WESTERN
JUNE 2018

GRDC
GROWNOTES™

GRDC
GRAINS RESEARCH
& DEVELOPMENT
CORPORATION

VETCH

SECTION 7

DISEASES

KEY POINTS | DISEASE MANAGEMENT

In-crop management – disease

Key points

- **Start to monitor at early growth stages and continue to monitor for disease through the growing season.**
- **Control foliar diseases when at early stages, preferably before canopy closure.**
- **Use integrated approaches to pest, disease and weed management.**

FEEDBACK

IN FOCUS

The presence of aphids may indicate symptoms are caused by a virus:

1. Seed-borne viruses can be controlled by sowing virus-free seed (<0.1% seed infection in high-risk areas, <0.5% seed infection in low-risk areas). Infection can come from infected neighbouring crops.
2. Minimise aphid landing sites. Avoid bare soil as aphids land in crops where there is a clearly defined contrast in colour between bare soil and green foliage. Ensure good crop establishment, retain standing cereal stubble and produce a dense crop canopy.
3. Minimise herbicide stress, as stressed plants are more attractive to aphids.
4. Control in-crop weeds (potential sources of virus) and/or vectors early.

7.1 Disease management

The diseases that cause major damage in vetch are chocolate spot (*Botrytis fabae*), Botrytis grey mould (*Botrytis cinerea*), rust (*Uromyces vicae-fabae*), Sclerotinia stem rot (*Sclerotinia sclerotiorum* and *S. trifolirum*), *Rhizoctonia* spp., and the mosaic and yellowing viruses. The other diseases listed in this section can cause problems in some seasons or regions.

Stem nematode (*Ditylenchus dipsaci*) can affect vetch but is only found in South Australia and Victoria.

Effective disease management relies on an integrated approach including: selection of a variety with the most suitable profile of disease resistance, most suitable paddock, clean seed, best agronomic practices and canopy management, as well as the use of fungicides (Table 1).

The use of integrated disease management (IDM) in vetch is especially important because controlling established foliar diseases with fungicides in vetch may not always be possible. There are few registered fungicides and some have long withholding periods (Table 2). For rust there are several options, while control options for Ascochyta are limited and for viruses non-existent.

If not sowing a resistant variety, a fungicide application may be needed in seed production crops, especially in high-rainfall regions, wet years or high-disease-risk situations (see Section 2.5.4).

Fungicides may be necessary to control rust in susceptible varieties if used for feed, as infected plants can induce abortions in pregnant livestock.

Care needs to be taken when using some fungicides (e.g. carbendazim) that have long withholding periods (28 days). Fungicides with long withholding periods should be avoided if the vetch crop is to be conserved as silage or hay destined for the dairy industry.

Ascochyta blight occurs in the earlier stage of crop development, potentially reducing grain and dry matter production. However, Botrytis can cause greater yield losses if the crop is dense and the growing season is cool and wet (Table 3). Note that some Ascochyta species are crop-specific.[1]

Understanding the potential sources of disease inoculum is important when planning planting and control programs (see Section 3.5 Carryover diseases and Table 2).

MORE INFORMATION

Fungicide Resistance Management Strategies – https://www.croplife.org.au/resistance-strategy/2017-fungicide-resistance-management-strategies1

Chemical Information Herbiguide http://www.herbiguide.com.au/

Details on farm biosecurity are at http://www.farmbiosecurity.com.au

MyCrop app https://www.agric.wa.gov.au/mycrop

1 L Sigel, J Brand, J Fanning, H Richardson (2016) Pulse Disease Guide. Agriculture Victoria, http://agriculture.vic.gov.au/agriculture/pests-diseases-and-weeds/plant-diseases/grains-pulses-and-cereals/pulse-disease-guide

FEEDBACK

Table 1: Integrated disease management strategies for vetch.

