Comparative water use of yellow serradella, volunteer pasture and wheat on a sandplain soil in Western Australia

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Yellow serradclla, *Ornithopus compressus,* is a legume pasture species suited to the yellow sandplain soils of the eastern wheatbelt region of Western Australia (275-350 mm annual rainfall) as it has a high degree of acid tolerance, a deep rooting depth, nutritive value as pasture feed and soil nitrogen fixing properties (I). Water movement below the root zone on these sandy soils can recharge the deep aquifer and add to the salinity problem. Previous measurements of water use by pastures have commenced at the start of the crop growing season, not on the year's first rain event, which disregards early water use of pastures.

Methods

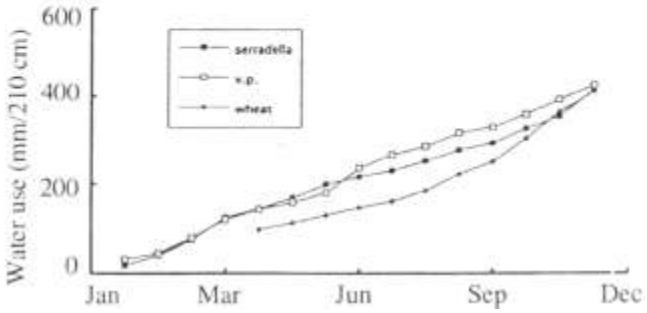
The trial was located at Merredin on a yellow sandplain soil. Treatments included an established serradella pasture, volunteer pasture (capeweed, wild radish, turnip and ryegrass) and a wheat crop. Soil water to a depth of 3 m was recorded during 1992 using a neutron moisture meter with water use during the season being calculated as differences in soil storage plus rainfall. Drainage and run-off were ignored in estimating water use.

Results and discussion

Summer and growing season rainfall were above average, with 152 mm and 278 mm respectively. Total seasonal water use was slightly higher for wheat than for the two pasture treatments, but total water use for the year was similar for all three species (Table 1). However, the pattern of water use throughout the year was different for the crop and pasture species (Fig. I). At seeding, soil water storage under wheat was approximately 60 mm compared to 20 mm under growing pastures because the pasture germinated in summer with *the* early seasonal rainfall. Water use exceeded evaporative demand for the autumn months.

Table 1. Seasonal and annual water use.

Crop or pasture	April-October (mm/210cm)	Annual
Serradella	276	414
Volunteer pasture	282	421
Wheat	313	407
l.s.d. (P=0.05)	21	7



Date

Figure 1. Yearly cumulative water use, 1992.

Early water use by a regenerating pasture before an adjacent crop is sown can have a substantial effect on the soil water balance. This may decrease the amount of water lost below the root zone following summer storms and early seasonal rains.

1. Rolland. M.D.A. and Gladstones. J.S. 1987. J. Aust. Inst. Agric. Sci. 53. 5-10.