

NYWGF ANNUAL REPORT

Fiscal Year 2025–2026

Understanding Berry Ripening Dynamics of Vinifera and Hybrid Grapevines in New York

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Year 2 of 3 — Data Collection Complete

Section 1 — Administrative Information

Project Title:

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Research Type:

New Research Continued Research

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Viticulture Enology

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Year 2 of 3 (growing season 2025; data collected July–October 2025)

Section 2 — Full Technical Report

Summary Impact Statement

The ability to predict harvest timing and fruit quality is a critical need for New York's wine grape industry, which spans diverse microclimates and relies on a wide range of vinifera and hybrid cultivars. This project is building the foundational dataset needed to develop harvest prediction models analogous to the Concord berry weight model already in use in the Lake Erie industry. In the 2025 growing season (Year 2), we completed biweekly fruit sampling of 23 cultivars at seven vineyard sites across the Finger Lakes (FLX) and Western New York Lake Erie (WNY) regions, measuring Brix, titratable acidity (TA), and pH from veraison through commercial harvest. These data, combined with hourly temperature records and growing degree hour (GDH) accumulation from April 1, document the characteristic ripening trajectory of each cultivar as a function of seasonal heat. Year 2 results confirm a strong, cultivar-specific relationship between GDH and the Brix/TA ratio across both regions, with clear differences in ripening rate between vinifera and hybrid varieties that have direct implications for harvest decision-making and climate suitability assessment. Post-veraison linear slopes of the Brix/TA ratio against GDH, computed here for the first time across the full cultivar panel, form the primary parameters for the harvest prediction models to be developed in Year 3.

Objectives

The objectives for Year 2 (fiscal year 2025–26) were:

1. Complete the third and final year of fruit collection from Concord microclimate sites in the Lake Erie region to determine how microclimate variation impacts fruit ripening patterns.
2. Repeat biweekly berry sampling of vinifera and hybrid grape cultivars in the Finger Lakes and Lake Erie regions to characterize fruit growth and ripening patterns needed to develop climate suitability models and harvest crop estimates for wine grapes.

Year 3 (fiscal year 2026–27) will focus on finalizing the baseline ripening dataset and developing GDH-based harvest prediction models from the combined two-year dataset. Berry size and weight data, currently being extracted from digital images via Biodock image analysis, will be integrated upon completion.

Activities and Methods

Sites and Cultivar Panel

Berry sampling was conducted at seven commercial vineyard sites: four in the Finger Lakes region (Anthony Road, Fox Run, Prejean, and Robbins vineyards) and three in Western New

York (CLEREL, Hutchinson, and Olde Chautauqua Farms). A total of 23 cultivars were sampled in 2025, including 14 vinifera and 9 hybrid varieties. The panel was designed to include overlapping varieties across both regions for direct cross-region comparison. Table 1 summarizes the full panel and sampling intensity.

Table 1. Cultivar panel sampled in Year 2 (2025), by region and site.

Cultivar	Type	Region	Site(s)	Sampling dates (2025)
Aravelle	Hybrid	FLX	Anthony Road	20
Cabernet Franc	Vinifera	FLX	Fox Run	32
Cabernet Sauvignon	Vinifera	FLX	Fox Run	32
Chardonnay	Vinifera	FLX	Fox Run	22
Gewurztraminer	Vinifera	FLX	Anthony Road	27
Lemberger	Vinifera	FLX	Fox Run	27
Marechal Foch	Hybrid	FLX	Prejean	27
Marquette	Hybrid	FLX	Anthony Road	17
Merlot	Vinifera	FLX	Fox Run	27
NY06	Hybrid	FLX	Robbins	26
Pinot gris	Vinifera	FLX	Anthony Road	27
Riesling	Vinifera	FLX	Prejean	31
Traminette	Hybrid	FLX	Prejean	32
Vignoles	Hybrid	FLX	Anthony Road	27
Aurore	Hybrid	WNY	CLEREL	25
Cab. Sauv. (3309C)	Vinifera	WNY	Olde Chautauqua	40
Cab. Sauv. (Riparia)	Vinifera	WNY	Olde Chautauqua	40
Chardonnay	Vinifera	WNY	Olde Chautauqua	30
Elvira	Hybrid	WNY	CLEREL	25
Gewurztraminer	Vinifera	WNY	Olde Chautauqua	30
Ives	Hybrid	WNY	CLEREL	35
Marquette	Hybrid	WNY	Hutchinson	25
Niagara	Hybrid	WNY	CLEREL	25
Pinot gris	Vinifera	WNY	Olde Chautauqua	30
Riesling	Vinifera	WNY	CLEREL	35
Seyval	Hybrid	WNY	CLEREL	25
Valvin Muscat	Hybrid	WNY	Olde Chautauqua	35
Vignoles	Hybrid	WNY	CLEREL	20
Vincent	Hybrid	WNY	CLEREL	35

Berry Sampling Protocol

Starting at or near veraison and continuing every 10–14 days through commercial harvest, 100-berry subsamples were collected from each cultivar-site combination in five replicates of 20 berries each. At each timepoint, berries were weighed and digitally imaged for berry size analysis (Biodock); image extraction is ongoing and berry size data are not included in the current analysis. Berries were manually pressed and juice was analyzed for Brix (digital refractometer), titratable acidity (TA; autosampler titration, Londo Lab), and pH. The Brix/TA ratio was computed as a composite ripening index.

Thermal Accumulation (Growing Degree Hours)

Hourly air temperature data were obtained from weather stations associated with each production region. Growing degree hours (GDH) were calculated as the cumulative sum of hourly temperature exceedances above a base of 10°C (50°F), starting April 1 of each year: $GDH = \sum \max(0, T_{hr} - 10^{\circ}\text{C})$. A single GDH accumulation curve was computed per region per year, as all sites within a region shared the same temperature record.

Table 2. Seasonal GDH totals and average summer maximum temperatures by region and year.

Region	Year	Total GDH (base 10°C)	Avg daily Tmax Jun–Sep (°C)
Finger Lakes	2024	41,582	26.2
Finger Lakes	2025	39,611	26.8
Western NY	2024	42,404	25.2
Western NY	2025	40,155	25.3

Statistical Approach

Seasonal ripening trajectories for Brix, TA, and the Brix/TA ratio were visualized using locally weighted regression (LOWESS) smooths applied to individual replicate observations per cultivar-region-year combination. LOWESS is a non-parametric approach well-suited to the sigmoid transition from pre-veraison to post-harvest conditions that characterizes berry ripening.

