Exploring seeding options

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In traditional no-till systems, seed-to-soil contact has been achieved by a press wheel running over the surface of the soil, squashing down everything below.

This system has proven reliable for many years but there are concerns that compressing the soil above the seed may delay germination or even inhibit early seedling vigor because the plant has to use up energy reserves from the seed to push through the compacted ground.

Other seed-closing systems achieve seed-to-soil contact by running a device in the furrow immediately above the seed to press it into the bottom of the furrow. The furrow side wall is then broken, bringing relatively loose soil in over the top of the seed.

In a simple experiment, an in-furrow wheel and a seed firmer were compared for crop emergence and early growth in the first weeks following planting (Figure 1).

The devices were fitted to grower tool bars and used simultaneously in the one pass, with all the seed rows closed over with loose soil by toothed closer wheels fitted to the seeder bar.

Some areas planted with the lock-wheel (Figure 2) and the seed firmer (Figure 3) were left to germinate as they were after the seeder pass. Other areas were immediately treated with an over-the-top press wheel simulation with 4kg/cm^2 of down force.

Treatment	Description
1	Seed firmer + toothed closer wheel + press wheel
2	Seed firmer + toothed closer wheel
3	Seed lock wheel + toothed closer wheel + press wheel
4	Seed lock wheel + toothed closer wheel

TABLE 1

This process, achieved by three growers each replacing some of the lock wheels on their disc seeders with seed firmers, meant four treatments were able to be assessed for seed emergence and early plant growth (Table 1).

FIGURE 1: THE SEEDER FITTED WITH LOCK WHEELS (LEFT) AND SEED FIRMERS (RIGHT).

Using a press wheel to compact the soil above seed offers no advantage and may delay emergence and initial plant growth.

Results

All the participating farmers felt the lock wheel performed better and was more durable than the seed firmer.

Several of the seed-firmers broke in stony ground and exhibited quite a high wear rate in conditions in which lock wheels continued working. (Figure 4)

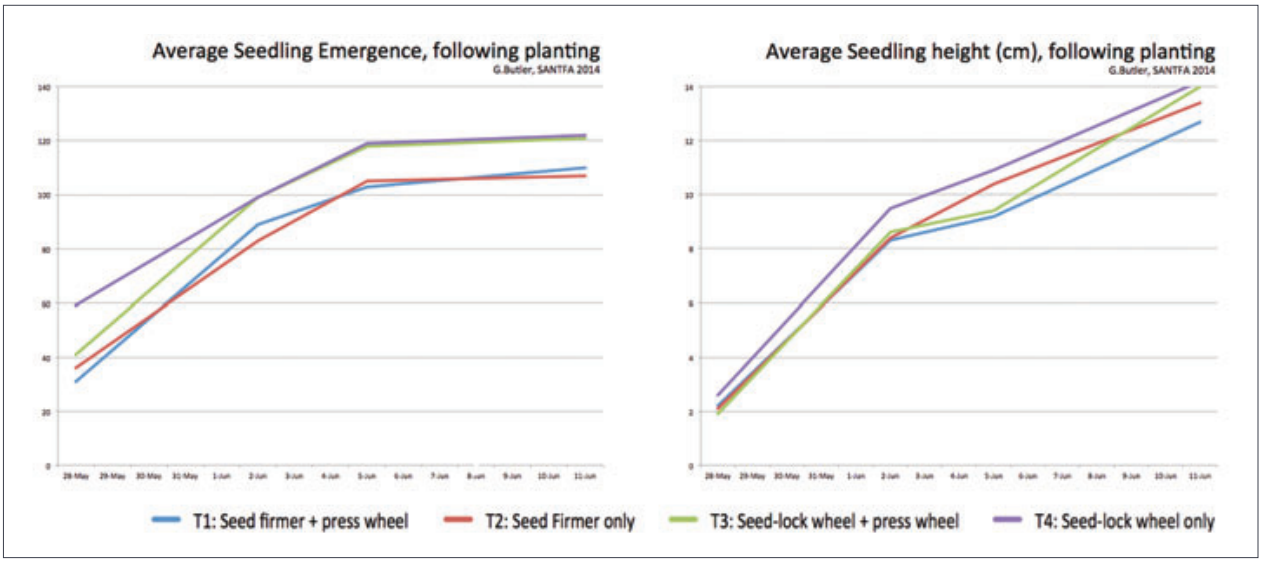
Crop emergence was faster and seedling plant growth was more vigorous where the lock wheel was used than in crop sown using the seed firmer (Graph 1a & 1b).

Graph 1a & 1b: Emergence and early plant growth measured in the weeks following seeding.

Emergence and seedling vigour was best where the soil over seed sown using the lock wheel was not compacted. Field observation suggests the impact of press wheel compaction in the seed row was more influential than the raw counts suggest.

FIGURE 3: A SEED FIRMER IN THE FURROW

FIGURE 2: A LOCK WHEEL IN THE FURROW



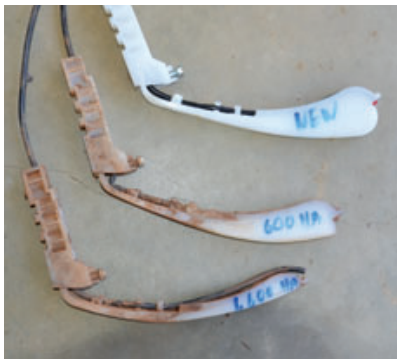


FIGURE 4: THE SEED FIRMERS HAD A HIGHER WEAR RATE AND WERE LESS DURABLE THAN THE LOCK-WHEELS ON EACH OF THE FARMS WHERE THE SIDE-BY-SIDE EVALUATION WAS CONDUCTED. WEAR IS SHOWN AFTER 600HA AND 1,600HA.

Conclusions

The lock wheel in-furrow seed-to-soil contact system resulted in better crop emergence and early plant vigour than the seed firmer in this evaluation.

Results from this trial indicate that, where seed-to-soil contact is achieved in the furrow with either a lock wheel or a seed firmer, using a press wheel to compact the soil above seed offers no advantage and may delay emergence and initial plant growth.

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