Factor	Best practice
Paddock history	A minimum of three, preferably four, years' break between vetch crops.
Paddock hygiene	Select paddocks at least 500 m from last year's vetch stubble. Avoid sowing adjacent to faba bean and, if possible, field pea and lentil stubbles (see Section 1, Table 2 and Section 6, Table 2),
Variety	Select a variety with suitable disease resistance for your district (see Section 2, Table 1).
Seed health	Use seed from crops that had a low severity of disease, especially at podding. Laboratory seed tests can confirm disease levels. Use seed with less than 10% chocolate spot or 5% Ascochyta. Rust is not seed-borne (see Section 4.3 Seed quality).
Sowing time	Do not sow too early. Early emergence leads to excessive vegetative growth, early exposure to disease and early canopy closure, increasing foliar disease (see Section 4.1 Time of sowing).
Sowing rate	Higher than ideal seeding rates and plant populations can lead to a dense crop canopy and increased disease risk (Section 4, Table 2).
Row spacing	Wider rows can delay canopy closure, reducing the risk of chocolate spot. Any increased lodging may increase the chance of foliar diseases (see Section 4.5 Seeding system – depth and row spacing).
Canopy	Delay sowing, reduce seeding rates, or else graze or cut early sown crops.
Fungicide application (see Table 3)	Success depends on monitoring, correct disease identification, adequate coverage and timeliness of sprays with the correct fungicide. Seed: To reduce transmission of disease (helps control Ascochyta, Botrytis grey mould and seedling root rots). Foliar: Most effective when applied before or at first signs of disease and before rain. Protection lasts 10–12 days. Subsequent new growth is unprotected.
Aphid control	Early detection and control can reduce virus spread. Summer weed control, thicker crop density, stubble and minimal bare soil reduce the presence of aphids (see Section 5, Table 2).
Harvest management	Early harvest reduces disease infection on the seed. Windrow or desiccate to enable earlier harvesting.

Source: PIRSA/GRDC (2010) Vetch: The Ute Guide. PIRSA/GRDC – https://grdc.com.au/vetch-the-ute-guide

FEEDBACK

Table 2: Fungicide active ingredients registered for use on vetch.

Chemical	Withholding period		Ascochyta blight	Chocolate spot and Botrytis grey mould	Rust
	Grazing	Harvest			
Mancozeb	14 days	28 days	✓	✓	✓
Carbendazim	28 days	28 days	Not registered	✓	Not registered
Metiram	21 days	42 days	✓	✓	✓

Source: PIRSA/GRDC (2010) Vetch: The Ute Guide. PIRSA/GRDC – https://grdc.com.au/vetch-the-ute-guide
Visit PUBCRIS APVMA for a full list of registered products www.apvma.gov.au

Table 3: Fungicide spraying program.

Critical period	Disease		Fungicide	Comments
	Target	Secondary		
1st critical period Early vegetative (6–8 weeks after emergence.	Ascochyta blight	–	Mancozeb or metiram	Early fungicide application can restrict early development and spread of disease. Use at first sign of infection. Use the higher rate for dense crops or if disease pressure is severe.
	Rust	–	Mancozeb or metiram	
	Rust plus	Ascochyta blight	Mancozeb or metiram	
2nd critical period Before canopy closure (13–16 weeks after emergence).	Ascochyta blight and/or rust plus	Chocolate spot	Mancozeb or metiram	On-farm experience application is more effective before canopy closure.
	Chocolate spot	–	Carbendazim	If Ascochyta is detected, and/or chocolate spot appear in the crop canopy, and rain or high humidity are likely, apply fungicide if crop has sufficient yield potential.
	Chocolate spot plus	Ascochyta blight	Carbendazim + Mancozeb or metiram	Apply a maximum of two consecutive applications at 14-day intervals. Apply a minimum of 100L of water per hectare.
3rd critical period End of flowering when pods are filling (15–20 weeks after emergence).	Ascochyta blight and/or rust plus	Chocolate spot	Mancozeb or metiram	If Ascochyta or rust is present, rain is likely, or new spots of chocolate spot or rust appear on unprotected leaves on the upper third of the plant, apply fungicide if the crop has sufficient yield potential. Observe all withholding periods.
	Chocolate spot plus	Ascochyta blight and/or rust	Carbendazim + mancozeb or metiram	
	Chocolate spot	–	Carbendazim	

Source: PIRSA/GRDC (2010) Vetch: The Ute Guide. PIRSA/GRDC – https://grdc.com.au/vetch-the-ute-guide

FEEDBACK

MORE INFORMATION

An app on crop disease symptoms of pulses is at https://itunes.apple.com/au/app/crop-disease-au/id946310779?mt=8

7.1.1 Ascochyta blight (*Ascochyta fabae*)

Description

Dark leaf spots that show through both sides and become grey with age.

Leaf spots circular, becoming elongated; pale centres may fall out leaving holes in leaf; tiny black fruiting bodies develop within lesions.

Herbicide damage (particularly simazine) can be mistaken for Ascochyta blight but is usually confined to leaf margins and spots do not have grey centres with black specks.

Stems develop elongated, dark, sunken lesions; stems may split and break, causing plants to lodge.

Pods develop black, sunken lesions, which can penetrate the pod and infect the developing seed. Badly infected seeds have brown or black stains.

First appears on leaves of seedlings when wet, cold conditions occur, usually well before flowering. Progresses to infect upper leaves, flowers, stems and pods.