For harvest prediction model development, linear regression was applied to the post-veraison phase of the Brix/TA ratio trajectory, defined as observations in which mean Brix had reached or exceeded 8 (the approximate onset of active sugar accumulation). Regression was fit to date-level means (across replicates) to characterize the population-level ripening rate per cultivar per region. Slope parameters from these regressions represent the rate of change of the Brix/TA ratio per 1,000 GDH units and serve as the primary harvest prediction parameters. Year 1 (2024) data are included in comparative figures to provide seasonal context; formal two-year model fitting will be conducted in Year 3.

Results and Progress

Growing Season Thermal Environment

The 2025 growing season was approximately 5% cooler than 2024 in both regions in total GDH accumulation (Table 2; Figure 1). Despite lower seasonal totals, average June–September daily maximum temperatures were similar between years (26.8°C vs. 26.2°C in FLX; 25.3°C vs. 25.2°C in WNY), indicating comparable peak-season heat with a somewhat cooler spring and fall in 2025. The Finger Lakes and Western NY regions tracked each other closely in GDH accumulation patterns, with WNY accumulating slightly more total heat in both years.

Brix Development

Brix increased in a consistent, nonlinear pattern with GDH accumulation across all cultivars in both regions (Figure 2). The early-season (pre-veraison) sampling captured the flat phase of the sugar accumulation curve at Brix typically below 5–6. Following veraison, Brix rose rapidly in close proportion to GDH. At the final sampling date of the 2025 season, Brix ranged from 12.2 (Elvira, WNY) to 25.4 (Marquette, FLX), reflecting wide cultivar-specific variation in ripening speed and maximum sugar accumulation (Table 3).

Hybrid cultivars generally reached commercial Brix values earlier in the season (lower GDH at maturity) than vinifera cultivars. Marquette consistently achieved the highest Brix in both regions. Late-season vinifera cultivars including Cabernet Franc, Cabernet Sauvignon, and Merlot required the highest GDH accumulation to reach commercially acceptable sugar levels. NY06, sampled for the first time in Year 2, did not reach commercial maturity thresholds during the 2025 sampling window. Brix trajectories were largely consistent between 2024 and 2025 when plotted against GDH, supporting GDH as a season-normalizing predictor (Figure 10).

Several CLEREL varieties in the WNY region — Elvira, Niagara, Seyval, and Aurore — reached low final Brix values at the last sampling date. These cultivars were harvested by the grower prior to reaching the Brix levels typical of varieties harvested exclusively for wine. Final sampling values for these cultivars reflect commercial harvest timing decisions rather than the limit of their biological ripening potential, and slopes computed for them are based on fewer post-harvest dates (Table 4, †).

Table 3. Final-season Brix, titratable acidity (TA), and Brix/TA ratio at last sampling date, Year 2 (2025). GDH computed from April 1, base 10°C. Asterisk (*) = harvested early by grower; final values reflect commercial harvest date, not biological maximum.

Cultivar	Region	Brix	TA	Brix/TA	GDH at last sample
Marquette	FLX	25.4	11.39	2.23	32,403
Marechal Foch	FLX	23.1	8.22	2.81	37,105
Vignoles	FLX	24.0	9.99	2.40	37,105
Aravelle	FLX	19.2	5.59	3.44	34,858
Lemberger	FLX	22.1	6.28	3.52	37,105
Gewurztraminer	FLX	22.3	4.90	4.55	37,105
Pinot gris	FLX	21.9	5.22	4.19	37,105
Merlot	FLX	22.3	5.72	3.90	37,105
Cabernet Franc	FLX	22.3	4.61	4.84	39,104

Cultivar	Region	Brix	TA	Brix/TA	GDH at last sample
Cabernet Sauvignon	FLX	20.6	5.33	3.86	39,104
Traminette	FLX	22.6	6.84	3.31	39,116
Riesling	FLX	19.7	7.23	2.73	39,116
Chardonnay	FLX	20.1	5.98	3.36	34,637
NY06	FLX	12.4	7.09	1.75	37,105
Marquette	WNY	20.6	10.84	1.90	32,832
Aurore*	WNY	16.0	10.39	1.54	32,832
Vignoles	WNY	22.1	14.94	1.48	32,832
Niagara*	WNY	12.8	8.18	1.57	32,832
Elvira*	WNY	12.2	13.80	0.88	32,832
Seyval*	WNY	14.1	10.71	1.32	32,832
Gewurztraminer	WNY	19.4	5.88	3.30	35,772
Pinot gris	WNY	21.6	4.91	4.40	35,772
Chardonnay	WNY	19.6	7.99	2.45	35,772
Valvin Muscat	WNY	21.0	7.29	2.88	38,646
Ives	WNY	17.3	7.38	2.35	38,646
Riesling	WNY	17.1	6.73	2.54	38,646
Vincent	WNY	18.1	7.87	2.30	38,646
Cab. Sauv. (3309C)	WNY	22.5	5.50	4.09	39,349
Cab. Sauv. (Riparia)	WNY	22.4	5.59	4.00	39,349

Titrateable Acidity (TA) Development

Titrateable acidity was high at all early sampling dates, consistent with the high organic acid concentrations of pre-veraison green berries. TA declined progressively through the season in all cultivars as organic acids are diluted by berry expansion and as malic acid is degraded by respiration (Figure 3). The rate and extent of TA decline was strongly cultivar-dependent. Vinifera varieties, particularly Cabernet Franc, Pinot gris, and Merlot, achieved the lowest TA at harvest, consistent with their origin in warm-climate production regions. Hybrid cultivars showed considerably more variation in final TA: Vignoles and Marquette retained the highest TA through the season while Marechal Foch and Aravelle showed TA profiles more similar to vinifera cultivars.

Brix/TA Ratio as a Ripening Index

The Brix/TA ratio showed the most consistent nonlinear increase with GDH of the three ripening metrics and is the most discriminating indicator of ripening progress across the cultivar panel (Figure 4). The ratio rose from near zero in pre-veraison samples to cultivar-specific harvest

values ranging from under 2.0 (Elvira, Aurore, Seyval) to above 4.5 (Cabernet Franc FLX, Pinot gris, Gewurztraminer). This broad range reflects fundamental differences in the sugar-acid balance at commercial maturity between vinifera and hybrid cultivars grown in New York conditions.

