



**Fig. 1.** *Wheat streak mosaic virus* - typical leaf streaking symptoms (a); stunted individual plants with streak-affected leaves (b); and affected crop in the field with plants showing severe stunting and streaking symptoms on their leaves (c). Photo credits DAFWA.

**Common Name:** *Wheat streak mosaic virus* (WSMV)

**Disease:** Wheat streak mosaic

**Classification:** F: *Potyviridae*, G: *Tritimovirus*

*Wheat streak mosaic virus* (WSMV) was found for the first time in Australia in 2002 in wheat plants in a cereal breeding facility in Canberra. It is now widely dispersed around the continent and is spread by means of infected wheat seed and a vector mite; Wheat Curl Mite (*Aceria tosichella*). Evidence suggests the virus was introduced once in wheat seed, multiplied where it was introduced, and then was dispersed around Australia along distribution routes for wheat breeding lines, germ plasm, and crop seed. This highlights the importance of effective monitoring of imported plant materials for exotic virus diseases during post-entry quarantine.

**Host Range:**

It is a major pathogen of wheat and other cereals in the Americas, Europe, Asia, and North Africa. Wheat is the most important host and the symptoms and damage are the most obvious in this host. Barley, oats, millet and cereal rye can be infected, but they do not show obvious symptoms or damage. A range of grass weeds also become infected. WSMV has been found in all Australian states except in Tasmania or the NT.

**Impact:**

WSMV in the first 3 years caused little crop loss in eastern Australia. But in 2005 in the slopes region of NSW, it caused crop failure of over 5,000 ha and by 2006, this area had reached 20,000 ha despite a non conducive growing season to WSMV epidemics. The future WSMV-induced economic loss in NSW has been estimated at \$21 million. In WA, the virus was first detected in volunteer wheat in autumn 2006. It caused widespread infection in the subsequent growing season, especially in the Merredin and

Hyden districts. Incidences of crop infection of over 10% were restricted to the Merredin area where at least one crop had 100% infection associated with major crop losses.

**Key Distinguishing Features:**

The symptoms appear as pale green streaking on the leaves with yellowing of leaf tips and stunted and tufted growth. The streaking is usually most obvious on older leaves. Affected plants become stunted relative to healthy plants. Heads on infected plants can be sterile and contain no seed, or can contain small shriveled grain. Its identification in symptomatic samples is best conformed by ELISA in a laboratory.

**Control:**

The only control options are to remove the green bridge at least 4 weeks before sowing, to sow healthy seed stocks of wheat, and to avoid early sowing when mild autumn temperatures favour the mite vector. A commercial seed test for seed samples is available from AGWEST Plant Labs. Presently, no effective miticides to spray against the vector and no WSMV-resistant wheat varieties are available.

**Further Reading:**

- Burges *et al.* (2003) *Wheat streak mosaic virus*. DAFWA Factsheet No 5/2003.
- Dwyer *et al.* (2007) *Plant Disease* **91**, 164-170.
- Ellis *et al.* (2003) *Australasian Plant Pathology* **52**, 208
- Jones *et al.* (2005) *Plant Disease* **89**, 1084-1050.
- Murray *et al.* (2005) *Wheat streak mosaic and the wheat curl mite*. Prime fact 99. NSW DPI.

**Key Contacts:** Mark Holland [AGWEST Plant Labs] 9368 3505; Brenda Coutts 9368 3266; Geoff Dwyer 9368 3677; Roger Jones 9368 3269.