Seeding depth of Dwalganup subterranean clover (Trifolium Subterraneum L) & Barrel medic (Medicago Tribuloides Desr.) - Experiments on some sandy surfaced soils of the Western Australian wheatbelt

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SEEDING DEPTH OF DWALGANUP SUBTERRANEAN CLOVER (Trifolium Subterraneum L.) & BARREL MEDIC (Medicago Tribuloides Desr.)

EXPERIMENTS ON SOME SANDY SURFACED SOILS OF THE WESTERN AUSTRALIAN CEREAL BELT

By J. TOMS, B.Sc. (Agric.), Research Officer, Plant Research Division

On sandy-surfaced scrub-plain soils at five centres, the best establishment of Dwalganup subterranean clover and barrel medic has in general been obtained with seeding depths between one and one and a half inches. Shallower or deeper seeding generally gave poorer results.

This response to depth of seeding is not confined to soils where a response to seed inoculation is obtained. Available machinery is not altogether satisfactory for obtaining required depths of seeding.

LOCATION OF 1956 EXPERIMENTS AND SEEDING METHODS USED

In 1956 experiments on establishment of Dwalganup subterranean clover and barrel medic were carried out at Merredin Research Station, on War Service Land Settlement holdings at Eneabba (30 miles south-west of Three Springs), and at Newdegate Demonstration Farm.

Seeding depth was one of the variables tested in these experiments.

All plots received 30 lb. of copper ore, 3 lb. of zinc oxide and 150 lb. super (or its equivalent of "basic" super) per acre.

In each case seeding was done with a 16-run disc drill. In order to obtain the required depth of seeding, seed and fertiliser were mixed immediately prior to seeding.

Overturned covering harrows were used to level the seed bed after planting, so that depth estimates could be more satisfactorily made.

In preliminary tests it was found that actual depths of seeding were difficult to determine accurately, but in trial runs with cereal grain it was obvious that the maximum depth required (3 in.) would not be possible with the machinery used.

A range of depth settings on the drill was therefore used and at two sites the depth of Dwalganup subclover seed placement at emergence was measured on plants dug up from each drill run of the experiment. For each depth of seeding in each experiment 192 plants were measured in this manner. This seed depth at emergence of the seedling would be somewhat less than actual seeding depths as some settling of the soil would have occurred.

Results.

The results of these 1956 experiments are listed in Table I.

It is interesting that where measured, the "surface" seeded plants had in reality been placed over ½ in. below the surface. Seeds roll into furrows and are covered by the harrows.

At Newdegate, where surface seeding proved superior for Dwalganup sub-clover, the sand was much finer than the other sites and formed a light surface crust on
Table I
RESULTS OF 1956 DEPTH OF SEEDING EXPERIMENTS

<table>
<thead>
<tr>
<th>Site</th>
<th>Legume Used</th>
<th>Mean Emergence depth in inches *</th>
<th>Yield in cwts./acre †</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>W.S.L.S. Eneabba ....</td>
<td>Dwalganup sub. clover</td>
<td>0-69, 1-16, 1-29, 1-44</td>
<td>2-34, 2-90, 3-79, 3-49</td>
<td>1-29 in. or 1-44 in. was better than 0-69 in. (surface seeding)</td>
</tr>
<tr>
<td>Merredin Research Station</td>
<td>Dwalganup sub. clover</td>
<td>0-6, 1-5, 1-9, 2-5</td>
<td>2-3, 3-46, 3-06, 0-93</td>
<td>1-5 in. or 1-9 in. was better than 0-6 in. (surface seeding)</td>
</tr>
<tr>
<td>Newdegate Demonstration Farm</td>
<td>Dwalganup sub. clover</td>
<td>&quot;Surface&quot; 1, 2, 3</td>
<td>7-05, 5-52, 4-85</td>
<td>&quot;Surface&quot; seeding superior</td>
</tr>
<tr>
<td>Newdegate Demonstration Farm</td>
<td>Barrel medic ....</td>
<td>&quot;Surface&quot; 1, 2, 3</td>
<td>5-68, 8-55, 8-01</td>
<td>&quot;Surface&quot; seeding inferior to any other depth tried</td>
</tr>
<tr>
<td>W.S.L.S. Eneabba ....</td>
<td>Barrel medic ....</td>
<td>0-69, 1-16, 1-29, 1-44</td>
<td>1-99, 4-18, 4-25, 4-49</td>
<td>Surface seeding (0-69 in.) inferior to any other depth tried</td>
</tr>
</tbody>
</table>

* Measured to the nearest sixteenth of an inch.
† Total above ground parts + burrs. Sampled late September, just prior to maturity.