Infection on mature pods leads to seed staining, especially when late rains occur pre-harvest. Disease can develop on pods of windrowed crops.

Prevalent in Western Australia.

Economic importance

Mostly in high-rainfall areas (>450 mm per year) but severity varies greatly from crop to crop and season to season. Yield losses are not as severe as Ascochyta blight in faba bean.[2]

Management

Grow varieties with resistance; sow disease-free seed; use crop rotation; sow away from vetch and bean residues (including self-sown plants).

Apply fungicide during seedling stages 6–8 weeks after sowing. Spray before an average infection of one lesion per plant develops and if rainfall is likely during the next week. A late fungicide application after flowering and when no new growth is occurring assists in preventing seed staining.

Sowing into standing stubble helps raise the crop off the ground and improve airflow, making the crop environment less conducive to Ascochyta.

7.1.2 Chocolate spot and Botrytis grey mould (*Botrytis fabae* and *B. cinerea*)

Description

These are major diseases in all vetch-growing areas. They infect plants at any stage but are worse after flowering; they defoliate plants, ruining forage quality and reducing podset.

Botrytis is favoured by temperatures of 15–25°C and high humidity (>70%) for 4–5 days. Very rapid build-up (aggressive stage) during warm, humid conditions late in the season. Worse in early-sown and dense crops, and heavy wet soils. Fluffy, grey fungal growth produces masses of spores on fallen leaves and petals under wet conditions.

Non-aggressive spots, initially pinhead-sized, circular and reddish-brown, on leaves and flowers; spots on one side of leaf only, most obvious as ‘chocolate spots’ early in the season. Spores are windblown so it tends to be in the upper canopy. Spots expand rapidly and combine under suitable conditions, blackening and killing large areas of leaf; infection can spread into stems.

Flowers turn brown and are killed, reducing podset. Pods develop reddish-brown, pinhead-sized spots. Pods may split allowing infection of seed, which may be covered in small reddish-brown spots.

2 J Lamb, A Poddar (2008) Grain Legume Handbook for the Pulse Industry. Grain Legume Hand Book Committee, https://grdc.com.au/grainlegumehandbook

FEEDBACK

Severe infection can result in complete crop failure.

Economic importance

Occurs in all areas where vetch can grow. Losses range from minor to complete crop failure depending on the level of infection, time of infection occurrence and amount of spring rainfall. In unprotected crops, in a mild, wet spring disease commonly reduces yield by 30–50% through loss of leaves and collapse of stands.

Management

No varieties have good resistance. Fungus survives on stubble, volunteers and infected seed, so ensure good rotations and pre-seeding hygiene.

Manage the canopy by delaying sowing; using crop rotation; and sowing away from bean and vetch residues. Control volunteer vetch plants.

Check the crop every 7 days when temperatures are below 15°C. Check every 3 days when 15–20°C and humidity over 70%.

Fungicide application may be futile if disease has developed unchecked and the crop is bulky and lodged, preventing fungicide penetration into the canopy.

Rainfall <350 mm/year:

- graze crop to reduce canopy size if required; or
- apply a protective fungicide only if disease risk is high in a seed production crop and humidity in the crop is likely to be high for at least a week, especially if signs of infection are present.

Rainfall >450 mm/year:

- graze crop to reduce canopy size if required; or
- apply a protective fungicide if disease is present or risk is high in a grain production crop and humidity in the crop is likely to be high for at least a week.
- repeat (10–21 days in severe cases) before rain, as determined by unprotected growth, rain since last application and expected rain. Last spray when flowering ceased and no new growth is expected.

Photo 1: *Dense, wet canopies, particularly in warm conditions, are conducive to the development of Botrytis, especially in the understorey where fungicides cannot penetrate.*

FEEDBACK

7.1.3 Rust (*Uromyces viciae-fabae*)

Description

Rust is the most important disease of vetch in Australia. It is most prevalent in long-season districts and in warmer areas, e.g. northern NSW. Occasionally causes significant crop losses in southern areas in warm to hot (20–30°C) and humid conditions.

Severe infection causes premature defoliation, resulting in reduced seed size.

Initial infection is as creamy-coloured spore masses on leaves, replaced by orange-brown pustules surrounded by a light-yellow halo. Severely infected leaves wither and drop off.

Rust pustules on stems are similar but often larger than on leaves and become darker as plants mature. Isolated rust pustules may develop on the pods.

Rust can occur earlier in the season than in other pulses but generally occurs during warm, humid conditions through grain-filling. Can develop very quickly under favourable conditions. Above 20°C the rust generations are every 10 days.

