

## Pulse Seed Treatments & Foliar Fungicides.

7th Edition!

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Seed treatments and foliar fungicides are part of an overall strategy to reduce losses from disease in pulse crops. The best results are achieved when fungicides are combined with clean seed, crop rotation, paddock selection, resistant varieties, and crop hygiene. Even though disease is reduced on resistant varieties, seed treatments and foliar fungicides can enhance their performance. Check that the fungicide registration or permit is current for the crop and disease targeted. Comply with all grazing withholding periods and any export slaughter intervals.

### Seed Treatment

Treating pulse seed with a fungicide reduces the establishment of seed-borne diseases in crops and also protects seed from infection by soil-borne fungi. Some fungicide seed dressings also protect seedlings from external airborne infection for the first few weeks. This is important in reducing the subsequent establishment and spread of disease within crops. Seed treatments provide effective control for a maximum of four to six weeks after sowing, but do not provide absolute control.

### Application

It is important for seed treatments to be evenly distributed on seed to ensure each seed gets an effective dose. This is enhanced for flowable seed treatments by dilution with water (refer to the label). Secondary mixing of treated seed through an auger assists to obtain even seed coverage. Correct calibration of the applicator and a consistent seed flow are critical for the recommended rate of seed treatment to be applied.

### Applying fungicides and rhizobium inoculant to seed.

Some fungicides are toxic to rhizobium, and should not be mixed together before application to seed. Read the labels for compatibilities. Ideally, seed should be treated with fungicide and then, in a separate operation, inoculated with rhizobium just before sowing. Sowing should occur immediately after rhizobium has been applied, particularly in acid soils. Granular or liquid injection of inoculum in-furrow eliminates the contact between seed treatments and rhizobia.

### Foliar Fungicides

Foliar fungicides are necessary for controlling some destructive pulse diseases. They are most effective when applied before or at the first sign of disease, or immediately prior to weather conditions favourable for disease development. Do not wait until the disease is established i.e. apply ahead of rain fronts, as pulse fungicides protect rather than cure. Fungicides provide protection for 10-20 days. The duration of protection varies with the product used, how rapidly the plants are growing, and the rainfall experienced. Any new growth after spraying is not protected. If disease persists, additional sprays will be required and should be applied prior to rain. Waiting until after a rain event allows infection to occur.

### Application

Uniform coverage of the crop foliage is important for prevention of disease. This is best achieved by using high water rates (preferably 100 L/ha by ground and 30 L/ha by air) with water pH not exceeding pH7, nozzles with a fine or extra fine droplet spectrum and an operating pressure of 400 kPa is suggested. Application onto a wet plant (heavy dew) can assist in coverage of the product.

### Lupin

#### Brown leaf spot/Pleiochaeta root rot (*Pleiochaeta setosa*)

Brown leaf spot can kill seedlings by defoliation up to the 4-leaf stage. Seed dressing can reduce leaf drop by 50%. Seed treatments containing either iprodione (eg Rovral®, Drove®, Xlfo®, ipridione® products) or procymidone (Sumisclex®, Spiral®, Lupinflo®) will reduce the transfer of seed-borne disease to seedlings. Remember if applying a fungicide seed treatment and seed-applied rhizobium, precautions are necessary to maximise the survival of rhizobium inoculum and nodulation.

Pleiochaeta root rot is only suppressed by seed treatment, but not completely controlled.

## **Anthracnose (*Colletotrichum lupini*)**

There are quarantine restrictions for seed movement from WA and SA into Vic & NSW.

Seed treatment with a product containing thiram (eg Thiragranz<sup>®</sup>, Thiraflo<sup>®</sup> or Thiram<sup>®</sup>) will reduce disease transmission from infected seed. Thiram does not control brown leaf spot, so use it in conjunction with brown leaf spot seed treatments containing iprodione or procymidone.

Only some mancozeb products are registered for foliar anthracnose control (eg Dithane Rainshield NeoTec<sup>®</sup>, Penncozeb 750<sup>®</sup>, Manzate<sup>®</sup>, Unizeb<sup>®</sup> or mancozeb<sup>®</sup> products).

