



**Supplementary Figure 1** Symptoms of *N. benthamiana* infected by PVX-C4-myc, PVX-mC4-myc, and PVX at different times.

ToLCGdV C4	..MGTLISTCLCN SKANTTARITDSSTWFP	28
TYLCV C4	..MGNHISMCLSN SKANTNVRTNGSSTWYP	28
MYMV AC4	MK MENLISMFCFNSKGS SKRRTQGSSTWFP	30
ToLCGdV C4	QPDQHISIRTFRELNPAPMSSPTSIRMETSE	58
TYLCV C4	QTGOHISIRTFRQLRAQQMSRPTWRKTETS	58
MYMV AC4	QQDQHITIRTFRQLKAHQMLSHTWTKTETS	60
ToLCGdV C4	LNGVNSRSTDEVLG EAARMLTTHVQRL...	85
TYLCV C4	LILEFPKSMADQLEEVS NLPTTHMPKHSIQ	88
MYMV AC4	LTMEVSKSMADQLEEVS NLPTTLMPRHSIV	90
ToLCGdV C4	.....	85
TYLCV C4	AVNPRPSIY	97
MYMV AC4	DPSYRPSIY	99

## Supplementary Figure 2 Amino acids alignment of AC4/C4 of ToLCGdV, TYLCV, and MYMV

The GenBank accession numbers are AAU00332 (ToLCGdV C4) CAA33691 (TYLCV C4), and QDN53931 (MYMV AC4)