Linseed production survey: Esperance, 1968

R J. Guyton

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A SURVEY conducted after the 1967 linseed season found that although most farmers understood the requirements of linseed growing there were several crop failures. These were associated with time of planting, soil type and insect control measures.

The Esperance district office of the Department of Agriculture conducted a second survey during December, 1968 and January, 1969 and included the 60 farmers new to linseed growing. Most interviews were carried out before harvest so that weed control, disease and general crop appearance could be studied.

The 1968 linseed survey involved all 95 growers in the Esperance region. Areas mentioned in this report are shown on the figure.

Seasonal conditions

Above average rainfall was recorded throughout the Esperance region in 1968 (see Table 1). Heavy rain in June and August helped to prolong waterlogged conditions which delayed planting and made conditions favourable for weeds, but better weather in July allowed most farmers to complete sowing. Other farmers were then able to reseed areas which had been washed away, or where waterlogging had reduced germination.

Linseed crops in general showed little effect from the saturated conditions in early spring, despite heavy rain in August, and rainfall in September and early October maintained hopes for a good season. However, the finish to the season was not satisfactory and it was not until mid-November that more useful rain was recorded.

LINSEED PRODUCTION 1968.

Linseed Growers 1968

Northern Limit 17" Annual Rainfall

* Now Rural Economist with the Rural Economics and Marketing Section, Department of Agriculture

186
Weed control and delayed ploughing

Planting is normally finished by mid-June but in 1968 it was often delayed by up to six weeks because of the excessive rain. There were only two periods at this time (June 11-13 and 15-17) when rain was not registered on three consecutive days.

Weed control was obtained at seeding by most farmers using harrows and combines. The number of cultivations varied from two to four however, and many were not immediately effective because of the consistent rain. Many cultivations simply "transplanted" the capeweed and Wimmera ryegrass clods.

Waterlogging

Consistent rain during the seeding period reduced the area of linseed harvested from a planned 21,000 acres to 18,200 acres. Some of this loss was due to areas not sown, and the remainder to waterlogged sown areas which were not worth harvesting. Waterlogging losses ranged from a few acres on most properties to entire paddocks in the Merriwale region.

Hail damage—Coomalbidgup

Hail damage, with insurance claims up to 30 per cent., was reported in the Coomalbidgup region after storms in late September—early October. Most damage was caused when stems snapped just below the flowering parts and no stem regeneration followed. Minor damage in some crops showed up as bruising of the semi-matured bolls.

Dry period

After a six week dry period in late-October and early-November (which included two days of hot northerly winds and high temperatures), many well-grown dense crops in an advanced boll stage were forced to mature early. Crops most affected during this period were growing on soils with shallow sand over clay, or on soils with clay or gravel at the surface. The early maturity reduced yields and in many cases the actual yield was 6 to 10 bushels below visual estimates made before harvest.

Lodging

Crops planted before early-June in the Gibson locality, on soil with shallow sand over clay, lodged badly in November.

Lodging occurs when linseed matures early and is subjected to late rains and...
warm weather. It is caused by a retting process which weakens the stems. Lodging in 1968 was not restricted to one variety although the variety Gibson does lodge more readily than the later maturing Kameniza.

**Harvesting**

Harvesting was prolonged over three months because:

- Heavy November rains caused lingering winter weeds—Wimmera ryegrass and Yarloop sub. clover, together with emerging summer weeds such as cotton fireweed, evening primrose and shepherd's lucerne, to make early harvesting of some crops difficult.
- Many farmers had to wait for contract harvesters or spare parts for their own harvesters.
- Many farmers with no on-farm storage facilities had to wait for seed cleaning plants to begin operations.

**Soil type**

Although Esperance soils are divided into three series: Fleming series, Caitup series and the Gibson series, linseed yield comparisons associated with soil type were made only on the depth of sand over clay or gravel. Between farms there were differences due to extent of waterlogging, distance from the coast, time of planting and variations in the amount of rain recorded during the year that prevented the full use of all individual yield data.