## **Rhizoctonia hypocotyl rot**

Seed treatment with products containing iprodione (eg Rovral<sup>®</sup>, Drovei<sup>®</sup>, Xiflo<sup>®</sup>) may suppress hypocotyl root rot.

## **Chickpea**

### **Ascochyta blight (*Ascochyta rabiei*)**

A seed treatment containing thiram (eg Thiragranz<sup>®</sup>, Thiraflo<sup>®</sup>, Thiram<sup>®</sup>) or thiram plus thiabendazole (eg P-Pickel T<sup>®</sup>, Fairgro<sup>®</sup> Reaper TT<sup>®</sup>) is essential to control seed-borne infection. Epidemics can start from a very low level of seed infection, and it is recommended that all seed be treated.

Chlorothalonil is the most effective foliar fungicide against ascochyta, with only Barrack<sup>®</sup> and Unite<sup>®</sup> products registered for ascochyta blight control on chickpea. Mancozeb (various) or metiram (Polyram<sup>®</sup>) can also control ascochyta if timeliness of application is observed. On susceptible cultivars fortnightly sprays with mancozeb are required compared to chlorothalonil sprays every 21 days. Refer to Pulse Australia leaflet 'Strategies for control of foliar diseases in chickpea'.

Chlorothalonil, mancozeb or metiram at podding may be sufficient for the more resistant cultivars PBA Slasher<sup>®</sup>, Genesis<sup>™</sup> 509 and Genesis<sup>™</sup> 090. Sprays should be applied ahead of rain fronts to prevent fungal infection and spread.

### **Botrytis Grey Mould and seedling blight (*Botrytis cinerea*)**

Seed treatment containing thiram (eg Thiragranz<sup>®</sup>, Thiraflo<sup>®</sup> or Thiram<sup>®</sup>) or thiram plus thiabendazole (eg Pickel T<sup>®</sup>, Fairgro<sup>®</sup> Reaper TT<sup>®</sup>) will control seed-borne botrytis infection. If infected seeds are sown untreated, botrytis seedling blight can reduce plant establishment throughout the growing season.

Botrytis grey mould can develop very quickly in spring if conditions are humid. Dense canopies, which retain humidity, will favour disease development.

Flowers and pods are the most susceptible part of the chickpea plant and fungicide sprays may be necessary to protect them, often earlier than with ascochyta treatment. Carbendazim is the most effective product against botrytis grey mould. Use of mancozeb or chlorothalonil as a foliar spray for control of ascochyta has the added benefit of controlling low levels of grey mould.

### **Phytophthora root rot (*Phytophthora megasperma*)**

Disease can be reduced by seed treatments containing metalaxyl (Apron XL<sup>®</sup>, Rampart<sup>®</sup>, Mantle<sup>®</sup> or Medley<sup>®</sup>)

## **Lentil**

Refer to Pulse Australia leaflet "Lentil disease management" and "Lentil, the Ute Guide".

### **Ascochyta blight (*Ascochyta lentis*)**

Seed treatment with products containing thiram plus thiabendazole (Pickel T<sup>®</sup>, Fairgro<sup>®</sup> or Reaper TT<sup>®</sup>) will reduce disease transmission by infected seed. Early appearance of the disease in mid – late winter will not require management. All varieties have moderate foliar resistance and hence early sprays are not warranted.

Control during podding should be a priority, as not all varieties have resistance to pod infection by ascochyta. Foliar infection in mid – late spring is likely during wet conditions so apply a foliar fungicide containing mancozeb, metiram or chlorothalonil at early pod formation and/or mid-pod fill to prevent seed staining. Sprays should be applied ahead of rain fronts to prevent fungal infection and spread.

### **Botrytis Grey Mould and seedling blight (*Botrytis cinerea*, *Botrytis fabae*)**

Treating seed with products containing thiram plus thiabendazole (eg P-Pickel T<sup>®</sup>, Fairgro<sup>®</sup> Reaper TT<sup>®</sup>) will reduce seed infection, thereby protecting new seedlings from infection. If infected seeds are sown untreated, botrytis seedling blight can reduce plant establishment during the growing season.

