



Test Characteristics

Test Name	Cowpea mild mottle virus	Capture Antibody	Polyclonal (Rabbit)
Catalog Number	79500	Detection Antibody	Polyclonal (Rabbit)
Acronym	CPMMV	Format	Lateral Flow Device
Genus	Carlavirus	Diluents	SEB1
		Sample Dilution	1:20

Summary

The Cowpea mild mottle virus (CPMMV) ImmunoStrip is used to detect the presence of CPMMV in bean and other vegetable crops. CPMMV is a member of the Carlavirus genus known for their flexuous rod-shaped virus particles. ImmunoStrips are the perfect screening tool for use in the field, greenhouse, and the lab.

Diagnostic Sensitivity

True Positives	53
Correct Diagnoses	53
Percent	100%

Analytical Sensitivity

Limit of Detection: 1:50,000 dilution of infected tissue (pathogen titer unknown)

Analytical Specificity

Inclusivity:

Isolates and Geographic Regions Detected:

CPMMV Florida/Puerto Rico Isolate (Clade II)	CPMMV PV-0090 (Ghana) (DSMZ) (Clade I)
CPMMV PV-0907 (Sudan) (DSMZ) (Clade I)	

Exclusivity:

Cross-reacts With:

Pea Streak Virus (PeSV)	
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Does Not Cross-react With:

Alfalfa mosaic virus (AMV)	Bean common mosaic virus (BCMV)
Bean Yellow Mosaic Virus (BYMV)	Comovirus siliquae (Bean pod mottle virus) (BPMV)
Comovirus vignae (Cowpea mosaic virus) (CPMV)	Cucumber mosaic virus (CMV)
Nepovirus arabis (Arabis mosaic virus) (ArMV)	Nepovirus lycopersici (Tomato ringspot virus) (ToRSV)
Nepovirus nicotianae (Tobacco ringspot virus) (TRSV)	Orthotospovirus arachianuli (Groundnut ringspot virus) (GRSV)
Orthotospovirus glycininecrovenae (Soybean vein necrosis virus) (SVNV)	Orthotospovirus impatiensnecromaculae (Impatiens necrotic spot virus) (INSV)
Orthotospovirus tomatomaculae (Tomato spotted wilt virus) (TSWV)	Peanut stunt virus (PSV)
Potato virus S (PVS)	Southern bean mosaic virus (SBMV)
Soybean mosaic virus (SMV)	Tobacco mosaic virus (TMV)
Tobacco streak virus (TSV)	Tomato Aspermy Virus (TAV)

Diagnostic Specificity

True Negatives 69
Correct Diagnoses 69
Percent 100%

Selectivity:

No Matrix Effect Observed With:			
Alfalfa leaves	Bean leaves	Browallia leaves	Cowpea leaves
Eggplant leaves	Faba bean leaves	Mirabilis jalapa leaves	Pea leaves
Peanut leaves	Salvia hispanica leaves	Soybean leaves	Tomato leaves
Vigna subterranea leaves			

The hosts on the above list have been chosen to represent those which historically cause a range of matrix effects, in addition to those expected to be screened for this pathogen. Not all plant species susceptible to this pathogen have been screened, but may still be used with this assay unless otherwise noted below. As with all diagnostic tools, Agdia recommends confirming all results with a secondary detection method before making any economic decisions (ex: discarding plants due to positive test results, etc.).

Matrix Effect Observed With:			
None Known			

Repeatability

Number of Samples 122
Replicates per Sample 2 - 3
Total Replicates 292
Replicates in Agreement 292
Percent Agreement 100%

Reproducibility

Number of Samples 47
Replicates per Sample 3
Number of Operators 3
Total Replicates 423
Replicates in Agreement 423
Percent Agreement 100%

Robustness

Planned deviation analysis:

No deviations from the user guide protocol were validated.

Stability:

	1-year stability (accelerated)	Real-time Stability Verification
Positive Sample (High)	Pass	Monitoring
Positive Sample (High)	Pass	Monitoring
Positive Sample (Low)	Pass	Monitoring
Positive Sample (Low)	Pass	Monitoring
Positive Sample (Low)	Pass	Monitoring
Negative Sample	Pass	Monitoring
Negative Sample	Pass	Monitoring
Negative Sample	Pass	Monitoring

Glossary

Diagnostic sensitivity¹:	The percentage of positive samples correctly identified in an experiment with known positive controls.
Diagnostic specificity¹:	The percentage of negative samples correctly identified in an experiment with known negative controls.
Analytical sensitivity²:	The smallest amount of target that can be detected reliably (this is sometimes referred to as the 'limit of detection')
Analytical specificity³:	(comprises inclusivity and exclusivity)
Inclusivity³:	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.
Exclusivity³:	The performance of a test with a range of non-targets (e.g. cross-reaction with closely related organisms, contaminants)
Selectivity²:	The level of effect that matrices and relevant plant parts have on the performance of the assay.
Repeatability²:	The agreement between test replicates of the same sample tested by the same operator.
Reproducibility³:	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^{1,3}:	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.
Stability¹:	The performance of test reagents or controls over time.

References:

¹Groth-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*.

²Eads, 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*.

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