The impact of changes in the amount and timing of precipitation on the herbaceous understorey of Mediterranean evergreen oak woodlands

Marjan Jongen, Xavier Lecomte, and João S. Pereira

Instituto Superior de Agronomia, Technical University of Lisbon, Lisbon, Portugal (fay@ireland.com)

In the Iberian Peninsula, the evergreen oak woodlands, called montados in Portugal and dehesas in Spain, are of great ecological and socio-economic importance. Dominated by evergreen *Quercus* species, these savanna-type woodlands are characterized by a widely separated tree stratum associated with an herbaceous understorey, dominated by C3 annual species. The productivity and biogeochemical cycles of the herbaceous layer are highly dependent on timing and magnitude of precipitation. Climate change scenarios for the region suggest not only increasing air temperatures, but also the possibility of decreasing spring precipitation, accompanied by an increase in the interval between precipitation events, which might cause drought conditions to occur.

To understand the impact of hydrological changes on productivity and ecosystem processes of the herbaceous understorey in these ecosystems, water manipulation experiments are being carried out in Portugal.

In autumn 2009, large ($30 \, \text{m}^2$) rain-out shelters were constructed near Coruche (Portugal), with the aim of studying the effect of precipitation variability on the understorey vegetation in a managed cork oak woodland. Initially, the two treatments in the rain-out shelters will be: (1) ambient precipitation quantity, with a dry period of 7 days, and (2) ambient precipitation quantity with a dry period of 21 days. The 'ambient precipitation quantity' is based on historical precipitation data for the experimental site, with average annual precipitation of 680 mm. In addition to the above two treatments, there will be non-sheltered reference plots, receiving natural rainfall patterns. In the future we aim to reduce the precipitation quantity (-30%) with similar length of the dry periods as above. From February 2010 onwards, we will gather a full data set for environmental variables, as well as productivity, species composition, soil CO_2 flux, soil nitrogen and photosynthesis. Preliminary results will be presented.