

Does spatial variability of plant available water capacity cause variability of grain yield in the Victorian Mallee?

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Abstract

Plant available water capacity (PAWC) is the maximum amount of plant available water that can be stored in the plant root zone. It is determined as the difference between soil water content at field capacity (FC) and permanent wilting point (PWP) and is an important determinant of crop yield. Knowledge of spatial variation in PAWC could be used for designing site-specific management strategies like variable rate fertilizer, seed rate and strategies for future soil sampling. This study was conducted to determine whether the variability of PAWC or PWP was better at explaining variability in grain yield. A 90 ha paddock located near Birchip Victoria was subdivided into six management zones using historical yield maps and satellite images. The FC and PWP was measured at 50 sampling points and the values of PWP and PAWC were found to be significantly different ($p < 0.01$) between yield zones. Overall, the values of both PAWC and PWP in the low yield zones were significantly greater compared to both moderate and high yield zones. The implications of variability of PAWC and PWP in terms of grain yield variability between site-specific management zones are discussed.

Additional keywords

Spatial variability of soil properties, grain yield variability, paddock zoning, precision agriculture