**Depth of sand**

At all times of planting on soil types with more than six inches of sand over clay, linseed yields were three to four bushels per acre higher than crops on soil with less sand over gravel or clay. Overall yields from known harvest results are shown in Table 2.

**Table 2.—Effect of depth of sand on linseed yields**

<table>
<thead>
<tr>
<th>Depth of Sand</th>
<th>Area</th>
<th>Production</th>
<th>Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-18 in. sand over clay</td>
<td>acres</td>
<td>bshls</td>
<td>bus/acre</td>
</tr>
<tr>
<td>6-18 in. sand over clay</td>
<td>4,600</td>
<td>65,800</td>
<td>14.3</td>
</tr>
<tr>
<td>Less than 6 in. sand</td>
<td>3,300</td>
<td>36,200</td>
<td>11.0</td>
</tr>
</tbody>
</table>

**Distance from the coast**

Because rainfall drops rapidly (about half an inch per mile) inland from the coast, the performance of crops at the northern limit of linseed growing—Fleming Grove road in 1968 were compared with crops grown at the Ravensthorpe—Fisheries road level in Table 3.

The three to four bushels per acre advantage for crops grown closer to the coast can be associated with spring rainfall and soil type. Rainfall recordings from Coomalbidgup across to Condingup indicated that about 1 inch more was recorded in spring on properties along the Ravensthorpe—Fisheries road level than for corresponding northern farms.

**Table 3.—Effect of distance from the coast on linseed yields**

<table>
<thead>
<tr>
<th>Location</th>
<th>Fleming Grove</th>
<th>Ravensthorpe—Fisheries road</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil type</td>
<td>Less than 6 in. sand</td>
<td>More than 6 in. sand</td>
</tr>
<tr>
<td>Production (bushels)</td>
<td>6,120</td>
<td>10,880</td>
</tr>
<tr>
<td>Area (acres)</td>
<td>610</td>
<td>925</td>
</tr>
<tr>
<td>Yield (bus/acre)</td>
<td>10.0</td>
<td>11.8</td>
</tr>
<tr>
<td>Aggregate yield (bus/acre)</td>
<td>11.1</td>
<td></td>
</tr>
</tbody>
</table>

There was a greater proportion of the crops in the Fleming Grove level grown on the shallower sands over clay, accentuating the effect of the dry spring in reducing yields.

**Time of Planting**

Although it is generally considered that late May to early June is the best time to plant linseed, seasonal conditions in 1968 meant that many farmers did not have control over their time of planting. Some farmers had poor yields from an early sowing while others recorded outstanding yields from late (July) plantings. The figures in Table 4 show that many differences in yield were due to soil type rather than time of planting.

Crops planted early on the shallow gravelly sands over clay although extremely well grown but shallow rooted
Table 4.—Time of planting: soil type effect on linseed yields

<table>
<thead>
<tr>
<th>Time of Planting</th>
<th>Soil type—Less than 6 in. sand over clay</th>
<th>Production (bushels)</th>
<th>Area (acres)</th>
<th>Yield (bus/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late (June—early July)</td>
<td>10,150</td>
<td>1,350</td>
<td>7.5</td>
<td>2,140</td>
</tr>
<tr>
<td>Early (May)</td>
<td>6-12 in. sand over clay</td>
<td>14,650</td>
<td>1,080</td>
<td>13.6</td>
</tr>
<tr>
<td>12-18 in. sand over clay</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
</tbody>
</table>

because of the prolonged wet conditions, were unable to withstand the spring moisture stress and matured early. In contrast, crops grown on the deeper sands were able to withstand the dry period due to better drainage allowing the root system to develop more than on the shallower soils.

There was a tendency in later sown crops also that the greater depth of sand over clay enabled plants to draw on a larger moisture reserve during the stress period better than the crops sown early on sandy soils. It was the heavy rains in mid-November that allowed some late planted crops to finish as good as if not better than early sown crops.