Post-Veraison Ripening Rates for Harvest Prediction

Linear regression of the Brix/TA ratio against GDH across the post-veraison phase (Brix \geq 8) yielded well-fitting models for most cultivars in both years (Table 4; Figure 4, dashed lines). Slope values ranged from approximately 0.14 to 0.55 across the cultivar panel and showed notable cultivar-level consistency between 2024 and 2025, providing an initial indication that these parameters are stable across seasons. These slopes are the primary parameters for the GDH-based harvest prediction models to be developed from the combined two-year dataset in Year 3.

Gewurztraminer, Pinot gris, and Cabernet Franc showed the highest ripening rates in the post-veraison period, indicating the fastest change in sugar-acid balance per unit of heat accumulation. Marquette, Aurore, and Vincent showed the lowest slopes, consistent with their early-ripening character. For cultivars with only two post-veraison sampling dates in 2025 (Elvira, Niagara, Seyval, Vignoles WNY), slope estimates are preliminary and will be refined with Year 3 data.

Table 4. Post-veraison linear slopes of Brix/TA ratio vs. GDH, Year 2 (2025). Slope = change in ratio per 1,000 GDH units (base 10°C) for sampling dates with Brix \geq 8. † = 2 post-veraison dates; interpret with caution.

Cultivar	Region	Slope (Δ ratio / 1000 GDH)	R ²	Post-veraison dates (n)	GDH range
Gewurztraminer	FLX	0.551	0.856	4	29,277–37,105
Cabernet Franc	FLX	0.492	0.957	5	29,277–39,104
Chardonnay	FLX	0.483	0.986	3	29,458–34,637
Merlot	FLX	0.436	0.924	4	29,458–37,105
Aravelle	FLX	0.451	0.998	3	29,277–34,858
Pinot gris	FLX	0.401	0.713	4	29,277–37,105
Lemberger	FLX	0.365	0.962	4	29,458–37,105
Traminette	FLX	0.328	0.881	5	29,277–39,116
NY06	FLX	0.318	1.000	3	32,403–37,105
Riesling	FLX	0.227	0.869	5	29,277–39,116
Vignoles	FLX	0.217	0.857	4	29,277–37,105
Marechal Foch	FLX	0.290	0.770	4	29,277–37,105
Marquette	FLX	0.211	0.984	3	23,296–32,403
Cab. Sauvignon (FLX)	FLX	0.143	0.703	6	15,122–39,104
Pinot gris	WNY	0.495	0.967	3	29,120–35,772
Gewurztraminer	WNY	0.443	0.953	3	29,120–35,772

Cultivar	Region	Slope (Δ ratio / 1000 GDH)	R ²	Post-veraison dates (n)	GDH range
Cab. Sauv. (3309C)	WNY	0.418	0.932	4	32,832–39,349
Cab. Sauv. (Riparia)	WNY	0.336	0.941	5	29,120–39,349
Chardonnay	WNY	0.281	1.000	3	29,120–35,772
Valvin Muscat	WNY	0.270	0.986	4	29,120–38,646
Riesling	WNY	0.245	0.810	3	32,832–38,646
Niagara†	WNY	0.261	1.000	2	29,120–32,832
Marquette	WNY	0.193	0.994	3	25,135–32,832
Ives	WNY	0.198	0.801	4	29,120–38,646
Vincent	WNY	0.183	0.989	4	29,120–38,646
Vignoles	WNY	0.221	1.000	2	29,120–32,832
Seyval†	WNY	0.214	1.000	2	29,120–32,832
Aurore†	WNY	0.159	0.987	3	25,135–32,832
Elvira†	WNY	0.139	1.000	2	29,120–32,832

Cross-Region Comparison

Seven cultivars were sampled in both regions in 2025, enabling a direct comparison of ripening trajectories on a common GDH x-axis (Figure 8, Figure 9). Cabernet Franc, Pinot gris, and Gewurztraminer showed broadly similar Brix trajectories relative to GDH across regions, suggesting that GDH is a primary driver of their ripening independent of regional climate. Vignoles showed a steeper Brix/TA increase in FLX than WNY at comparable GDH. Riesling in WNY showed modest variability in Brix at the final sampling dates. With two years of data, these cross-region patterns remain exploratory; formal regional comparisons will be conducted in Year 3.

Key Observations

- GDH (base 10°C, April 1 start) explains the substantial majority of within-cultivar Brix and Brix/TA variation across the growing season in both regions and years.
- Post-veraison linear slopes of the Brix/TA ratio vs. GDH are consistent across the two study years, supporting their use as cultivar-specific harvest prediction parameters.
- Hybrid cultivars generally ripen earlier and at lower GDH than vinifera cultivars, with the exception of high-acid late hybrids such as Vignoles.
- NY06 did not reach commercial maturity thresholds in 2025 and warrants continued monitoring.
- Berry size and weight data from digital images (Biodock) are pending and will be incorporated into the full dataset upon completion; these are essential for the crop estimation component of the harvest models.

- Year-over-year consistency of ripening trajectories when plotted against GDH supports the suitability of the GDH framework for harvest prediction model development.

Next Steps

- Complete Biodock image extraction of berry size and weight metrics for both study years.
- Conduct Year 3 (2026) berry sampling to complete the three-year baseline dataset and provide a model validation year.
- Develop formal GDH-based harvest prediction models from the combined two-year dataset, incorporating both Brix/TA ratio slopes and berry weight as response variables.
- Compare GDH-based models against established European frameworks (e.g., Vitadapt) to assess transferability to New York climate conditions.
- Evaluate whether separate model families are required for vinifera and hybrid cultivar groups.
- Prepare a peer-reviewed manuscript upon completion of the three-year study.

Technology Transfer Plan

Results from this project will be communicated to growers, extension educators, and the research community through multiple channels. The long-term output of this project is a set of GDH-based harvest prediction models for New York vinifera and hybrid cultivars, to be made available through the NEWA (Network for Environment and Weather Applications) platform following model development in Year 3. Extension of these tools to growers will follow the model established by the existing Concord harvest prediction system.

Attachments

Figure 1. Growing degree hour (GDH) accumulation by region and year

Cumulative GDH from April 1 through October 31, base 10°C, for the Finger Lakes (blue) and Western NY (red), 2024 (dashed) and 2025 (solid). The 2025 season accumulated approximately 5% less heat than 2024 in both regions.

