NYWGF RESEARCH - FINAL REPORT

Funding for fiscal year: 2025-26

SECTION 1:

Project title: Defining maximum recommended limits for Spotted Lanternfly contamination of grapes to avoid sensory issues in wines and juices

Principal Investigator with contact info: Dr. Gavin Sacks, Professor, Department of Food Science, 251 Stocking Hall, Cornell University, Ithaca, NY. Email: gls9@cornell.edu. 607-255-2335;

Co-PI Collaborators with contact info:

(co-PI) Anna Katharine Mansfield, Associate Professor, Department of Food Science, 107 Food Research Lab, 665 W North St, Cornell University - AgriTech, Geneva, NY. akm87@cornell.edu 315-787-2268

(co-PI) Jennifer Russo Phillips, LERGP Team Leader, Viticulture Extension Specialist, Lake Erie Regional Grape Program, Cornell Lake Erie Research and Extension Laboratory. 6592 W Main Rd, Portland, NY jjr268@cornell.edu 716-640-5350

New Research ☒ **Continued Research** ☐

Amount Funded **$** 59,996

SECTION 2:

Project Summary Impact Statement:

The spotted lanternfly (SLF), an invasive pest, has been observed in several NY State grapegrowing regions in recent years. In addition to a loss of fruit quality due to vine damage, producers are concerned that mechanical co-harvesting of SLF with fruit will directly impact juice and wine flavor (e.g. off-aromas, bitterness), as has been observed for other insect pests (e.g. Multi-colored Asian Ladybeetle).
In this work, SLF was field sourced from growing regions in New York State. wines (Cabernet franc, Chardonnay) and juices (hot press Concord, cold-press Niagara) were prepared at Cornell with different rates of SLF contamination (0, 0.1, 0.3, 1.0% w/w). Basic juice and wine chemistry was shown not to vary among treatments. were then chemically characterized for compounds of toxicological and off-aroma concern before undergoing sensory testing with trained panels. The proposed work will establish maximum recommended limits for SLF contamination.

Objectives: To develop maximum recommended limits (MRLs) for SLF contamination of grapes for a representative range of juice and wine products.

Materials & Methods:

Two juices and two wines (Hot press Concord juice, cold press Niagara juice, skin-fermented Cabernet franc wine, no heat treatment, Hot press (thermovinified) Concord wine, fermented without skins) will be produced using industry standard practices at Cornell University. These were selected to represent the range of products typical of New York State.
Grapes were hand-harvested from area vineyard cooperators. SLF were field harvested from New York State vineyards, and killed prior to transport to Cornell. For each of the four products, SLF were added to the grapes just prior to processing at one of four rates: 0% (control), 0.1%, 0.3%, and 1.0% w/w.

In summary, the following parameters will be evaluated in a full factorial design

- 4 types of products (Hot press Concord juice, cold press Niagara juice, skin-fermented Cabernet franc wine, no heat treatment, hot press Concord wine)
- 4 levels of SLF 0% (control), 0.1%, 0.3%, and 1.0% w/w. SLF will be provided by Jennifer Phillips-Russo, and sourced from local vineyards.

All juices and wine treatments will be produced in replicated lots. Following processing and fermentation (for wines), samples were sulfited and cold-stabilized prior to bottling under screw cap.

Chemical analyses:

Basic chemistry: Soluble solids (for juice), ethanol and residual sugar (for wine), color parameters, pH, titratable acidity

Toxicology: Ailanthone by LC-MS

Volatiles: Non-targeted analyses by GC-MS. Additional targeted analyses may be performed based on planned gas chromatography – olfactometry experiments to identify key off-odorants in SLF.

Sensory analyses: Trained sensory panelists will evaluate products for both aroma and flavor. However, flavor analyses will only proceed following initial confirmation of the lack of ailanthone. Descriptive analyses for aroma and flavor were performed with two separate panels for juice and wine. Panelists first developed a common lexicon and standards for describing sample attributes, and be trained on the standards prior to sample evaluation.

Results/Progress

Concord and Cabernet franc grapes were sourced from a Cornell vineyard, Niagara and Chardonnay grapes were sourced from a commercial Finger Lakes vineyard. Basic juice chemistry is reported in Table 1. SLF were acquired from Jennifer Phillips Russo (Cornell Cooperative Extension) from vineyard sites in the Lake Erie region, asphyxiated, and transported to Cornell. Juice and wine production took place in Sep-Oct 2026 at the Cornell AgriTech Vinification and Brewing Facility. During processing, SLF were added at 0, 0.1, 0.3, 1.0% w/w prior after crushing and prior to pressing. The upper limit (1%) was selected because it corresponds with the highest level of insect filth permitted by the USDA in processing grapes.

Table 1*- Basic juice chemistry of grapes used in this study*

	TSS (Brix)	pH	TA g/L)
Cabernet franc	21.5	3.16	7.7
Concord	19.2	3.21	4.5
Chardonnay	24.7	3.27	8.9
Niagara	17.7	3.25	6.0

Wine grapes (Chardonnay, Cabernet franc) underwent standard winemaking practices for white and red grapes, respectively. Concord grapes underwent hot pressing. Niagara grapes were processed by cold-pressing. Samples were prepared in replicate.

