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Field peas: a crop for the cereal growing areas?

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FIELD PEAS—A CROP FOR THE CEREAL GROWING AREAS?

PEAS have been grown in W.A. on a limited scale for many years to supply local stock feed manufacturers and to provide seed for forage crops.

Field peas have a protein content of about 25 per cent when dry, which makes them suitable for inclusion in high quality livestock and poultry rations. Small amounts are also used for split peas for human consumption and in pigeon food. Table 1 shows production over the past five seasons in W.A.

<table>
<thead>
<tr>
<th>Year</th>
<th>Area (ac.)</th>
<th>Production (bus.)</th>
<th>Yield/ac (bus.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965–66</td>
<td>4,356</td>
<td>30,669</td>
<td>7.0</td>
</tr>
<tr>
<td>1966–67</td>
<td>4,551</td>
<td>39,435</td>
<td>8.7</td>
</tr>
<tr>
<td>1968–69</td>
<td>7,691</td>
<td>60,412</td>
<td>7.8</td>
</tr>
<tr>
<td>1969–70</td>
<td>6,022</td>
<td>22,162</td>
<td>3.7</td>
</tr>
</tbody>
</table>

Current marketing problems with wheat and wool have caused increased interest in field peas as an alternative grain crop for cereal growing areas.

Markets for peas are limited and uncertain at present but, if farmers can negotiate sale of the crop, peas could be profitable in some areas.

This article describes production methods, likely yields in different areas, and possible markets for peas.

Climate and soil requirements

Climate

Peas will do best in the high rainfall areas. They also favour the long, cool growing season in southern areas. Farmers have averaged up to 50 bushels per acre from bulk crops in these districts, but yields are usually 15 to 30 bushels per acre. Yields in low rainfall areas are usually between 5 and 10 bushels per acre, and may be less in years with a dry finish to the season.

Peas are tolerant of cold but may be injured by severe frost, particularly at flowering time. Crops are often lost in inland areas.

Soils

Peas, like most crops, grow best on friable, well drained loams with high organic matter. However, provided correct fertilisers are applied, they should grow satisfactorily on all soils except heavy clays, deep sands and waterlogged areas. They seldom do well as pioneer legumes on new land.

* The authors: M. L. POOLE, Plant Research Officer, and H. M. FISHER, Cereal Adviser.
Clean, even areas free of rocks and roots greatly facilitate harvesting.

**Varieties and yields of peas**

*Dun*

Dun, or Early Dun as it is sometimes called, is widely grown throughout Australia. It has purple flowers and produces large seed of a dull greyish brown colour (dun). It yields well in wetter districts.

*White Brunswick*

Has white flowers and produces medium sized creamy-coloured grain, making it popular for the split pea trade. It matures 2 to 3 weeks earlier than Dun. Considerable areas are grown as forage crops in this State, including drier districts.

*Collegian*

Was produced from a cross between Dun and White Brunswick and has speckled dun-coloured seed, slightly larger than White Brunswick. It is early maturing but has never been very popular in Western Australia.

*Buckley*

A new variety produced in Victoria, Buckley has white flowers and cream-coloured seeds derived from White Brunswick, which is one of its parents. It has the same maturity as White Brunswick.

*Derrimut*

Another new variety from Victoria, Derrimut is the earliest maturing variety available. Collegian is one of its parents. It has purple flowers and produces dun-coloured seeds that are smaller than those of Dun or Collegian. It has yielded well in trials in Western Australia, particularly in drier areas.

Other varieties include Grey and Maple which mature too late for areas with less than 25 in. rainfall.

Table 2 shows the average yields obtained in Department of Agriculture trials in 1968 and 1969. Wheat and barley yields are shown for comparison. Farm yields over broad acres are likely to be at least 25 per cent, lower than these. A harvested yield of 15 bushels per acre is usually considered good for peas under farm conditions.

