ST.06-O-5

Sala 2 - miércoles, 20 octubre, (bloque mañana: 12:15 h.)

Disentangling water sources in a gypsum plant community. Tracing the use of gypsum crystalline water.

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The ability to access different water sources during drought is a key determining factor of the composition of gypsum plant communities growing on gypsiferous soils. Considering gypsum crystallization water as a potential source, we analyzed the principal water sources used by 20 species living in a top gypsum hill and the interaction of the plants with the soil beneath them, assessing differences between species with distinct root depths and gypsum affinities. We characterized water stable isotope composition, d2H and d18O, of plant xylem water and related it with the free and gypsum crystallization water extracted from the top 20 cm of the soil beneath each plant, from different depths along three one-meter-deep profiles and the groundwater, both in spring and summer. We observed a plant-soil interaction in spring, and indirect evidences of a possible hydraulic lift by deep-rooted species in summer. In spring, all species used free water from the top soil as the main source, but in summer, there was a segregation in the water sources, depending on the root depth, but not on the gypsum affinity of the species. While free water from 50-100 cm depth was the main source for the deep-rooted species, gypsum crystallization water was the main source for shallow-rooted species, dominant in the community. Crystallization water of gypsum represents an unaccounted, vital source for most of the shallow-rooted species, dominant in the community, and allows them to survive the arid conditions, contributing to more diverse communities.

ST.06-O-6

Sala 2 - miércoles, 20 octubre, (bloque mañana: 12:30 h.)

Assessment of water balance focused on the green water component in P.halepensis and Q.coccifera stands under Mediterranean dry and semiarid climates

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Water scarcity is one of the main limiting factors in Mediterranean dry-semiarid forest ecosystems. In a context of climate change, predicted raises in aridity require a deep understanding of these communities' water balance. Forest water consumption (green water) emerges as a key component of such balances, as it is a proxy to quantify drought effects on plant's performance, as well as their impact on ecosystem's water yield directly usable by society (blue water). In this work, we have assessed water use and transpirationin coexisting Pinus halepensis and Quercus coccifera stands, by sap flow technique at hourly and daily scales, as well as their contribution to stand evapotranspiration. Our aim was to achieve a detailed understanding of how both species' water use varies alongside environmental conditions, as well as to weight the influence of key environmental drivers. Our results show that water use in P.halepensis, a more isohydric species, is quite determined by soil water content at 30 cm depth, followed by changes VPD. On the other hand, water use in Q.coccifera stands remains relatively stable when soil moisture conditions at this depth grow drier, being mostly determined by VPD dynamics, although their contribution to stand evapotranspiration is lower compared to P.halepensis. Therefore, P. halepensis stands would be quite sensitive to droughts affecting water availability at those soil depths, which accentuates the need of water-oriented adaptative forest management to ensure their functionality under future climate conditions.