

## TRANSGENIC LUPIN CULTIVAR IMMUNE TO BEAN YELLOW MOSAIC VIRUS

Wylie S.<sup>1,2</sup>, Welsh B.<sup>1,2</sup>, Hodgson L.<sup>2</sup>, Chapple S.<sup>2</sup>, Fletcher N.<sup>2</sup>, Barker S.<sup>2</sup>, Smith P.<sup>2</sup> and Jones M.G.K.<sup>1,2</sup>

<sup>1</sup>Plant Biotechnology Research Group, WA State Agricultural Biotechnology Centre, Murdoch University, Perth WA 6150. <sup>2</sup>Centre for Legumes in Mediterranean Agriculture, University of Western Australia, Perth WA 6009, Australia.

Narrow-leafed lupin (*Lupinus angustifolius*) is a locally important legume crop grown in southern Australia, Europe, South America and USA. Western Australia produces the bulk of the world's crop at present, although there is increased interest in the crop in Europe as a replacement for imported GM soy. *Bean yellow mosaic potyvirus* (BYMV) can cause serious yield decline in lupin crops, especially when vector aphids are prevalent and surrounding legume pastures are infected. BYMV kills the whole lupin plant 2-4 weeks post infection. There is no known immunity to BYMV in the germplasm, although there are degrees of susceptibility amongst cultivars. A synthetic resistance gene to BYMV was constructed as a non-translatable inverted repeat of part of the RNA-dependent RNA polymerase gene segment of BYMV and driven by a constitutive promoter derived from Subterranean clover stunt virus segment 4. The construct was transferred to lupin cultivar Wonga, known for its tolerance to anthracnose, a serious fungal pathogen of lupin. 16 transgenic events (T0) were generated and progeny collected from these events was screened for the transgene. Approximately 30% of the progeny were transgenic, resulting in 45 T1 'lines', each derived from a single seed. Lines were challenged with sap inoculation of BYMV in a glasshouse over two generations (T2-T3). Seven lines derived from three transformation events were immune to repeated inoculation of BYMV. All non-transgenic control plants and susceptible transgenic plants showed typical disease symptoms. The plants from the immune lines contained one or two copies of the transgene.