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# OK392 (‘Mamont Noir’) a Red-Pulped Bunch Grape with Potential for Upper South Vineyards

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## Abstract

The grape industry is expanding acreage production of wine, juice, and other value-added products throughout the United States. Recent estimates show the grape and wine industries in states surrounding Mississippi have significant economic impact. To prepare for a potential expansion of the grape industry in Mississippi, underappreciated cultivars and breeding selections are being grown, harvested, and processed to determine suitability. A selection from Oklahoma, OK392, was grown for several years at the Mississippi State University (MSU) Beaumont Horticultural Unit as well as the Oklahoma State University Cimarron Valley Experiment Station. OK392 compared favorably to other hybrid bunch grapes in many measured categories; however, it did have higher loads of Pierce’s disease (PD) (*Xylella fastidiosa*) in Mississippi. Even with the higher detected PD, vines are still surviving in South Mississippi and producing grapes. Wine was also made from fruit collected and it has promise in blending and as a teinturier to provide deep red color for other grapes. Overall, OK392 has potential for upper South vineyards and may be useful in grape breeding programs as well, and we propose the name ‘Mamont Noir’ for future use.

## Origin

Advanced selections in breeding programs often get discarded for a variety of reasons, but usually because they were not acceptable for their intended purpose. However, a few can escape to other locations and make an impact. Two recent examples for grapes are ‘Victoria Red’ and ‘Southern Sensation Seedless’, both originally bred at the University of Arkansas but ultimately found enough success in Texas to be commercially released (Moore et al. 2011; Scheiner et al. 2022). Such is a similar case with OK392, for which we propose the name ‘Mamont Noir’, combining Oklahoma and Beaumont (Mississippi), along with its dark color. OK392 was selected by Herman Hinrichs of Oklahoma State University (OSU) from a cross of ‘America’ x SV12-375 (‘Villard blanc’) (Fig. 1). The OSU hybrid grape breeding program began in the 1950s, with a few cultivars being released in the 1960s and 1970s (Stafne 2006; Stafne et al. 2015).

## Description and Performance

Vines were grown at the Mississippi State University Beaumont Horticultural Unit in Beaumont, MS (31°14′6” N, 88°55′7” W; elevation 30 m asl; USDA hardiness zone 8b) and at the Oklahoma State University Cimarron Valley Research Station in Perkins, OK (35°59’42” N, 97°2’5” W; elevation 288 m asl; USDA hardiness zone 7b) (Fig. 2). Vines were trained to a high wire bilateral cordon system with 2.1 m between vines and 3.7 m between rows, except for the muscadine

