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Field pea in the great southern

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Introduction

Semi-leafless field pea like Kaspa have lifted the benchmark set by the previous conventional varieties such as Parafield and Dunwa. Semi-leafless field pea have the same traits as conventional field pea: adaptation to a range of soil types; wide selection of weed control options (including crop topping); nitrogen input; disease break; and reduction in root lesion nematodes. Semi-leafless pea is easier to harvest and is less prone to pod shatter.

The release of Kaspa has led to an increase in the area sown to field pea and the expectation by some that Kaspa will solve all their cropping or field pea problems. However, this is not the case as shown in the Lower Great Southern in 2005 with growers having a number of difficulties including:

- Blackspot disease and lodging due to the crop being sown too early
- Wet conditions, multiple and late germinations in the 2005 season resulting in poor weed control
- Damage to grain from a late influx of native budworm flights.

2005 also showed that issues which face growers now are due more to management and agronomy than variety and as such can be improved as experience with the crop is gained.

Paddock selection

Paddock selection is a vital step in profitable field pea production. Choosing the best mix of soil types is the first step in selecting the correct paddock and growing a successful field pea crop.

Soil type

Field pea grows well on a wide range of soils from clay loams to duplex soils, with pH values ranging from 4.5 to 7.5 in calcium chloride (CaCl₂). Clay loams and sandy loams with a pH above 6.0 tend to be more productive than lighter soils. In low rainfall areas or years (less than 325 mm average annual rainfall) sandy loams and duplex soils give more consistent yields than heavier soils (see Table 1).
Table 1. Yield (t/ha) of Derrimut field pea grown on three soil types at Merredin.

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>1984</th>
<th>1985</th>
<th>1986</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy (sandy clay loam)</td>
<td>2.43</td>
<td>0.65</td>
<td>2.45</td>
<td>1.86</td>
</tr>
<tr>
<td>Medium (sandy loam)</td>
<td>1.66</td>
<td>1.22</td>
<td>1.96</td>
<td>1.65</td>
</tr>
<tr>
<td>Duplex (sand over clay at 30 to 45 cm)</td>
<td>0.88</td>
<td>1.19</td>
<td>1.46</td>
<td>1.18</td>
</tr>
</tbody>
</table>

Field pea will generally outyield lupins on most soil types in the Great Southern particularly on duplex soils with less than 40 cm sand over clay.

Waterlogging

Field pea is more sensitive to waterlogging than cereal and faba bean. Fungal diseases such as blackspot and downy mildew are more severe on poorly drained soils.

Herbicide residue

Many paddocks in the Great Southern are made up of soils which have a uniform appearance on the surface but differ markedly below the surface. If the soil pH is above 6.5 (CaCl$_2$) and a sulfonylurea herbicide was used the previous year, residual damage may occur. Different sulfonylureas have different breakdown rates depending upon soil pH, soil moisture and soil temperature. Read the label for safe plant back periods. Growers in the Great Southern need to be cautious of herbicide residue particularly on duplex soils as many of these soils have a neutral to slightly acidic (pH 5.0) topsoil sitting on top of a clay subsoil which has a pH range from 4.5 – 8.0.

Frost risk

Low lying paddocks or parts of paddocks are at a high risk of being frosted, and if possible should be avoided. Field pea is one of the more frost sensitive crops, being more sensitive than lupin and faba bean with flowers, pods and seeds being all very susceptible to frost. The sowing window largely determines the relative level of frost risk. Sowing early increases the frost risk, whilst sowing later may lower it, however, time of sowing cannot eliminate the risk of frost completely. A very late frost as experienced in 2005 would have had a similar impact on early or late sown crops.

Stubble management

Careful management of the field pea stubble generally reduces the risk of wind erosion to a level comparable to that of a grazed lupin stubble. Retaining cereal stubble within the field pea crop will reduce the risk of wind erosion and not grazing the field pea stubble at all will further reduce the risk of wind erosion.

Soil types considered suitable for field pea production in the Southern Region

Sandy loams over alkaline clay subsoil (5 to 30 cm to clay). E.g. Salmon gum-York gum soils which are shallow hard setting duplex soils.

Reddish loamy to clayey valley soils. E.g. reddish brown sandy loams and clay loams such as those found in the Ravensthorpe district.

Grey clayey valley soils. E.g. Kumarl clay loams and Dowak loams, Gimlet clays-“Sunday soils” and Moort grey clays.