<table>
<thead>
<tr>
<th></th>
<th>High Rainfall (18-25 in)</th>
<th>Medium Rainfall (13-18 in)</th>
<th>Low Rainfall (10-13 in)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1968 (normal year)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peas (Dun)</td>
<td>15.6</td>
<td>10.3</td>
<td>6.1</td>
</tr>
<tr>
<td>Peas (Buckley)</td>
<td>14.2</td>
<td>12.8</td>
<td>7.8</td>
</tr>
<tr>
<td>Wheat</td>
<td>29.0</td>
<td>29.5</td>
<td>27.2</td>
</tr>
<tr>
<td>Barley</td>
<td>38.5</td>
<td>38.0</td>
<td>38.2</td>
</tr>
<tr>
<td><strong>1969 (Dry year)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peas (Dun)</td>
<td>18.1</td>
<td>2.9</td>
<td>1.2</td>
</tr>
<tr>
<td>Peas (White Brunswick)</td>
<td>15.9</td>
<td>4.5</td>
<td>2.7</td>
</tr>
<tr>
<td>Peas (Derrimut)</td>
<td>20.8</td>
<td>7.8</td>
<td>3.3</td>
</tr>
<tr>
<td>Wheat</td>
<td>37.6</td>
<td>19.2</td>
<td>14.9</td>
</tr>
<tr>
<td>Barley</td>
<td>42.0</td>
<td>23.0</td>
<td>17.8</td>
</tr>
</tbody>
</table>
Variety recommendations for brown (b) and white (w) seeded peas for different rainfall areas are:

- **Low rainfall (13 in. and less)**
  - Derrimut (b)
  - Buckley (w)
  (These varieties will do best, but are unlikely to be profitable.)

- **Medium rainfall (13-18 in.)**
  - Derrimut (b)
  - White Brunswick (w)
  - Buckley (w)

- **High rainfall (18 in. and more)**
  - Derrimut (b)
  - Dun (b)
  - White Brunswick (w)

It seems likely that Derrimut will give the highest yield in all areas.

These varieties are all available in W.A. at present at 6 to 9 cents per pound.

**Fertilisers**

Superphosphate applications should be the same as or slightly higher than those for wheat crops.

Because peas are legumes and can fix their own nitrogen from the atmosphere they usually do not need nitrogen fertiliser. However, on relatively infertile light land crops are often slow to nodulate, and some farmers apply light rates of nitrogen at seeding, usually as compound fertiliser.

The trace elements copper, zinc and molybdenum should be applied at recommended rates for the particular soil type if they have not been applied in the past.

**Sowing peas**

Good weed control is essential in preparing land for peas, as the crop is very susceptible to weed competition.

Cultural measures are the main means of control and it is suggested that land be ploughed 4 in. deep after full weed germination. The herbicide Diuron at 1 lb. per acre has given good control of common weeds in peas (cape-weed, subterranean clover, annual grasses and wild turnip) when applied as either a pre-emergence or post-emergence spray. Areas infested with doublegee should be avoided because of problems at harvest.

Pea crops should be sown as early as possible following good weed control. Seeding rates of 60-100 lb. per acre are recommended. The higher rate should be used if the ground is rough, if weeds are likely to be a problem later in the season, or if the crops are sown late. Only seed which has not been damaged by pea weevil should be used.

If the area has not grown peas before, inoculation of the seed is necessary. Inoculated seed should be lime pelleted if sown in contact with high rates of fertiliser and cannot be treated with insecticide dusts. If seed is not inoculated, use of these dusts is recommended (see section on insects).

Peas should be sown 1 to 1½ in. deep with a normal drill or combine (rows 7 in. apart).
Insect control

Red-legged earth mite (Halodyeus destructor)

Red-legged earth mite damages peas during seedling emergence. It is essential that all crops be sprayed within seven days of planting before the seedlings emerge if red-legged earth mite is likely to cause trouble.

If heavy populations are expected, 4 oz. of DDT active ingredient per acre is required. If only light insect populations are expected, the rate can be reduced to 2 or 3 oz. Avoid contamination of fodder and pasture crops with DDT.

Seed treatment with the systemic insecticides dimethoate or omethoate can be carried out if the seed is not inoculated.

Systemic insecticides are not effective when sprayed on bare soil, and it could be dangerous to wait for the seedlings to emerge before controlling red-legged earth mite with this type of material.

Spraying the boundaries of neighbouring clover paddocks with methidothion, omethoate, Imidan or dimethoate will help prevent the movement of red-legged earth mite from pasture into pea crops. Do not use DDT in these situations.

For further details see Bulletin No. 3217.

Native budworm (climbing cutworm) (Heliothis armigera)

The native budworm moth is active in the growing crop in spring, and the caterpillars appear during or soon after flowering. Growers should inspect crops frequently after the first sign of caterpillar activity. The following points should be remembered:

- Moths lay eggs singly on buds, flowers, pods or foliage of host plants and the eggs hatch two to eight days later.