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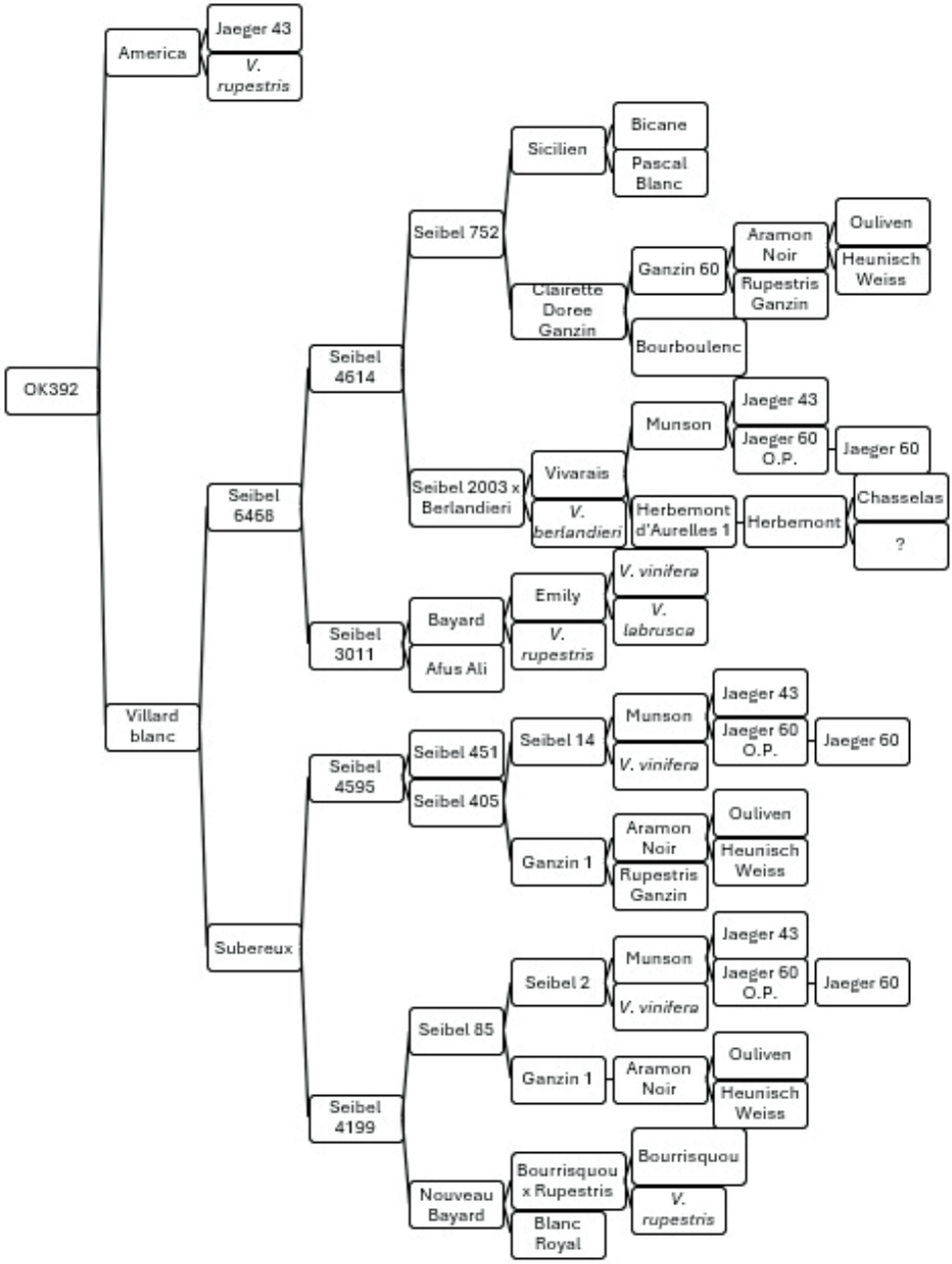


**Figure 1.** Pedigree of OK392 (‘Mamont Noir’).

**Figure 2.** Vigorously growing OK392 ('Mamont Noir') at the Oklahoma State University Cimarron Valley Research Station in Perkins, OK (above) and at the Mississippi State University Beaumont Horticultural Unit in Beaumont, MS (below).

'Doreen' vines which were spaced at 6.1 m between vines and 3.7 m between rows. Fungicide and herbicide control was done as needed. Insecticide sprays were not applied. Vines were spur-pruned in February or March.

Anecdotal testimony from Arkansas (Johnson R, personal communication) and Missouri (Harris J, personal communication) showed that it can be productive in the upper South region, perhaps on a commercial scale, and is best suited as a blending wine grape. It was tested in California, but yields were too low to compare with other red-pulped cultivars like Rubired (Cousins P, personal communication).

A single vine in Oklahoma at the Oklahoma State University Cimarron Valley Research Station has grown vigorously and produced fruit (Table 1). Soluble solids concentration varied from a high of 18.9 to a low of 14.5. Titratable acidity levels were also higher than desirable. This may indicate, along with the low soluble solids recorded in 2022, that the fruit was not at peak ripeness at harvest. The cluster size was much larger than those measured in Mississippi, and that came with a concomitant smaller berry size as well.

The second location, at the Mississippi State University Beaumont Horticultural Unit, had twelve vines planted in 2015 from which data were collected in 2019 and 2020 along with other bunch grape and muscadine cultivars (Table 2). The experimental design was completely randomized with 6 replicate vines. Cluster weights were based on 5 clusters and berry weights from 10 berries.

**Table 1.** Averages of OK392 ('Mamont Noir') fruit quality measurements collected during two seasons at the Oklahoma State University Cimarron Valley Research Station in Perkins, Oklahoma.

| Year | Soluble solids (%) | Titratable Acidity (g/L) | pH | Avg berry Wt. (g) | Avg cluster Wt. (g) |
|---|---|---|---|---|---|
| 2019 | 18.9 | NA[i] | NA | NA | NA |
| 2022 | 14.5 | 12.0 | 3.22 | 1.7 | 101.9 |

[i] Data not collected.