**Spring moisture supply**

Pre-harvest inspection indicated several crops which appeared capable of yielding more than 15 bushels per acre but, their harvested yield was less than 10 bushels per acre. Such results appear to be associated with better soil moisture conditions during August and September. Table 6 shows this association for two comparable crops sown in mid-June but with yields differing by 8 bushels per acre.

**Soil fertility**

There were at least ten farmers who averaged more than twenty bushels per acre in paddocks of 50 acres to 260 acres in area. The shortest period of clover ley before the first crop was a fifth year Woogenellup paddock that yielded 24 bushels per acre. Also in this group was a third successive crop of linseed (following oats and then wheat) grown on land sown to Yarloop in 1958. The control of weeds, together with a high rate of nitrogen fertiliser (100 lb. of urea per acre) allowed this crop to yield as well as the best first crop on clover ley. A yield of 15 bushels per acre was obtained on land

Table 5.—Effect of very late sowing on linseed yields

<table>
<thead>
<tr>
<th>Time of Planting</th>
<th>Location</th>
<th>Depth of Sand</th>
<th>Yield (bus/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late</td>
<td>Fleming Grove</td>
<td>12-20</td>
<td>22.0</td>
</tr>
<tr>
<td>Late</td>
<td>Dalyup</td>
<td>12</td>
<td>22.0</td>
</tr>
<tr>
<td>Mid-August</td>
<td>Coomalbidgup</td>
<td>12</td>
<td>18.0</td>
</tr>
<tr>
<td>Mid-August</td>
<td>Coomalbidgup</td>
<td>12</td>
<td>18.0</td>
</tr>
<tr>
<td>Second week July</td>
<td>Lor River (North)</td>
<td>Gravelly sandy loam</td>
<td>9</td>
</tr>
<tr>
<td>Fourth week July</td>
<td>Coomalbidgup (Coast)</td>
<td>6-9</td>
<td>9.0</td>
</tr>
<tr>
<td>Fourth week July</td>
<td>Coomalbidgup (North)</td>
<td>6-9</td>
<td>9.0</td>
</tr>
<tr>
<td>Fourth week July</td>
<td>Neridup</td>
<td>6-9</td>
<td>9.5</td>
</tr>
</tbody>
</table>

* Figures in the table indicate that only where the depth of sand over clay was 12 inches or more did late sowing produce high linseed yields. A further factor to be considered is that the good rains in mid-November allowed ALL late crops to finish off.

Table 6.—Effect of spring moisture on linseed yield

<table>
<thead>
<tr>
<th>District</th>
<th>Area</th>
<th>Yield</th>
<th>Rainfall—1968</th>
</tr>
</thead>
<tbody>
<tr>
<td>Howwick*</td>
<td>120 acres</td>
<td>8.5 bus/ac.</td>
<td>518</td>
</tr>
<tr>
<td>Condingup*</td>
<td>154 acres</td>
<td>17.0</td>
<td>643</td>
</tr>
</tbody>
</table>

* Although both crops received less than 1 inch of rain in October, the farm at Condingup recorded 3½ inches more than that at Howick during August and September. This provided good spring moisture relations which allowed the Condingup crop to finish in spite of the dry period in October-November.
Well-grown plots of linseed in a variety trial at Esperance Downs Research Station

after three years of dominant Woogenellup pasture, but most farmers familiar to linseed prefer older pastures.

Other problems
Problems associated with paddocks on a farm at Coomalbidgup are highlighted in Table 7. Lack of weed control delayed seeding on this farm until late-June when heavy rain prolonged waterlogging. One paddock survived waterlogging but the other suffered such reduced germination that it was reseeded three weeks later.

Experience with paddocks most likely to suffer from weeds (because of no seed-set control in 1967) was varied. Weeds became dominant wherever water lay for any length of time. Even on reasonably well drained paddocks the delayed germination of Wimmera ryegrass was moderate to heavy.

