

1. Introduction

1.1 Background

The Shepparton Irrigation Region (SIR) includes about 300,000 ha of irrigated land and is an important agricultural production area in Victoria. The SIR has detailed soil maps that feature six major soil groups, comprising about 150 soil types. Prior to this study, there had been only a few measurements of soil hydraulic properties on some soil types for specific purposes. Although broad association had often been made between soil permeability and soil groups, overall there was a poor understanding of the hydraulic properties of the soils in the region.

Soil hydraulic properties, especially hydraulic conductivity and soil water holding capacity, are important to the design and operation of irrigated agriculture systems. Information on soil hydraulic properties is particularly useful for irrigation scheduling and management including when, how much, and at what rate water should be applied. In addition, soil hydraulic properties are often critical input parameters to irrigation and water management models, at scales ranging from plot to catchment.

A two year study (“Irrigation in a Variable Landscape: Matching Irrigation Systems and Enterprises to Soil Hydraulic Properties”) to collect information on soil hydraulic properties of major soils in the SIR has been completed (Mehta and Wang, 2004). Soil properties of Horizons A and B1 for 34 soil types were measured at 79 sites, representing 75% of the total area of the SIR.

The collected soil hydraulic property data are compiled and presented in this document. It describes soil properties based on soil types and soil groups. The data are presented in the form of look-up tables. Values of mean, median and variability measures are given. Group values of each soil group are also given, and can be used for those soil types that were not measured.

The availability of information on soil hydraulic properties adds significant value to the existing soil maps and will assist in land use planning, irrigation design, water management and irrigation related policy initiatives.

1.2 Information in the Document

The following soil physical, chemical and hydraulic property parameters of Horizons A and B1 are included. For Horizon B2, only saturated hydraulic conductivity parameter is included.

Physical property parameters

- particle size distribution
- bulk density (BD)
- depth of horizons
- organic matter content (OM)

Chemical property parameters

- electrical conductivity (EC)
- pH (H₂O)
- pH (CaCl₂)

- exchangeable cations such as Ca, Mg, Na and K
- exchangeable sodium percentage (ESP)

Soil hydraulic property parameters

- saturated hydraulic conductivity (Ksat) of Horizons A, B1 and B2
- final infiltration rate (FIR) at Horizon B1
- water retention characteristic

1.3 Organisation of the Data

Soil physical, chemical and hydraulic properties data are presented in a number of formats to assist the users of this document to quickly locate the required information. The data are organised into tables in various hierarchies by soil property, by soil type, by soil group, and by irrigation area. For example, "Listing by Soil Property/Irrigation Area/Soil Group/Soil Type" means that the data are listed by soil property first, then by irrigation area, then by soil group, then by soil type, in a number of separate tables and in a number of entries within each table.