# Validation Report: ELISA

SRA 46202 • Broad bean wilt virus 1 and 2 (BBWV-1,2)



#### **Test Characteristics**

Test Name	Broad bean wilt virus 1 and 2
Catalog Number	46202
Acronym	BBWV-1,2
Genus	Fabavirus

Capture AntibodyPolyclonal (Rabbit)Detection AntibodyPolyclonal (Rabbit)FormatDAS-ELISADiluentsGEB3/ECISample Dilution1:10

### Summary

This ELISA test is a qualitative serological assay for the detection of Broad bean wilt virus 1 and 2 (BBWV-1,2) in ornamental leaves. BBWV-1,2 is a member of the Fabavirus genus known for their non-enveloped, icosahedral-shaped virus particles.

Diagnostic Sensi	tivity	Analytical Sensitivity
True Positives	29	Limit of Detection: 1:51,200 dilution of infected tissue (pathogen titer unknown)
Correct Diagnoses	29	
Percent	100%	

#### **Analytical Specificity**

#### Inclusivity:

#### Isolates and Geographic Regions Detected:

BBWV-1 PV-0221 (Italy)	BBWV-1 PV-0548 (Syria)	
BBWV-1 PV-0549 (Germany)	BBWV-1 PV-0881 (Austria)	
BBWV-1-Spinach (ATCC® PV-132™) (NY, USA)	BBWV-2 PV-0537	
BBWV-2 PV-0550 (Germany)	BBWV-2 PV-0862 (Germany)	
BBWV-2-Lettuce (ATCC <sup>®</sup> PV-131 <sup>™</sup> ) (NY, USA)	BBWV-2-Yangzhou (China) <sup>1</sup>	
BBWV-2-ZK2 (China) <sup>1</sup>	BBWV-2-ZK3 (China) <sup>1</sup>	
<sup>1</sup> BBWV-2-Yangzhou, BBWV-2-ZK2, and BBWV-2-ZK3 have been externally <u>reported</u> to be detected.		

#### **Exclusivity:**

Cross-reacts With:	
None known	

#### Does Not Cross-react With:

Angelonia flower break virus (AnFBV)	Apple mosaic virus (ApMV)
Arabis mosaic virus (ArMV)	Bean pod mottle virus (BPMV)
Beet western yellows virus (BWYV)	Carnation mottle virus (CarMV)
Carnation necrotic fleck virus (CNFV)	Calibrachoa mottle virus (CbMV)



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Does Not Cross-react With:	
Cucumber mosaic virus (CMV)	Chrysanthemum virus B (CVB)
Cymbidium mosaic virus (CymMV)	Cymbidium ringspot virus (CymRSV)
Dahlia mosaic virus (DMV)	Dasheen mosaic virus (DsMV)
Hisbiscus chlorotic ringspot virus (HCRSV)	Hosta virus X (HVX)
Impatiens necrotic spot virus (INSV)	Kalanchoe latent virus (KLV)
Lamium mild mosaic virus (LMMV)	Lettuce mosaic virus (LMV)
Nemesia ring necrosis virus (NeRNV)	Odontoglossum ringspot virus (ORSV)
Papaya mosaic virus (PapMV)	Pepper mild mottle virus (PMMoV)
Pepper mottle virus (PepMoV)	Pepino mosaic virus (PepMV)
Pelargonium flower break virus (PFBV)	Potato leafroll virus (PLRV)
Potato virus Y (PVY)	Prunus necrotic ringspot virus (PNRSV)
Poinsettia mosaic virus (PnMV)	Potyvirus Group (Poty)
Ribgrass mosaic virus (RMV)	Scrophularia mottle virus (ScrMV)
Tomato aspermy virus (TAV)	Tobacco etch virus (TEV)
Tobacco mosaic virus (TMV)	Tobacco mosaic virus, common strain (TMV-c)
Tomato mosaic virus (ToMV)	Tomato ringspot virus (ToRSV)
Tobacco rattle virus (TRV)	Tobacco ringspot virus (TRSV)
Tobacco streak virus (TSV)	Tomato spotted wilt virus (TSWV)

## **Diagnostic Specificity**

True Negatives 1,131 Correct Diagnoses 1,128 Percent 99.73%

## Selectivity:

No Matrix Effect Observed With:			
Abutilon leaves	Acalypha leaves	Achillea leaves	Aethiopica spring carla leaves
Agastache leaves	Agerantum leaves	Angyranthemum leaves	Alternanthera leaves
Anagalis leaves	Angelonia leaves	Anisodontea leaves	Arctotis leaves
Artemesia leaves	Aster leaves	Asteriscus leaves	Bacopa leaves
Begonia leaves	Bellis leaves	Bidens leaves	Bouvardia leaves
Brachycome leaves	Bracteantha leaves	Calathea leaves	Calibrachoa leaves
Calocephalus leaves	Calylophus leaves	Caryopteris leaves	Celosia leaves
Ceratostigma leaves	Cestrum leaves	Chelome leaves	Chrysocephalum leaves
Cineria leaves	Cleome leaves	Coleus leaves	Colocasia leaves
Convolvulus leaves	Coprosoma leaves	Cuphea leaves	Dahlia leaves
Dianthus leaves	Didelta leaves	Didena leaves	Diascia leaves
Dracaena leaves	Duranta leaves	Echinacea leaves	Escallonia leaves
Eranthemum leaves	Erysimum leaves	Eupathorium leaves	Euphorbia leaves
Euryops leaves	Evovulus leaves	Felicia leaves	Fuchsia leaves
Gaillardia leaves	Guara leaves	Gazania leaves	Glechoma leaves



