

Northern Region Field Pea Management Guide



Photos: Gordon Cumming

In Collaboration with:



Introduction

The benefits of pulse crops in northern farming systems are well understood. However, a major limitation to their continued adoption has been the availability of a range of pulse crops to fit the varied soil types and environments.

The release of field pea varieties that have been specifically selected for the northern region means that field pea can now be considered a viable pulse crop option for the region. These varieties are suitable for both stockfeed and human consumption markets.

Newer field pea varieties have improved regional adaptation through greater yield potential, improved standability at harvest and improved disease resistance.

Field peas are a hardy winter pulse that can provide economic gross margins for grain growers and flow-on benefits to the following cereal crop. Most field peas are grown for grain; however, some varieties are also increasingly being used for green manure, forage or hay. In the traditional field pea growing regions of southern Australia the major pea required in the market place is the dun type, with other types (blue and white) filling niche markets. However, in the northern region with most uses targeted at the domestic stockfeed market, seed type is less important.

Where field pea fits in the farming system

Field peas offer flexibility and provide many benefits to growers in the northern region. They can be grown for grain, used as a green manure crop, made into hay or silage, or even grazed, depending on seasonal conditions and market prospects.

As a result of these multiple options, field peas are a useful component in both dryland winter crop rotations or as part of a mixed cropping – livestock enterprise. They are well suited to no-till farming systems of the northern region. They are preferably grown following a cereal crop (using the standing stubble as an aid to crop management), and to provide nitrogen and break-crop benefits to the following cereal crop. Field peas should be grown in a 1 in 4 year rotation and should never immediately follow another broadleaf break crop, due to the risk of sclerotinia disease carry-over.

There would be very few farming situations in the northern region where field pea would not be suited. Field peas have the widest adaptation to soil types

of all pulse crops, including soil types ranging from sandy loams through to clays, acid or alkaline pH, and sodic soils.

There are two primary limitations to the production of field peas in the northern region being the foliar disease powdery mildew and shortened flowering period.

The northern region field pea breeding program has specifically targeted both these limitations releasing two new varieties, Maki[®] and Yarrum[®], which have early flowering and maturity and are resistant to powdery mildew.

The flowering habit or phenology of field peas is a genetic characteristic of each variety. Field peas will not flower until they reach a critical growth stage, measured as the number of nodes. Actual length of flowering, and the number of flowering nodes or sites, is determined by environmental conditions during flowering, such as temperature and moisture availability. Field peas will stop flowering once temperatures reach 30°C, or at a lower temperature if moisture is limiting. Unlike chickpeas, flowering will not recommence if temperatures drop. For this reason it is recommended that field peas be planted as early as possible in the sowing window to allow sufficient time for flowering and pod development to occur.

Rotational benefits

Rotational benefits include the ability to conserve or increase soil nitrogen levels, increased flexibility for weed control and as a break crop for cereal root and crown diseases.

A well nodulated field pea crop with good weed control can provide nitrogen input into the crop rotation by means of “sparing” soil nitrogen (compared to non-pulses) and releasing nitrogen from crop residues. Larger benefits to the following crop in the rotation are more likely where soil fertility is low to medium prior to planting field peas.

Like other pulses, a grass-free field pea crop will help to reduce the levels of cereal root disease such as crown rot (*Fusarium pseudograminearum*) which remains a major limitations to winter cereal production in the northern region.

Field peas can also be used to extend the cropping phase, by providing additional herbicide group options to reduce the potential development of herbicide resistance.

Field Pea Varieties

Maki[Ⓛ] (AP18)

The cross and early selection was made by Plant Research NZ Ltd with the line AP18 identified and evaluated by the University of Sydney Plant Breeding Institute (PBI) Narrabri. It was commercially released as Maki[Ⓛ] for the 2009 winter season.

Maki[Ⓛ] was selected for its improved yield potential in the warmer, shorter season environments of northern NSW and southern Qld.

Key characteristics include;

- Resistant to powdery mildew, the major disease constraint to field pea production in the northern region.
- Resistant to *Pea seed-borne mosaic virus* (PSbMV).
- Useful resistance to a number of the leuteoviruses, especially *Bean leaf roll virus* (BLRV).

- Green seeded blue pea.
- High and stable yield potential.
- Semi-leafless, semi-dwarf type of early to medium maturity.
- Excellent standability at harvest.
- Suitable for stock feed or human consumption.
- Very low levels of Trypsin Inhibitor Activity, a significant anti-nutritional factor for livestock.

