

Subsoil amelioration on a sand-over-clay: Crop performance and residual yield benefits.

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Abstract

The impact on crop production of deep placing fluid fertilisers, organic matter, gypsum or surface application of composted piggery bedding straw was compared to district practice at two sites in South Australia. Field trials were established with wheat, barley, canola and lupins in 2004 at two sites with infertile sand-over-clay soils. Subsoil amelioration treatments were only applied in 2004. In the 2005 growing season all crops and treatments had district practice applied to them to gauge residual responses from the various treatments.

Deep ripping increased wheat yields by up to 26% in the first growing season, but only by 13% in the subsequent growing season. The highest grain yields for wheat and canola were generally recorded with the deep fertiliser treatment, increasing yields by 80% for wheat and 116% for canola at the Stansbury site in 2004 (decile 4 rainfall). No grain yield improvements were recorded for any subsoil amelioration treatments at Darke Peak in 2004 (decile 2) despite large dry matter benefits up until the time of flowering. The residual grain yield benefit measured in 2005 (decile 6 at both sites), for the deep fertiliser treatment was reduced in magnitude with yield improvements from 33% for wheat and 11% for canola at Stansbury. Although no yield improvements were recorded at Darke Peak in 2004, residual responses were recorded in 2005 (wheat 29%; barley 19% and lupins 22%).

Deep placement of fluid fertiliser at depth provided large increases in grain yield for wheat and canola in the year of application. Residual effects of deep fertiliser placement were also substantial. However, residual benefits need to be prolonged for a number of growing seasons to justify the initially large investment required by the deep ripping with fluid fertiliser operation.