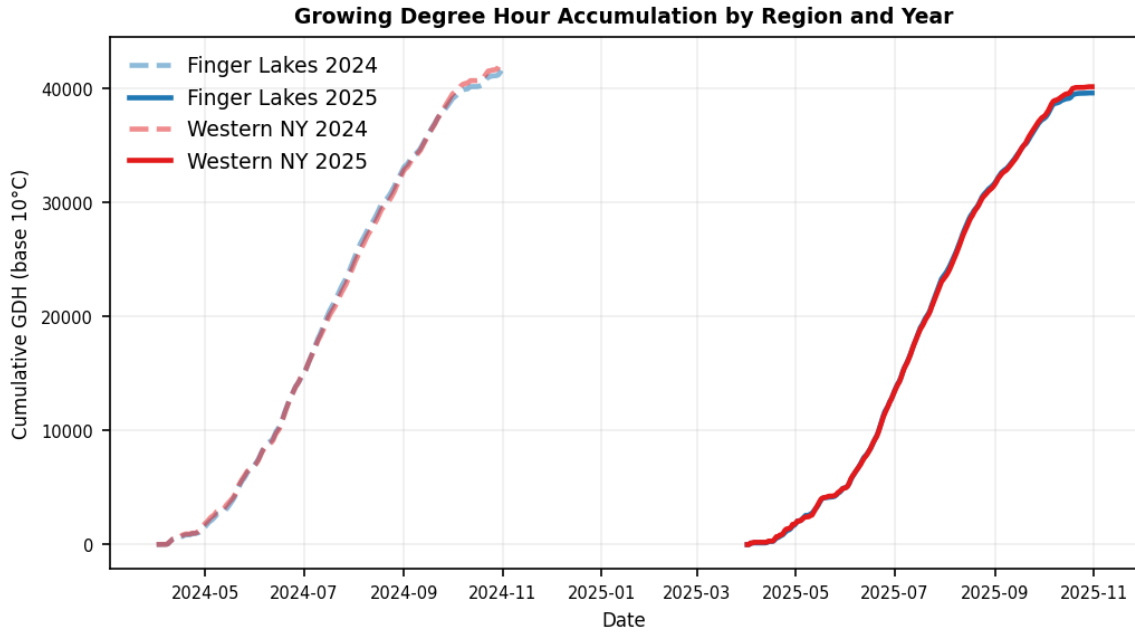


Figure 1. Cumulative GDH (base 10°C) from April 1, Finger Lakes (blue) and Western NY (red), 2024 (dashed) and 2025 (solid). Right panel shows base 4.4°C for reference; both bases yield near-identical relative patterns.

Figure 2. Brix vs. GDH — Year 2 (2025) primary, Year 1 (2024) context

Brix plotted against cumulative GDH (base 10°C, April 1) for all cultivars in 2025. Blue = Finger Lakes; red = Western NY. Light open circles = 2024 context. Lines are LOWESS smooths fitted to 2025 data.

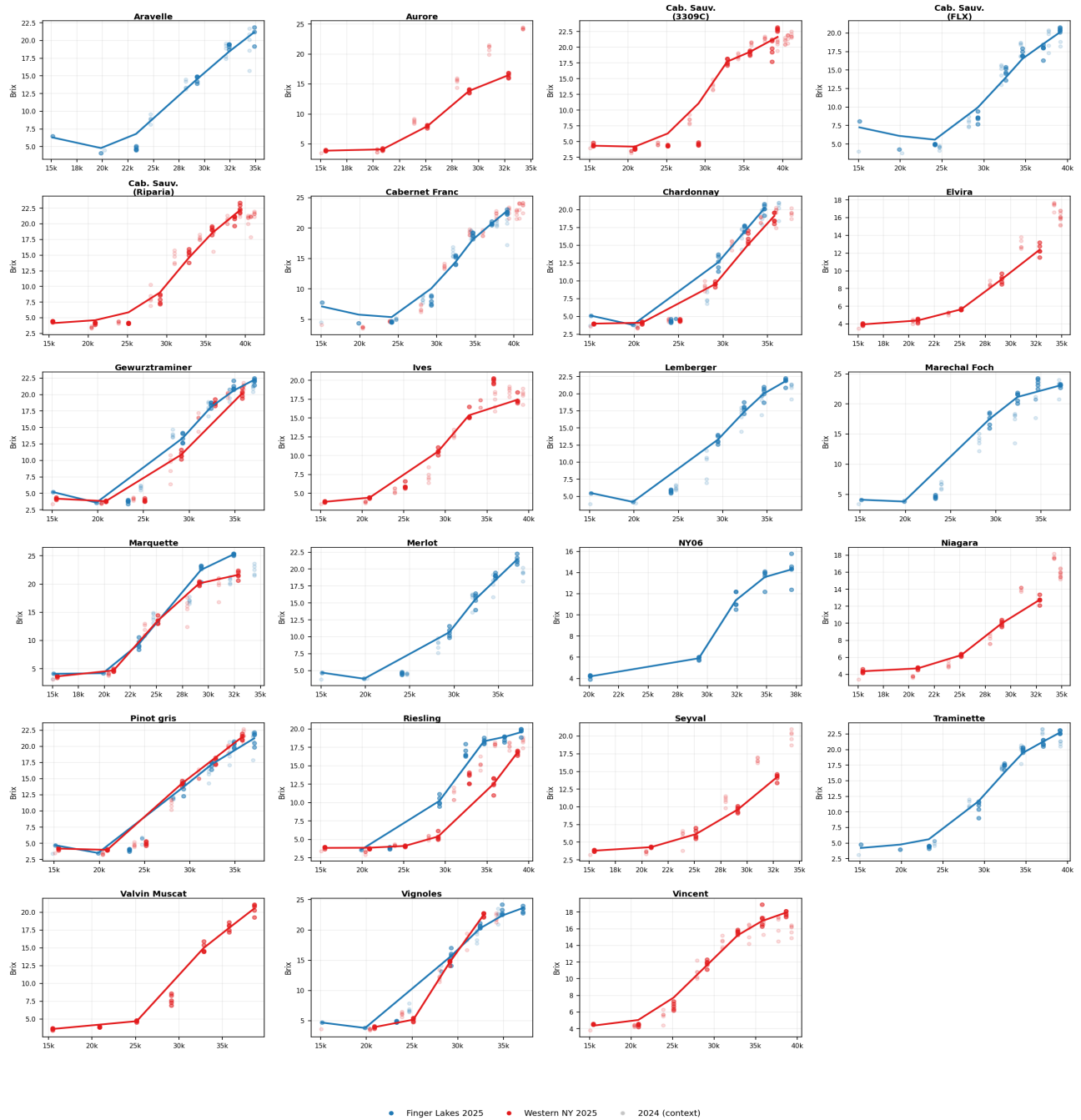


Figure 2. Brix vs. cumulative GDH (base 10°C), Year 2 (2025). Blue = Finger Lakes; red = Western NY. Background open circles = Year 1 (2024). Lines = LOWESS smooths.

