Comparison of seeding machines for sowing sub-tropical grasses

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Purpose: To determine whether successful establishment of sub-tropical grasses is affected by seeding machine configuration

Location: Gillingarra

Soil Type: Deep non-wetting sand

Soil Test Results: (ex CSBP Ltd)

Ammonium N	Nitrate N	P Colwell	K Colwell	S	Organic C	Conductivity	pH (CaCl2)
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	dS/m	pH
3	57	28	87	173.00	1.64	0.297	5.50

Rotation: Pasture for more than three years

GSR: 182 mm

BACKGROUND SUMMARY

A range of machines and seeding configurations have been used to sow sub-tropical grasses, with varying levels of success. Small plot studies have shown several key factors for successful establishment, including scalping of non-wetting sand and weeds from drill runs, a sowing depth of 5-10 mm, development of furrows, and the use of press wheels. An experiment was conducted to see whether successful sub-tropical grass establishment can be achieved with a variety of different commercial seeding machines if these key principles are followed.

TRIAL DESIGN

Three combine machines, each with press wheels, were compared:

1. A Chamberlain with converted plough disc for scalping non wetting sand and a soil deflector (row spacing 650 mm);
2. An International with standard knife points (row spacing 180 mm); and
3. A Massey Ferguson with scalping points, soil rider depth control (row spacing 615 mm).

Plot areas of 150 m x 40 m were sown by each machine on August 27 using the Evergreen mix @ 4 kg/ha. The majority of the site had a single knockdown herbicide spray on August 15 (glyphosate @ 1L/ha), while 10 m strips of different pre-emergent herbicide treatments were applied perpendicular to machinery treatments. Results are presented as the means across all herbicide treatments. Nine plastic tags, 90 mm long, were placed in random locations in the bottom of seeding furrows for each machinery treatment plot (total of 81 tags). The amount of sand infill into furrows was measured on these tags 47 days after sowing. However, these were not placed until 5 days after sowing and initial sand infill was not measured. Seedling counts were conducted in 1 m sections either side of each tag.

RESULTS

Establishment densities from the Massey-Ferguson and International seeders were significantly greater than the Chamberlain disc seeder (Table 1). This was in spite of greater sand infill in the Massey-Ferguson plots than the other two seeders. The reason for the lower plant density from the Chamberlain

seeder may be due to deeper or less accurate seed placement or poorer seed-soil contact. Observations at seeding showed that although this machine had the best scalping of non wetting sand, seeds sat on the surface and the press wheels did not adequately cover them. It was also the most aggressive of the machines in terms of furrow development and soil movement and it is possible that more initial infill occurred (sand infill was not measured in the first 5 days after sowing). Although there were no significant differences between the Massey-Ferguson and International combines, the latter was visually patchier, possibly because the knife point tynes of the International seeder did not scalp the non wetting sand. The Massey-Ferguson scalped some of the non-wetting sand and had more accurate seed placement.

Table 1 *Establishment density (plants/m^2) of warm season perennial grass seedlings and amount of sand infill following sowing sown with three different seeding machines and three different pre-emergent herbicide treatments at Gillingarra.*

Seeding machine	Seedling density (plants/m^2)	Sand infill into furrows (mm)
Massey-Ferguson	27.5	9.1
Chamberlain	8.5	6.3
International	25.8	3.2
Mean	20.6	6.2
Probability of no difference	P < 0.001	P < 0.001
l.s.d.	5.48	2.53

DISCUSSION

This trial demonstrates that a good establishment result is possible using a range of different seeding configurations, provided the key steps to establishment are followed. These factors include:

- scalping of non-wetting sand and weeds away from drill runs;
- row spacing of 50-60 cm;
- sowing into furrows to harvest rainfall (especially important in dry springs);
- minimizing furrow collapse;
- ensuring sowing depth is 5-10 mm; and
- using press wheels for good soil contact with seed.

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