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Establishing wheatbelt pastures? Don't use a cover crop

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Cover Page Footnote
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Establishing wheatbelt pastures?

- DON'T USE A COVER CROP

One of the factors which influence the establishment of improved pasture in the West Australian wheatbelt is whether the pasture legume is sown with a cover crop or not. Mediocre establishment can follow when a cover crop is used and it is recommended that, for rapid establishment, any pasture legume should be sown without a cover crop.

By J. A. C. SMITH, Agricultural Adviser, Merredin, and D. B. ARGYLE,* Rural Officer, Commonwealth Bank, Perth

A DENSE, productive stand of pasture in the first year should be a major objective in wheatbelt pasture establishment.

There are a number of good reasons why first year pastures should be dense and productive. Among these are:

- Only such pastures are capable of setting enough seed to give worthwhile regeneration in the second and subsequent years.
- Unless pasture growth is dense and vigorous, soil fertility will not be raised nor will carrying capacity be lifted.
- Because most of the Western Australian wheatbelt is cropped every three years, pasture growth in the intervening non-cropping years must be good if it is to do its job in the limited time available.

If cover crops are not used, liberal seeding rates, good initial weed control, choice of the right legume species, inoculation with the correct nodule-forming bacteria, adequate fertiliser application and proper

*Sown without a cover crop both commercial and Cyprus barrel medics produced dense, vigorous stands in the second year, with Cyprus giving the best result.
grazing almost always combine to give dense productive pastures in the first year. With the introduction of pasture legumes suited to lower rainfall areas in the Western Australian wheatbelt, it is necessary to examine critically the validity of the Department of Agriculture recommendations for successful pasture establishment for these new environments. The recommendation to sow improved pastures without a cover crop was examined at the Merredin Research Station during 1962.

**MERREDDIN TRIAL**

Part of the Merredin Research Station is situated on heavy land typical of many of the heavy soils of the eastern wheatbelt where barrel medics thrive if properly managed. Commercial barrel medic has been successfully maintained there for some years.

During 1962 an experiment was sown to test the influence cover crops have on the establishment of commercial and Cyprus barrel medics. The soil type was a grey gimlet clay, which is inclined to be structureless.

Heavy and light cover crops were used. The heavy cover crop was wheat sown at 40 lb. per acre and the light cover crop was wheat sown at 10 lb. per acre.

Both medic varieties were sown at 6 lb. of seed per acre and the seed was inoculated and lime-pelleted.

After the opening rains which fell late in May, the site was cultivated sufficiently to achieve weed control normal for wheat cropping. The inoculated and lime-pelleted medic seed was sown together with the cover crop at a depth of 1 inch. The trial was sown mid-June.

Over the May to October growing period 776 points of rain fell, compared with the average growing period rainfall of 817 points. The annual total for the year was 1,064 points, which was more than an inch less than the annual average of 1,180 points.

In January, 1963, the plots were sampled at random, using four-square-link (1 link x 4 link) quadrats or sampling areas. All

Graph 1.—The tremendous depression of seed production due to the presence of a cover crop is illustrated in this diagram. Even a light cover crop greatly reduced seed yield, although the reduction was less in the early maturing Cyprus barrel medic than the commercial strain.

A heavy cover crop (40 lb. wheat per acre) reduced seed production so that second year stands were sparse. Cyprus was less affected than commercial barrel medic.
burrs within each quadrat were collected, counted and hand threshed. The average number of burrs per square link for each treatment was determined as well as the average number of seeds per burr. Clean seed yield was calculated from the weights of threshed seed. Shrivelled, small seed was kept separate to find the extent of the production of non viable seed.

Results
The presence of a cover crop markedly depressed the production of seed by both strains of barrel medic. This is shown in the Table.

The first diagram (Graph 1) shows how cover crops reduced seed yields in the first year medic pastures at Merredin. The other graphs show the effects of cover crops on the main components of seed production by the legumes—the number of burrs produced (Graph 2) and the number of seeds per burr (Graph 3).

The proportion of shrivelled non viable seed produced by either Cyprus or commercial barrel medic was insignificant and did not vary with different treatments.

During the winter of 1963 the plots were grazed continuously to suppress volunteer grass growth. Medic growth in the second year reflected markedly the amount of seed set the previous year.

The "no cover crop" plots were vastly superior to either the "light cover crop" or "heavy cover crop" plots. The "no cover crop" second year stands were the only pastures that could be classified as dense and vigorous, and therefore acceptable as suitable by farmers.

IMPLICATIONS FOR PASTURE ESTABLISHMENT
Several important points arise out of the results of the experiment which have an important bearing on pasture establishment in the lower rainfall areas of the West Australian wheatbelt.

(1) Cover crops, even when lightly sown, have a marked deleterious effect on the seed set of first year medic pastures. By inference the
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same effect can be expected when planting subterranean clover on light soils. This has been observed on trials and on farmers' properties often enough for the conclusion to be reached that the sowing of any cover crop when establishing legume pastures in lower rainfall areas places the legume in an extremely hazardous position.