Figure 3. Titratable acidity vs. GDH — Year 2 (2025)

Titrate acidity plotted against GDH for all cultivars in 2025. TA is high pre-veraison and declines progressively at a rate that is strongly cultivar-dependent.

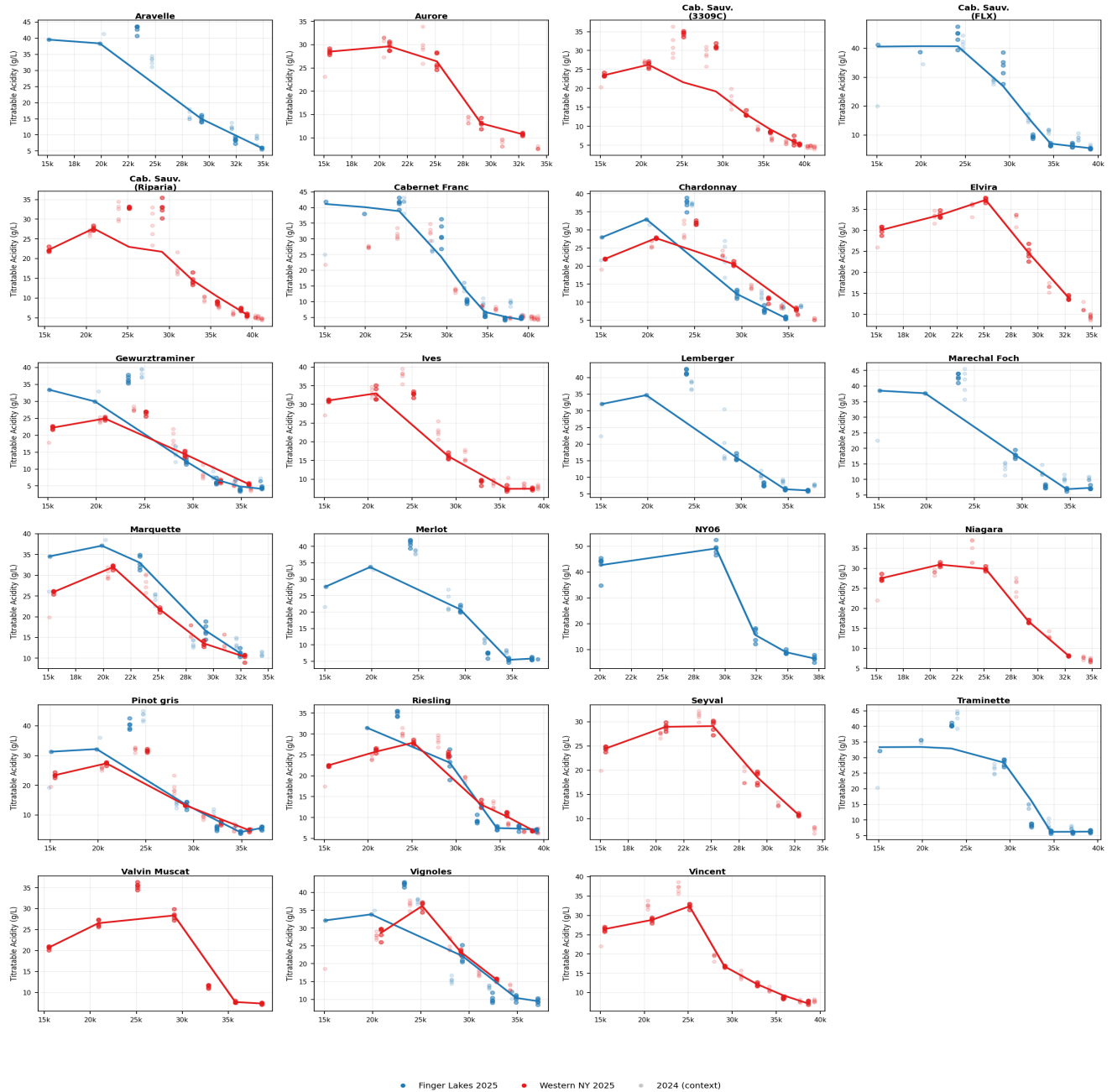


Figure 3. Titratable acidity vs. cumulative GDH (base 10°C), Year 2 (2025). Lines = LOWESS smooths.

Figure 4. Brix/TA ratio vs. GDH — Year 2 (2025) with post-veraison linear fits

The Brix/TA ratio as a composite ripening index plotted against GDH. Solid lines: LOWESS smooths. Dashed lines: post-veraison linear fits (Brix ≥ 8) used to estimate harvest prediction slopes (Table 4).