In spring, warm, humid/wet conditions under the crop canopy are ideal for the development and spread of botrytis grey mould. Prior to canopy closure, apply a foliar spray of either carbendazim (eg Bavistin<sup>®</sup>, Spin<sup>®</sup>), mancozeb (various), chlorothalonil (Barrack<sup>®</sup> and Unite<sup>®</sup> products) or metiram (Polyram<sup>®</sup>). Continued warm, humid/wet conditions will warrant extra spray applications. If botrytis pressure is high then carbendazim or procymidone are the preferred fungicides.

## Field Pea

Refer to Pulse Australia leaflet 'Strategies for disease control in field pea' and "Field Pea, the Ute Guide".

### Ascochyta blight

*(Mycosphaerella pinodes, Phoma medicaginis, Ascochyta pisi, Phoma koolunga)*

Paddock selection and sowing time are the keys to minimise yield loss to ascochyta blight in pea. Treat seed with products containing thiram plus thiabendazole, (Pickel T<sup>®</sup>, Fairgro<sup>®</sup> or Reaper TT<sup>®</sup>) to minimise the establishment of disease early or in new areas.

Early sown peas (May) and those sown next to pea stubbles are more likely to benefit from seed treatment. Later sown peas (mid-June) will have less blackspot infection and seldom benefit from seed treatment.

On acidic soils where the survival of seed applied rhizobium and maximising nodulation is important, seed treatment with thiram plus thiabendazole is only recommended for high disease risk situations (e.g. if crop rotation with field pea is short). Use of granular or liquid injection of inoculants may alleviate rhizobia-fungicide conflicts.

In high yielding pea crops (>2 t/ha) it may be economical to put out two mancozeb sprays in a season, if blackspot is present or of high risk in the crop. First spray should be applied at 9-10 nodes (immediately ahead of canopy closure) and the second spray at early flowering. Sprays should be timed ahead of rain fronts to prevent fungal infection.

### Downy mildew

*(Peronospora viciae)*

There is a high risk of downy mildew at crop emergence if the disease has occurred in the paddock previously.

Downy mildew is effectively controlled with products containing metalaxyl (Apron XL<sup>®</sup>, Rampart<sup>®</sup> or Mantle<sup>®</sup> or Medley<sup>®</sup>) used as a seed treatment. Treatment can improve yield by as much as 60% in susceptible varieties, but will have little benefit in resistant varieties (eg. Snowpeak). Resistance to downy mildew in Kasp<sup>®</sup> has broken down with a new strain detected at a number of locations across South Australia. Kasp<sup>®</sup> needs to be treated for protection against downy mildew in high-risk paddocks.

### Powdery mildew

*(Erysiphe polygoni)*

Seed treatment for powdery mildew is not effective.

Resistant varieties are available (such as Yarrum<sup>®</sup>) that require no treatment for control. For susceptible varieties, apply foliar fungicides that contain either: triadimefon (Triad<sup>®</sup> in SA; Turret<sup>®</sup> or Kenso AgCare Triadimefon<sup>®</sup> in WA; various products including Triad<sup>®</sup>, Turret<sup>®</sup>, Slingshot<sup>®</sup>, Triadan<sup>®</sup> and Triadimefon<sup>®</sup> products in NSW, Vic); or tebuconazole (various, eg Folicur<sup>®</sup>, Blast<sup>®</sup>, Orius<sup>®</sup>, Hornet<sup>®</sup>, Tebuconazole<sup>®</sup>). Spray at the first sign of disease in early spring (September to early October). Disease-spread is rapid so delay can be costly.

If powdery mildew develops at the end of the growing season (last 4 weeks), yield losses will be minimal and fungicide applications may be uneconomic.

### Seedling root rots (damping off)

Seed treatments containing thiram or thiram plus thiabendazole (P-Pickel T<sup>®</sup>, Fairgro<sup>®</sup> or Reaper TT<sup>®</sup>) or metalaxyl (Apron XL<sup>®</sup>, Rampart<sup>®</sup>, Mantle<sup>®</sup> or Medley<sup>®</sup>) will help with crop establishment by also controlling *Pythium* and/or *Fusarium* root rots.

