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Fertility build up under northern wheatbelt pastures

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Cover Page Footnote
Thanks are extended to Messrs. A. Hesford and A. J. McKay who made land available for the trials, and to the district advisers and field assistants who assisted with planting and observations.
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RESULTS FROM RECENT RESEARCH

FERTILITY BUILD UP UNDER NORTHERN WHEATBELT PASTURES

by: M. L. Poole

Experiments on two farmers’ properties demonstrated that legume pastures increase the fertility of northern wheatbelt soils. Crops on legume pastures had higher yields than crops on volunteer pasture. The experiments also indicated the most productive legume species for each situation and demonstrated that nitrogen added by legumes has a residual effect in the soil.

**Experiment 1—Perenjori**

In 1962, seven legume species were sown in a 12½ in. rainfall area on a red sandy loam. The site had been cleared in 1920 and carried jam and large mallee in its virgin state. Pasture establishment methods recommended by the Department of Agriculture were used except that the fertiliser was 180 lb. 50/50 lime-super per acre. The plots were lightly grazed over summer and topdressed with 95 lb. per acre super each year. Volunteer plots (Table 1) received the same cultivation and fertiliser treatments as legume plots.

**Pasture results**

When the pasture stage of the trial ended in 1965 it was concluded that Harbinger medic, Cyprus barrel medic and Geraldton subterranean clover were equally suited to the environment. The medics established fastest but grass build-up was greater under the sub. clovers. Table 1 shows production results in November, 1963, the last year in which detailed pasture evaluation was carried out.

**Crop results**

After the four year pasture phase, two successive crops of Gamenya wheat were planted, in May, 1966 and June, 1967, using normal district practices.

**Experiment 2—Binnu**

Seven pasture species and two pasture mixtures were sown on a yellow sandplain soil with loaminess increasing with depth. The area receives 14 in. annual rainfall and native vegetation is low scrub, grevillea, native pine and occasional mallee. The experimental site was on new land which had been cropped once and treated with super-copper-zinc fertiliser. Seeding was carried out in 1964 using establishment methods, and seed and fertiliser rates recommended by the Department of Agriculture. Volunteer plots received 185 lb. super per acre drilled. All plots were lightly grazed over summer and topdressed in autumn each year.

**Pasture results**

No quantitative measurements were taken but, when the pasture stage concluded in 1966, Harbinger medic was rated as the best legume species followed by Kondinin rose, Geraldton sub. clover, Cyprus barrel medic and Beenong cherleri. The lucerne was eaten out by rabbits in the first year.

The pasture mixtures (shown in Table 2) became progressively dominated by Harbinger medic.

**Crop results**

Gamenya wheat was drilled with 140 lb. super per acre in May, 1967, using normal seeding practices. Yield results on each of the pasture treatments are shown in Table 2.

**Conclusions**

In addition to indicating the most satisfactory legume species for each situation, the trials clearly demonstrated the value of even mediocre legume pastures for improving soil fertility. Both experiments indicated little difference in the level of nitrogen fixation by

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**Table 1. Comparative Production off Eight Pasture Areas**

<table>
<thead>
<tr>
<th>Pasture Treatment</th>
<th>1963 Pasture Production</th>
<th>Crop Yields 1966</th>
<th>Crop Yields 1967</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dry Matter lb./ac.</td>
<td>Burr lb./ac.</td>
<td>Seed lb./ac.</td>
</tr>
<tr>
<td>Cyprus barrel medic</td>
<td>2,840</td>
<td>1,835</td>
<td>503</td>
</tr>
<tr>
<td>Harbinger medic</td>
<td>3,033</td>
<td>1,544</td>
<td>488</td>
</tr>
<tr>
<td>Snail medic</td>
<td>*</td>
<td>616</td>
<td>143</td>
</tr>
<tr>
<td>Burr trefoil</td>
<td>357</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Dwalganup sub. clover</td>
<td>*</td>
<td>568</td>
<td>153</td>
</tr>
<tr>
<td>Geraldton sub. clover</td>
<td>*</td>
<td>1,701</td>
<td>655</td>
</tr>
<tr>
<td>Lucerne</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Volunteer pasture</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

* Measurements not taken.
† Eaten out by rabbits.
different legume species which grew satisfactorily; Experiment 1 also indicated that this nitrogen had a residual effect which raised second crop yields.

Acknowledgments
Thanks are extended to Messrs. A. Hesford and A. J. McKay who made land available for the trials, and to the district advisers and field assistants who assisted with planting and observations.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield—bu./ac.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kondinin rose clover</td>
<td>24.2</td>
</tr>
<tr>
<td>Geraldton sub. clover</td>
<td>22.1</td>
</tr>
<tr>
<td>Harbinger medic</td>
<td>21.1</td>
</tr>
<tr>
<td>Mixture (Kond. Ger. Harb.)</td>
<td>20.7</td>
</tr>
<tr>
<td>Mixture (Harb. Cyp. Lucerne)</td>
<td>20.0</td>
</tr>
<tr>
<td>Cyprus barrel medic</td>
<td>19.3</td>
</tr>
<tr>
<td>Sirint rose clover</td>
<td>14.6</td>
</tr>
<tr>
<td>Beenong cherleri</td>
<td>14.1</td>
</tr>
<tr>
<td>Hunter River lucerne</td>
<td>10.8</td>
</tr>
<tr>
<td>Volunteer pasture</td>
<td>9.2</td>
</tr>
</tbody>
</table>

* Legume plots were very weedy and differences might have been even greater under weed-free conditions.
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