Loamy sands over alkaline clay subsoil (5 to 30 cm to clay). E.g. White gum soils.
Field pea stubble historically has been grazed due to the amount of grain left on the ground after harvest. However the new semi leafless field pea varieties like Kaspa and Yarrum have substantially improved structure for harvesting compared with trailing types such as Dundale and Parafield. The combination of reduced lodging, improved pod height and reduced pod shatter available in semi-leafless lines like Kaspa results in lower harvest losses in the paddock and a cleaner sample. Thus the new semi-leafless field pea removes the reason to graze field pea stubble after harvest as harvest losses are as low as 30-90 kg/ha, even in a crop yielding over 3.5 t/ha. Even if there is pea seed left on the ground, they contain nitrogen which recycles quickly once the field pea seedlings are killed by herbicide early in next year’s crop.

**Time of sowing**

Sowing too early increases the risk of blackspot disease while sowing too late shortens the growing season and reduces potential yield.

Field pea is the last crop to be sown but still must be sown in its proper sowing window. If you have finished your cropping program early apart from your peas, then wait until it is the right time to sow. Although target dates have been given in the table below, in any year these dates may change due to either a lower or higher blackspot risk following conditions over summer/autumn and at sowing. Therefore it is recommend you also visit the disease forecast area at [www.agric.wa.gov.au](http://www.agric.wa.gov.au) for seasonal updates closer to sowing.

<table>
<thead>
<tr>
<th>Rainfall Zone</th>
<th>Target start date in most years</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>20 May</td>
<td>Most to gain by visiting web site to see if earlier sowing is possible. Once sowing is delayed into June there is usually no difference between early and late June sowings in any one year.</td>
</tr>
<tr>
<td>Medium</td>
<td>4 June</td>
<td>Only sow earlier if the seasonal update on the web says it’s safe. Sowing until the end of June has little impact on yield.</td>
</tr>
<tr>
<td>High</td>
<td>10 June</td>
<td>Avoid sowing earlier. Sowing until the end of June has little impact on yield, and early July sowings are still viable.</td>
</tr>
</tbody>
</table>

Time of sowing experiments at Katanning have shown June sowings to usually yield better than May, and crop may still be sown in July without dramatic yield loss.

**Sowing depth**

Sow seeds 5-8 cm deep. This improves plant establishment and minimises the risk of herbicide damage from soil applied herbicides.

**Inoculum**

Always inoculate with group E inoculum prior to sowing. No seed dressings or in-furrow fungicides are recommended for field pea.

**Fertiliser**

Phosphorus is the main fertiliser required by field pea in Western Australia. Apply as much superphosphate as for wheat grown on the same paddock. On soils with high pH and a foliar spray equivalent to 1 kg manganese/ha applied 6 to 8 weeks after sowing may increase yield.

**Rolling**

Pods are held above ground level in most Kaspa crops, nevertheless rolling is still recommended to guard against harvest problems. Roll after sowing with rubber tyre or steel rollers to level the paddock surface and push rocks or sticks into the soil.

Roll immediately after sowing or after plants have emerged and past the 3 node stage. Don’t roll two weeks before or after the application of post-emergent herbicides.

**Sowing rate and row spacing**

Semi-leafless field pea like Kaspa require higher sowing rates than trailing type field pea like Parafield. Aim to establish 55 plants/m² (compared to 45 plants/m² for trailing type varieties). Assuming a seed size of 190 mg, germination rate of 95% and a field establishment of 90%, 55 plants/m² equates to a seeding rate of 120 kg/ha.

If bulking up, aim to establish 30 plants/m². This equates to a sowing rate of about 70 kg/ha and will provide a greater multiplication rate (i.e. more seed returned for each seed sown) but the yield per hectare will be about 25-50% lower than a crop sown at the higher rate. Crops sown at low rates for seed multiplication compromise weed control and ease of harvest, so ensure the paddock selected has a low weed burden and no obstacles for harvest.
Field pea grows well in conventionally spaced rows up to 30 cm. The standing ability of Kaspa for harvest is likely to be impaired by rows wider than 30 cm because the tendrils will be less able to latch onto wider-row neighbours for support.

Weed control

A big pre-season for wheat.

Think of the weed control practices being carried out in field pea akin to pre-season training in football and as all the players and experts say if you have a “big pre-season you have set yourself up for a good season”. Controlling your total weed burden in field pea by time of sowing, knock down herbicides, pre and post emergent herbicides and crop-topping allows you to sow your wheat to achieve the maximum potential yield with the least herbicide cost.

Weed Control/Herbicide Options.

There are a number of weed control options and herbicide rotations for field pea. Weed control in field pea requires commitment for the entire season and like in a game of football, if you are only partly committed you will lose. Weed control in field pea requires all of the following options;

- Knockdowns - chemical and or mechanical
- Delayed time of sowing for weed and disease control
- Apply pre-emergent herbicides, post-emergent herbicides if required and crop-topping to control any late germinating or weed escapes.