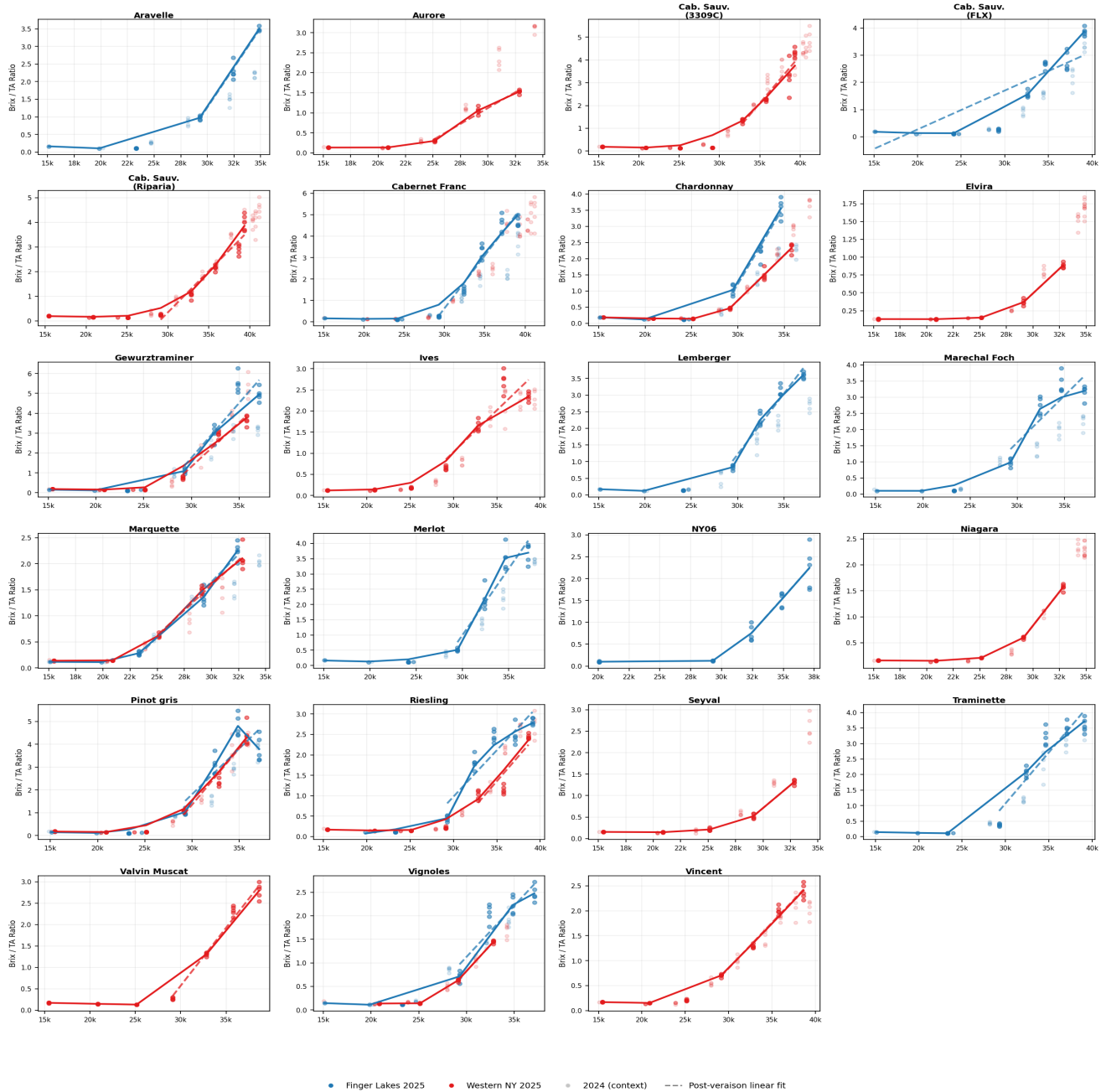


Figure 4. Brix/TA ratio vs. cumulative GDH (base 10°C), Year 2 (2025). Solid = LOWESS smooth; dashed = post- veraison linear fit. Slope parameters from dashed lines are reported in Table 4.

Figure 5. Cross-region comparison: Brix vs. GDH — overlapping cultivars (2025)

Direct comparison of Brix trajectories for the seven cultivars sampled in both the Finger Lakes and Western NY in 2025. Lines connect LOWESS-smoothed means per sampling date per region.

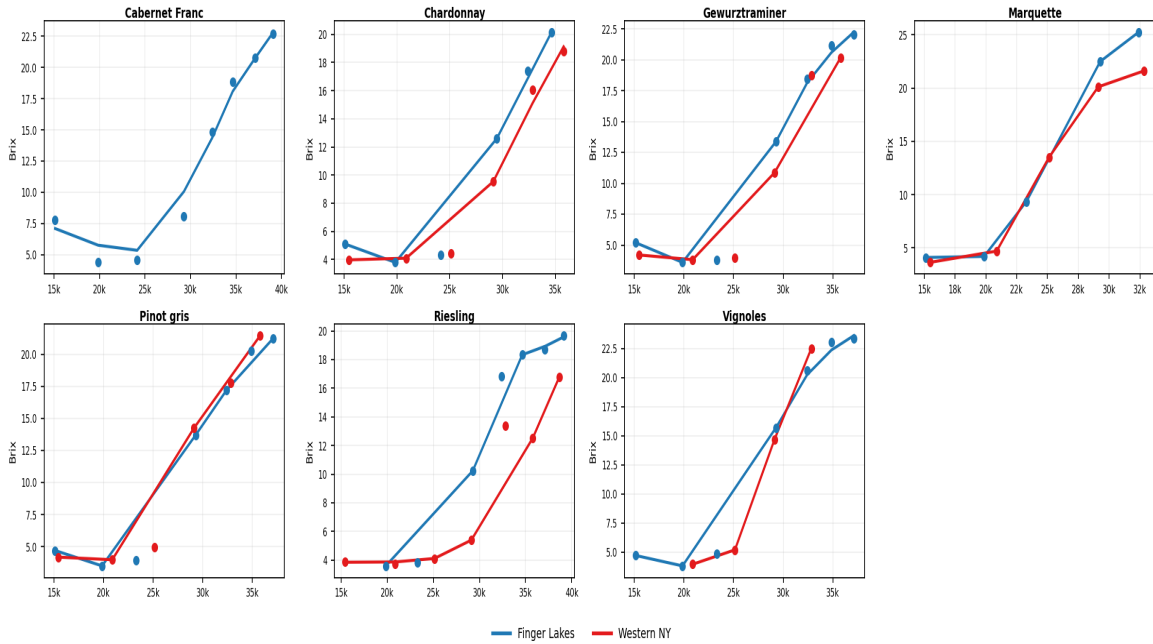


Figure 5. Brix vs. GDH (base 10°C) for seven cultivars sampled in both regions, 2025. Blue = Finger Lakes; red = Western NY.

Figure 6. Cross-region comparison: Brix/TA ratio vs. GDH — overlapping cultivars (2025)

Direct comparison of the Brix/TA ratio trajectories across regions for the seven overlapping cultivars.