### Bacterial Blight

*(Pseudomonas syringae pv pisi, & pv syringae)*

No seed treatment is effective for the control of bacterial blight of field pea. Some copper based foliar fungicide sprays are registered, but are unlikely to give an economic return. Copper ammonium acetate/complex products are registered as fungicides and bactericides, but their efficacy is unknown. Any copper application must be before the disease spreads and multiple applications are required. Avoid driving across an infected paddock as the disease will be spread by the vehicle wheels. If sprays are applied, do so by air. Use of a more tolerant variety is recommended, particularly in areas with a high frequency of bacterial blight (eg Parafield and Yarrum<sup>®</sup> are more tolerant of *pv syringae*).

## Faba Bean

Refer to Pulse Australia leaflet 'Strategies for disease control in faba bean' or "Faba Bean, the Ute Guide". Note grazing restrictions, withholding periods and export slaughter intervals.

### Chocolate spot

*(Botrytis fabae, Botrytis cinerea)*

Varieties with partial resistance (Nura<sup>®</sup>) do not require as many applications to control chocolate spot as older varieties (eg Fiord). Products containing carbendazim (eg Bavistin<sup>®</sup>, Spinflo<sup>®</sup>), mancozeb (numerous), chlorothalonil (various, including Barrack<sup>®</sup>, Unite<sup>®</sup> products, Bravo<sup>®</sup>), procymidone (various, eg Sumisclex<sup>®</sup>), metiram (Polyram<sup>®</sup>) or copper (eg copper oxychloride<sup>®</sup> products) provide chocolate spot control at varying efficacies and cost. If chocolate spot pressure is high then carbendazim or procymidone are preferred fungicides.

Risk of chocolate spot is greatest in dense, early sown or lodged crops. A precautionary treatment should be applied at early to mid flowering before canopy closure. Use of foliar fungicides is required if significant infection occurs at flowering and/or pod fill or temperature is 15-25°C and humidity is likely to be high (70%) for 4-5 days.

Chlorothalonil, mancozeb or metiram used as a foliar spray to control chocolate spot has the added benefit of controlling ascochyta seed staining and rust.

## Ascochyta leaf & pod blight (*Ascochyta fabae*)

Ascochyta resistant varieties (Nura<sup>(1)</sup>, Farah<sup>(1)</sup> or PBA Kareema<sup>(1)</sup>) do not require ascochyta treatment, unless there is high potential for seed staining during podding. Thiram plus thiabendazole (Pickel T<sup>®</sup>, Fairgro<sup>®</sup> or Reaper TT<sup>®</sup>) is registered in faba bean for seedling root rots, but should minimise ascochyta seed-borne infection in susceptible varieties. Remember if applying a fungicide seed treatment and seed-applied rhizobium to undertake precautions that maximise the survival of rhizobium inoculum and nodulation. Use of granular or liquid injection forms of inoculants may alleviate rhizobia-fungicide conflicts.

Applications to control ascochyta in susceptible varieties should commence at 6-8 weeks after sowing using mancozeb (eg Dithane Rainshield<sup>®</sup>, Penncozeb<sup>®</sup> 750 or Mancozeb<sup>®</sup>), metiram (Polyram<sup>®</sup>) or chlorothalonil (eg. Barrack<sup>®</sup>, Unite<sup>®</sup>). Additional sprays (mancozeb and/or chlorothalonil) will be necessary at 10-21 day intervals if weather conditions are conducive to disease.

Seed staining due to ascochyta is a major problem in susceptible varieties (eg Fiesta VF) when wet weather occurs prior to harvest. To minimise seed discolouration, the foliar fungicides need to be applied during pod filling prior to the crop drying down. Sprays should be applied ahead of rain fronts to prevent fungal infection.