Relying on only one or two of these options will result in poor weed control and/or yield. Broadleaf weeds found more commonly in the Great Southern such as toad rush, fumitory, cotula, wild radish and capeweed can be controlled in field pea but due to staggered germinations it may require a number of weed control timings including crop-topping to achieve satisfactory weed control.

Registered herbicides for common broadleaf weeds found in the Great Southern

<table>
<thead>
<tr>
<th>Weed</th>
<th>Sowing</th>
<th>Post-emergence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toad rush</td>
<td>Metribuzin, Bladex®, Spinnaker®</td>
<td>Metribuzin, Brodal®, Spinnaker®</td>
</tr>
<tr>
<td>Fumitory</td>
<td>Metribuzin, Bladex®, Trifluralin</td>
<td>Metribuzin Bladex®*</td>
</tr>
<tr>
<td>Cotula</td>
<td>Metribuzin</td>
<td>Metribuzin</td>
</tr>
<tr>
<td>Capeweed</td>
<td>Bladex®, Diuron, Spinnaker®, Metribuzin</td>
<td>Metribuzin, Brodal®, Sniper®, Broadstrike®, Bladex®</td>
</tr>
<tr>
<td>Wild radish</td>
<td>Bladex®, Diuron, Spinnaker®, Metribuzin</td>
<td>Metribuzin, Brodal®, Sniper®, Raptor®, Broadstrike®, Bladex®</td>
</tr>
</tbody>
</table>

Registered but not recommended

Sowing depth.

Sow seeds 5-8 cm deep. This improves plant establishment and minimises the risk of herbicide damage from soil applied herbicides. Shallow sowing results in poor crop growth and herbicide damage, which leads to greater blackspot disease, which leads to poor crop growth and the vicious cycle begins again. A variation of sowing shallow is to sow the field pea crop with knife points and press wheels and spray either Diuron or metribuzin onto the furrows. The result is the same - crop loss of 30-50%.
**Time of Sowing.**

Sowing field pea at the end of your sowing program allows the control of at least one or two weed germinations.

**Pre-Emergent Herbicides**

There are two commonly used pre-emergent strategies used on field pea in Western Australia. For both strategies it is important not to sow field pea too shallow (see above) and where diuron or metribuzin is used, to level the seedbed by harrowing and/or rolling before applying the herbicide. Otherwise, rain may concentrate the herbicide in the furrows. See picture below.

![Furrowed seed bed prior to rolling. (Photograph by Rodger Beermier)](image)

1. Apply 1 – 1.5 L/ha diuron (500 g a.i./L) and 1 – 2 L/ha trifluralin (400 g a.i./L) before sowing when the crop is sown with knife points. The diuron controls many broadleaf weeds and the trifluralin controls grasses and wireweed. In conventionally cultivated systems, which leave the paddock relatively flat, apply diuron post-sowing pre-emergent (PSPE). The trifluralin is still best applied before sowing to ensure that it is well mixed with the soil.

2. Apply 34 g/ha Spinnaker® and 1 – 1.5 L/ha diuron PSPE. It is important to level the seedbed by harrowing and/or rolling before applying this mixture. Spinnaker® will control wireweed, some grass weeds, and a wide spectrum of broadleaf weeds.

**Post-emergent Herbicides**

There are many herbicides registered for post-emergent weed control in field pea. These are mostly applied at the 3 – 8 node stage of the crop.

- Brodal® and metribuzin mixes: usually 60 mL/ha Brodal® (500 g a.i./L) and 60 mL/ha metribuzin (750 g a.i./L) is adequate for cruciferous weeds and capeweed. Higher rates of metribuzin will improve doublegee control, but are also more likely to damage the crop. At higher rates Brodal® and metribuzin can be used alone, but they are more likely to damage the crop and are less effective against weeds than when mixed together.

- 45 g/ha Raptor® + 2% BS1000 will control cruciferous weeds, lupins, barley grass, brome grass, and volunteer cereals. It will not control annual ryegrass and cannot be tank mixed with post-emergent grass killers.

- 700 – 1000 mL/ha MCPA 250 (as the sodium salt) will control late germinating cruciferous weeds and can be applied to field pea from the 6 – 8 node stage. However, it will retard the crop, and may cause stem distortions for up to 2 weeks after application. This option should only be used when good growing conditions are expected following application so the crop can recover.

- Most of the selective grass herbicides. Check registration labels.

