Section 5.

**RNAi-mediated resistance to *Potato leafroll virus*, *Potato virus* A and *Potato virus* Y in transgenic potato plants**

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Transgenic potato plants of *Solanum tuberosum* cultivar Sumi were generated that expressed fused, tandem, 200 bp segments derived from the capsid protein coding sequences of *potato virus* Y (PVY strain O) and *potato leafroll virus* (PLRV), as well as the cylindrical inclusion body coding sequences of *potato virus* A (PVA), as inverted repeat double-stranded RNAs, separated by an intron. The orientation of the expressed double-stranded RNAs was either sense–intron–antisense or antisense–intron–sense RNAs, and the double-stranded RNAs were processed into small RNAs (Chung, 2013). Four lines of such transgenic potato plants were assessed for resistance to infection by PVY-O, PLRV, or PVA, all transmitted by a natural vector, the green-peach aphid, *Myzus persicae*. Resistance was assessed by the absence of detectable virus accumulation in the foliage (Cillo, 2014). All four transgenic potato lines tested showed 100 % resistance to infection by either PVY-O or PVA, but variable resistance to infection by PLRV. This was regardless of the orientation of the viral inserts in the construct used to generate the transgenic plants and the gene copy number of the transgene. This demonstrates the potential for using tandem, fused viral segments and the inverted-repeat expression system to achieve multiple virus resistance to viruses transmitted by aphids in potato.