

Soil organic carbon under pasture-cropping and conventional-cropping: The interaction of management with soil horizons and cover types

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Since the introduction of European farming systems into Australian landscapes, land degradation from conventional agriculture has led to declines in soil organic carbon (SOC), with concomitant declines in soil physical properties and nutrient cycling. Consequently, conservation management practices, such as pasture-cropping (PC) have been developed. This study compared soil properties from adjacent PC and conventional-cropping (CC) farms near Gulgong in NSW. Previous research has shown lower nutrient concentrations and higher SOC under PC when compared to CC. This study contributes to existing research by analysing the interaction of PC when compared to CC on soil properties with soil horizons and cover types. This study found that PC has higher SOC, structural stability, and nutrient concentrations in the A1-horizon when compared to CC. The soil properties under perennial grasses and litter indicate that the grasses under PC are affecting soil properties under both litter and grass, while the grasses under CC are affecting soil properties under grass only. However, phosphorus concentrations are probably more limiting to carbon sequestration into stable soil organic matter pools under PC than CC. This may be due to the high uptake of nutrients by the continuous perennial grass sward in PC. By improving the understanding of the benefits and limitations of PC when compared to CC, this study will facilitate the adoption of sustainable management practices such as PC.