**Table 2.** Averages of hybrid grape and muscadine fruit quality measurements collected during two seasons at the Mississippi State University Beaumont Horticultural Unit in Beaumont, Mississippi.[i]

| Cultivar | Sol. solids (%) | Titratable Acidity (g/L) | pH | Avg. berry wt. (g) | Avg. cluster wt. (g) | Yield/vine (kg) |
|---|---|---|---|---|---|---|
| | | | 2019 | | | |
| Blanc du Bois | 16.6 b[ii] | NA | 3.8 a | NA | 72.6 b | 3.4 b |
| Doreen | 18.4 a | 7.3 c | 3.4 bc | 7.9 a | NA[iii] | 19.5 a |
| MidSouth | 14.3 c | 13.8 a | 3.1 d | 3.4 b | 113.4 a | 7.4 b |
| Miss Blanc | 18.5 a | 12.1 b | 3.5 b | 2.5 bc | 79.8 b | 3.7 b |
| OK392 (Mamont Noir) | 15.8 b | 13.2 ab | 3.3 c | 2.1 c | 69.9 b | 2.3 b |
| *P*-value | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 |
| | | | 2020 | | | |
| Doreen | 17.7 a | 6.1 b | 3.5 a | 5.5 a | NA | 15.9 a |
| MidSouth | 16.2 b | 13.8 a | 2.9 c | 3.4 b | 117.9 a | 3.6 b |
| Miss Blanc | 16.0 b | 12.7 a | 3.4 a | 2.9 c | 78.0 b | 3.3 b |
| OK392 (Mamont Noir) | 14.9 c | 13.6 a | 3.2 b | 2.3 d | 80.7 b | 2.6 b |
| *P*-value | <.0001 | <.0001 | <.0001 | <.0001 | .0041 | <.0001 |

[i] Vines were spaced at 2.1 m in-row and 3.7 m between rows except for the muscadine 'Doreen' which was 6.1 m in-row and 3.7 m between rows.
[ii] Means within a column followed by the same letter are similar according to Tukey's honest significant difference.
[iii] Data not collected.

Soluble solids concentration of OK392 ('Mamont Noir') was comparable to 'Blanc du Bois', a standard PD-tolerant cultivar (Mortensen 1988), in 2019, and slightly lower than 'MidSouth', a Missisippi-released cultivar (Overcash et al. 1981; Williams and Staffne 2022) in 2020, as well as the other cultivars. Titratable acidity for OK392 ('Mamont Noir') was higher than desirable for winemaking purposes, but similar to the other bunch grape cultivars. Harvesting grapes in south Mississippi is challenging due to many en-

vironmental factors including rainfall during harvest, high daytime and nighttime temperatures, and consistently high humidity. Each of these factors work against obtaining the highest quality grapes. Fungal diseases, including various bunch rots and black rot (*Guignardia bidwellii*) (Fig. 3), also reduce the amount of harvested fruit. However, because OK392 ('Mamont Noir') berries are tolerant of most diseases and resistant to cracking (Rezazadeh et al. 2018) enough fruit was collected for other measurements. Berries of OK392 ('Mamont Noir') were slightly smaller than those of the other hybrid bunch grapes and were consistent in size between years. Cluster weights for OK392 ('Mamont Noir') averaged around 80 g, similar to 'Blanc du bois' and 'Miss Blanc'. Average yield per vine was also similar to the other bunch grapes but far less than 'Doreen'. Cold tolerance measurements using differential thermal analysis indicated that OK392 ('Mamont Noir') may be cold hardy to -20°C in mid-winter (January) (data not shown).