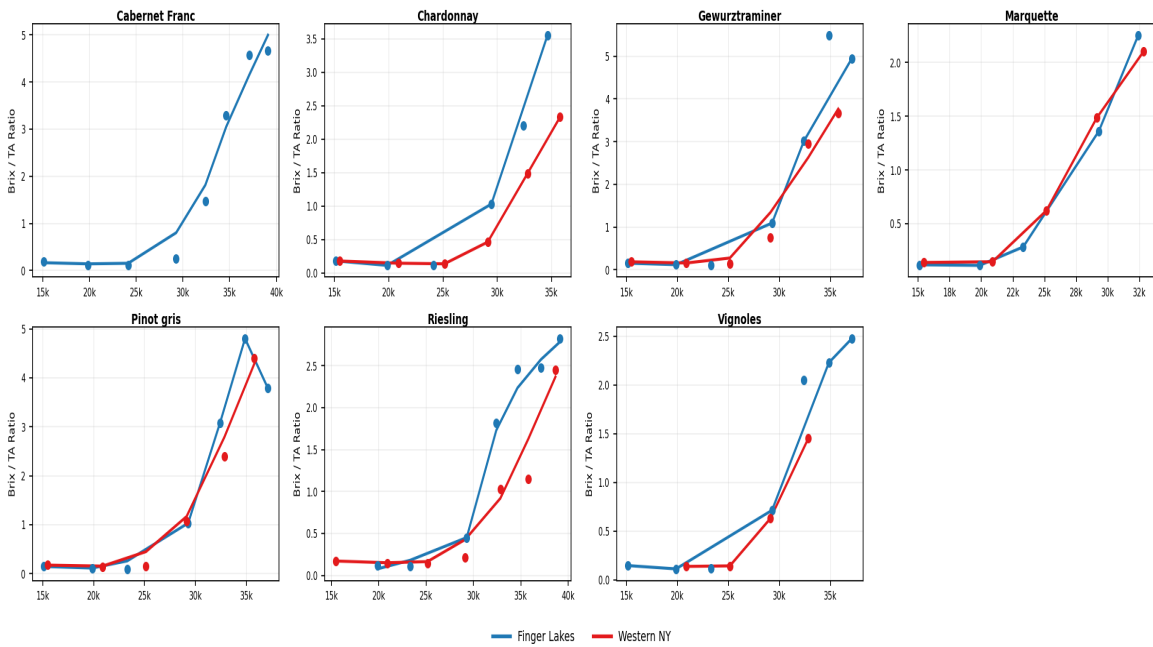


Figure 6. Brix/TA ratio vs. GDH (base 10°C) for seven cultivars sampled in both regions, 2025. Blue = Finger Lakes; red = Western NY.

Figure 7. Year comparison: Brix vs. GDH — 2024 vs. 2025

Brix vs. GDH (base 10°C) for cultivars sampled in both years. Solid lines = 2025 (primary); dashed = 2024 (context). Consistency between years for most cultivars supports GDH as a season-normalizing predictor.

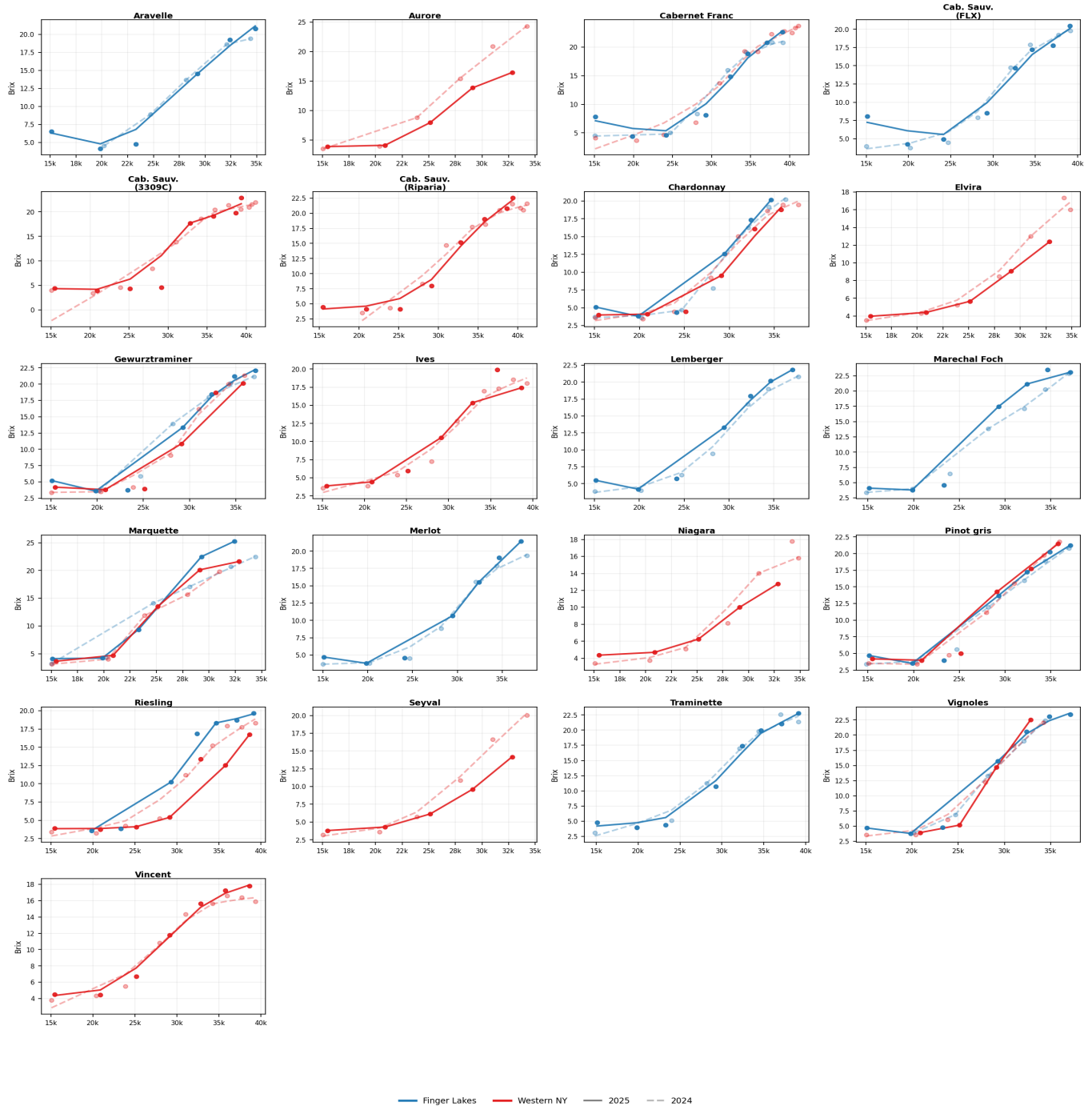


Figure 7. Brix vs. GDH (base 10°C), 2024 (dashed) vs. 2025 (solid) for cultivars present in both years. Blue = Finger Lakes; red = Western NY.

Section 3 — Grower-Facing Summary

Project Objectives

This project is tracking how and when grapes ripen across more than 20 wine grape varieties grown in the Finger Lakes and Lake Erie regions of New York. Each year, our team collects berry samples starting just before color change (veraison) and continuing every 10–14 days until harvest. From each sample, we measure sugar content (Brix), acid content (titratable acidity), and the balance between the two — all metrics used by growers and winemakers to judge when grapes are ready to pick.

Our goal is to build harvest prediction tools for New York’s wine grape industry, similar to the harvest timing model that already exists for Concord grapes in the Lake Erie region. By tracking how the sugar-to-acid ratio changes as the season accumulates heat — measured as growing degree hours (GDH), which counts warm hours above a minimum temperature since spring — we aim to give growers a way to estimate when their specific variety will be ready to harvest.

