

Demonstrating improved use of disk seeders and herbicide use in no-till farming systems

- Location:** South Australia: - Mid North, Yorke Peninsula, Eyre Peninsula and Murray Mallee
- NRM Region:** Northern Yorke, SA Murray-Darling Basin and Eyre Peninsula Natural Resource Management Regions
- Industry:** Grains
- Group:** South Australian No-Till Farmers Association
- Issue:** The effective use of disc seeders and herbicides in no-till farming systems
- Key Outcomes:**
- Many disc seeding configurations had problems with the use of incorporation-by-sowing herbicides and in handling wet sticky loam and clay soils.
 - Disc seeders improved stubble handling capacity, had lower soil disturbance compared to tined seeders and improved handling of stony paddocks.
 - The project had significant impact on the improved use of disc seeder and herbicide use technology by growers.

Background

The South Australian No-Till Farmers Association (SANTFA) is a non-profit farmer-driven organisation led by a committee of volunteer farmers. SANTFA began in 1998, and since then has successfully raised the profile of the benefits of no-till farming systems and conservation farming in general and now has over 1000 members across South Australia. SANTFA is committed to no-tillage systems and to pushing the limits on equipment design and system advances.

The Project

The project aimed to demonstrate the improved use of disc seeders and herbicide use in no-till farming systems. Three strategically placed sites were established in low, medium and high rainfall zones to identify the performance of four key types of disc seeders compared to current best practice tine-based knife-point and press-wheel systems. The trials were established in June and July 2004 at Hart and Mintaro (Mid-North), and Waikerie (Mallee). In addition nine trial sites to identify incorporated-by-sowing (IBS) herbicide options for use with disc seeders were established using five different farmer's disc seeding equipment in low and medium rainfall zones. These were established on Eyre Peninsula (Lock and Worrulla), Mallee (Waikerie), Mid-North (Mallala) and Yorke Peninsula (Paskeville, Ardrossan, Urania and Minlaton). The use of disc seeder technology was demonstrated at field days and crop walks and workshops across the agricultural districts of the state.



Close up of the working mechanisms of a no-till disc seeder. (Photo: SANTFA)

Outcomes

The project attracted widespread grower interest across the agricultural districts of SA. It has had a significant impact on the improved use of disc seeder and herbicide use technology as a result of the visual impact of the trial plots at field days and crop walks. This has contributed to increasing no-till farming adoption in SA with the appropriate use of disc seeder technology. This project also contributed to the broader outcomes of increasing the adoption of no-till cropping systems, with the resulting reduction in soil erosion.

The best overall performing disc seeding systems was the disc coulters+double disc+press wheel type. This system worked well on most soil types, and resulted in higher soil disturbance compared to the other disc types demonstrated. This particular disc type was also the simplest and cheapest disc design, with a leading coulters and double disc seeding mechanism followed by a trailed press wheel, which also controlled seeding depth. Many of the disc seeding types had problems with the use of IBS herbicides because of lack of soil throw, compared to current best practice tined seeders. In some cases movement of chemical treated soil back over the seed row by the disc opener caused crop damage from chemical toxicity. Problems were also experienced handling sticky loam and clay soils in wet conditions. This caused many problems for farmers and it appears that in about 20% of situations on loam and clay soils, disc seeders are not as effective as tined machines.



Herbicide use in no-till disc seeding demonstrations on the Yorke Peninsula. (Photo: Mark Stanley)

Despite these problems, there were many advantages demonstrated from using disc seeders such as improved stubble handling capacity, lower soil disturbance compared to tined seeders, increased possible seeding speeds and improved handling of stony paddocks.

It has been discussed by many of the trial collaborators that disc seeders are an ideal second seeding machine if the farm business is large enough to warrant two seeding machines. It has become apparent that although disc seeders have many advantages in a no-till system, it is important to recognize their limitations and improve our understanding of what conditions they are suitable to be used in.

The findings of the disc trials were presented at the Annual SANTFA conference and GRDC Grains Research Update in Adelaide during February 2005. Findings of this project were also presented across SA at the SANTFA pre-seeding grower meetings in March 2005. The findings and recommendations of this work have been published in 'The Essential Guide to No-Till Farming' and a special disc seeding edition of 'The No-Till Journal'.

The Future

As a result of this project it has been recognized that, although offering many advantages in no-till systems, disc seeders still need to be developed and refined further. Disc seeding hardware needs to be improved and a better understanding of their appropriate use and application would be of great benefit. Much of this knowledge is within the farming industry already and there is a need to capture this. There is an opportunity to survey farmers who have had some years experience using disc seeders to assist other growers in avoiding problems already experienced. There are several South American disc seeder designs that differ from the types tested in this project. These designs may overcome some of the issues experienced with sticky soils, soil throw and IBS herbicide use.



No-till disc seeder in operation (Photo: SANTFA)