39th New Phytologist Symposium

Trait covariation: Structural and functional relationships in plant ecology

27–29 June 2017
Exeter, UK

New Phytologist

Programme, abstracts and participants

P30 Fine-root response to experimental warming in an ombrotrophic peatland

A. MALHOTRA, J. CHILDS, D. J. BRICE, P.J. HANSON, C. M. IVERSEN

Climate Change Science Institute and Environmental Sciences Division, Oak Ridge National Laboratory Oak Ridge, Tennessee, USA

Peatlands are long term reservoirs of carbon (C) and the magnitude and mechanisms of increased C losses from peatlands due to global change are poorly understood. Ephemeral fine roots regulate ecosystem C and nutrient cycling and may be the first to respond to increasing temperatures. Ecosystem warming could increase nutrient cycling rates and decrease belowground carbon allocation. Fine-root traits and rooting depth distribution may also respond to changes in water and nutrient availability. We will present results from the first two years of warming at SPRUCE (Spruce and Peatland Responses Under Climatic and Environmental change), a whole ecosystem warming and elevated CO_2 experiment in an ombrotrophic peatland. Ingrowth cores were used to study changes in woody fine-root traits, chemistry, and production along a temperature treatment gradient (0, +2.25, +4.5, +6.75 and +9 °C above ambient). We observed a 3-fold increase in total fine-root production in the +2.25 and +4.5 °C above ambient treatments. Results also varied by plant functional type (PFT) wherein warming response of root production was unimodal in trees and linear in shrubs. Our results highlight non-linear and PFT-specific warming responses that will be useful to parameterize belowground components of peatland models.

P31 Traits influence the role of trees on ecosystem services: phytostabilization of trace elements and carbon sequestration

J. T. MARAÑÓN, M. GIL-MARTÍNEZ, C. M. NAVARRO-FERNÁNDEZ, M. T. DOMÍNGUEZ, P. MADEJÓN, J. M. MURILLO

IRNAS, CSIC, Avenida Reina Mercedes 10, 41012 Sevilla, Spain

Functional traits of trees affect soil functions and ecosystem services in different ways. Here we studied a restored land affected by a mine-spill in SW Spain. We analysed morphological and chemical traits on leaves and roots of seven afforested tree species with contrasted leaf habit. We evaluated two ecosystem services: 1) the regulation of soil quality by immobilization of trace elements (phytostabilization), and 2) the mitigation of climate change by C sequestration. A main trend of trait variation was associated with higher SLA and SRL, and lower leaf C:N in deciduous species, while a secondary trend separated *Populus alba* with higher leaf Cd concentration. The retention of trace elements on the roots was higher for *Fraxinus angustifolia* and *Celtis australis* favouring the phytostabilization process, while the high transfer of Cd to leaves of *Populus alba* (above toxicity levels) favoured its mobilization, adding a risk for herbivores. In general, soil underneath all tree species accumulated more organic matter than in non-afforested sites, due to a higher litter input and a lower respiration rate. *Ceratonia siliqua* showed a higher C accumulation in the forest floor, a relatively low C:N, and a high soil C density; all favouring C sequestration.