

FALLOWING AND GREEN MANURING PRACTICES FOR IRRIGATED SUGARCANE

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Abstract

There are at present concerns within the sugar industry that long-term monoculture has led to soil degradation and consequent yield decline (Meyer and van Antwerpen, 2001; Garside *et al.*, 2001).

Studies have previously been conducted to assess the effects of fallowing and green manuring on subsequent irrigated sugarcane yields:

- Comparison of commercial yields in Swaziland indicated a response to fallowing and green manuring of about 50% in the plant crop and 25% in the first and second ratoons, with no response thereafter (Nixon, 1992). However, this effect was shown to be partly caused by seasonal variations in yield due to time of harvest, as previously demonstrated by Sweet and Patel (1985).
- A further investigation was conducted to assess the effects of fallowing and green manuring practices over a seven-month period on sugarcane yields and the physical properties of a poorly draining clay soil (Nixon and Simmonds, 2004). There were yield increases of 10 and 8% in the subsequent plant and first ratoon crops respectively, after fallowing and green manuring, but no significant yield responses in the second ratoon. Topsoil air-filled porosity increased from 11% under continuous sugarcane to 16-19% after fallowing, and steady state ponded infiltration rates were increased from 0.6 to 1.3 mm/h. These improvements were no longer evident after a year back under sugarcane. Levels of soil organic matter were reduced in all cases, probably as a result of the tillage operations involved. In the plant and first ratoon crops, total root length was related to air-filled porosity, indicating the importance of below-ground air supply for sugarcane production on poorly draining soils.

The findings of these studies are consistent with those of other experiments conducted in Australia (Garside and Bell, 2001; Braunack *et al.*, 2003). Partly as a result of this work, fallowing and green manuring have now become standard practices at several sugar estates in Swaziland.

Keywords: sugarcane; fallowing; green manuring, irrigation

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