Cultivation also affected weed problems. Where operations such as scarifying brought grass seeds to the surface a late germination of Wimmera ryegrass was a likely result. One interesting observation was where a shallow disc ploughing (after the break of the season), followed by a deeper ploughing two weeks later reduced an anticipated weed problem to a very low level.

Implications for 1969

Rainfall
- Because of the problems associated with waterlogged areas in 1968, and the possibility of similar conditions, low lying poorly drained areas should be avoided as linseed paddocks.
- The effect of a dry spring in 1968 again showed the important relationship between good spring moisture supplies and crop yield. To ensure this supply linseed should not be grown in areas with less than 17 inches annual rainfall. Even in these better rainfall areas those soil types which tend to dry out during spring should be avoided.

Table 7.—Result of reseeding on a farm at Coomalbidgup

<table>
<thead>
<tr>
<th>Soil type</th>
<th>Paddock A—110 acres</th>
<th>Paddock B—265 acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultivations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disc ploughed early</td>
<td>9-12 in. sand over gravel</td>
<td>6 in. gravelly sand over clay</td>
</tr>
<tr>
<td>April</td>
<td></td>
<td>Scarified late—April</td>
</tr>
<tr>
<td>Scarified-Harrowed</td>
<td></td>
<td>Reworked three times in May</td>
</tr>
<tr>
<td>early—May</td>
<td></td>
<td>Disc ploughed June 12</td>
</tr>
<tr>
<td>Scarified - Harrowed twice in June</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sowing date</td>
<td>June 24</td>
<td>June 26 Reseeded July 14</td>
</tr>
<tr>
<td>Yield</td>
<td>21.0 bus/acre</td>
<td>9.3 bus/acre</td>
</tr>
</tbody>
</table>

190

Journal of Agriculture, Vol 10 No 5, 1969
Soil types
- Sandy surfaced soils with more than six inches of sand over clay are likely to give the most consistent yields. Shallow sands over clay or gravel have the potential to yield well but are likely to suffer from moisture stress in spring. Use of the shallow soils is best restricted to areas closer to the coast where rainfall is higher and where the chance of showers during spring is greater.

Time of planting
- Crops planted very early have a tendency to lodge especially if a dry spring forces them to mature early. However, such crops can be picked up with crop lifters provided the paddock is clean.
- Planting should be carried out between mid-May and mid-June in most areas, although the shallower the depth of sand the earlier planting can safely be carried out. Planting after June depends so much on November rains to finish the crop that spring sowing of wheat should be considered as an alternative especially on the shallower sands over clay.

Weed control
- The continued wet periods during seeding in 1968 emphasised the importance of early weed control.
- Late germination of Wimmera rye grass was a major problem for Esperance growers in 1968. Grassy areas should be avoided if possible, but where a grass weed problem is expected—
- Heavy grazing or mowing in the previous spring will reduce the amount of seed set by this weed, and a late summer burn will destroy much of the seed still on the surface of the ground.
- Deep ploughing (preferably with a mouldboard plough) buries much of the surface seed to a depth from which it will not germinate. Any subsequent workings should be shallow so that the seed is not returned to the surface.
- Linseed can be cleaned of grass seeds by the normal commercial services, or on the farm by passing the harvested sample back through the harvesting machine, which must first be modified for this purpose.

Soil fertility
- Highest linseed yields are obtained from paddocks with at least four or five years of dominant clover pasture.
- Provided weeds and the disease PASMO are not a problem, linseed can be cropped successively after clover ley by using high rates of nitrogen.
- New land sowings of linseed cannot be recommended on a large scale.

Further information
A brochure covering all aspects of linseed growing is available from the Department of Agriculture, Esperance or South Perth. General recommendations for weed control in linseed were published in the April, 1969 issue of the Journal of Agriculture.

Acknowledgment
Appreciation is extended to District Advisers R. J. Parkin and P. P. Eckersley of the Esperance Office, and to farmers who supplied data and comments.
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