Table II
RESULTS OF 1957 DEPTH OF SEEDING EXPERIMENTS

<table>
<thead>
<tr>
<th>Site</th>
<th>Legume Used</th>
<th>Seeding depth in inches</th>
<th>Yield in cwts./acre *</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Badgingarra ....</td>
<td>Dwalganup sub. clover</td>
<td>&quot;Surface&quot; 1, 2, 3</td>
<td>1-18, 1-90, 2-42</td>
<td>1 in. or 2 in. better than &quot;surface&quot; seeding</td>
</tr>
<tr>
<td>W.S.L.S. Jerramungup</td>
<td>Dwalganup sub. clover</td>
<td>&quot;Surface&quot; 1, 2, 3</td>
<td>15-48, 23-59, 21-52</td>
<td>1 in. or 2 in. better than &quot;surface&quot; seeding</td>
</tr>
</tbody>
</table>

* Total above ground parts + burrs. Sampled late September, just prior to maturity.

drying. The experiment on barrel medic, though adjacent, was on a much coarser sand and here the smaller barrel medic seeds had no trouble in emerging from depth.

It has been previously mentioned that all of these experiments were complicated by other factors being tested at the same time.

1957 EXPERIMENTS

In 1957, two other experiments in which depth of seeding was the sole factor tested, were carried out on sandy-surfaced soils.
Absolute depth measurements were not taken. Observations by the operators, however, suggested that the depths indicated were approximately obtained.

It has been previously mentioned that the only satisfactory way of seeding with the available machinery to a required depth was to mix seed and fertiliser prior to seeding. To protect the seed inoculum, "basic" superphosphate (prepared by mixing 85 lb. superphosphate with 15 lb. slaked lime, \( \text{Ca(OH)}_2 \)) was used as the phosphorus fertiliser in the two 1957 trials. Table II shows the results of these 1957 experiments.

The site at Badgingarra was a deep sand, the low fertility of which is reflected in the poor yields obtained.

From Tables I and II it is seen that seeding depths of between one and two inches have been superior in six out of the seven experiments carried out. However it should be remembered that these experiments were carried out on soils of coarse-textured surface.

**METHODS OF SEEDING AT DEPTH**

Mixing inoculated seed and superphosphate is not recommended because of the harmful effect of superphosphate on the bacteria. This point was demonstrated in one of the 1956 experiments where a response to inoculum was obtained. Though fertiliser and seed were mixed for a maximum of half an hour before being seeded into moist soil, this short time was enough to affect nodulation. Well prepared basic super did not show this adverse effect.

Some farmers seed small seeds through the grain box and mixed with oats. Even so, mixing of fertiliser and seed occurs in the boot of the drill. Seeding oats with clover is not recommended unless the oats are fed off in late winter or early spring. The oats should not be allowed to compete with the clover for moisture during the seed-setting period. Also, a cereal crop can affect the growth of the clover seeded with it even before moisture becomes an important factor. The reason for this is not known but competition for nutrients may be involved.

A reasonable method of seeding at depth using a small seed box is to obtain longer hoses and strap these to the back of the boots of the drill. The seeds will then be placed a little above the fertiliser.

It is clear that seeding machinery at present available is not suitable for precise and separate placement of small seeds and fertiliser.

In conclusion it might be suggested that on sandy-surfaced soils in the cereal belt, farmers seeding subterranean clover should aim at placing fertiliser about 1½-2 in. deep, and clover seed about ½ in. directly above the fertiliser band.

**Acknowledgment.**

The author wishes to acknowledge the help given him by the officers of the Wheat and Sheep Division stationed at Moora in the experimental work carried out in their district.
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