



Effect of Juniper tree age on infiltration at different soils and land uses in a Texas Savannah

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Woody plant encroachment is a widespread land-cover change in savannah landscapes. Although it is widely acknowledged that this phenomenon can affect the hydrology and water budget on the watershed scale, the fine-scale hydrological drivers of woody plant encroachment are still little understood. Specifically, there is a need for better understanding of how woody plants modify infiltration in different soil types, and how such modifications can change over time and with land management. Here we contrast infiltration at open areas (grass and bare cover) with infiltration under the canopy of Juniper trees (one of the most common woody plant encroaching on the Southern Great Plains) at the Texas A&M Sonora Research Station in Sonora, Texas. Single ring infiltration experiments following the Beerkan Estimation of Soil Transfer parameter (BEST) method are being carried to obtain the estimated saturated hydraulic conductivity (Ksat) under the canopy of Juniper trees of different sizes (as a proxy for tree age), on different soils (clay and loam) at three locations: (i) an overgrazed site; (ii) a well-managed grazed site; and (iii) an ungrazed site. We predict that infiltration rates will be affected by all variables included in the study (tree size, soil type and management). Specifically, we hypothesize that: (1) trees will progressively increase soil infiltrability up to a certain size, after which further improvements will not be significant; (2) improvements on infiltration will be more pronounced around trees on clay soils and on overgrazed lands—which are expected to have lower infiltrability than loam soils and well managed/ungrazed land. The results from this study will contribute to the growing body of knowledge on the hydrological drivers behind woodland encroachment by shedding a light on how Juniper trees at various development stage improve infiltration differently and how these improvements also depend on soil type and land management.