## Rust

### (*Uromyces vicia-fabae*)

Monitor crops mid-spring, especially when temperatures increase above 20°C. Apply a foliar spray of mancozeb (numerous), chlorothalonil (eg Barrack<sup>®</sup>, Unite<sup>®</sup> products, Bravo<sup>®</sup>), metiram (Polyram<sup>®</sup>) or a copper product (eg copper oxychloride<sup>®</sup> products) to restrict a rust epidemic. Applications of mancozeb or chlorothalonil products have the added benefit of protecting against chocolate spot and ascochyta.

## Seed Testing is Available from:

SARDI Diagnostic Centre, Urrbrae, South Australia, Ph: (08) 8303 9360.

Agriquality, Tullaramine, Victoria, Ph: (03) 8318 9000

AGWEST Plant Laboratories, South Perth, Western Australia, Ph: (08) 9368 3721

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## Cercospora leaf spot (*Cercospora zonata*)

Cercospora is predominantly a soil-borne disease that needs to be controlled early (5-8 weeks after sowing), particularly in bean crops that are in close rotation, or adjacent to a bean stubble. There is a permit for use of tebuconazole (various, eg Folicur<sup>®</sup>, Blast<sup>®</sup>, Orius<sup>®</sup>, Hornet<sup>®</sup>, Tebuconazole<sup>®</sup>) for cercospora control. Carbendazim (eg Howzat<sup>®</sup>, Spinflo<sup>®</sup>, Bavistin<sup>®</sup>) is effective but not registered for this disease. Use of a carbendazim for early cercospora control limits the subsequent number of applications for botrytis control. Chlorothalonil also shows some efficacy against cercospora, but is less effective. Efficacy of mancozeb and metiram on cercospora appears to be low in research trials, despite several products being registered for its control.

## Vetch

Refer to "Vetch, the Ute Guide." Fungicide use in vetch is not usual, but if applied, then principles of use and fungicides are similar to those used in lentil and/or faba bean. Diseases of interest are botrytis grey mould, ascochyta blight and rust. Control of all of these diseases must commence early, before canopy closure.

## Resistance strategy (Croplife Australia)

To avoid resistance development in *Botrytis* spp. to **Group 1, Group 2** and **Group M3** fungicides (see tables 1 & 2), it is recommended:

1. **DO NOT** apply more than two consecutive **Group 1** sprays, including a seed treatment containing a **Group 1** fungicide. Apply no more than two consecutive sprays of a **Group 1** fungicide alone.
2. **DO NOT** apply more than two **Group 1** treatments (including seed treatment) in a season.
3. **DO NOT** apply more than two **Group 2** sprays in one season. Apply no more than two consecutive sprays of a **Group 2** fungicide.
4. **DO NOT** apply more than two **Group M3** treatments (including seed treatment) in a season. Apply no more than two consecutive sprays of a **Group M3** fungicide alone.
5. It is advisable to rotate groups between seasons.

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**Table 1. Pulse Seed Treatments**

Active ingredient:	Procymidone	Iprodione	Thiram	Thiram + Thiabendazole	Metalaxyl-M	Metalaxyl
Fungicide group:	2	2	M3	M3 & 1	4	4
Product:	1. Sumisclex® 2. Lupinflo® 3. Spiral®	1. Rovral® 2. Drover® 3. Chief® 4. Vanquish® 5. XLFlo® 6. Cataclysmic® 7. Iprod® 8. Iprine® 9. Iprodione®	1. Thiragranz® 2. Thiram®600 3. Thiraflo® 4. Thiram®	1. P-Pickel T® 2. Fairgro® 3. Reaper® TT	1. ApronXL®	1. Mantle® 2. Mantle® flowable 3. Rampart® 4. Medley®
Company:	1,2. Sumitomo 3. Farmoz	1. Bayer, Crop Care, BASF 2. Conquest 3. Farmoz 4,5. Chemtura 6. Ospray 7. Sipcam Pacific 8. Farmalinx 9. Innova, Country United Farmers	1,2. Cropcare 3. Chemtura 4. Barnac	1. CropCare 2. Farmoz 3. Ospray	1. Syngenta	1,2. Chemtura 3. United Phos. 4. Cropcare
Active ingredient:	Procymidone 500 g/L	Iprodione 250 g/L	Thiram 1. 800 g/kg 2,3,4. 600 g/L	Thiram 360 g/L + TBZ 200 g/L	Metalaxyl-M 350 g/L	Metalaxyl 1,3. 350 g/kg 2,4. 322 g/L
Rate: (per 100kg seed)	100 ml or 200 ml. (+ 50 ml WA)	100 ml to 500 ml (to 400 ml WA)	1. 125-150 g 2,3,4. 170 to 200 ml	200 ml	75 ml	1,2,3. 150 g 4. 150 ml
Approx. cost to treat 100kg seed (\$)¹	5-10	3-17	2-4	8-10	21-30	21-30