Economic importance

This disease has caused losses of up to 30% on its own, and in combination with chocolate spot it can reduce yields by up to 50%.[3]

Management

Sow a resistant variety. Sow away from vetch and bean residues and self-sown plants remaining after sowing.

Where broad-spectrum fungicides are used as treatments for the other diseases, separate rust control is unlikely to be needed unless the product used does not control rust (e.g. carbendazim).

Graze the canopy to reduce crop bulk and its susceptibility to rust. Grazing rust-infected plants has caused abortion in pregnant stock.

Photo 2: *Rust is the most serious disease of vetch in Australia and growing varieties with resistance is an important management strategy. Symptoms can occur early in the season as creamy-coloured spore masses on leaves, which are replaced by orange-brown pustules surrounded by a light-yellow halo as the disease progresses. Severely infected leaves wither and drop off.*

3 J Lamb, A Poddar (2008) Grain Legume Handbook for the Pulse Industry. Grain Legume Hand Book Committee, https://grdc.com.au/grainlegumehandbook

FEEDBACK

7.1.4 Root rots (*Fusarium*, *Phoma*, *Rhizoctonia* and *Pythium* spp.)

Description

Plants are stunted and often die in patches. Leaves yellow and wilt before dying. Crown and stem bases are brown to black.

Roots are blackened and the root system is severely reduced or may be totally rotted before emergence. Lateral roots are short with tips rotted and if infected with *Rhizoctonia* these are often pointed.

Management

Control any green plant growth for at least several weeks prior to sowing as Rhizoctonia builds up on green plants. It is also more common in sandy, infertile soils and in crops sown using minimal disturbance (e.g. with disc seeders).

Shattering the soil below seed level at seeding will reduce *Rhizoctonia*.

Ensure adequate nitrogen and zinc nutrition.

Avoid situations of wet, cold weather with poor soil structure and free surface water. Close rotations of vetch, faba bean or other pulses, especially field pea and chickpea, can increase the severity of Rhizoctonia.

7.1.5 Sclerotinia stem rot (*Sclerotinia sclerotiorum* and *S. trifoliorum*)

Sclerotinia has a very wide host range for the species, including most broadleaf crops and weeds. *Sclerotinia* can build up in paddocks and the sclerotes can survive for up to 10 years in soil, so will be a problem for other crops grown in the rotation, such as canola.

Description

Affects isolated plants at any stage of growth. Plants wilt and collapse.

Infects stems, leaves or pods; young plants develop a slimy-wet rot at ground level.

Plants have a blackened base covered with fluffy, white fungal growth and are easily pulled from the soil.

Sclerotes (2–5 mm in diameter) form on the surface and in the centre of stems. Sclerotes are white at first, then turn black and hard.

Occurs where a high frequency of pulses and oilseeds are in the crop sequence; high seeding rates; cool, wet conditions.

Management

Once established in a crop *Sclerotinia* is difficult to control. Lower seeding rates, wider row spacing and good weed control produce a more open crop less prone to disease.

Rotation with cereals will decrease soil inoculum levels.

FEEDBACK

Photo 3: *Sclerotinia occurs where a high frequency of pulses and oilseeds are in the crop sequence; high seeding rates; cool, wet conditions. Rotations including cereals decrease inoculum levels and are an important part of an integrated disease management strategy as in-crop control is difficult.*

7.1.6 Viruses

Virus diseases are not regarded as significant in vetch. Some viruses are seed-borne, but most rely on living plant tissue to survive between seasons (the 'green bridge'). It is possible for vetch to be a host for viruses and to infect other crops yet show no symptoms.

Bean yellow mosaic virus (BYMV), Clover yellow vein virus (CYVV), Pea seed-borne mosaic virus (PSbMV) and Broad bean wilt virus (BBWV) are non-persistent, which means aphids lose their infectivity soon after feeding on healthy plants. Thus aphids usually only spread these viruses over short distances.

Bean leafroll virus (BLRV), Subterranean clover redleaf virus (SCRLV), Beet western yellows virus (BWYV) and Subterranean clover stunt virus (SCSV) (yellowing or luteoviruses) are persistent viruses, with the aphids remaining infected for life. These viruses can be spread by aphids over long distances. The relatively long feeding time needed for the aphid to transmit the virus makes them responsive to control by insecticides.

Virus symptoms can include yellowing, leaf mottling or mosaics, stunting and tip distortion. Symptoms can easily be mistaken for herbicide damage, nutrient deficiencies, salinity effects or other abiotic factors. It is difficult to diagnose a virus just on field symptoms.

Growers are advised to seek expert advice. Crop patches or rings, which increase over time, often indicate the presence of a virus.