Yarrum[Ⓛ]

The first field pea cultivar to be selected specifically for adaptation to northern NSW and southern Queensland and commercially released for the 2004 winter cropping season.

Key characteristics include;

- Resistant to powdery mildew.
- Dun seed type.
- Semi-leafless, semi-dwarf type of medium maturity.
- Suitable for stock feed or human consumption.

Agronomic features & disease resistance

	Seed type	Leaf type	Plant height	Relative flowering time	Maturity	Standing at maturity	Pod shatter resistance	Black spot	Downy mildew	Powdery mildew	*Bacterial blight (<i>P. Syringae</i> pv. <i>syringae</i>)	PSbMV	Bean leaf roll virus
Maki [Ⓛ]	Blue	SL	M	Early	Early	Fair-Good	S	S	MS-MR	R	S	R	MR
Yarrum [Ⓛ]	Dun	SL	M	Mid	Early-mid	Fair	S	S	S	R	MS-MR	R	MS-MR
Kaspa [Ⓛ]	Dun	SL	M	Late	Late	Fair	R	MS-MR	MS-MR	S	S	S	S
Parafield	Dun	C	T	Mid-late	Late	Poor	S	S	S	S	MS-MR	S	S
Excell	Blue	SL	S	Early	Mid-Late	Fair-Good	VS	S	MR	S	S	S	S

* Resistance only demonstrated to the bacterial blight pathovar *Pseudomonas syringae* pv. *syringae*.

R = resistant; MR = moderately resistant; MS = moderately susceptible; S = susceptible.

Leaf type: C = conventional, SL = semi-leafless.

Northern region S4 – long term yields as % of Yarrum[Ⓛ], data years 2006-2009

Variety	4 Year Average	Combined Site Means			
		2009	2008	2007	2006
Maki [Ⓛ]	114	97	97	145	119
Yarrum [Ⓛ]	100	100	100	100	100
Kaspa [Ⓛ]	62	73	43	67	63
Parafield	71	66	52	78	87
Excell	48	41	44	60	45
Yarrum [Ⓛ] yield (t/ha)	2.00	1.18	2.27	1.48	1.98
Number of trial sites	25	4	7	7	7

Yield data courtesy of: Pork CRC project 1A-108

"Development of adapted field pea varieties for pork producing regions in northern and southern Australia"

Paddock Selection & Planting

Soil types

Field peas have the widest adaptation to soil types of all pulse crops, from sandy loams through to heavy clays. Soils may be slightly acid to alkaline (pH_{Ca} 5.5 to 9.0), and there would be very few farming situations in the northern region where field pea would not be suited.

Field pea is the only pulse crop adapted to tighter hard setting clay soils (sodic soils), which is one of the reasons why they have created interest in the northern region.

Like all pulse crops, field peas are less productive on soils with a hard setting surface or with heavy clay subsoils that drain poorly. They do not tolerate extended periods of waterlogging, particularly at the seedling stage. Well drained soils are therefore important for successful crop establishment and growth. Field pea can be sensitive to high levels of exchangeable aluminium in acid soils.

Level paddocks are preferred; paddocks with gilgais, rocks or sticks, and hardpans should be avoided.

Guidelines for pulse crop soil requirements on central NSW soils

	Soil type	Soil pH _{Ca}	Exchangeable Al% range	Drainage tolerance (1-5) **	Sodicity in root zone (90 cm) (ESP) +
Lupin – narrow-leaf	Sandy – loams	4.2 – 6.0	20% Tolerant	Sensitive (2)	< 1 surface < 3 subsoil
Lupin – albus	Sandy – loams – clay loams	4.6 – 7.0	Up to 8%	Very Sensitive (1)	< 1 surface < 3 subsoil
Field pea	Sandy – loams – clays	4.6 – 8.0	Up to 5–10%	Tolerant (3)	< 5 surface < 8 subsoil
Chickpea	Loams – self mulching clay loams	5.2 – 8.0	Nil	Very Sensitive (1)	< 1 surface < 5 subsoil
Faba bean	Loams – clay loams	5.4 – 8.0	Nil	Very Tolerant (4)	< 5 surface < 10 subsoil
Canola*	Loams – clay loams	4.8 – 8.0	0–5 %	Tolerant (3)	< 3 surface < 6 subsoil
Lucerne*	Loams – clay loams	5.0 – 8.0	Nil	Sensitive – Tolerant (1-3) dependent on variety	< 3 surface < 5 subsoil

* Non pulse comparison.