**Diseases controlled (√) or suppressed (S)**

<b>Lupin</b>						
Brown leaf spot	√	√	-	-	-	-
Pleoichaeta Root Rot	-	<b>S (NR)</b>	-	-	-	-
Rhizoctonia hypocotyl rot	-	<b>S</b>	-	-	-	-
Anthraxnose	-	-	√	-	-	-
<b>Chickpea</b>						
Botrytis	-	-	√	√	-	-
Ascochyta	-	-	√ (NAP)	√	-	-
Phytophthora	-	-	-	-	√	√
Damping off, seedling root rots	-	-	√	√	-	-
<b>Lentil</b>						
Ascochyta	-	-	-	√	-	-
Botrytis	-	-	-	-	-	-
Seedling root rot	-	-	-	√	-	-
<b>Field pea</b>						
Ascochyta blight	-	-	-	√	-	-
Downy mildew	-	-	-	-	√	√
Damping off, seedling root rots	-	-	-	√	√	√
<b>Faba bean</b>						
Ascochyta blight	-	-	-	-	-	-
Botrytis	-	-	-	-	-	-
Seedling root rots	-	-	-	√	-	-
<b>Vetch</b>						
Seedling root rots	-	-	-	√	-	-

Always read the label. ® = registered trademark. **NAP** = not all products registered for this disease, **S** = suppression, **NR** = not registered for this disease  
1 = indicative retail prices are GST inclusive at June 2010.

**Table 2 part A. Pulse foliar fungicides (valid at 1/6/2010)**

Active ingredient and (group)	Product	Company	Rate	Approx Cost <sup>1</sup> (\$/ha)	Chickpea		Lentil		Faba & Broad bean				Lupin		Pea				Vetch		
					Botrytis	Ascochyta	Botrytis	Ascochyta	Chocolate spot	Ascochyta	Rust	Cercospora	Botrytis	Anthraxnose	Powdery mildew	Downy mildew	Blackspot Ascochyta	Bacterial blight	Botrytis	Ascochyta	Rust
Mancozeb 1. 420g/L 2. 430g/L (M3)	1. Penncozeb420SC® 2. Dithane 430SC®	1. Nufarm 2. Dupont	Chickpea; 1.8-3.95 L/ha Lentil; 2.5 L/ha Bean; 3.5 L/ha	12-34	-	√	-	√	√	-	-	-	√	√	-	-	√	-	√	√	√
Mancozeb 750 g/kg (M3)	1. Dithane Rainshield® Neo Tec 2. Manfil® 3. Manzate® DF 4. Manzeb® 5-11. Mancozeb®	1. Dow 2. Runge 3. Dupont 4. Farnalinx 5. Sabero 6. Innova 7. Ospray 8. Titan 9. Farnoz 10. Imtrade 11. Forward	1.0-2.2 kg/ha	7-26	√	√	√	√	√	√	√	E	√	√	-	-	√	-	√	√	√
Mancozeb 750 g/kg (M3)	1. Penncozeb750DF® 2. Unizeb®	1. Nufarm 2. UnitedPhos	1.0-2.2 kg/ha	7-19	√	√	√	√	√	√	√	-	√	√	-	-	√	-	√	√	√
Mancozeb 750g/kg (M3)	1. Mancozeb®	1. Barmac	1.0-2.2 kg/ha	7-19	-	-	-	-	√	√	√	-	-	-	-	-	-	-	-	-	-
Mancozeb 750 or 800g/kg (M3)	Many	Various	1.0-2.2 kg/ha	7-19	-	-	-	-	√	-	√	-	-	-	-	-	-	-	-	-	-
Carbendazim 500 g/L (1)	1. Howzat® 2. Spinflo® 3. Bavistin® 4. Boomer® 5. Goldazim®	1. Farnoz 2. Nufarm 3. Crop Care 4. Sipcam 5. Campbell	500 mL/ha	10-12	√	-	√	-	√	-	-	-	-	-	-	-	-	-	√	-	-
Metiram 700 g/kg (M3)	1. Polyram DF®	1. Nufarm	1.0-2.2 kg/ha	12-30	√	√	√	√	√	√	√	E	-	-	-	-	√	-	√	√	√