Basic chemistry in the juices (soluble solids, pH, YAN, and titratable acidity) and wines (alcohol, pH, TA, organic acids, residual sugars) were measured by standard techniques. No significant differences were observed as a function of SLF treatment level (Table 2).

Table 2*- Representative basic chemistry from SLF treatments of Niagara juice, showing no significant differences. A similar lack of significant differences as a function of SLF treatment was observed for other juices.*

Treatment		Brix	pH	TA	YAN
Control	**Avg**	17.7	3.3	6.0	178.7
	StDev	0.5	0.0	0.2	7.3
0.1% SLF	**Avg**	17.4	3.3	6.3	187.4
	StDev	0.1	0.0	0.1	5.2
0.3% SLF	**Avg**	17.2	3.3	6.2	192.2
	StDev	0.1	0.0	0.0	2.6
1.0% SLF	**Avg**	17.4	3.3	6.2	190.5
	StDev	0.0	0.0	0.0	7.9

A trained sensory panel was convened at the Cornell Sensory Evaluation Center, and evaluated the juices for differences in aroma attributes. No significant differences in aroma were observed for either Concord or Niagara juices. Representative data for Niagara juices are shown in Figure

1.

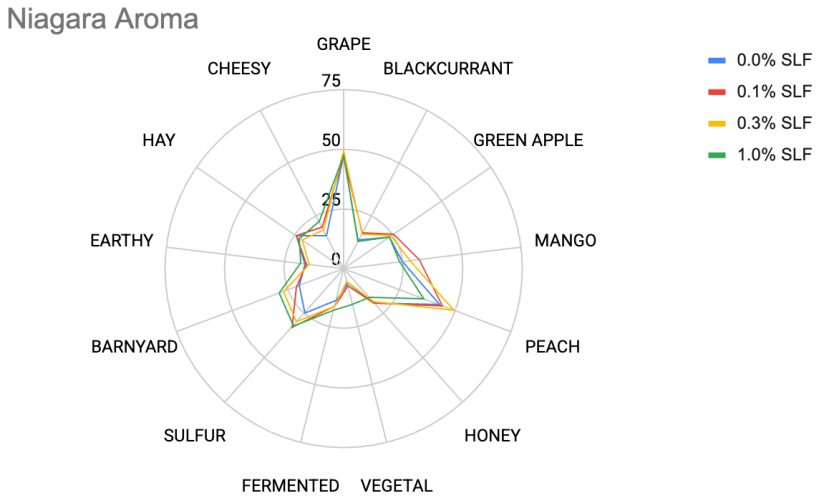

Figure 1*- Aroma evaluation of control and SLF treated Niagara juices. No sensory attributes differed significantly (>0.05%). Similar results were observed for Concord juices. Analyses performed at Cornell Sensory Facility by Cassidy Lee, Alina Stelick, and Robin Dando.*

In spring and summer 2026, we will complete the following analyses of juices and wines; i) volatiles by gas chromatography – mass spectrometry (GC-MS); ii) ailanthone by LC-MS; iii) sensory evaluations of juices (flavor) and wines (aroma, flavor), assuming ailanthone is not detectable. This information will be used to provide further information on appropriate limits, if necessary.

Technology Transfer Plan: Preliminary results from this work have been shared with Cornell IPM (Kyle Bekelja) for use during the March 2026 Spotted Lanternfly Summit; Members of the USDA-SCRI Spotted Lanternfly project team (Brian Walsh, Tracy Lesky, Julie Urban); and members of the NYS grape industry. An update was also given to New York State winemakers at the annual BEV-NY symposium.

- [Extension Presentation] Sacks, GL. “MALB, BMSB, and now SLF: What’s the potential for the newest insect-related acronym to taint wines?”. *BEV-NY 2025*. Canandaigua, NY. 60 attendees, 0.75 hour = 45 contact hours.

SECTION 3:

Project summary and objectives:. In this work, wines (Cabernet franc, Chardonnay) and juices (cold-press Niagara, hot-press Concord) were prepared with different rates of added spotted lanternfly (SLF). SLF was added at 0, 0.1, 0.3 or 1% prior to pressing. Finished wines were then characterized chemically and sensorially.

Importance of research to the NY wine industry: To date, research on spotted lanternfly (SLF) has focused on its impact grapevine productivity and delays in fruit maturation. However, juice

and wine producers are concerned that co-harvesting of SLF with fruit will degrade the quality of resulting products. The USDA limits insect contamination of processing grapes to 1%. However, it is not known if stricter limits should be introduced for SLF contamination, e.g. to prevent off-aromas. Chemical and sensory characterization of wines and juice produced with known amounts of SLF contamination will allow the establishment of appropriate maximum recommended limits.

Project Results/next steps: No significant differences were observed in basic juice or wine chemistry as a function of SLF treatment level. A trained sensory panel was convened at the Cornell Sensory Center, and evaluated the Concord and Niagara juices for differences in aroma attributes. No significant differences in aroma were observed. In spring and summer 2026, we will complete the following analyses of juices and wines; i) volatiles by gas chromatography – mass spectrometry (GC-MS); ii) ailanthone, a toxin from Tree of Heaven that is bioaccumulated in SLF, using liquid chromatography – mass spectrometry (LC-MS); iii) sensory evaluations of juices (flavor) and wines (aroma, flavor), assuming ailanthone is not detectable. This information will be used to provide further information on appropriate limits, if necessary.