** No hard pans and good drainage (no puddles after 24 hours from a 50 mm rain event).

Hardpans – can aggravate waterlogging and cause artificial waterlogging. + Exchangeable Sodium %.

Source: Agnote DPI 446 *The right pulse in the right paddock at the right time.* (Revised May 2004)



Photo: Gordon Cumming

Paddock and planting preparation

All pulse crops should be sown as a part of an appropriate rotation. The previous crop should be a non-pulse and preferably a cereal. This will maximise the amount of nitrogen fixed by the field pea. Ideally, there should be standing stubble with the crop planted as no-till. This assists with minimising aphid activity within the crop, which can transmit viruses. The standing stubble also provides support for the growing field pea crop.

Field peas can be planted with most conventional equipment used for sowing cereals. The paddock surface should be left relatively even after sowing. This will reduce the risk of damage from soil clods and stones during the harvest operation.



Photo: Gordon Cumming

Broadleaf weeds

Broadleaf weed pressure should be low – the weed seed bank should have been reduced in previous crops. Avoid problem weed paddocks, considering both weeds which are difficult to control and weeds which may contaminate the grain sample.

Herbicide residues

Herbicide history must also be considered and paddock records reviewed.

Residues of Group B herbicides that have been applied in the previous crop can be very damaging to following pulse crops including field pea, particularly in alkaline soils after extended dry periods.

Examples of these products include; sulfonylurea herbicides such as chlorsulfuron (eg: Glean®) and metsulfuron methyl (eg: Ally®) as well as metosulam (Eclipse®), triasulfuron (Logran®) and imazapic + imazapyr (OnDuty®).

Common spikes used in pre-plant knockdown sprays (e.g. 2,4-D products and dicamba) have plant back restrictions. These range from 7 to 21 days dependent upon product and rate.

When applied to dry soil, at least 15 mm of rainfall is required prior to the commencement of the plant back period.

Always consult the product label and follow the recommended plant back periods.

Planting depth

Field peas are commonly planted at 5 to 7 cm.

They are large seeded and need to be placed well into the moisture band.

Row spacing

Planting into standing stubble is encouraged, with row widths ranging from 15 cm to a maximum of 35 cm. Row widths should be reduced to 25 cm or less in bare fallows.

Sowing on wide rows, e.g. 50 to 60 cm is not advised as it increases susceptibility to lodging and clumping at harvest.



Maki planted on 32 cm rows

Maki planted on 64 cm rows

Photos: Steve Moore

Plant population and planting rate

Don't skimp on seed – correct plant population is important.

Aim for a minimum plant population of 60 plants/m². Plant populations of 30 plants/m² or less can result in significant yield losses and cause harvest difficulties due to lodging.

The planting rate required for an individual seed line will depend on the germination and establishment percentages and seed weight.

The planting rate is calculated using the following equation:

Seeding rate in kg/ha =

$$\frac{\text{Target density (plants/m}^2\text{)} \times 100 \text{ seed weight (g)} \times 1000}{\text{Germination \%} \times \text{Establishment \%}}$$

A typical planting rate range is 125 – 150 kg/ha.

Planting time

Planting time should be adjusted to allow flowering to commence from mid to late August to avoid the main frost period.

Planting earlier than recommended can result in frost damage and later than recommended planting dates can potentially result in yield loss due to heat stress.

Inoculation

Inoculation with Group E inoculant is essential on all soil types with care taken to ensure that it has been properly stored and applied.

Take care with seed inoculation. Many failures with nitrogen fixation have been associated with improper application techniques. Thorough coverage of the seed is critical since seeds not exposed to the bacteria will result in plants unable to fix nitrogen.

Growers should refer to the manufacturer's package labels to review proper inoculant rate and handling procedure.

If seed is to be treated with a fungicide, carry out this operation first and then apply the inoculant separately, immediately prior to planting. Avoid inoculating directly into the airseeder bin as newly inoculated seed is often sticky and does not flow properly, causing uneven seed flow, resulting in patchy establishment across the paddock.

Growers should check their fields to determine if inoculation was successful. Normally, nodules will form on the roots 4 – 6 weeks after emergence.

