characteristic traits in common: The plant hosts (ca. 1300 species of 10 families are known) are pollinated by bees (melittophilous) and constitute a special group that usually lacks nectaries (except Cucurbitaceae) and produces instead a liquid, high energy reward consisting uniformly of one class of relatively hydrophilic acyloxy-fatty acids with chain lengths of 14–18 carbon atoms, usually bound as mono- or diglycerides. They are produced by special, often paired floral gland fields (elaiophores), which may be epidermal epithelia or trichome cushions located on various floral parts. Certain bees, always the females, collect the oil with their specially equipped legs or the ventral metasoma. The mouth parts are never involved except in rare cases of direct ingestion. The oil, mixed with pollen of the oil host or from non-oil flowers, is exclusively used as provision for the larvae and, in addition, often serves as a solidifying material for sealing the brood cell walls. Adults of both sexes take up nectar from non-oil flowers for their own nutrition. Oil flower systems are rare among the other flower guilds. The paleotropic system extends from SE-Asia to New Guinea and Australia, but is also represented in tropical Africa. The mutualism between the cucurbitaceous, mostly dioecious genera *Thladiantha* and *Momordica* is exclusively visited by the bee genus *Ctenoplectra*. The females mop the large trichome fields by sweeping their metasoma across. A paleartic/neartic system is constituted by the association of *Lysimachia* (Primulaceae, Subgenus *Lysimachia*) with the melittid genus *Macropis*. These bees harvest the oil with the front and middle leg pairs from the trichomatic elaiophore covering the staminal column of the host. The complex has its centre in China but extends to Europe and (Subgenus *Seleucia*) to North America. The largest oil flower domain is neotropical and is distributed from Texas as far as Patagonia. The host plants evolved here include members of 7 families: Malpighiaceae (36 genera), Krameriaceae (*Krameria*), Solanaceae (*Nierembergia*), Scrophulariaceae (4 genera), Calculeolariaceae (Calceolaria), Iridaceae (4) and Orchidaceae (<9). Their guests are throughout endemic anthophorid bees of the tribes Centridini (2 genera), Tapinotaspidini (4) and Tetrapediini (1). Depending on genera, they may gather the oil with front or mid legs or the metasoma. Flowers are often alternatively adapted to big-sized Centridini or to the small-sized members of the two other tribes. Some most important pollination mechanisms of the plants involved and the collecting procedures of the bees are explained and illustrated. The origin of the oil flower symbiosis probably dates back to the early Tertiary. The evolution of the neotropical system may perhaps have started from the Malpighiaceae, later followed by the mainly herbaceous taxa. The partly controversial ecological aspects of some oil-bearing neotropical taxa systematically connected with their Old World relatives (Malpighiaceae, Hemimerideae, Iridaceae) are discussed.

Climate change, drought and biodiversity: An ecophysiological perspective

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A seeming certainty of climate change is that changes in temperature and precipitation will impact ecosystem water balance. In the Mediterranean-type climate zone of South Africa, future climate simulations predict warmer temperatures and a reduction in precipitation, leading to more frequent and intense periods of drought. A change in the duration and intensity of drought is likely to have profound impacts on the highly diverse and endemic flora of the Cape Floral Region (CFR), as this flora may have radiated in relatively mesic and stable climate conditions. However, uncertainty in climate predictions (particularly for precipitation) coupled with a poor understanding of species responses to drought, leaves us with very little concrete information about what the specific impacts may actually be. Thus, the challenge facing ecologists is to understand, mechanistically rather than correlatively, how species will respond to changes in the water balance and to do this in a region with extraordinary levels of plant diversity. Can obtaining ecophysiological data help improve our understanding of what lies ahead for fynbos plants in the face of climate change? Using a recently developed theoretical framework by McDowell and colleagues (2008), together with new data from experimental studies in the fynbos, I explore the potential for improving our estimates of drought-related impacts in the CFR. I show the potential for detecting categories of plant responses to drought that will improve our ability to predict the impacts of future climate in the region, and highlight areas where improvements in our knowledge are needed.

