GRDC
GRAINS RESEARCH & DEVELOPMENT CORPORATION

NVT
DISEASE RATING DEFINITIONS

GRDC NATIONAL VARIETY TRIALS™

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Cereal foliar disease resistance ratings definitions

Rusts and foliar diseases

A standard disease resistance rating system has been adopted for all crops in all states across Australia. This document helps to explain the values and their implications for growers and advisers.

Standard disease ratings		
Rating	**Alpha code**	**Numeric code**
Resistant	R	9
Resistant – Moderately Resistant	R-MR	8
Moderately Resistant	MR	7
Moderately Resistant – Moderately Susceptible	MR-MS	6
Moderately Susceptible	MS	5
Moderately Susceptible – Susceptible	MS-S	4
Susceptible	S	3
Susceptible – Very Susceptible	S-VS	2
Very Susceptible	VS	1

Rating	Management option description	For growers: what do I see?	For growers: what do I do?
Resistant (R)	Disease may be found but will be at such a level that no economic management is required, even in instances of high disease pressure.	Trace levels of disease may be found.	No economic management decisions required.
Moderately Resistant (MR)	Disease may be observed but no economic management decisions will be required. Preventative sprays not necessary but disease should be monitored. Management of seed quality may be required.	The disease may be observed at very low levels.	No economic management decisions required. Monitor crops for disease development.
Moderately Susceptible (MS)	In the presence of inoculum and in seasons conducive to disease, the disease will be seen more readily when inspecting the crop. If the disease appears early in the season, then an economic management decision (preventative spray) may be appropriate. Later occurrence of the disease may not require any action. Management of seed quality will be required.	In the presence of inoculum, the disease will be seen more readily when inspecting the crop.	Monitor crops for disease development. In the presence of inoculum and in seasons conducive to disease, an economic management decision may be appropriate (e.g. preventative spray). Later occurrence of the disease may not require any action.
Susceptible (S)	The disease will be easily found in the crop. Management decisions will be required to reduce yield loss and will most probably be economic to do so. Management of seed quality will be required.	In the presence of inoculum, the disease will often be easily found in the crop. The disease will be observed readily in the crop.	Management decisions will be required to reduce yield loss and will most probably be economic to do so.

Rating	Management option description	For growers: what do I see?	For growers: what do I do?
Very Susceptible (VS)	Do not grow this variety if the disease in question is a regular occurrence or risk. The variety in question can be a complete loss if sown and no disease management is applied.	The disease will be readily observed in the crop.	If this variety is to be grown in areas at risk of disease development, then additional management strategies are essential.

Pulse disease rating definitions

Rating	Definition
Resistant (R)	No symptoms visible. No fungicides are required.
Resistant to Moderately Resistant (R-MR)	The disease may be visible but will not cause significant plant damage or loss. However, under extreme disease pressure or highly favourable environments conditions fungicide applications may be required e.g., to prevent seed staining.
Moderately Resistant (MR)	The disease may be visible but will not cause significant plant damage or loss. However, under high disease pressure or highly favourable environments conditions, fungicide applications may be required e.g., to prevent seed staining.
Moderately Resistant to Moderately Susceptible (MR-MS)	The disease symptoms are moderate and may cause some yield and/or seed quality losses in conducive conditions. Fungicide applications, if applicable, may be required to prevent yield loss and seed staining.
Moderately Susceptible (MS)	Disease symptoms are moderate to severe and will cause significant yield and seed quality loss in the absence of fungicides in conducive seasons, but not complete crop loss.
Susceptible (S)	The disease is severe and will cause significant yield and seed quality loss, including complete crop loss in the absence of fungicides, in conducive conditions.
Very Susceptible (VS)	Growing this variety in areas where a disease is likely to be present is very high risk. Significant yield and seed quality losses, including complete crop loss, can be expected without control and the increase in inoculum may create problems for other growers.

Nematode resistance rating definitions

Nematode resistance

Nematode resistance relates to the effect of the variety on the nematode density present within the paddock. A standard nematode resistance rating system has been adopted for all crops in all states across Australia. This document helps to explain the values and their implications for growers and advisers.

Standard disease ratings		
Rating	**Alpha code**	**Numeric code**
Resistant	R	9
Resistant – Moderately Resistant	R-MR	8
Moderately Resistant	MR	7
Moderately Resistant – Moderately Susceptible	MR-MS	6
Moderately Susceptible	MS	5
Moderately Susceptible – Susceptible	MS-S	4
Susceptible	S	3
Susceptible – Very Susceptible	S-VS	2
Very Susceptible	VS	1

