

Water use patterns of *Caragana korshinskii* and *Tamarix ramosissima* in different ages in western Chinese Loess Plateau

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Abstract

Caragana korshinskii and *Tamarix ramosissima* are pioneer shrubs for water and soil conservation and windbreak and sand fixation in arid and semi-arid areas. Understanding the water use patterns of *C. korshinskii* and *T. ramosissima* and their response to rainfall is of great importance for their survival in regions where drought occurs. In this work we present the monitoring results of stable isotopes in soil water (depths from 0 to 200 cm), twig xylem water of juvenile, intermediate, and adult *C. korshinskii* and *T. ramosissima*. The monitoring campaign took place in western Chinese Loess Plateau from July to October 2020. During the same period, we also measured relevant environmental and meteorological variables and soil water content. The results showed that juvenile and of intermediate age *C. korshinskii* both mainly absorb water from the surface (0–10 cm) and shallow (10–40 cm) soil layers, but adult *C. korshinskii* use mainly water from the deep soil layers. Juvenile and of intermediate age *T. ramosissima* extract water from deep soil layers, while adult *T. ramosissima* use mainly water from middle (40–100 cm) soil depths. Both plant species increase the proportion of surface and shallow soil layer water after precipitation. This increase is more pronounced and faster for the *C. korshinskii* of intermediate age rather than for juvenile and adult plants. On the contrary, it is the absorption of surface and shallow soil water from juvenile and of intermediate *T. ramosissima* plants that fluctuates more after precipitation than from adult plants. Our findings provide a reference for vegetation restoration and ecological management of the western Chinese Loess Plateau.

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