

### 308 The lower limit of extractable soil water for crops grown on a cracking clay soil.

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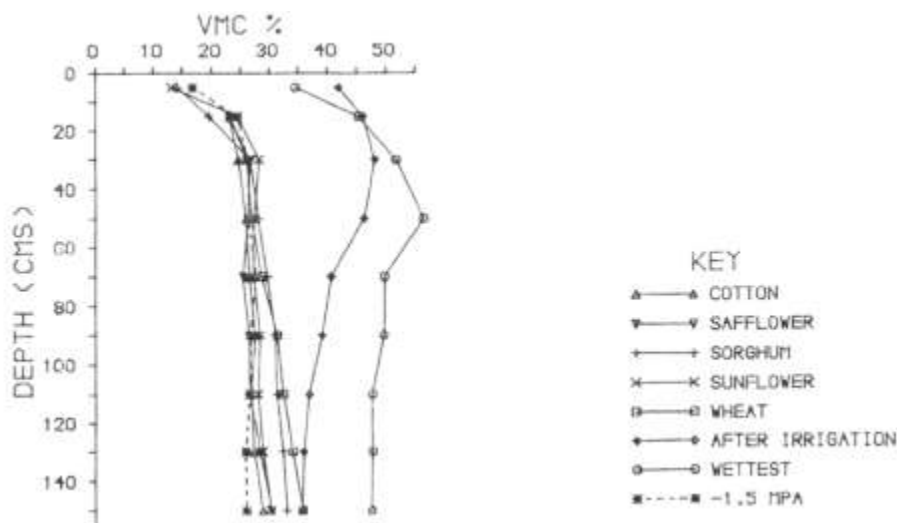
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The use of irrigation scheduling to optimise the interval between irrigations and increase the efficiency of water use is currently being developed and used in so major irrigation areas. Efficient scheduling involves irrigation at the maximum soil moisture deficit which does not inhibit yield. Traditionally, this deficit has been defined using the -1.5 MPa potential as the lower limit of soil water extraction. However, species may differ in their ability to extract water, particularly at depth. Extractable soil water is defined as the amount of soil water which can be extracted from a soil by a given plant species. This paper defines the lower limit of extractable soil water for cotton, sunflower, safflower, sorghum and wheat grown on a heavy grey cracking clay soil.

#### Methods

Soil moisture was measured with a neutron probe in trials grown on the N.S.W. Department of Agriculture Station at Narrabri during 1979 and 1980. The -1.5 MPa profile was calculated from Mason (1) using bulk densities measured in the sunflower and cotton crops. The wettest measured profile and a typical profile, one day after furrow irrigation, are shown. Extractable Soil Water (ESW) is the difference between the wettest and driest profile for each species.

#### Results and Discussion



The driest soil moisture profiles measured for 5 crop species grown on a heavy grey cracking clay soil.

The species differed in their ability to extract water, particularly at depth. Cotton dried the soil to the lowest moisture content, followed by safflower and sunflower. Sorghum and wheat did not dry the soil to the same moisture content as the tap-rooted species. All species except wheat extracted water from depths greater than 1.5 metres. The departure of each species from the -1.5 MPa profile and the failure of the soil to attain its maximum water-holding capacity when furrow irrigated highlight two sources of error which may occur in the definition of extractable soil water.

1. Mason, W.K. 1979. Unpublished Ph.D. thesis. University of New England, Armidale. N.S.W.