Rating	Management option description	For growers: what do I see?	For growers: what do I do?
Resistant (R)	Growing these varieties will reduce the density of the nematode in question and so reduce yield loss in subsequent intolerant crops.	There will be a reduction in nematode densities when these varieties are grown.	Use these varieties in rotation with non-host crops to reduce nematode infestations. If using R varieties in paddocks with high nematode infestations make sure variety is also tolerant to prevent significant yield loss.
Moderately Resistant (MR)	Growing these varieties will, to a lesser degree than growing a resistant variety, reduce the density of the nematode in question and, therefore, reduce yield loss in subsequent intolerant crops.	There will be a reduction in nematode densities when these varieties are grown.	These varieties are suitable to be grown in paddocks with high nematode infestations as they reduce nematode densities. They will, however, not reduce nematode densities to the same degree as a resistant variety. Note that if nematode densities are high, choose a tolerant variety to minimise yield loss.
Moderately Susceptible (MS)	Growing these varieties will result in a small increase in nematode densities during the season.	Growing these varieties will increase the nematode density. However, unless the season is exceptionally favourable, growing these varieties in paddocks with low level nematode densities will only increase densities to moderate levels. If nematode densities are already moderate these varieties may result in high densities that may cause substantial loss in a following intolerant variety.	These varieties are suitable to be grown in paddocks with low nematode densities. They will, however, increase nematode densities which may be a problem for a following intolerant crop.

Rating	Management option description	For growers: what do I see?	For growers: what do I do?
Susceptible (S)	Growing these varieties will increase nematode density which may then cause problems to a following intolerant crop.	Growing these varieties will result in increases in the density of the nematode in question. However, unless the season is exceptionally favourable, growing these varieties in paddocks with a low level will only result in moderate levels. If nematode densities are already moderate these varieties can result in high levels that may cause substantial loss in a following intolerant variety.	These varieties will increase the density of nematodes in a paddock that may be of concern to a following intolerant crop. If nematode densities are high following a susceptible crop, growers should avoid intolerant crops in the following year and select a resistant crop to reduce nematode densities.
Very Susceptible (VS)	Growing these varieties will support large multiplication rates of the nematode. It may take more than one year of a resistant variety/non-host crop to reduce the nematode densities to a level that will not affect the yield of an intolerant crop.	These varieties will support large increases in nematode numbers when grown in infested paddocks.	Growers should, where possible, avoid growing these varieties in infested paddocks. Also avoid growing intolerant varieties after VS varieties due to the potential for significant yield loss. A tolerant non-host crop/ resistant variety should be used following VS varieties to reduce nematode densities. If nematode densities are very high it may take more than two years of non-host/resistant varieties to reduce nematode levels to low risk densities.

Nematode tolerance rating definitions

Nematode tolerance

A standard nematode tolerant rating system has been adopted for all crops in all states across Australia. This document helps to explain the values and their implications for growers and advisers.

Standard disease ratings		
Rating	**Alpha code**	**Numeric code**
Tolerant	T	9
Tolerant – Moderately Tolerant	T-MT	8
Moderately Tolerant	MT	7
Moderately Tolerant – Moderately Intolerant	MT-MI	6
Moderately Intolerant	MI	5
Moderately Intolerant – Intolerant	MI-I	4
Intolerant	I	3
Intolerant – Very Intolerant	I-VI	2
Very Intolerant	VI	1

Rating	Management option description	For growers: what do I see?	For growers: what do I do?
Tolerant (T)	Variety will not lose yield in the presence of the nematode, even at high nematode densities.	The crop will not be affected by the presence of the nematode.	No economic management decisions required.
Moderately Tolerant (MT)	These varieties can generally be sown in paddocks with low to medium levels of nematode infestations without a significant effect on grain yield occurring. These varieties can suffer yield loss (up to 10%) in the presence of high nematode densities.	Minimal yield loss will occur in the presence of the nematode (i.e. < 5%), except when nematode densities are high when up to 10% yield loss may occur.	Do not grow these varieties in paddocks with high nematode densities present. Suggest follow management recommendations to minimise yield loss for the nematode of concern.
Moderately Intolerant (MI)	These varieties should not be grown in paddocks with medium to high nematode densities. In the presence of high nematode densities in a paddock these varieties may lose up to 30% yield.	In the presence of the nematode and in seasons conducive to disease, these varieties will lose yield and may show symptoms consistent with root damage. The expression of symptoms will be greater in paddocks with higher nematode densities.	These varieties should not be grown in paddocks with medium to high nematode densities. In the presence of high nematode densities in a paddock these varieties can lose up to 30% yield. Suggest follow management recommendations to minimise yield loss for the nematode of concern.
Intolerant (I)	These varieties are prone to yield loss even in the presence of low nematode densities. Such varieties should not be grown in paddocks where nematodes are known to be present. In the presence of high nematode densities yield loss of up to 50% can occur.	In the presence of the nematode symptoms of root disease will often be easily found in the crop.	Do not grow these varieties in paddocks where the nematode is present at medium to high levels. Even paddocks with low nematode densities should be avoided when possible. Follow management recommendations to minimise yield loss for the nematode of concern.

Rating	Management option description	For growers: what do I see?	For growers: what do I do?
Very Intolerant (VI)	Do not grow this variety unless the paddock is known to be nematode free or present at very low densities. High nematode densities could cause yield losses of greater than 50% to occur.	Symptoms of nematode damage will be present in these varieties even in the presence of low nematode densities.	Do not grow these varieties in paddocks where the nematode is present, even at low levels. If the variety is to be grown a soil test should be conducted prior to sowing to ensure that the paddock is free from the nematode in question. Follow management recommendations to minimise yield loss for the nematode of concern.

