



**Fig. 1.** Luteovirus infected chickpea field showing 95% crop loss, Tunisia 2006 (a). A comparison between a healthy faba bean and one infected with *Bean leafroll virus* (b). Photo credits Mai Hlaing Loh.

**Common Name:** None

**Disease:** Various

**Classification:** O: Virales, F: Luteoviridae [LHT System of Classification by Lwoff, Horne & Tournier (1962)]

The family of *Luteoviridae* viruses contains three genera: *Luteovirus*, *Polerovirus* and *Enamovirus*. Within these genera there are 15 recognised and 11 unassigned species with additional viruses reported, and yet to be recognised by the International Committee on Taxonomy of Viruses (ICTV). Their virions have isohedral symmetry in hexagonal spheres which are 25 to 30nm in diameter; their particles are made up of two proteins with a core of single stranded genomic RNA. Luteovirid genomes are from 5.3 to 5.9 kilobases in length, depending on the species and are transmitted by aphids in a persistent, circulative and non-propagative manner. These viruses are not seedborne and survive in alternate hosts between cropping seasons.

**Host Range:**

*Luteoviridae* viruses which infect pulse crops are distributed worldwide and can have a wide host range within the legume family (Fabaceae) and all cool season food legumes (pulses) are susceptible to these viruses. The host range can be limited (e.g. *Soybean dwarf virus*; around 15 legume species) or extremely large (e.g. *Beet western yellows virus*; at over 150 species including non-legumes).

**Impact:**

*Luteoviridae* viruses which infect pulse crops can cause mild crop loss e.g. *Soybean dwarf virus* or severe crop loss e.g. *Chickpea chlorotic dwarf virus* which may cause yield losses of up to 95%. Early infections generally cause the most severe yield losses and these occur when flights of virus-infected (viruliferous) aphids infect the crop in the first 8-10 weeks after emergence, sometimes resulting in near total crop failure.

**Key Distinguishing Features:**

After initial infection, plants can develop characteristic yellowing and stunting symptoms (e.g. *Bean leafroll virus*, *Chickpea chlorotic stunt virus*), these symptoms can range from mild to severe, with early infections resulting in the most severe symptoms and greater crop losses. However, symptoms can vary with plant species infected and can include leaf reddening; necrosis is also common for some of the viruses within the family (e.g. *Beet western yellows virus*).

**Control:**

There is no way of eliminating virus from a plant once it is infected. The best method of control is through a combination of preventative management strategies such as elimination of alternate hosts which provide a “green bridge” for virus and aphids between seasons; crop monitoring for aphids followed by spraying to prevent aphid colonisation and secondary virus spread; agronomic practices such as time of sowing to avoid early aphids and row spacing and ground cover to reduce attractiveness to aphids. The use of resistant varieties is the best long term solution, but few resistant varieties are currently available.

**Further Reading:**

Makkouk & Kumari (2009) ‘Epidemiology and integrated management of persistently transmitted aphid-borne viruses of legume and cereal crops in West Asia and North Africa’, *Virus Research*, doi:10.1016/j.virusres.2008.12.007  
 D’Arcy & Domier (2005) ‘Luteoviridae’, IN Fauquet, D. M., Mayo, M. A., Maniloff, M. J., Desselberger, U. & Ball, L. A. (Eds.) *Virus Taxonomy*, VIIIth Report of the International Committee on Taxonomy of Viruses. New York, Academic Press.

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