![Conventional field pea (left) and semi-leafless field pea at 3 node stage (right) (Photograph by Pam Burgess)](image)

Grass selectives (Select, Verdict) and broadleaf weed sprays (Brodal, Lexone) need to go on between the 3 and 8 node stage of the field pea plant. However, remember to leave a 10 day gap between these sprays to obtain the best possible effectiveness on the target weeds. In many instances it is better to spray for broadleaf weeds first then return 10 days later to spray for grasses as large broadleaf weeds are harder to control.
**Crop topping**

Crop topping aims to prevent seed set of surviving in-crop weeds, hence lower the weed burden in the following crop. The early maturity of field pea makes it ideally suited to crop topping.

Reglone can be used for crop topping, but the most economical chemical is Gramoxone at 600 mL/ha for ryegrass, or 800 mL/ha for wild radish. Timing is critical to the success of crop topping. Spraying too early will reduce the crop’s yield potential, and spraying too late will have little effect on the weeds. Once the field pea seeds have reached 30% moisture, or when the lower 75% of the pods are brown, with firm seeds and leathery pods, crop topping will not reduce crop yield. The crop can still have green tips at this stage, and the operation may improve harvest efficiency by making the crop ripen more evenly.

Glyphosate should only be used when the crop is to be swathed. Glyphosate should be applied at 50 to 75% brown pods if it is used in crop topping a swathed crop.

Don’t use glyphosate to desiccate or crop top a seed crop as it can reduce seed viability.

**Insect control**

During and following emergence, monitor for
* Red legged earth mite
* Lucerne flea
* Cutworm
* Pasture looper

To protect crops of Kaspa from these pests apply an appropriate insecticide with the knockdown herbicide or apply a bare earth spray immediately after sowing. Bare earth sprays are more appropriate where red legged earth mite are the major pest.

**Pea Weevil**

Begin monitoring the crop with a sweep net just before the first pods begin to form (5 – 7 days after flowering begins). Monitor on warm days (the temperature needs to be above 18°C for the pea weevil to be active), first along the edges of paddocks nearest to trees and last year’s field pea stubble.

If more than 1 pea weevil in 100 sweeps are present then spray a synthetic pyrethroid (i.e. Karate®) immediately. In large paddocks clear of trees, it is usually only necessary to spray a 60 m border around the paddock because pea weevil work their way in from the edges of the paddock.

Eggs on pods and larvae in pods will not be killed by insecticide so it is important to kill adults before they lay eggs.

Weevils lay their eggs on the emerging pod (tiny orange sacs approx 2 mm long) and the larvae from the sacs burrow through the pod wall into the developing pea. This is where they stay until they reach adulthood (when the crop is ripe and usually in the silo) slowly eating the inside of the pea. They then emerge as an adult weevil from the centre of the pea leaving a perfectly round hole in the pea.

Recommence monitoring the crop about 14 days after spraying. If you find more pea weevil spray the entire crop.

**Native Budworm**

In the past 2 seasons, late native budworm moth flights have resulted in serious damage to field pea pods and seeds - so be prepared. Kaspa appears to be more readily damaged than normal trailing varieties such as Parafield. Spray immediately to protect pods once native budworm grubs have been found. Don’t wait for the grubs to grow.

The best way to determine grub numbers in the crop is to use a sweepnet. With the face of the net angled slightly backwards so that the grubs fall into the net, sweep the top 15 cm of the crop in a horizontal arc. Semi-leafless varieties (Kaspa) are harder to sweep than trailing varieties (Parafield) therefore spray Kaspa crops if you find 1 grub in every 20 sweeps, compared to 1 grub in 10 sweeps for Parafield crops. Monitor the crop after spraying to determine if follow up sprays are required.

**Diseases**

Blackspot is the most serious disease of field pea in Western Australia. The best way to manage this disease is to avoid infection sources by

* Separation > 500m from last season’s field pea stubble.

* Rotation at least 3 years between crops.

* Delay sowing until safe to sow (see web page) - often 10 – 28 days after the break of the season.

Seed dressings and foliar fungicides do not provide economic control.
Harvesting

Semi-leafless field pea varieties like Kaspa, Yarrum, Moonlight and Snowpeak have a substantially improved structure for harvesting compared with trailing types such as Dundale or Parafield. In most conditions Kaspa will stand better at harvest than trailing type varieties. Nevertheless, for ease of harvest, particularly in circumstances where semi-leafless peas may lodge, it is important to prepare paddocks prior to, and after sowing to ensure a clean level paddock for harvest.