(2) Under favourable conditions both Cyprus and commercial barrel medic are capable of producing large quantities of seed. Cyprus is even better than commercial. Here it must be appreciated that it is up to the grower to provide the favourable conditions.

(3) Cyprus barrel medic is capable of withstanding harsher conditions than commercial barrel. This is evidenced by Cyprus's ability to set more seed per burr, more burrs, and more seed per acre under identical conditions.

### ESTIMATING SEED YIELDS

To get a reasonably accurate estimate of how much seed has been set per acre by a barrel medic pasture it is necessary to measure the number of burrs set in a measured area, then determine the average number of seeds per burr.

Once this has been determined a good rule of thumb for working out seed yield is that two seeds per square foot is equivalent to 1 lb. of seed per acre.

For example, 100 burrs per square foot each containing an average of six seeds is equivalent to 300 lb. of seed per acre.

### THE EFFECT OF COVER CROPS ON SEED PRODUCTION BY FIRST YEAR BARREL MEDIC

<table>
<thead>
<tr>
<th>TREATMENT</th>
<th>No. of Burrs per square link</th>
<th>No. of Seeds per Burr</th>
<th>Viable Seed per acre</th>
<th>Non-Viable Seed per acre</th>
<th>Total Seed per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Cover</td>
<td>Commercial Barrel medic</td>
<td>73</td>
<td>6.8</td>
<td>334.1</td>
<td>13.0</td>
</tr>
<tr>
<td>Cover Crop</td>
<td>Cyprus Barrel medic</td>
<td>78.5</td>
<td>7.3</td>
<td>493.3</td>
<td>4.9</td>
</tr>
<tr>
<td>Light Cover</td>
<td>Commercial Barrel medic</td>
<td>1.1</td>
<td>2.5</td>
<td>1.4</td>
<td>0.4</td>
</tr>
<tr>
<td>Cover Crop</td>
<td>Cyprus Barrel medic</td>
<td>14.4</td>
<td>6.3</td>
<td>40.2</td>
<td>2.2</td>
</tr>
<tr>
<td>Heavy Cover</td>
<td>Commercial Barrel medic</td>
<td>0.4</td>
<td>1.3</td>
<td>0.4</td>
<td>—</td>
</tr>
<tr>
<td>Cover Crop</td>
<td>Cyprus Barrel medic</td>
<td>1.4</td>
<td>5.8</td>
<td>4.9</td>
<td>—</td>
</tr>
</tbody>
</table>

Conclusion

This trial has confirmed the recommendation that cover crops should not be used in pasture establishment in the Merredin district, representing the lower rainfall areas of the West Australian wheatbelt.
Because pasture establishment must be rapid to make pasture worth growing, cover crops of any sort should not be used. The only possible exception may be on light sandy soils liable to blow. Under these conditions some seed set will have to be sacrificed by allowing a light cover crop to be grown for the purpose of reducing wind blast. From 5 to 10 lb. of a cereal should be enough to reduce wind blast.

As pointed out at the beginning of this article, whether a cover crop is used or not is only one of the factors which influence the success of pasture establishment. Others are just as important and unless all are taken into account, money may be wasted.

ACKNOWLEDGMENTS

Grateful acknowledgment is made of the help of the staff of the Merredin Research Station in carrying out this trial. For thoughtful criticism of the project, particular thanks are given to Mr. A. J. Reany, Cereal Breeder, and to Mr. S. D. Byrne, Manager.

REFERENCE


THE LATE BRIAN CARLIN

The Journal of Agriculture records with deep regret the sudden death of Mr. B. F. Carlin, agricultural adviser in the Department of Agriculture’s Wheat and Sheep Division at Bridgetown, on January 29 this year.

Brian Frederick Carlin was born in 1927. He served in the R.A.N. before entering the University of W.A., from which he graduated with the degree of Bachelor of Science in Agriculture in 1951. He joined the Department of Agriculture’s Wheat and Sheep Division in 1952 and served as agricultural adviser at Mt. Barker and Moora before being posted to Bridgetown.

At Moora he took a leading part in the work on light land development in the West Midlands, which has been instrumental in the development of a big area of land in this district.

He was posted to Bridgetown in 1959 to serve the increasing number of farmers in the higher rainfall areas engaged in sheep raising and cereal growing. As a result of his work in these areas he became widely known throughout the State for his advocacy of improved husbandry methods, particularly set stocking at higher stocking rates, spring lambing and autumn shearing. His work with farmers had a marked effect on sheep management in these districts. This influence will undoubtedly continue well into the future.

Brian Carlin was an enthusiastic extension worker who gained the respect of farmers and his professional colleagues for his practical and imaginative approach to his job. He was considered one of the Department’s most able agricultural advisers. He was a fluent writer, making good use of the written word in his extension work through many articles published in the Journal of Agriculture as well as other publications. At the time of his death he was preparing a comprehensive article on set stocking for the Journal of Agriculture. This will be published in a future issue.

Brian Carlin was survived by a wife and three children.
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