Scientific registration number : 488
Symposium : 3
Presentation : Poster

Water uptake and runoff under three pasture types in the Northern Tablelands of New South Wales, Australia
Extraction hydrique et ruissellement sur trois types de pâturages sur les plateaux du Nord en Nouvelles Galles du Sud, Australie

Malem K. MCLEOD, Donald A. MACLEOD, Nelly BLAIR and Heiko DANIEL

Division of Agronomy and Soil Science, The University of New England, Armidale, NSW 2351 Australia.

A soil water balance study was conducted between 1994 and 1997 under degraded, phalaris dominant and phalaris-white clover pastures in Armidale, the Northern Tablelands of New South Wales, Australia. It was hypothesized that there would be less water use on the degraded pasture as compared to that of the phalaris-white clover pasture. Soil water deficit (1994 - 1997) and a set of moisture extraction data during Spring 1997, were compared under the three pasture types.

The pattern of soil water distribution and movement was strongly affected by the duplex profile. There was a large fluctuation in moisture content with time within the A-horizon, while the moisture within the B horizon was relatively constant. Soil water deficit was greater under the phalaris-white clover pasture than that under the degraded pasture over drying periods. The degraded pasture extracted most water from the A-horizon (0 - 40 cm) whereas the phalaris-white clover pasture extracted water down to 60 cm depth. Phalaris-white clover pasture was able to extract 74 ± 0.8 mm of water over a 20 day period in Spring 1997, whereas the degraded and phalaris pasture extracted only 52 ± 3.7 mm and 56 ± 1.6 mm, respectively for the same period.

Runoff was strongly affected by plant cover particularly by the surface litter. Runoff was eliminated under 98% cover in the phalaris-white clover pasture even at the highest rainfall event of 106 mm. Under the phalaris dominant pasture, with less than 50% cover, 24 mm runoff was produced from the same rainfall event.

Pasture containing deep rooted perennial grass and legumes utilised more water compared to the degraded pasture over a 20 days dry period in spring. Runoff is significantly reduced by the increase of ground cover and profile storage capacity.

Key words : soil water content, soil water deficit, runoff, water uptake, pasture, duplex soil, grazing
Mots clés : teneur en eau, déficit hydraulique, ruissellement, extraction hydrique, pâturages, sol polygénique