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Looking for phylogenetic patterns in species lists

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The availability of published phylogenies has made it increasingly easy to look at how phylogenetic patterns relate to ecological or environmental patterns (arguably leading to a rebirth of community ecology). However, the analytical frameworks do not always exist, or have been poorly tested. Nonetheless, phylogenies open up fascinating insights into many aspects of life (not just biology!). We illustrate this with a...
Pollen viability, pollen germination and pollen tube growth in *Jatropha curcas* – A potential oil seed crop for biodiesel

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Experiments were conducted to investigate pollen viability, *in vitro* pollen germination and *in vivo* pollen tube growth in *Jatropha curcas*. Light and fluorescence microscopy were employed to examine the different developmental stages. It was possible to determine pollen viability and distinguish between fresh and dead pollen using 2,3,5-triphenyltetrazolium chloride (TTC). Pollen germination was significantly higher in agar-based medium composed of sucrose, boric acid and calcium nitrate compared to the control treatment (distilled water). Supplementation of IAA to the different media significantly increased pollen germination and pollen length compared to the control treatment. Pollen from hermaphrodite flowers had a lower viability, lower germination rates and shorter pollen tubes, with abnormal shapes, compared to the pollen from male flowers. Pollen tubes from both self- and cross-pollinated flowers entered the ovary within 8 HAP (8 h after pollination). However, at 6 HAP, the pollen tube length and growth rate were significantly higher in cross- compared to self-pollinated pollen. Our results suggest that TTC is a reliable test for pollen viability; boric acid, calcium nitrate, sucrose and addition of IAA are essential and beneficial for pollen germination in this plant. Pollen germination and pollen tube growth were not inhibited, nor interfered with, as a result of self-pollination treatments. During both types of pollination, fertility is maintained as evidenced by ovule penetration by pollen tubes. This suggests that type of pollination has no influence on the success of fertilization in *J. curcas*.

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Effect of foliar application of plant growth regulators on flowering and fruit set in *Jatropha curcas* – A potential oil seed crop for biodiesel

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Experiments were conducted to determine the potential of different plant growth regulators (PGR’s) to increase seed production in *Jatropha curcas* plants. In the subsequent year following a single foliar application, the parameters of flowering, fruit set, fruit characteristics and total oil content were evaluated. Number of flowers per plant and number of fruits per bunch were significantly affected by the different treatments. However there were no variations in percentage of fruit set. A single foliar application of BA (6-benzylaminopurine) produced more flowers per plant and more fruits per bunch with heavier weight and bigger size compared to MP (manual pruning) treatment. TIBA (2,3,5-Triiodobenzoic acid) at all concentrations produced heavier and more fruits compared to the control and MP treatments. Dikegulac (2,3:4,6-di-O-isopropylidene-2-keto-L-gulonic acid) at 2, 4, and 6 mmol l⁻¹ produced more seeds per fruit compared to MP. Maleic hydrazide (1,2-dihydro-3,6-pyridazinedione, coline salt) produced heavier and bigger fruits with numerous and heavier seeds compared to the control and MP. This study indicates that foliar application of PGR’s can be used in *J. curcas* to increase seed production and improve fruit quality.

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Phylogenetic relationships in southern African *Strychnos* (Strychnaceae) inferred from plastid and its sequences

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This study uses molecular phylogenetic relationships among southern African *Strychnos* to evaluate morphologically-informed sectional distinctions, and to provide some insight into the probable ancestral habitat for the genus. Nucleotide sequences from the nuclear ribosomal ITS2 region, *trnG2S-* *trnS* and *trnL-* *trnF* intergenic spacers of the chloroplast genome were generated for 15 species across six of the 12 sections recognized by Leeuwenberg. Parsimony and maximum likelihood analyses of combined dataset provided better resolution of phylogenetic relationships, with *Strychnos mitis* shown to be sister to the other species. Three main monophyletic clades are...