- Experience has shown that spraying the crop is warranted if one or two caterpillars are found per square yard. Thorough inspection is needed to detect such low numbers.

- DDT is the most effective chemical for budworm control but it should not be used if the crop or stubble is to be grazed. Carbaryl (16 oz. active ingredient per acre) or trichlorphon (12 oz. active ingredient per acre) are recommended. Higher rates may be required for heavy infestations or large caterpillars.

- As the possibility of a second infestation cannot be predicted, frequent regular inspections must be made.

- Some farmers use a mister mounted on a utility to control budworm infestations with little damage to crops.

- Further details appear in Bulletin No. 2230.

Pea weevil (Bruchus pisorum)

Adult beetles lay eggs on the green pea pods in spring. The eggs hatch in five to nine days and the larvae bore through the pods into a developing seed. The larvae feed and grow in the pea, devouring the inside of the pea as it develops.

- Pea weevil can be controlled by:
  - Planting clean or fumigated seed.
  - Planting well away from old pea fields.
  - Destroying volunteer pea plants.
  - Burning, deep cultivating or grazing immediately after harvest.
  - Spraying the swarming beetles in spring with U.L.V. malathion or methyl parathion. DDT may be used if the crop or stubble is not to be grazed.

- Harvested peas must be fumigated to kill the larvae and pupae.

A comprehensive bulletin, The Pea Weevil—Technical Note 70/4, is available from the Department of Agriculture.

Chemicals recommended by their common names are available in the following trade products:

<table>
<thead>
<tr>
<th>Common name</th>
<th>Trade product</th>
</tr>
</thead>
<tbody>
<tr>
<td>dimethoate</td>
<td>Rogor, Ridmide, Diostop</td>
</tr>
<tr>
<td>omethoate</td>
<td>Le-mat</td>
</tr>
<tr>
<td>methidothion</td>
<td>Ultracide</td>
</tr>
<tr>
<td>imidan</td>
<td>Imicide</td>
</tr>
<tr>
<td>carbaryl</td>
<td>Bugmaster, Dicarban</td>
</tr>
<tr>
<td>trichlorphon</td>
<td>Le-baryl, Pestone, Resistox,</td>
</tr>
<tr>
<td></td>
<td>Savyon, Septene, Sevin, Zevilon</td>
</tr>
</tbody>
</table>

Diseases

The fungal disease Black Spot (Ascochyta pisi) is the most common disease of peas and is often serious in higher rainfall areas. It can be reduced by:

- Sowing seed from a disease-free crop.
- Dusting the seed with a fungicide if it is not being inoculated.
- Never cropping a paddock to peas more often than every fourth year.

A discussion of the disease and control is found in Bulletin 2214.
Harvesting

Field peas can be harvested satisfactorily by direct heading using crop lifters. Even with lifters, the comb or cutter bar must be set low and clean ground is necessary to avoid machine damage.

The pods should be thoroughly dry and the peas hard. Once in the machine peas thresh fairly easily. Drum speed should be as low as possible and concaves wide open to avoid cracking. A special slotted pea riddle is better for screening than the normal wheat riddle. The riddles and air blast should be adjusted so that a clean sample of grain is obtained and there is no repeat of grain through the thresher.

Warm, dry days are best for harvesting. In damp weather the pods are tough and the peas absorb moisture, making threshing more difficult. On very hot days pods may shatter and the peas are more liable to crack.

To get good samples of peas for the seed or split pea trades it is usually necessary to grade the seeds after harvest. This removes small and cracked peas but adds to the cost of production.

Markets for grain

The market for peas for the birdseed or the split pea trade is small and specialised and has traditionally been supplied by Victoria and South Australia. A local company hopes to enter this industry soon.

The only significant market is likely to be as a protein source for livestock and poultry feeds. In this role peas compete with a very large range of protein sources such as the oilseed meals, soyabean meal, fishmeal, lupins, vetches, etc. Peas suffer here in that their protein content of 25 per cent. is well below the 30-45 per cent. of most other vegetable protein sources. However, this is partly offset by their low fibre and high carbohydrate contents and their freedom from any toxins. Composition of peas and a number of other grain meals is shown in Table 3.

Local markets

The local market pays $1.65 per bushel for lupins, $1.50 for vetches and $70 per ton for rapeseed meal but, because of their lower protein content, the price for peas is only $1.20-$1.30 per bushel delivered to Perth.

