

# Distribution of Dahlia Mosaic Virus in Tubers

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## Introduction

Dahlias are in high demand by florists and have been increasingly grown by Utah cut flower growers in the last few years. Growers have been trying to acquire dahlia tubers that are virus free which is very difficult. Dahlia Mosaic virus (DMV) is widespread in commercially available dahlia tubers. Recently, growers from across the country have been sending dahlia samples to the Utah Plant Pest Diagnostics lab (UPPDL) with symptoms of stunted growth, mosaic patterns on leaves and color breaking for testing after receiving conflicting results from other testing facilities using different testing methods. The UPPDL uses conventional PCR, gel electrophoresis and when needed DNA sequencing to determine if a plant is positive. Some testing facilities claim the inconsistent results come from uneven distribution of DMV in tubers. This research project determines the distribution of three strains of DMV in individual dahlia tubers.



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## Methods

Individual dahlia tubers were cut into 0.5-inch pieces, and put into lysing matrix tubes (MP Biomedical, Irvine CA). DNA extraction was done using DNEasy Plant Mini kit (Qiagen, Redwood City California), following manufacturer's protocol. PCR was then conducted using Phusion Master Mix with HF buffer (New England Biolabs, Ipswich, MA). Strain-specific primers for DMV-Holland, DMV-Portland, and DMV-D10 were used (Pahalawatta et al. 2007). Gel electrophoresis was utilized to visualize the PCR products for the DMV strains. Results were plotted for each tuber in Excel Fig . Each tuber segment is represented by a cell in the Excel image.

Select DMV isolates were sequenced to confirm PCR results. For this purpose PCR products were extracted from the gels using the QiaQuick gel extraction kit (Qiagen, Redwood City, CA) following manufacturer's protocol. The resulting DNA was sent for sequencing to Eton Bioscience in Union, NJ. The sequences were compared to known sequences in the NCBI GenBank database.

## Results/Conclusions

Three different dahlia plants with four to six tubers each have been tested to date. Tuber segments of each plant showed consistent virus presence throughout the entire tuber. The distribution of the virus in the tubers is evenly distributed providing evidence that our research findings do not support the idea that sample selection affects testing results.

## Dahlia Tubers



## Excel Test results

	Segments							
	1	2	3	4	5	6		
Emony Paul 1 Tuber 4, 1-6	Positive	Positive	Positive	Positive	Positive	Positive	Holland	
	Positive	Positive	Positive	Positive	Positive	Positive	D-10	
	Positive	Positive	Positive	Positive	Positive	Positive	Portland	
Grand Finale Tuber 1, 1-8	Positive	Positive	Positive	Positive	Positive	Positive	Holland	Positive
	Positive	Positive	Positive	Positive	Positive	Positive	D-10	Positive
	Positive	Positive	Positive	Positive	Positive	Positive	Portland	Positive

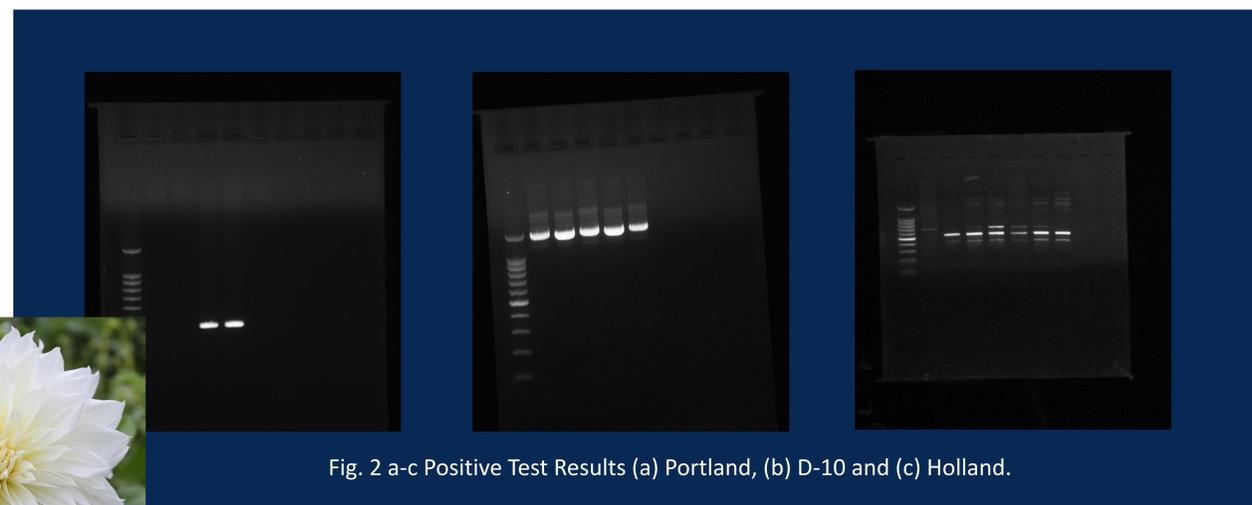


Fig. 2 a-c Positive Test Results (a) Portland, (b) D-10 and (c) Holland.

## References

Pahalawatta, V., Miglino, R., Druffel, K. B., Jodlowska, A., van Schadewijk, A. R., and Pappu, H.R. 2007. Incidence and relative prevalence of distinct caulimoviruses (genus Caulimovirus, family Caulimoviridae) associated with dahlia mosaic in Dahlia variables. Plant Dis. 91:1194-1197.



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