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Is dewfall an important source of water in semiarid coastal steppe ecosystems in SE Spain?

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Dewfall phenomena is widely recognised as an important source of water, leading in recent years to an increasing interest in its study. Dewfall deposition can be a significant source of moisture in arid and semiarid ecosystems, thus contributing to improve daily and annual water balances. Occurrence, frequency and amount of dewfall were measured in a Mediterranean semiarid ecosystem (Balsa Blanca, Almería, SE Spain) from January 2007 to December 2009. This area has a sparse vegetation cover dominated by Stipa tenaccisima combined with bare soil and biological soil crusts.

Wetness sensors were used to detect occurrence and frequency of dew events. The single-source Penman—Monteith equation simplified for potential water condensation was used to calculate potential dew amount. Micro-meteorological conditions during dew formation were also measured.

Dew condensation was recorded over 79% of nights during the study period. Dewfall length varied from 1.5 to 16 hours per night with an average of 10.1 $\pm$ 2.9 hours per night. The average dew amount was 0.21 $\pm$ 0.14 mm per night and it was mostly dependent on dew duration. Dew episodes were longer in late autumn and winter and decreased along spring.

Annual dewfall was 41.5 mm in 2007, 57.2 mm in 2008 and 71.1 mm in 2009, which represents, respectively, 13.7%, 18.8% and 18.0% of total rainfall. 2007 and 2008 were average years with 264 mm and 246 mm of rainfall, respectively whereas 2009 was a wetter year with 324 mm of rainfall. The comparison of the contribution of dewfall to the local water balance during a wet (September – November 2008, 146.3 mm rainfall) and a dry period (June - Augustus 2009, 0.8 mm rainfall), represented a dew contribution (dew / rainfall) of 8.4% for the wet but of 2602.0% for the dry period.

These results highlight the relevance of dewfall as a relatively small but constant source of water in arid ecosystems, as well as its significant contribution to the local water balance mainly during dry periods.