To check for nodulation, carefully dig up a number of plants and gently wash out the root mass. Nodules should be present on both the primary and lateral roots. Split the nodules with a sharp knife, effective nodules will be a pink to red colour inside.

Suggested planting times by region

Region	Week	May				June			
		1	2	3	4	1	2	3	4
Burnett									
Darling Downs									
Western Downs/Maranoa									
NW / NSW									
Liverpool Plains									

Preferred Sowing Window

Earlier or later than recommended. Yield reduction likely.

If nodulation does not occur and soil nitrogen levels are low, an application of nitrogen fertiliser may be required to optimise yields.



Strong healthy nodules. The blood red colour is a sign of good health for the rhizobia

Nutrition

Phosphorus: is the major nutrient required by field peas and rates are typically equivalent to those used on cereals, 10 – 40 kg P/ha. Rates should be based on soil testing, paddock cropping history and potential crop yield.

Sulphur & Zinc: most pulse crops have comparable requirements for sulphur and zinc with field pea thought to be similar to chickpea, especially on alkaline soils and/or where double cropping occurs in northern regions.

If soils are known to be sulphur or zinc responsive (consider soil type and cropping history), then consider using a starter fertiliser containing these nutrients when addressing the phosphorus requirements for the crop at planting.

Potassium: as pulse crops are also significant users of potassium, it is advisable to monitor soil levels, particularly on red earth soil types, and apply starter blends or specific potassium fertilisers as required.

In Crop Management

Weed control

Field peas have the greatest selection of herbicides of any pulse crop. There are more post-emergent herbicide options for field peas than for other pulses, as long as they are applied at the correct crop growth stage.

Herbicide options in NSW & Qld include

Pre-emergent	
Active ingredient	Example trade name
trifluralin	TriflurX®
triallate	Avadex® Xtra
cyanazine	Bladex®
Post sowing pre-emergent*	
imazethapyr#	Spinnaker®#
cyanazine	Bladex®
metribuzin	Sencor®
diuron	Diuron

* **Note:** care should be taken when applying to grey clay soils in areas prone to waterlogging as seedling death and/or subsequent crop damage can occur.

However field peas do not compete well with weeds, particularly early in the season. Herbicide options are not as extensive as those for non-pulses, so soil seed levels of broadleaf weeds should be low.

Despite field peas having more effective broadleaf weed control options than other pulses, it is important to understand potential weed problems in individual paddocks. Avoid paddocks with high weed seed loads or where weeds are unlikely to be controlled.

Post-emergent broadleaf control	
Active ingredient	Example trade name
metribuzin	Sencor®
cyanazine	Bladex®
MCPA 250	MCPA 250
MCPA 750#	Thistle-Killem® 750#
picolinafen	Sniper®
imazethapyr#	Spinnaker®#
imazamox	Raptor®
flumetsulam	Broadstrike®
diflufenican#	Brodal® Options#

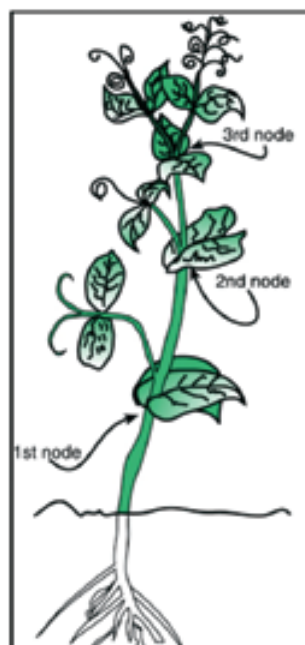
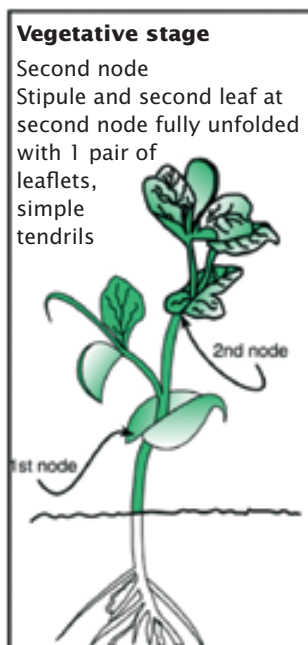
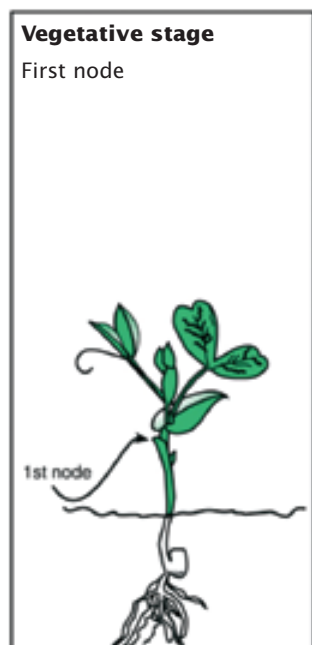
Post-emergent grass control
There is a wide range of Group A grass selective herbicides available.

