part, of their life cycle. These fungi are known to be important for the structure, function, and health of plant communities. In fact, without fungal symbioses, plant communities do not survive many environmental stresses. Mutualistic fungi have been shown to provide the host with additional defences against diseases and pests with induced resistance and/or competitive exclusion, enhanced drought, salt and temperature tolerances and enhanced growth, independent of apparent biotic or abiotic stresses. The mechanisms through which invasive species alter native ecosystems may depend on association of the invaders with microbial mutualists. Current research suggests that invasive species can strongly affect ecosystem properties. One of our research objectives is to determine to what extent fungal endophytes are responsible for the invasiveness of *Acacia saligna* in introduced habitats. Specifically, we will test the hypotheses that introduced (non-native) *Acacia* species will have a less diverse endophyte community than indigenous (native) *Acacia* species. Samples of native and invasive *Acacia* species, including *Acacia karroo*, *A. saligna* and *A. paradoxa* will be collected. Isolations will be made from stems, showing no disease symptoms, and seeds collected from soil surrounding the sample trees. After isolation, stem and seed cultures will be classified morphologically, using microscopic and culture characteristics. Abundance, presence/absence and diversity indices data will be evaluated. The results and conclusions will be presented in the paper. There are potential ecosystem effects associated with the increase and decline of invasive plants species in natural areas including changes in native species diversity, ecosystem processes, and food webs. The research

will further our understanding of the role fungal endophytes play in the success and/or failure of invasive plant species in natural areas.

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Biodiversity assessment: Farm Kyffhäuser, Namibia

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Namibian relatives of southern African plant taxa are often neglected or omitted from taxonomic and systematic studies, in part due to limited knowledge available for Namibian taxa, and in part due to problems concerning the logistics of collecting and correctly identifying Namibian plants. Here we introduce a new initiative to document, identify and make botanical data available from the farm Kyffhäuser, located just south of the species-rich Naukluft Mountains in Namibia. We present an overview of the habitat diversity (including rainfall patterns, river drainage systems, elevation and topography) of the region, followed by an up to date list of all plant taxa collected and identified to date. We evaluate this botanical diversity by listing rare and or endangered taxa discovered, along with numerous taxa found to present range extensions into this region. We consider weeds and invasives common to this area, and highlight some interesting plants recorded from the farm. Finally we introduce the website that has been established for Kyffhauser, and invite future collaborations.

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Grassland ecology along an urban–rural gradient using GIS techniques in Klerksdorp, South Africa

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Urban areas represent complex assemblages of unique vegetation communities. The multitude of influences on cities adds to this complexity and understanding the underlying patterns and processes operating in urban areas becomes increasingly important with large scale urbanisation. The urban–rural gradient approach often used to study these patterns and processes, aims to quantify the existing gradient allowing comparisons of vegetation at different locations, each with diverse human influences. However, accurately quantifying the urban areas became difficult with the realisation that gradients are non-linear and complex. Previous studies were not truly comparative due to differences in measures used to quantify the gradient and a lack of a well-defined definition for urban areas. Our study in Klerksdorp (North-West Province, SA) focused on testing a model developed in Melbourne (Australia) in an attempt to contribute towards creating a standard set of measures to quantify the urban–rural gradient. The methods used in Melbourne aimed to set a general standard with which to globally compare urbanised areas taking into account the entire extent of the study area allowing multidimensional insights into the unknown gradients. In our study, satellite imagery and GIS techniques were used to calculate measures representing demographic and physical variables, as well as landscape metrics. PCA and subsequent factor analysis of the 12 chosen measures showed the observed variation explained by both landscape and demographic measures. One measure per group was chosen to further represent the gradient. In addition, potential changes in grassland ecology were identified with vegetation surveys studying both the extant vegetation and the soil seed bank. Results indicated clear differences in the vegetation composition of comparable grassland patches at different locations along the gradient. This shows that urbanisation does influence vegetation composition and survival. Patterns and processes emerging from these studies could drastically influence planning and implementation actions concerning human development.

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On the evolution of leaflessness and morphometric studies of the *Psoralea aphylla* complex (Fabaceae)

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Leaf morphology within the genus *Psoralea* is highly variable, ranging from a complete absence of leaves, to a reduction of leaves into scales, to simple broad leaves or tiny filliform leaves, up to compound leaves made up of 3 to 11 leaflets. The leafless members of this genus form a species complex variously included in *Psoralea aphylla* (here referred to as the "*aphylla group*"). All *Psoralea* are leafy at seedling stage and the aphylla group has secondary reduction or complete loss of leaves. Whether this complex represents a single polymorphic species or multiple taxa that need to be recognised as distinct entities is not clear. In this paper, the taxonomy of the aphylla group is revisited to test the hypothesis that the loss of leaves is a single evolutionary event and hence members of the aphylla group represent a monophyletic entity. A phylogeny of *Psoralea* based on nuclear and chloroplast DNA sequence data is presented. Ancestral trait reconstruction for the presence or absence of leaves is performed on the phylogeny using maximum likelihood. Taxon delimitation is inferred from a