Canola blackleg resistance ratings definitions

Rating	What do you see?	What do you do?
Resistant (R)	• Leaf lesions may or may not be present depending on the effectiveness of the major gene resistance (Resistance group) on your farm. • No or very limited internal infection (0-10 %) at the base of the plant when cut near maturity. • No external cankering. • R rated cultivars are unlikely to gain a yield response from fungicide application.	Do not sow into canola stubble from the previous year. Separate your crop by 500m from the previous year's stubble. Fungicide use is unlikely to be economic.
Resistant to Moderately Resistant (R-MR)	• Leaf lesions may or may not be present depending on the effectiveness of the major gene resistance (Resistance group) on your farm. • Leaf lesions may or may not be present. • No external cankering. • Very limited internal infection (0-10%) at the base of the plant when cut near maturity. • R-MR rated cultivars are unlikely to gain yield a response from fungicide application.	Do not sow into canola stubble from the previous year. Separate your crop by 500m from the previous year's stubble. Fungicide use is unlikely to be economic.
Moderately Resistant (MR)	• Lesions will likely be present on cotyledons and leaves. • Internal infection at the base of the plant when cut near maturity may occur if sown under high disease pressure. • Some external cankering may occur if sown under high disease pressure. • MR cultivars are unlikely to gain yield a response from fungicide application under normal disease pressure. However, they may respond to fungicides if sown under high disease pressure.	Do not sow into canola stubble from the previous year. Separate your crop by 500m from the previous year's stubble. In high disease risk situations fungicide use may be of economic benefit.
Moderately Resistant to Moderately Susceptible (MR-MS)	• Lesions will likely be present on cotyledons and leaves. • Internal infection at the base of the plant when cut near maturity, even under moderate disease pressure. • External cankering likely to occur if sown under high disease pressure. • Plant death will occur under high disease pressure situations. • MR-MS cultivars are likely to respond to fungicides if sown under moderate to high disease pressure.	Do not sow into canola stubble from the previous year. Separate your crop by 500m from the previous year's stubble. In moderate to high disease risk situations fungicide use may be of economic benefit.
Moderately Susceptible (MS)	• Lesions will likely be present on cotyledons and leaves. • Internal infection at the base of the plant when cut near maturity, unless sown under low disease pressure. • External cankering likely to occur if sown under moderate disease pressure. • Plant death will be easily found under moderate to high disease pressure situations. • MS cultivars are highly likely to respond to fungicides if sown under moderate to high disease pressure.	Avoid high disease pressure. Do not sow into canola stubble from the previous year. Separate your crop by 500m from the previous year's stubble. In moderate disease risk situations fungicide use is likely to be of economic benefit.

Rating	What do you see?	What do you do?
Moderately Susceptible to Susceptible (MS-S)	• Only recommended to lower disease pressure environment. • In low disease pressure situations, some lesions on cotyledons and leaves may be found. • Low levels of internal infection in low pressure environments, however, will likely occur during wetter growing seasons. • Low levels of external canker under low pressure environments. • If sown in moderate disease pressure situations plant death is likely to be severe. • MS-S cultivars are likely to respond to fungicides if sown under moderate disease pressure.	Recommended for low disease pressure regions only (i.e., low rainfall areas). Do not sow into canola stubble from the previous year. Separate your crop by 500m from the previous year's stubble. In moderate disease risk situations fungicide use may be of economic benefit.
Susceptible (S)	• Not recommended for Australian canola production. • Lesions will likely be present on cotyledons and leaves. • Internal infection at the base of the plant when cut near maturity. • External cankering likely to occur. • Plant death will be easily found. • Will respond to fungicide application, but fungicides may not be adequate to achieve potential yield.	Recommended for low disease pressure regions only (i.e., low rainfall areas). Do not sow into canola stubble from the previous year. Separate your crop by 500m from the previous year's stubble. Fungicide use is unlikely to be economic at high or low disease risk situations. If blackleg is causing yield loss, consider a more resistant variety in future years.
Susceptible to Very Susceptible (S-VS)	• Not recommended for Australian canola production. • Lesions will likely be present on cotyledons and leaves. • Internal infection at the base of the plant when cut near maturity. • External cankering likely to occur. • Plant death will be easily found. • Will respond to fungicide application, but fungicides may not be adequate to achieve potential yield.	Recommended for low disease pressure regions only (i.e., low rainfall areas). Do not sow into canola stubble from the previous year. Separate your crop by 500m from the previous year's stubble. Fungicide use is unlikely to be economic at high or low disease risk situations. If blackleg is causing yield loss, consider a more resistant variety in future years.
Very Susceptible (VS)	• Not recommended for Australian canola production.	Recommended for low disease pressure regions only (i.e., low rainfall areas). Do not sow into canola stubble from the previous year. Separate your crop by 500m from the previous year's stubble. Fungicide use is unlikely to be economic at high or low disease risk situations. If blackleg is causing yield loss, consider a more resistant variety in future years.