Not registered for use in Queensland, but is registered for use in northern NSW.

**For more information consult the I&I NSW publication; “Weed Control in Winter Crops”.
Caution: check timing and/or growth stage of the crop prior to herbicide application, refer to below diagram.**

Early stages of field pea development

Herbicide labels refer to the node stage for the timing of spraying field peas. The diagrams below show node development.



Vegetative stage
Third node
Third leaf fully unfolded at third node with one pair of leaflets, complex tendrils

Source: Field pea: western planting guide, I&I NSW

Disease management

The impact of diseases on field pea production can be minimised by planting resistant varieties, using certified, disease-free seed, appropriate crop rotation (not growing field peas in the same paddock more than once in four years) and eliminating volunteer field pea plants.

Powdery mildew: is the major disease threat to field pea production in the northern region, north of the Macquarie Valley. It is capable of causing significant yield loss if early infection occurs.

Both Maki[®] and Yarrum[®] are resistant to this disease and for this reason are the preferred varieties north of the Macquarie Valley.



Photo: Steve Moore

Virus: Luteovirus are a group of viruses which are spread by aphids. These viruses are present in the northern region although their severity varies greatly between seasons.

Whilst varietal resistance is an important option, many new varieties are of unknown status.

Recent studies indicate that both Maki[®] and Yarrum[®] have a high level of resistance to *Pea seed-borne mosaic virus* (PSbMV) and useful levels of resistance to *Bean leaf roll virus* (BLRV).

There are no control measures for virus but the potential for infection can be significantly reduced by;

- Planting field peas into standing stubble to deter aphids from landing on the newly emerged crop,
- Avoid planting near areas that aphids are known to infest (pastures, lucerne, medic etc),
- Ensure a uniform plant stand with no bare patches that could attract aphids.



Susceptible varieties in the foreground. Resistant varieties at the rear. Photo: Joop van Leur

Bacterial blight: is a major disease of field pea in southern growing regions. It has been observed at both Narrabri and Inverell but no yield losses have been recorded to date. This highly infectious disease can be easily spread by movement through the crop of machinery, people and animals.

Preventative measures include; sourcing seed only from crops where bacterial blight has not been detected, avoid planting seed sourced from the southern region and maintaining isolation from previous year's field pea paddock(s).

Crop monitoring, especially in areas which have been stressed from frost, waterlogging, chemical damage etc, will more quickly identify if the disease is present. If detected, seed from the crop should not be used for subsequent plantings.



Photo: Grain Legume Handbook

Insect management

The two main insects which pose a threat to field peas are heliothis and pea weevil. There is no varietal resistance to either pest.

Heliothis (*Helicoverpa* spp)

Observations to date indicate that heliothis focus on field pea flowers and pods and not the leaf area.

The crop should be monitored once flowering commences, through pod formation and dry down.

Economic thresholds differ depending on end product use (livestock or human consumption) of the crop. However, control of heliothis is almost always needed.

Recommended thresholds for the stockfeed market are 4 – 5 larvae per 10 sweeps when using a sweep net. However when targeting human consumption markets there is little tolerance for grub damage and the threshold should be reduced to 1 – 2 larvae per 10 sweeps.

The most effective control is achieved when larvae are small (< 10 mm in size) and before they bore into the pod. Sometimes more than one spray may be required.



Photos: Gordon Cumming



Photo: Grain Legume Handbook

Pea weevil (*Bruchus pisorum*)

This is a major pest in southern regions and its presence needs to be monitored for in the northern region.

