

Seasonal and inter-annual soil CO₂ efflux in savanna/wetland mosaic in the Okavango Delta, Botswana

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The evaluation of biospheric fluxes and stocks of carbon is of major importance in the context of increasing CO₂ concentration in the atmosphere and the related potential change in climate. We investigated the effects of seasonal changes in soil temperature and soil water content on soil respiration in three different ecosystems, rain-fed grassland, seasonal floodplain and permanent swamp, at the Okavango Delta, Botswana. We further analysed the spatial variation of soil respiration within each site and attempted to relate these variations to the stand structure and to local soil characteristics. The observed large seasonal amplitude of soil respiration rates at the rain-fed grassland and the seasonal floodplain clearly reflected reduced soil water content. By contrast, low soil respiration rates at the permanent swamp in June were caused by the presence of seasonal floodwaters. During the wet season, average soil respiration rates at the permanent swamp and the seasonal floodplain were similar, $9.4 \pm 2.4 \mu\text{mol m}^{-2} \text{s}^{-1}$ and $7.7 \pm 4.3 \mu\text{mol m}^{-2} \text{s}^{-1}$, respectively, and were almost four-fold higher than that at the rain-fed grassland, $2.31 \pm 1.13 \mu\text{mol m}^{-2} \text{s}^{-1}$. Largest day-to-day changes in soil respiration rates as a result rainfall events, approximately 20%, were found at the rain-fed grassland. The Arrhenius type equation, describing the relationship between soil respiration and soil temperature for each site and each season, predicted the seasonal variations in soil respiration reasonably well, $r^2 \geq 0.6$, despite the confounding effects of soil temperature and soil water content since both factors co-vary across seasons.

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Vanadium, an element required by animals but not by plants

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Plants passively take up elements that are not essential to their growth and development. Some of these affect animals that feed on the plants, either favourably as nutrients, or unfavourably as toxins. There are a number of elements that are thought to be required by animals, but not by the plants on which they feed. These include Na, I, Co, Se, Cr, Sn, F and V. Since crops are not usually supplied with these elements, it is possible that through continual cropping they may become depleted in the soil and therefore not be available in sufficient concentrations to the animals that feed on these plants. This work tested the effects of Vanadium, a ubiquitous yet understudied element, on the growth and mineral nutrition of a root crop (turnip) and a leaf crop (spinach). The element was supplied in the form of ammonium vanadate (NH₄VO₃) in five concentrations on a logarithmic scale from 0 to 20 mg L⁻¹, chosen specifically to determine the concentrations at which effects are noticed, due to the fact that no definite mean or toxic level has been described in literature. Sand culture was used in a random block experiment including five replicates. Only at the highest level of 20 mg L⁻¹ was growth significantly reduced, and the chemical composition significantly affected.

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An investigation on the biological activity of *Acacia robusta* subsp. *robusta*

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Acacia robusta subsp. *robusta* (Mimosaceae) is used in folk medicine to treat throat infections. Methanol and dichloromethane extracts of *A. robusta* subsp. *robusta* were screened for antimicrobial activity using disc diffusion method. In this study, root bark methanol extract exhibited activity against some Gram-positive bacteria and little activity against some Gram-negative bacteria. Dichloromethane extract had little activity against both Gram-positive and negative bacteria. The detection of some antibacterial activity in this plant seems to justify its use by the traditional medical practitioners for the treatment of ailments of infectious nature.

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The function and maintenance of distyly in *Pentanisia prunelloides* (Rubiaceae)

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