Can Delving Control Waterlogging Impacts?

Background

Waterlogging is a major limitation to production on Kangaroo Island – be it in crops or pastures. In the past, work has looked at surface drains and raised beds. Whilst both of these treatments can be effective, they have a major impact on the practical use of the land ie wherever you drive you seem to end up running into them! What if we could have an 'invisible' drainage system?
Delving is one option. This system uses a modified delving operation which rips the clay and allows topsoil/gravel to fall back into the clay slots, in effect creating a subsurface drainage line through the clay – or that's the theory anyway!

What was done

In 2004, trials were set up on P. & J. Tonkin's property to look at the effectiveness of surface drains and deep ripping/delving to alleviate waterlogging. Whilst the conventional drains did run a substantial amount of water they had limited impact on reducing the waterlogging impacts any distance from the drains. The delving was done in the direction of the water flow with the aim of shattering the clay to allow for improved water movement at depth. Where there was sufficient slope to allow for water flow the delving appeared to have a positive impact.
In 2005 the delving work was extended to cover more trials on the Tonkin's property as well as another site on N. & R. Pontifex's property. The sites were delved in April 2005 to a depth of 500-600 mm.

Delving machine

Canola roots: plant on left from delved site, on right non-delved.

Results

Visually both sites ran considerable amounts of water, so from a simple drainage perspective the system appeared to be working. One site became very wet prior to seeding and due to the delving, the soil was quite soft and machinery access was impossible.
On the other site that was sown to Canola, there were quite clear visual differences between the delved and non-delved sites, with the delved sites showing improved plant density and growth. (The picture above shows the improved root development on the delved site). The yield results were quite impressive with the delved site yielding 2t/ha and the non-delved area averaging 1.4t/ha

Delving is an expensive operation so the full cost/benefit needs to be looked at closely. After the paddock has been delved it must then be ploughed and leveled (as delving brings up clay to the surface, considerable work must be put into the paddock to get it level and trafficable).

The sites will be monitored over the next few years to gauge the long-term effectiveness of these treatments.

For further information contact

Lyn Dohle, Rural Solutions SA on 8553 4999 BH or 8553 2487 AH.

Funders/Sponsors

National Landcare Program, N. & R. Pontifex, and P.& J. Tonkin.

Photo showing delve lines some 6 months after delving. Note the topsoil in the clay horizon

Take Home Message

- Timeliness of operations is essential. The paddock may need to be dry sown as once the soil wets up you may not get back on the site again.
- Whilst the results from 2005 were very encouraging, for the technique to be cost effective the delved areas will need to produce increased yields for at least two years.
- Care must also be taken with the run-off flows to ensure there are no negative off-site impacts.