Pea weevils are small black chunky beetles about 5 mm long. Since they depend on pea pollen for survival, they actively seek pea crops from first flowering onwards. Control must occur during the first few weeks of flowering and before eggs are laid on the pods. (refer Pulse Point 4 - *Managing Pea Weevil*, I & I NSW)

Monitoring of crops at least weekly from flowering through to early pod set, for pea weevil should be standard practice. They are most likely to be found in parts of the paddock adjacent or close to trees, wooden fence posts or pasture. A sweep net is the most effective means of detection. Take 25 sweeps at 6 – 10 sites on crop edges within 1 – 2 m from the crop margin.

Control is recommended if there is more than 1 weevil per site (25 sweeps). Control is only effective if adult weevils are treated before they lay eggs. A border spray to 40 metres into the crop will provide adequate control in most situations.

Crop monitoring

Perform the required number of sweeps, at each sampling site, by sweeping the net through the top of the canopy whilst walking forward through the crop.

Then count and record the number of insect pests captured. Empty the net and move to the next site.



Photo: Gordon Cumming

Harvest Management and Marketing

Desiccation

Desiccation of field pea crops prior to harvest can improve timeliness of harvest, maintain grain quality and reduce soil and trash contamination of the sample. In addition, crop maturity can be advanced by 7 to 14 days. Harvest problems caused by late weed growth or irregular ripening and yield losses from potential shattering, wet weather delays or hail damage can be minimised with desiccation. High seed quality is also maintained with less damage from late insect attack or disease blemishes.

In seasons with hot dry finishes, the crop naturally matures quickly and evenly, and the benefits of desiccation can be greatly reduced. Producers need to assess their own circumstances to determine if desiccation will provide financial and managerial benefits.

Timing of desiccation

A good starting point to estimate the correct timing of desiccation is to record the end of flowering. Wait a further 20 days, then start close crop monitoring as maturity approaches.

- A. Visibly assess pod colour and development changes. Desiccate when the lower three quarters of pods along the stem are brown, the seeds are firm, rubbery, and split rather than squash when squeezed and the shells are thin and leathery. Field pea pods mature from the lowest flowering node upwards. Many plants at this stage may still have green tips.
- B. Monitor seed moisture changes. Desiccate when seed moisture drops to around 30%. To collect seed for this, randomly pick 10-20 stems or more across the paddock.

Registered products for desiccating field pea

Active ingredient	Example trade name	Rate (L/ha)	Withholding period (WHP) days
diquat (200 g/L)	Reglone®	2.0 – 3.0	0
glyphosate (540 g/L)	Roundup PowerMAX®	0.68 – 1.8	7

Refer to the current product label for full directions prior to use.

For additional information refer to: Pulse Point 5 – Desiccation & harvest of field peas, I&I NSW.

Product choice

Both glyphosate 540 g/L (e.g. Roundup PowerMAX®) and diquat 200 g/L (e.g. Reglone®) are registered for desiccation of field peas.

The reason for desiccation will determine product choice. For example some crops may require the removal of green material to reduce moisture content in the sample (e.g. glyphosate). In other crops a very quick desiccation will speed up maturity as a harvest aid (e.g. diquat).

Seed to be used for planting or sprouting should not be desiccated with glyphosate.