Always read the label before use. Lower rates to be used on shorter crops up to 20cm in height or to the commencement of flowering, whichever comes first. Use higher rate for dense crops and if disease severe. RR = Restricted registration (this use is not registered in all states). RR<sup>#</sup> = Restricted registration for processing peas only (not all states). RR<sup>^</sup> = Restricted use registered for Peas and Beans (vegetable crops). √<sup>P</sup> = application allowed under permit, but check permit expiry. E = registered for this disease but efficacy may be low. ® = registered trademark. 1 = indicative retail prices are GST inclusive at June 2010.

**Table 2 part B. Pulse foliar fungicides (valid at 1/6/2010)**

Active ingredient and (group)	Product	Company	Rate	Approx Cost <sup>1</sup> (\$/ha)	Chickpea		Lentil		Faba & Broad bean				Lupin		Pea				Vetch		
					Botrytis	Ascochyta	Botrytis	Ascochyta	Chocolate spot	Ascochyta	Rust	Cercospora	Botrytis	Anthraxnose	Powdery mildew	Downy mildew	Blackspot	Ascochyta	Bacterial blight	Botrytis	Ascochyta
Chlorothalonil 720 g/L (M5)	1. Barrack® 2. Barrack® Betterstick 3. Unite® 720	1,2. Crop Care 3. Nufarm	Chickpea & Lentil 1.1-2.0 L/ha  Bean 1.4-2.3 L/ha	32-54	-	√	√	√	√	-	√	-	-	-	-	RR <sup>#</sup>	RR <sup>#</sup>	-	-	-	-
Chlorothalonil 720 g/L (M5)	1. Unite® Ultrastick	1.Nufarm	1.1-1.8 L/ha	30-50	-	-	-	-	√	-	√	-	-	-	-	RR <sup>#</sup>	RR <sup>#</sup>	-	-	-	-
Chlorothalonil 720 g/L (M5)	Many Including; 1. Bravo® 2. Bravo Weather Stik® 3. Chlorothalonil®	1,2. Syngenta 3. Various	1.4-2.3 L/ha	30-68	-	-	-	-	√	-	√	-	-	-	-	RR	-	-	-	-	-
Chlorothalonil 900 g/kg (M5)	1. Echo® 2. Wack®	1. Sipcam 2. Chemag	1.2-1.9 kg/ha	21-34	-	-	-	-	√	-	√	-	-	-	-	RR	-	-	-	-	-
Chlorothalonil 500 g/L (M5)	1. Elect® 2. Echo® 3. Wack® 4. Fung-o-Nil® 5. Chlorothalonil®	1. Nufarm 2. Sipcam 3. Chemag 4. Farnoz 5. Bayer	1.6-3.3 L/ha	17-35	-	-	-	-	√	-	√	-	-	-	-	RR	-	-	-	-	-
Procymidone 500 g/L (2)	1,2. Sumisclex® +/-Broadacre 3. Fortress®	1,2. Sumitomo 3. CropCare	500 ml/ha	23-26	-	-	√	-	√	-	-	-	-	-	-	-	-	-	-	-	-
Procymidone 500 g/L (2)	1. Spiral® 2. Proflex® 3. Rumble® 4. 4. Metapris® 5. Procymidone®	1. Farnoz 2. Genfarm 3. Sipcam 4. Farnalinx 5. Country	500 ml/ha	23-26	-	-	-	-	√	-	-	-	-	-	-	-	-	-	-	-	-