OK392 ('Mamont Noir') has the desirable trait of strong red color, which many red grape cultivars lack in the South (Fig. 4). It is a dark, red-skinned grape with reddish pulp

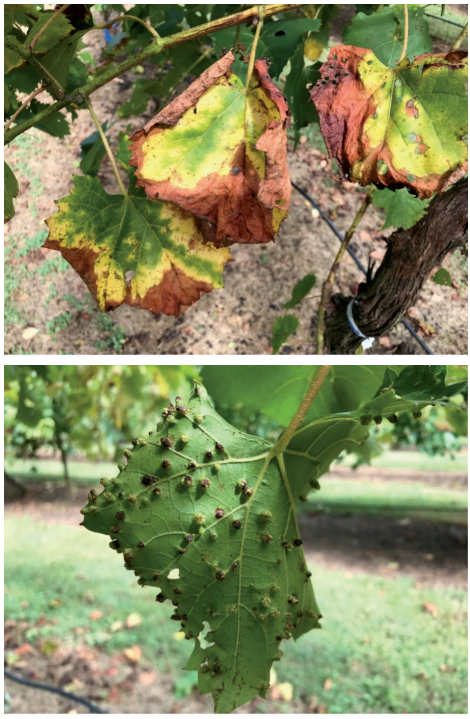

**Figure 3.** Various fungal diseases such as black rot (above) were observed as well as grape leaf phylloxera (below) on OK392 ('Mamont Noir') at the MSU Beaumont Horticulture Unit in Beaumont, MS.

**Table 3.** Detected *Xylella fastidiosa* levels in hybrid grape and muscadine cultivars grown at the Mississippi State University Beaumont Horticultural Unit averaged over two seasons.

| Cultivar | Log CFU/mg tissue |
|---|---|
| OK392 (Mamont Noir) | 5.65 a[i] |
| Blanc du Bois | 2.13 b |
| Doreen | 1.54 b |
| Miss Blanc | 1.05 bc |
| MidSouth | 0.00 c |
| *P*- value | <.0001 |

[i]Means within a column followed by the same letter are similar according to Tukey's honest significant difference.

that can be used as a teinturier in blended wines to deepen the color. The flavor and aroma are unremarkable, but it does not have a strong "hybrid" character either.

Pierce's disease (PD) detection and quantification was done in 2019 and 2020. The annotated genomes were deposited in GenBank and the accession numbers for raw reads were deposited in the Sequence Read Archive (SRA) (Mavrodi et al. 2020). While 'MidSouth' had no detectable PD, this was not the case for OK392 ('Mamont Noir') (Table 3). Levels were higher than 'MidSouth', 'Miss Blanc' (1.05), and 'Blanc du Bois' (2.13). While concerning, OK392 ('Mamont Noir') was resilient and tolerated PD. The reality is that South Mississippi, where PD pressure is extreme, may be too far south for OK392 ('Mamont Noir'). Beaumont, Mississippi is roughly 60 miles (97 km) northeast of the USDA-ARS Thad Cochran Horticultural Laboratory in Poplarville (30°50′6" N, 89°32′46" W; elevation 97 m asl; USDA hardiness zone 9a) where vines were first tested in Mississippi. The Poplarville vines died within 3 years, but the vines in Beaumont continued to live to 8 years before becoming unproductive (Fig. 5). Based on this observation, vines planted farther north in areas that have less extreme PD pressure would likely survive better and produce more fruit. In addition, the level of PD-tolerance is better than 'Villard Blanc' which was also tested at Beaumont where all vines perished within 6 years.

Like most bunch grapes, OK392 ('Mamont Noir') would require a vigorous spray program to deal with fungal diseases and insect pests such as grape phylloxera (*Daktulosphaira vitifoliae*) (Fig. 3), grape leaffolder (*Desmia funeralis*), grape berry moth (*Paralobesia viteana*), and grape flea beetle (*Altica chalybea*). Abiotic problems like potassium deficiency were observed during fruit ripening, so addition of this element may be necessary, but the situation resolves upon removal of the crop. Most OK392 ('Mamont Noir') vines are not grafted; however, attempts to graft it to 'MidSouth' were suc-


**Figure 4.** Deep red colored juice (top), must (center), and berries (bottom) produced from OK392 ('Mamont Noir').

**Figure 5.** A seven-year-old OK392 ('Mamont Noir') vine in decline from Pierce's disease (*Xylella fastidiosa*) at the MSU Beaumont Horticultural Unit in Beaumont, MS.

cessful and grafting may improve some vine characteristics. Overall, with intensive management OK392 ('Mamont Noir') can be a useful cultivar for winegrape growers in the upper South.

## Availability

Requests for cuttings should be sent to Stafne, ET (eric.stafne@msstate.edu) and/or Carroll, BL (becky.carroll@okstate.edu). No guarantee is made that plant material is free from any insect or disease.

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