



Powdery mildew in field peas

A growers guide to management

The key points

- **Resistant varieties** offer the best form of control
- **Early detection** is essential for effective fungicidal control, so monitor regularly
- **Rotations** - at least 4 years between pea crops. Isolate from last years pea stubble.
- **Farm hygiene** - control volunteer field peas

Powdery mildew occurs sporadically across southern NSW and is generally of no consequence. However severe infections occur around one year in 10, such as in 1999, when damage and loss of yield was significant. In northern and central NSW the disease occurs regularly and it's management is an integral component of production systems.

The disease

Powdery mildew in field peas is caused by the fungus *Erysiphe poygoni*.

Infected plants are covered with a white powdery spore mass (see Figures 1 and 5). Leaves, stems and pods can become infected, resulting in withering of the whole plant. Spore masses are present on both sides of the leaf. Severe pod infection can result in a grey-brown discolouration of the seeds.

The fungal spores are disseminated by wind from infected pea trash or volunteer plants from previous crops. Warm, humid conditions with overnight dew help the disease to



Peter Matthews

Figure 1 Early infection of powdery mildew. Note white spores on stipule.

develop very quickly, especially towards the end of flowering. These conditions occur regularly during pod filling in northern NSW, but are infrequent in the south. Heavy rain does not favour disease development.

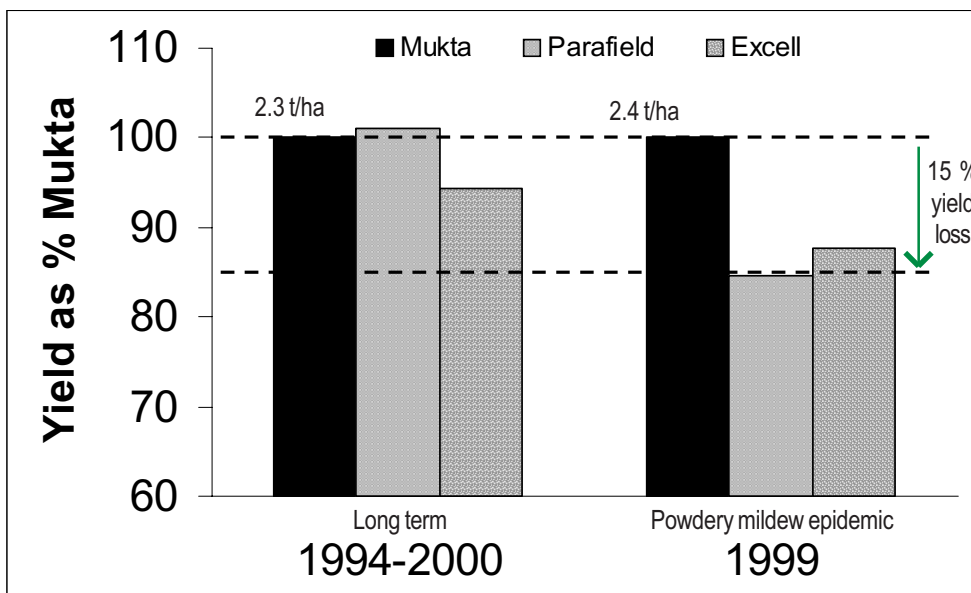


Figure 2 Yield of commonly grown field pea varieties Parafield and Excell expressed as a percentage of Mukta, a powdery mildew resistant variety. In 1999 powdery mildew infection was severe, occurring early, during pod fill. Parafield and Excell yielded approximately 15% below Mukta.

Severe infections reduce plant growth including seed weight, seeds per pod and total pod number. Severe pod infection leads to seed discolouration and downgrading of quality. The earlier the disease occurs the more severe the damage.



Di Carpenter

Figure 3 Powdery mildew infection on field pea pod.

Potential economic cost to growers

Limited information is available on the direct impact of powdery mildew on the yield of field pea varieties in southern NSW. However it is well known that there is good resistance available in varieties such as Glenroy, Mukta and Kiley. These varieties can be used as a guide to estimate economic losses of susceptible varieties during years when powdery mildew occurs.

1999 was such a year across southern NSW. Plants were infected early, many during early pod fill, and significant yield loss resulted. Figure 2 uses Mukta as a reference for comparing powdery mildew susceptible varieties Parafield and Excell in 1999 with long term yield data.

This approach shows that in 1999, Parafield suffered a yield loss of 15% (0.63 t/ha) compared to Mukta. This equates to an estimated economic loss of \$125.65/ha (on farm price \$200/tonne).

Calculating the economics of applying fungicide An example

STEP ONE—calculate the cost of spraying

Cost of fungicide	\$ 19 per ha
Cost of application	\$6 per ha
Total cost of spraying	\$25 per ha (X)

STEP TWO—calculate potential economic loss

Target yield	=	2.2 t/ha
Assume predicted loss due to powdery mildew		15%
Predicted yield loss =	2.2 t/ha X 0.15	
	=	0.33 t/ha
Pred. economic loss =	0.33 t/ha X \$200/t	
	=	\$66 per ha (Y)

If (Y) is significantly greater than (X), spraying is worthwhile.

The cost of applying fungicides and the potential economic loss from powdery mildew can be calculated using the guide above. The earlier the infection, the greater the predicted loss will be, and the more worthwhile it is to spray.