Some semi-leafless peas including Moonlight and Kaspa have a sugar pod trait that reduces pod shatter. Other lines such as Yarrum and Snowpeak do not have a sugar pod trait and are more likely to shed seed if left to stand in the paddock for extended periods once mature or if they are handled roughly at harvesting. The combination of reduced lodging, improved pod height and reduced pod shatter available in semi-leafless lines like Kaspa and Moonlight results in lower losses in the paddock and a cleaner sample.

Kaspa like cereals may be harvested above ground level, even where it has lodged. This is because most pods are formed near the top of the plant. Semi-leafless lines like Kaspa tend to be airy or fluffy at maturity i.e. they have a large volume to weight ratio and this may result in a build-up of material on the front. This is common on draper/belt fronts, but has also been observed when Kaspa was harvested with a conventional header with a plucker front.

The following table provides some suggested harvest settings or modifications to existing machinery which are relatively inexpensive, and make the harvesting of semi-leafless field pea like Kaspa no greater a task than harvesting cereals.

### Big Ticket Items for 2006

1. Separate 2006 field pea paddock from last years stubble by a minimum of 500 metres.
2. Inoculate seed effectively. If you forget to inoculate or rhizobia dies (dry soil or some fungicide seed dressings), not only is the yield of the field pea crop significantly reduced but also the potential wheat yields for the following year.
3. Sow field pea to ensure a final seeding depth of 5 cm. It is better to err on sowing deeper than shallow.
4. Apply Post Sowing Pre-Emergent herbicides onto a level seedbed.
5. Level paddock after sowing for harvest.
6. Sow your field pea in their sowing window not a window of convenience i.e. do not sow the field pea paddock because the machinery is passing that paddock. Although target dates have been given in any year these dates may change due to conditions over summer/autumn and at sowing. Therefore it is recommend you also visit the disease forecast area at [www.agric.wa.gov.au](http://www.agric.wa.gov.au) for seasonal updates closer to sowing.

### References

Producing Pulses in the Southern Agricultural Region, Department of Agriculture Bulletin 4645, April 2005.

Successful Field Pea Harvesting, Department of Agriculture Bulletin 4569, 2005.

Successfully harvesting semi-leafless field peas, Department of Agriculture Farmnote 14/2005.
| **Suggested harvest settings/modifications for trailing and semi-leafless field pea** |
|---|---|---|
| **Trailing**<br> Dunwa, Helena, Parafield. | **Semi-leafless**<br> Kaspa, Moonlight |
| **Harvest timing** | Cool conditions | Warm conditions – sugar pod/plant trait makes the vines ropey and hard to thresh and chop in cool/damp conditions |
|  | At beginning of program | Harvest may be delayed provided pea weevil management and marketing is not compromised |
| **Crop lifters** | Essential | May be possible to remove lifters if crop is upright – resulting in less dirt in sample |
| **Finger tyne adjustment** | Tilted back slightly to assist lifting of material | Set in vertical position to force material down and onto draper fronts |
| **Reel speed** | 1.1 times ground speed | 1.0 to 1.3 times ground speed |
| **Raised cross auger** | not required in most crops | Essential for draper fronts |
| **Raised cross Auger with paddles on middle section** | not required in most crops | Improves speed of harvest of pluckers |
| **Lupin breakers** | not required in most crops | Essential for draper fronts |
| **Position of broad elevator**<br> feeder house auger | setback | Moving feeder house auger forward may reduce blockages |
| **Stripper plate** | Thought to be a useful addition to stop material building up behind raised cross augers and going over the rear of the table |
| **Flexible fingers above plucker** | Useful addition | Useful addition |
| **Wire fence across back of fronts** | Useful addition | May assist in light crops but not a reliable method compared to raised cross auger fitted with paddles |
| **Crop dividing coulters** | Useful addition | Most setups will benefit |
| **Drum or Rotor speed** | Low | Low |
|  | 300-600 rpm | 300-600 rpm |
| **Engine capacity** | More power required |
| **Concave** | Easy to thresh 10-25 mm | Ensure concave wire gaps are at least 7mm and not blocked. The extra time taken for the increased dry matter to be threshed when sieves are blocked may lead to seed damage. |
| **Fan speed** | 60-75% | 60-75% |
| **Screens** | Crop is likely to pick up dirt – fit screens to remove dirt wherever possible | Correct screen size is required or damage will occur due to increased threshing time |
| **Top sieve** | 20-25 mm | 20-25 mm |
| **Bottom sieve** | 10-15 mm | 10-15 mm |
| **Straw Chopper** | Useful addition | Essential due to the ropey nature of the vine. |

# Not suitable for semi-leafless peas which do not possess the sugar pod trait – Bundi, Yarrum.

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