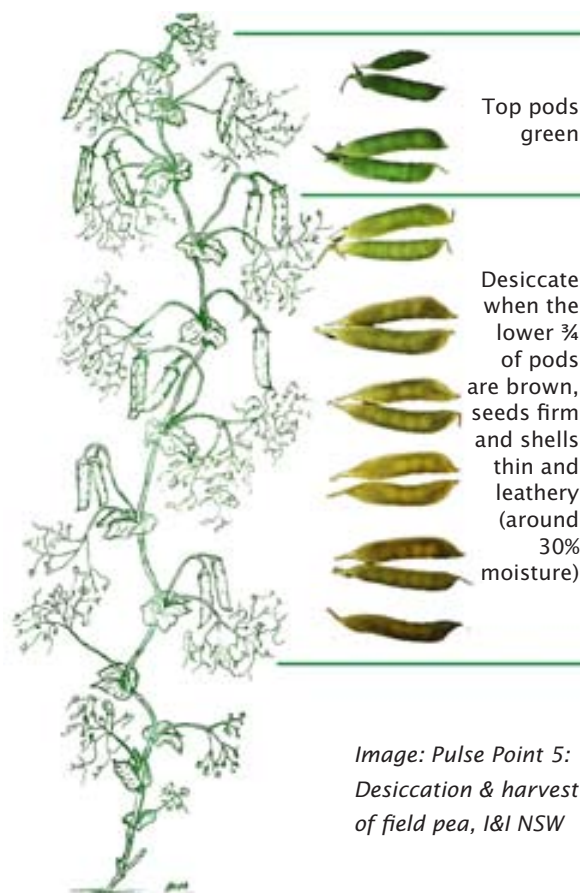


Image: Pulse Point 5: Desiccation & harvest of field pea, I&I NSW

Harvesting

Harvest of field pea crops normally occurs well before wheat is ready and should start as soon as seed moisture falls to 14%. Delayed harvest leads to seed quality loss, harvest clashes with other crops, greater soil contamination, increased pod shattering, emergence of pea weevil in the field, problems with late weed growth, more severe crop lodging and increased crop vulnerability to damage by rain and hail.

Planting crops into standing stubble can considerably reduce soil contamination of the seed. Use contour following crop lifters. Seed to be kept for planting should be harvested first when moisture content is higher and damage caused by the header is least. Grain damage can be minimised by adjusting header settings, in particular low drum speeds should be used.

As the crop may lodge as it approaches harvest maturity, it is recommended that harvester speeds be reduced from normal cereal harvest speeds.

Attention to the correct plant population and row spacing at planting will greatly help to minimise the potential for crop lodging and help the crop to feed into the header front.

Suggested harvester settings for field peas

Reel speed	Medium
Spiral clearance	Standard
Thresher speed	400 – 600 rpm
Concave clearance	10 – 30 mm
Fan speed	High
Top sieve	32 mm
Bottom sieve	16 mm
Rotor speed*	700 – 900 rpm

*Rotary machines only

Neither Maki^{db} nor Yarrum^{db} possess the shatter resistant sugar pod trait. Therefore harvest needs to be managed in a timely manner. Desiccation is an option to minimise any potential yield losses from pod shattering.



Photo: Eric Armstrong

Handling and storage

Minimise subsequent handling particularly through screw-type augers. To minimise damage, the auger should be run full and at a slower speed than for cereals. Belt shifters are preferred for handling pulses.

Field peas can be stored in sheds, bunkers and silos. Where pea weevil infestation of the grain is detected on farm, fumigate with phosphine tablets in a sealed silo.

Marketing

Field pea production in the northern region is primarily aimed at the domestic intensive livestock industry, especially pigs and poultry.

Benefits of feeding field peas

Field peas have great benefits as a stock feed and are an efficient protein source with a good profile and balance of amino acids. Subject to price, field peas are one of the more favourable pulses in the stock feed industry due to;

- Good protein quality and high amino acid availability,
- Highly digestible, thus a valuable energy source,
- Low level of anti nutritional factors,
- Ease of storage and milling,
- Relatively consistent composition between crop sources,
- Low hull/endosperm ratio and therefore minimal processing,
- Safe to feed.

Nutritional value of pulses

The following table is a guide to the nutritive value of field peas compared to other commonly used stock feeds.

Average nutritive value of common feeds

Feed	Dry matter %	Crude protein %	Metabolisable energy (Mj/kg DM)
Field pea	90	23	14
Lupin	90	30	13
Faba bean	90	25	13
Chickpea	90	19	15
Mungbean	90	24	11
Triticale	90	12	13
Barley	90	11	13
Wheat	90	12	13
Oats	90	8	11
Soybean meal	90	47	12

Source: Pulses nutritional value and their role in the feed industry, Pulse Australia



Further references

Pulse Australia publications

Pulses nutritional value and their role in the feed industry

Variety management packages (VMP)

I&I NSW publications

Field pea: western NSW planting guide (2005)

Winter crop variety sowing guide

Weed control in winter crops

Insect and mite control in field crops

Pulse Point 4 Managing pea weevil

Pulse Point 5 Desiccation & harvest of field peas

Pulse Point 13 Strategies to minimise bacterial blight in field peas

Pulse point 14 Powdery mildew in field peas

Agnote DPI 446 The right pulse in the right paddock at the right time. (Revised May 2004).

Website addresses

I&I NSW: www.dpi.nsw.gov.au

Pulse Australia: www.pulseaus.com.au

DEEDI: www.dpi.qld.gov.au

AGT: www.ausgraintech.com

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Chemical use

The advice provided in this publication is intended as a source of information only. Always read the label before using any of the products mentioned and obtain expert advice when in doubt.

The registration and directions for use of chemicals may change over time. Before using a chemical always check the uses as described on the current product label.