ImmunoStrip® Validation Report

On-site Plant Pathogen Testing

Cymbidium mosaic virus & Odontoglossum ringspot virus (CymMV & ORSV) ISK/STX 13301

ImmunoStrip®

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Test Characteristics

Test Name	Cymbidium mosaic virus & Odontoglossum ringspot virus
Catalog Number	13301
Acronym	CymMV & ORSV
Genus	Potexvirus (CymMV) and Tobamovirus (ORSV)
Capture Antibody	Monoclonal and Polyclonal (Mouse, Goat, and Rabbit)
Detection Antibody	Polyclonal (Rabbit)
Format	Lateral Flow Device
Diluents	SEB1
Sample Dilution	1:20

Summary

The Orchid ImmunoStrip® is trusted and widely used by tissue culture labs, growers and hobbyists as a fast and reliable on-site diagnostic for Cymbidium mosaic virus (CymMV) and Odontoglossum ringspot virus (ORSV), the two most prominent viruses found in orchid plants.

Diagnostic Sensitivity

True Positives	53
Correct Diagnoses	53
Percent	100.0%

Analytical Sensitivity

Limit of Detection (CymMV): 1:218,700 dilution of infected tissue (pathogen titer unknown)

Limit of Detection (ORSV): 1:583,200 dilution of infected tissue (pathogen titer unknown)

Analytical Specificity

Inclusivity:

Isolates and Geographic Regions Detected:

CymMV ATCC® PV-317™ (FL, USA)	CymMV ATCC® PV-82™ (MD, USA)
CymMV Japan isolate	CymMV PV-0334
CymMV South Korea isolate	CymMV-K (South Korea)
CymMV-Ph (South Korea)	ORSV-Pc161 (Madagascar)[1]
ORSV-Pc163 (Madagascar)[1]	ORSV-Pc164 (Madagascar)[1]
ORSV-Pc166 (Madagascar)[1]	ORSV-Pc168 (Madagascar)[1]
[1]ORSV-Pc161 - ORSV-Pc168 have been externally reported to be detected.	

Exclusivity:

Cross-reacts With:

Kyuri green mottle mosaic virus (KGMMV)	

Does Not Cross-react With:

African eggplant-associated virus (AEaV)[2]	Calibrachoa mottle virus (CbMV)
Chili pepper mild mottle virus (CPMMoV)	Cucumber green mottle mosaic virus (CGMMV)
Cucumber mosaic virus (CMV)	Cymbidium ringspot virus (CymRSV)
Frangipani mosaic virus (FrMV)	Hosta virus X (HVX)
Impatiens necrotic spot virus (INSV)	Pepino mosaic virus (PepMV)

Does Not Cross-react With:

Pepper mild mottle virus (PMMoV)	Piper chlorosis virus (PChV)[1]
Rehmannia mosaic virus (ReMV)	Ribgrass mosaic virus (RMV)
Tobacco mosaic virus (TMV)	Tomato mosaic virus (ToMV)
Tomato spotted wilt virus (TSWV)	
[1]Piper chlorosis virus (PChV) has been reported to be a possible novel Tobamovirus.	
[2]African eggplant-associated virus (AEaV) has been reported to be a possible novel Tobamovirus.	

Diagnostic Specificity

True Negatives 55
Correct Diagnoses 55
Percent 100.0%

Selectivity:

No Matrix Effect Observed With:			
Bakueana leaves	Bassavola leaves	Brassica leaves	Brassolaeliocattleya leaves
Bulbophyllum leaves	Calanthe leaves	Cattleya leaves	Cymbidium leaves
Dendrobium leaves	Epidendrum leaves	Epilaeliocattleya leaves	Gaurianthe leaves
Gongora leaves	Iwanagara leaves	Laelia leaves	Laeliocattleya leaves
Lycaste leaves	Masdevallia leaves	Miltonia leaves	Miltoniopsis leaves
Oncidium leaves	Paphiopedilum leaves	Phalaeonopsis leaves	Phragmipedium leaves
Pleruothallis leaves	Sarcochilus leaves	Scaphosepalum leaves	Sobralia leaves
Sophrolaeliocattleya leaves	Stanhopea leaves		

Repeatability

Number of Samples 60
Replicates per Sample 2 - 3
Average Percent Agreement Between Replicates 100.0%

Glossary

Diagnostic sensitivity[1]:	The percentage of positive samples correctly identified in an experiment with known positive controls.
Diagnostic specificity[1]:	The percentage of negative samples correctly identified in an experiment with known negative controls.
Analytical sensitivity[3]:	The smallest amount of target that can be detected reliably (this is sometimes referred to as the 'limit of detection')
Analytical specificity[3]:	(comprises inclusivity and exclusivity)
Inclusivity[3]:	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[3]:	The performance of a test with a range of non-targets (e.g. cross-reaction with closely related organisms, contaminants)
Selectivity[2]:	The level of effect that matrices and relevant plant parts have on the performance of the assay.
Repeatability[2]:	The agreement between test replicates of the same sample tested by the same operator.
Reproducibility[3]:	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.
Stability[1]:	The performance of test reagents or controls over time.

References:

[1]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.
[2]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.
[3]EPPO (2018) PM 7/76 (5) Use of EPPO Diagnostic Standards, EPPO Bulletin 48, 373– 377.