There is no organised pea market operating in W.A. at present. Local feed millers require only 1,000-1,500 tons annually, which could be produced on about 5,000 acres. They might use more peas if prices were lower. The Eastern States produce more than their own domestic requirements.

Overseas markets

Australia exports small quantities of peas to Japan and the United Kingdom. For this export market peas must be clean, uniform in size, free from damage and true to variety.

Peas for livestock rations are quoted at $70 per ton ($1.80 per bushel) at European ports at present. Allowing for shipping freight and farm to port freight, a farmgate price of about $1.05 per bushel appears possible for good quality export peas.

South Australian high quality graded White Brunswick peas in new bags bound for U.K. fetch $2.00 per bushel f.o.b. Adelaide.

Prospects as an alternative crop

Taking into account the risks involved with growing peas, the high cost of production, the

<table>
<thead>
<tr>
<th>Foodstuff</th>
<th>Form</th>
<th>Crude protein</th>
<th>Oil (ether extract)</th>
<th>Crude fibre</th>
<th>N-free* extract</th>
<th>Ash</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peas...</td>
<td>Whole seeds</td>
<td>26</td>
<td>2</td>
<td>6</td>
<td>62</td>
<td>3</td>
</tr>
<tr>
<td>Vetches</td>
<td>Whole seeds</td>
<td>30</td>
<td>2</td>
<td>7</td>
<td>57</td>
<td>4</td>
</tr>
<tr>
<td>Lupins (WA Blue)</td>
<td>Whole seeds</td>
<td>34</td>
<td>5</td>
<td>15</td>
<td>43</td>
<td>3</td>
</tr>
<tr>
<td>Rapeseed meal</td>
<td>Extracted</td>
<td>41</td>
<td>3</td>
<td>10</td>
<td>37</td>
<td>8</td>
</tr>
<tr>
<td>Linseed cake</td>
<td>Expressed</td>
<td>35</td>
<td>8</td>
<td>10</td>
<td>40</td>
<td>5</td>
</tr>
<tr>
<td>Soyabean meal</td>
<td>Solvent extract</td>
<td>50</td>
<td>2</td>
<td>6</td>
<td>36</td>
<td>6</td>
</tr>
</tbody>
</table>

*N-free extract is approximately equal to the carbohydrate content other than that in the crude fibre fraction.
lack of organised markets, and the price, peas do not look a particularly promising crop. Barley or oilseed crops may give greater returns.

However, compared with other grain legumes (vetches and lupins), peas are likely to give the greatest gross returns per acre in most areas. Unharvested peas also make excellent summer feed for fattening sheep and the stubbles contain no toxins. Many farmers believe this offsets the lower margin per acre from peas grown for grain.

In addition, peas have some advantage in rotations as a cleaning crop to sow before cereals, as they are not susceptible to cereal diseases.

Anyone trying peas should ensure—
Suitable market prospects.
Good quality seed of correct variety for his area.
Suitable land, well prepared with emphasis on weed control.
Attention to fertilisers and insect control.
Careful harvesting for a good quality sample.

Field peas as hay and forage crops

Peas are often sown either alone or with oats to produce hay or high quality standing summer feed.

Hay crops

When sown alone for hay 60-100 lb. of seed per acre is recommended. When sown with oats for hay a mixture of 40 lb. of peas and 20 lb. of oats will give high quality pea hay. If lower quality oaten-pea hay is required, 40 lb. of peas and 60 lb. of oats are recommended.

Peas are usually cut for hay at the normal time in spring. However, some farmers leave pure stands of peas until they are mature, then bale the dry material and pods. If this technique is used, baling on damp mornings is recommended to reduce pod shattering.

Forage crops

When sown alone for standing summer forage, the recommended rate is again 60-100 lb. of peas per acre. A popular practice is to add 20 lb. of oats also. These provide a support for the climbing peas, making the peas easier to graze. The oat stubble gives some soil cover in summer. Sheep graze pure stands of peas bare, creating a wind erosion hazard.

Best use is made of forage peas if they are not grazed until after the peas have hardened in the pods. They do not recover well after grazing or cutting when green and are not very palatable in the green state. Palatability improves as they mature.

Grazing at flowering is particularly unwise because the yield of high protein grain will be greatly reduced.

Acknowledgements

The help of many people who provided information for this article is acknowledged, particularly the Biological Services Division of this Department. Mr. John Feeney supplied the photographs.