Always read the label before use. Lower rates to be used on shorter crops up to 20cm in height or to the commencement of flowering, whichever comes first. Use higher rate for dense crops and if disease severe. RR = Restricted registration (this use is not registered in all states). RR<sup>#</sup> = Restricted registration for processing peas only (not all states). RR<sup>^</sup> = Restricted registration for Peas and Beans (vegetable crops only). √<sup>P</sup> = application allowed under permit, but check permit expiry. E = registered for this disease but efficacy may be low. ® = registered trademark. 1 = indicative retail prices are GST inclusive at June 2010.

**Table 2 part C. Pulse foliar fungicides (valid at 1/6/2010)**

Active ingredient and (group)	Product	Company	Rate	Approx Cost <sup>1</sup> (\$/ha)	Chickpea		Lentil		Faba & Broad bean				Lupin		Pea			Vetch			
					Botrytis	Ascochyta	Botrytis	Ascochyta	Chocolate spot	Ascochyta	Rust	Cercospora	Botrytis	Anthraxnose	Powdery mildew	Downy mildew	Blackspot	Ascochyta	Bacterial blight	Botrytis	Ascochyta
Copper as hydroxide, oxychloride or oxide. 1,7; 500g/kg, 2; 360g/kg, 3,6; 375g/kg, 4; 190g/L, 5; 400g/kg 8-10; 500g/kg (M1)	Many, including; 1. Blue Shield® 2. Kocide BlueXtra® 3. Champ Dry Prill® 4. Tri-base Blue® 5. Blu-cop® 6. Neoram® 7. Oxydul DF 8-10. Copper Oxychloride®	1.Bayer, 2.Dupont 3,4.Nufarm  5.Tradewyns 6.Isagro 7.Nufarm 8.Barmac 9.Semal, 10.United Phos	1; 2.2 kg/ha 2; 1.65 kg/ha 3; 1.55 kg/ha 4; 3 L/ha 5; 2.2 kg/ha 6; 1.55 kg/ha 7-10; 2.5 kg/ha	28-33	-	-	-	-	RR^	-	RR^	-	-	-	-	-	RR^	RR^ E	-	-	-
Copper oxychloride. 500 g/kg (M1)	1-3. Copper Oxychloride®	1.Swift, 2.Redox 3. Ospray	2.5 kg/ha	23-30	-	-	-	-	√	-	√	-	-	-	-	-	√	E	-	-	-
Copper ammonium acetate/complex 93 g/L (M1)	1. Copperguard® 2. Copper-count-N® 3. Cop-it® 4. Liquicop®	1.Spraygro, 2,3.Agspec, 4.AgVantage	2.5 L/ha		-	-	-	-	RR^	-	RR^	-	-	-	-	-	RR^	RR^ E	-	-	-
Tebuconazole 430 g/L (3)	1. Folicur® 2. Blast® 3. Orius® 4. Hornet® 5. Stingray® 6. Empero® 7. Laguna® 8. Rebuke® 9. Isis® 10. Launch® 11. Tebucon 12. Tebuconazole	1.Bayer 2.Gemfarm 3.Farmoz 4.Nufarm 5.Conquest 6.Crop Care 7. Sipcam 8.Kenso 9. Canpbell 10.Ospray 11.Farmalinx 12= various	145 ml/ha	4-8	-	-	-	-	-	-	-	√ <sup>P</sup>	-	-	√	-	-	-	-	-	-
Tebuconazole 500 g/L (3)	1. Hornet®500sc	1.Nufarm	125 ml/ha	3-6	-	-	-	-	-	-	-	-	-	-	√	-	-	-	-	-	-
Triadimefon 125 g/L (3)	1. Triad® 2. Turret® 3. Slingshot® 3. Triadan® 4. Triadimefon®	1. Farmoz , 2. Nufarm, 3.Sipcam, 4.Farmalinx 5.= various	500 ml/ha	3-4	-	-	-	-	-	-	-	-	-	-	RR	-	-	-	-	-	-

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