

Study on transpiration rates of *Vicia villosa* and *Bromus inermis* species

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Introduction Ecohydrology is concerned with the interaction between the hydrological and plant processes. Some aspects of the hydrologic cycle, such as transpiration and interception have received little attention owing to difficulties in field measurements. Quantifying the components of water balance for a watershed is crucial for understanding the dominant hydrologic processes occurring in a basin (Flerchinger & Cooley, 2000). Water use by vegetation is controlled by the water uptake by roots, the transfer of liquid water through plants and vapour loss from the leaf surfaces by the opening and closure of the stomata (Roberts, 2000) i.e. transpiration. Comparison of transpiration of rangelands species is a prerequisite for improving range management. The present study is a preliminary comparison in transpiration between two important Iranian rangeland species, viz. the legume, *Vicia villosa* and the grass, *Bromus inermis*.

Materials and methods Four or five shoots of *Vicia villosa* and *Bromus inermis* were planted in small polyethylene pots of surface area 50.27 cm² in five replicates. The amount of daily evapotranspiration was measured by determining the weight lost during each day weighing with scales of 0.0001 g accuracy. Un-planted pots were also weighed to determine evaporation from the soil surface. Transpiration was calculated by subtracting evaporation from evapotranspiration taking account of the amount of water lost by drainage or applied by irrigation. The study was carried out from 29 May to 3 July 2004 under relatively natural conditions. Mean transpiration rates of the species were determined and statistically compared.

Results The average daily transpiration of *Bromus inermis* and *Vicia villosa* is shown in Figure 1. The average daily transpiration during the study period was 5.166 and 5.358 ml per pot (standard deviation of 2.392 and 2.360 ml) for *Bromus inermis* and *Vicia villosa*, respectively. The minimum and maximum values of transpiration for *Bromus inermis* varied from almost zero to 10.06 ml per pot whereas the corresponding values for *Vicia villosa* were 1.11 and 9.94. The differences between the means for the two species were not significantly different at the 95% significance level.

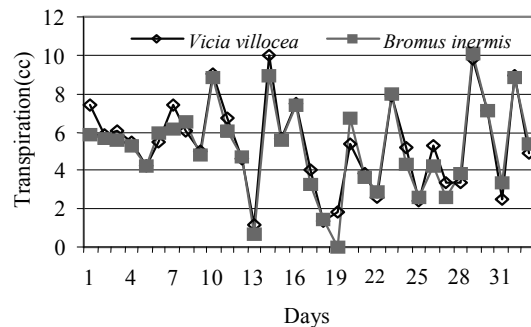


Figure 1 Daily transpiration of *Bromus inermis* and *Vicia villosa*

Conclusions These results demonstrate that daily transpiration rate of the studied species are similar. The variation was probably due to climatological factors, such as temperature and relative humidity as discussed by Roberts (2000), as well as to physiological characteristics of the plants (Anderson 1981). More studies on other species for longer study periods are recommended.

References

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