Goji leaves	Goodenia leaves	Gypsophilia leaves	Haloragis leaves
Hedera leaves	Hesperozygis leaves	Heliopsis leaves	Heliotropium leaves <sup>1</sup>
Heuchera leaves	Helychrisium leaves	Hibiscus leaves	Hydrangea leaves
Impatiens leaves	Ichroma leaves	Ipomoea leaves	Iris leaves
Irisine leaves	Jasminium leaves	Kalanchoe leaves	Lamiastrum leaves
Lamium leaves	Lantana leaves	Laurentia leaves	Lavandula leaves
Lavender leaves	Leptinella leaves	Leucanthemum leaves	Liriope leaves
Lobelia leaves	Lysimachia leaves	Mandevilla leaves	Mazus tissue culture
Mercadonia leaves	Meuhlenbeckia leaves	Mimulus leaves	Mint leaves
Monopsis leaves	Myosotis leaves	Nemesia leaves	Nepeta leaves
Nierembergia leaves	New Guinea Impatiens leaves	Nolana leaves	Ocimum leaves
Oenothera leaves	Orcetchys leaves	Orostachys leaves	Osteospermum leaves
Otocanthus leaves	Oxalis leaves	Ozothamnus leaves	Pelargonium leaves
Pennisetum leaves	Pentas leaves	Perilla leaves	Peristrophe leaves
Petunia leaves	Phlox leaves	Phygelius leaves	Pictranthus leaves
Plectranthus leaves	Portulaca leaves	Pulmoneria leaves	Ranunculus leaves
Raoulia leaves	Rhodanthemum leaves	Rosa leaves	Russelia leaves
Ruttya frutiosa leaves	Sagina leaves	Salvia leaves <sup>2</sup>	Sanchezia leaves
Santolina leaves	Satureja leaves	Sanvitalia leaves	Scabiosa leaves
Scaevola leaves	Schefflera leaves	Scutelaria leaves	Scoparia leaves
Sedum leaves	Senetti leaves	Snapdragon leaves	Solenisotigma leaves
Solenostemom leaves	Soloirolia leaves	Spath tissue culture	Sphaerealcea leaves
Stachys leaves	Strawflower leaves	Streptocarpus leaves	Strobilanthes leaves
Sutera leaves	Torenia leaves	Tradescantia leaves	Thymus leaves
Tiarella leaves	Tropaeolum leaves	Tricytis leaves	Trifolium leaves
Turnera leaves	Verbena leaves	Veronica leaves	Vinca leaves
Viola leaves			
<sup>1</sup> False positive observed in 2 out	of 9 samples of Heliotropium.		
<sup>2</sup> False positive observed in 1 out of 15 sampels of Salvia.			



#### Glossary

Diagnostic sensitivity <sup>1</sup> :	The percentage of positive samples correctly identified in an experiment with known positive controls.
Diagnostic specificity <sup>1</sup> :	The percentage of negative samples correctly identified in an experiment with known negative controls.
Analytical sensitivity <sup>3</sup> :	The smallest amount of target that can be detected reliably (this is sometimes referred to as the 'limit of detection')
Analytical specificity <sup>3</sup> :	(comprises inclusivity and exclusivity)
Inclusivity <sup>3</sup> :	The performance of a test with a range of target isolates covering genetic diversity, different geographical origin and/or hosts associated with the target organism.
Exclusivity <sup>3</sup> :	The performance of a test with a range of non-targets (e.g. cross-reaction with closely related organisms, contaminants)
Selectivity <sup>2</sup> :	The level of effect that matrices and relevant plant parts have on the performance of the assay.
Repeatability <sup>2</sup> :	The agreement between test replicates of the same sample tested by the same operator.
Reproducibility <sup>3</sup> :	The ability of a test to provide consistent results when applied to aliquots of the same sample tested under different conditions (e.g. time, users, equipment, location)
Robustness <sup>1,3</sup> :	The extent to which varying test conditions (e.g. temperature, volume, change of buffers) affect the established test performance values. May also be referred to as planned deviation analysis.
Stability <sup>1</sup> :	The performance of test reagents or controls over time.

#### References:

<sup>1</sup>Groth-Helms, D., Rivera, Y., Martin, F. N., Arif, M., Sharma, P., Castlebury, L. A. (in press). Terminology and Guidelines for Diagnostic Assay Development and Validation: Best Practices for Molecular Tests. PhytoFrontiers.

<sup>2</sup>Eads, A., Groth-Helms, D., Davenport, B., Cha, X., Li, R., Walsh, C., Schuetz, K., (in press). The Commercial Validation of Three Tomato Brown Rugose Fruit Virus Assays. PhytoFrontiers.

<sup>3</sup>EPPO (2018) PM 7/76 (5) Use of EPPO Diagnostic Standards, EPPO Bulletin 48, 373–377.



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