Why This Matters for the New York Wine Industry

Knowing when to pick is one of the most consequential decisions a grower makes each year. For Concord growers, a proven model already exists that predicts harvest date based on berry weight 30 days after bloom. No equivalent tool exists for the 20+ wine grape varieties grown across New York.

This matters even more as the climate changes. Warmer seasons can accelerate ripening and compress the harvest window, while increased fall precipitation creates disease pressure at the end of the season. A variety-specific model that links temperature accumulation to ripening progress would allow growers to better plan harvest logistics and make informed management decisions through the critical summer and fall months.

What We Found in Year 2 (2025)

In 2025, we sampled 23 grape varieties at seven vineyard sites across both regions. The season was slightly cooler overall than 2024, but ripening patterns were similar between years — an encouraging sign that our approach is capturing something real and repeatable.

The key metric we are tracking is the ratio of sugar to acid (Brix/TA), which rises steadily as grapes ripen and integrates both sugar gain and acid loss into a single number that growers already use intuitively when tasting for harvest. We can now describe, for each variety, how fast this ratio rises per unit of heat accumulated. Early-ripening hybrids like Marquette and Marechal Foch show a slower but early-starting rise in the ratio, reaching commercial targets at lower total heat. Cabernet Franc and Gewurztraminer show a steep and rapid rise in the ratio once they begin ripening, requiring higher total heat accumulation but then moving quickly to maturity. These differences in ripening rate are what the harvest prediction models will capture.

Berry size and weight data from digital images are still being processed and will be added in the coming months. These measurements are essential for the crop estimation side of the project.

Next Steps

We are in Year 2 of a three-year study. Year 3 (2026) will be the final data collection season, after which we will build the harvest prediction models and make them available through NEWA. Results will be shared in Veraison to Harvest, Appellation Cornell, and at winter viticulture meetings. We welcome grower feedback on the varieties and sites most important to include in the final model framework.

Supporting Figure

Figure 8 shows the Brix/TA ripening ratio for all sampled varieties in 2025 (colored lines and points) with 2024 in the background (light open circles). The dashed lines show the linear rate of change in the post-ripening phase that will be used for harvest prediction. Each panel is one variety. Blue = Finger Lakes; red = Western NY.

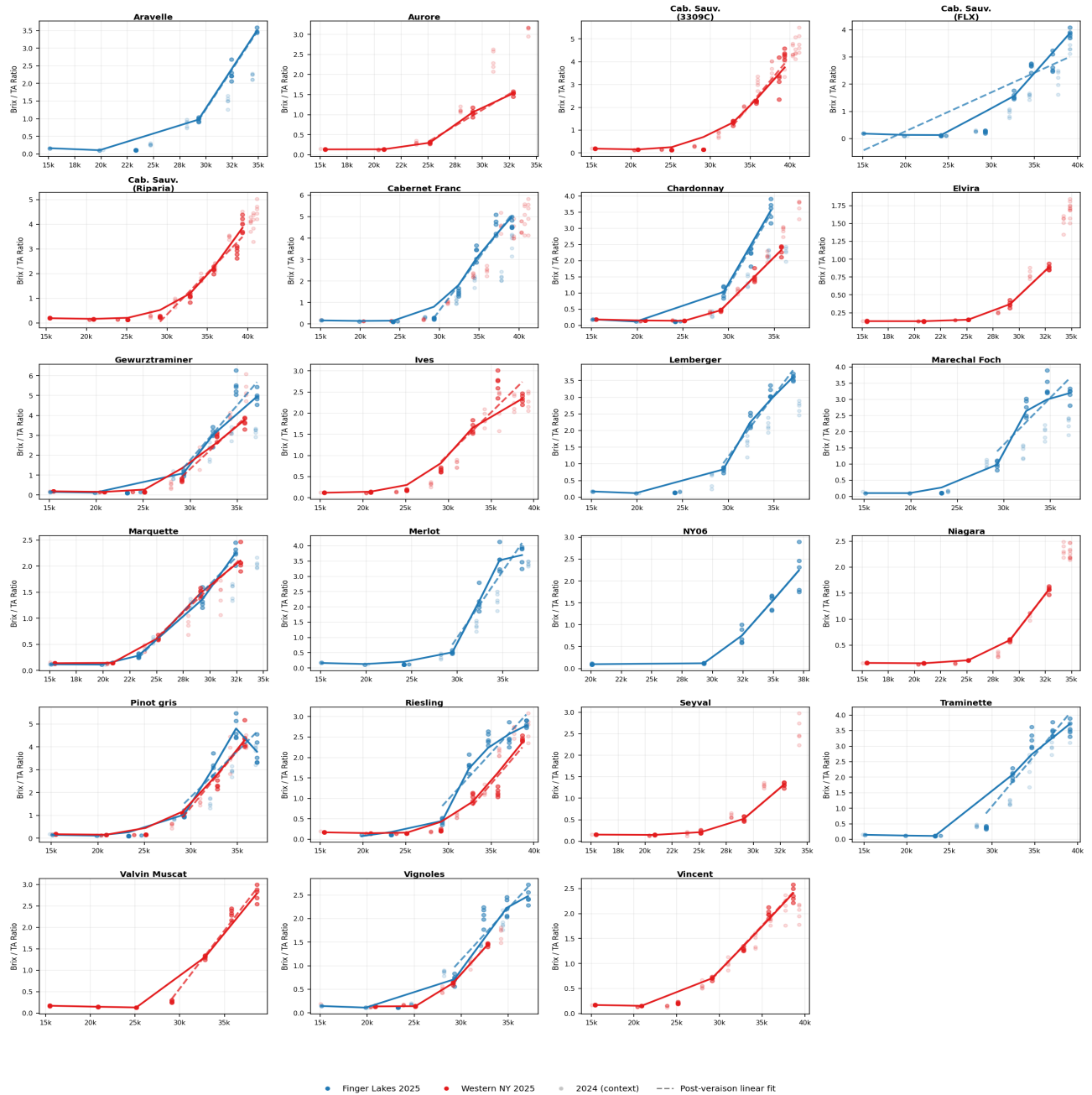


Figure 8. Brix/TA ripening ratio for all sampled wine grape varieties, 2025 (colored points and LOWESS lines) and 2024 context (light open circles). Dashed lines show post-veraison linear trends used for harvest prediction model development. Blue = Finger Lakes; red = Western NY. GDH = growing degree hours accumulated from April 1.