Generally, only one fungicide application will be required in any one season.

Managing the disease

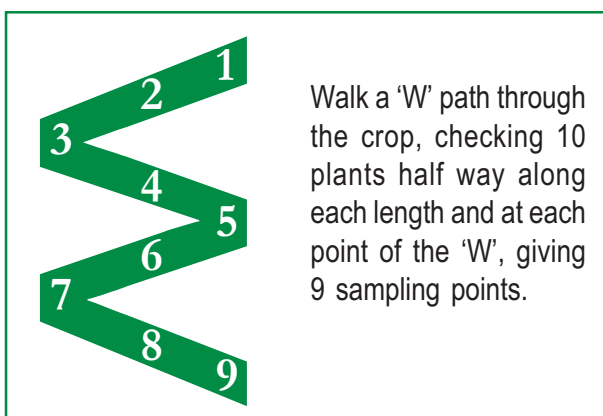
The most effective means of controlling powdery mildew is to grow a resistant variety, Mukta, Kiley or Glenroy. In northern NSW this is the only real option as the disease occurs at severe levels in most years.

In southern NSW where the disease is only sporadic, growers have the additional option to grow susceptible varieties and opt for other effective disease management strategies such as:

- Leaving 4 years between field pea crops. Powdery mildew does not affect other crops in the rotation.
- Separating crops from previous field pea crops.
- Burning or incorporating infected field pea trash soon after harvest.
- Using fungicidal control when disease symptoms first appear. Control is only economical and effective if disease is **detected early when disease levels are low**. It is essential to use a proper paddock sampling procedure to estimate disease levels and to have the disease correctly identified.

Paddock sampling

To properly assess the level of powdery mildew in a crop, sample across a number of sites. Disease severity varies within a paddock depending on prevailing wind direction and location of field pea stubbles. Use the W method outlined in the following diagram, collecting samples at each numbered site.



Disease identification

Powdery mildew is seen as a film of powdery white spores on both the upper and lower surfaces of the leaves, and on stems and pods (see Figures 3 and 4). Initially an infection appears as small grey patches on the leaves (Figure 1) and then progresses to the whole plant (Figure 5). Early detection is essential for fungicides to be effective.



Di Carpenter

Figure 4 Powdery mildew infection on field pea leaf and stem.

Fungicidal control

Two fungicides (Table 1) are registered for the control of powdery mildew in field peas. Key points to remember are:

- The fungicides are protectants. They only protect uninfected foliage and have limited systemic activity. Over time, triadimefon accumulates at the leaf margins, leaving other parts of the leaf more open to infection. Tebuconazole is active over the whole leaf for a longer period, giving more sustained control.
- Good plant coverage with the fungicide is essential. When applying by ground rig use at least 100 L per ha water and fine droplets. Twin fan nozzles give the best coverage with fungicides. When applying by air use maximum water rate and fine droplets.
- Treated foliage is protected for about 14 days. This can be reduced if disease pressure is high

Active ingredient	Product Names	Rate ml/ha	Cost † \$/ha
tebuconazole (430g/l)	various	145	16.00
triadimefon (125 g/l)	various	500	4.00

† Cost does not include application costs and is indicative only

Table 1 Registered fungicides used to control powdery mildew in field peas. Additional formulations of active ingredients may be available. Please check current pesticide registrations.

and conditions are suitable for infection.

- Application of chemical at the early stages of disease development is essential. Control is ineffective if delayed until disease is widespread.

Fungicide control programs

Fungicides can be applied either routinely (preventative program) or only when disease is observed (reactive program). The latter method is more realistic and cost effective for southern NSW where the disease occurrence is sporadic. However success is dependent on effective monitoring and timely application. Growers should check crops regularly starting at flowering. This can be done in conjunction with pea weevil and heliothis monitoring.

Reactive program

Given the sporadic nature of powdery mildew and the effectiveness of fungicides when applied at the first sign of disease, control is cost effective. Fungicide must be applied when:

- the number of plants infected is low, and
- infection level on each plant is minimal (5% infection or less).

Generally only one application is required, unless infection comes in very early and/or conditions conducive to infection persist. In this case follow-up

applications may be required.

Fungicide can be applied by ground rig

Preventative program

This program is more appropriate when powdery mildew is known to occur regularly such as in northern NSW. The first spray is applied at flowering and then followed with additional sprays at 14 day intervals depending on disease presence.

Note

The most important part of the whole program is crop monitoring. Failure to detect the presence of the disease early can reduce your ability to manage the disease and limit yield loss.



Eric Armstrong

Figure 5 Fungicidal control of powdery mildew is only effective if disease is detected early. At levels shown here control will be minimal.

ALWAYS READ THE LABEL

Users of agricultural (or veterinary) chemical products must always read the label and any permit, before using the product, and strictly comply with the directions on the label and the conditions of any permit. Users are not absolved from compliance with the directions on the label or the conditions of the permit by reason of any statement made or omitted to be made in this publication.

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NSW Agriculture 2003
ISSN 1441-2233

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The information contained in this publication is based on knowledge and understanding at the time of writing in December 2003. However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up-to-date and to check currency of the information with the appropriate officer of New South Wales Department of Agriculture or the user's independent adviser.

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Pulse Points are produced as part of the GRDC project DAN463, 'Cultivar evaluation and management of pulses in southern NSW'.

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