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## Blueberry Varieties for Michigan

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### History of Blueberry Production in Michigan

Blueberries have only been grown commercially in Michigan for about a century. However, Native American tribes in the Great Lakes region have used blueberries as food, dye, and medicine for thousands of years (Hummer, 2013).

Cultivation of northern highbush blueberries in Michigan began in the 1920s. Back then, Stanley Johnson, a horticulture professor at what is now Michigan State University, learned of Frederick Coville and Elizabeth White's efforts to cultivate blueberries at USDA facilities and on White's family farm in New Jersey (Coville was a botanist with the U.S. Department of Agriculture and White was a farmer). Johnson wanted to evaluate this new crop in Michigan, so he set up test plots around the Lower and Upper Peninsulas.

Johnson's research revealed that blueberries would thrive on the sandy and acidic soils along Lake Michigan. His success, both in breeding and expanding cultivation of this crop, helped spur tremendous growth in the state's blueberry industry in the 1940s and 1950s.

### Blueberry Producing Regions in Michigan

Most Michigan blueberries are grown in the western Fruit Belt of the Lower Peninsula, close to Lake Michigan. These areas have similar soil and climate conditions, with two exceptions (Table 1).

First, cumulative growing degree days, or GDD, are lower in the West Central Region than in the Southwest Region. This cooler weather during the growing season delays the blueberry harvest in the West Central Region by about a week, which serves to spread the harvest dates across the major production regions. In years past, the delay gave growers in the West Central Region a market advantage because they could supply late-season cultivars at premium prices. Increased blueberry imports from South America in the past few years, however, have reduced this opportunity.

Second, the distances from the inland and lakeshore subregions to Lake Michigan dictates the average low temperatures in winter, with fields nearer the lake having higher temperatures and more snow cover in winter. A cultivar's cold hardiness (Table 2) dictates whether it will grow in



the colder inland areas. For example, some inland growers in Michigan won't grow less cold hardy varieties (such as Legacy and Draper) because these varieties' fruiting buds may be more likely to suffer freeze damage, which decreases their yields.

### Production, Fruit Quality Characteristics, & Pest & Disease Resistance of Blueberry Varieties

Deciding which blueberry cultivar to plant depends on several factors:

**Table 1. Climate and geographical characteristics of Michigan's major blueberry producing regions. The growing degree day, temperature, and precipitation information are averages from 2013 to 2023. Most of the measurements came from the Enviroweather stations listed in data row 1, which are considered the most representative of their regions.**

Geographical or climate characteristic	Southwest—Inland Subregion	Southwest—Lakeshore Subregion	West Central—Inland Subregion	West Central—Lakeshore Subregion	East Region	Northwest Region
<b>Enviroweather station</b>	Lawton—Oxley Farms	Benton Harbor—Southwest Michigan Research and Extension Center	Hart—West Central Michigan Research and Extension Center	Fennville—Trevor Nichols Research Center	Romeo—West View Orchard	Traverse City—Northwest Michigan Horticulture Research Center
<b>Elevation</b>	791 ft (251 m)	591 ft (233 m)	682 ft (233 m)	666 ft (214 m)	810 ft (249 m)	626 ft (247 m)
<b>Soil type<sup>a</sup></b>	Sandy loam/loamy sand	Loam/loamy fine sand	Sand/loamy fine sand	Sand/loamy fine sand	Sandy loam/loamy sand	Loamy sand
<b>USDA plant hardiness zone<sup>b</sup></b>	6a	6b	6a	6b	6a	6b
<b>Cumulative growing degree days (GDD; base 50 °F, April 1–October 1)</b>	3,314.4 °F (1,823.6 °C)	3,341.8 °F (1,838.8 °C)	2,731.9 °F (1,499.9 °C)	3,036.3 °F (1,669.1 °C)	2,905.3 °F (1,596.3 °C)	2,082.0 °F (1,138.9 °C)
<b>Highest temperature</b>	97.1 °F (36.2 °C)	97.5 °F (36.4 °C)	95.0 °F (35.0 °C)	98.7 °F (37.1 °C)	96.8 °F (36.0 °C)	96.5 °F (35.8 °C)
<b>Lowest temperature</b>	-9.9 °F (-23.3 °C)	-8.4 °F (-22.4 °C)	-13.9 °F (-25.5 °C)	-9.3 °F (-22.9 °C)	-7.3 °F (-21.8 °C)	-10.6 °F (-23.7 °C)
<b>Cumulative precipitation</b>	28.13 in. (714.6 mm)	27.3 in. (693.1 mm)	24.4 in. (620.1 mm)	26.5 in. (674.5 mm)	23.6 in. (600.3 mm)	23.9 in. (607.6 mm)

<sup>a</sup> Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey (<https://websoilsurvey.sc.egov.usda.gov/app/>).

<sup>b</sup> 2023 USDA Plant Hardiness Zone Map (<https://planthardiness.ars.usda.gov/>).



- **Winter temperatures**—Northern highbush varieties are the only viable options for Michigan growers because of the state's cold winter temperatures.
- **Intended use**—Fruit characteristics, particularly firmness, largely dictate how growers and processors use a blueberry cultivar. For example, cultivars with very firm fruits and long shelf lives are best suited for the fresh market (though fruit size and flavor are becoming increasingly important to fresh market consumers). In contrast, cultivars with soft fruits—particularly those with great flavor—are best for processing and U-pick operations, where shelf life is less important.
- **Harvest window**—Choosing cultivars with staggered harvest periods allows growers to spread the harvest season labor and processing load evenly throughout the summer.

New cultivars are often compared to current cultivars with similar harvest periods. The cultivars in Tables 2, 3, and 4 are organized by harvest season, from earliest in the season to the latest.

(**Note:** We do not discuss club program varieties, because these varieties are not available to all growers.)

### Early-Season Cultivars

**Duke** is the main early-season cultivar grown in Michigan and other temperate production regions in the U.S. and Canada. In our survey, Michigan growers gave Duke average ratings for cold-hardiness, vigor, and flavor, and above-average ratings for yield and firmness. One downside to this cultivar is that its late-blooming flowers can be hard to pollinate, resulting in small fruit that is better suited for processing than for the fresh market.

While Duke received good ratings, its popularity is largely due to a lack of early-season cultivars with better characteristics. Growers have chosen to stay with Duke because newer releases such as **Hannah's Choice** and **Chanticleer** offer similar or slightly lower yields, fruit size, and flavor. Duke

will likely remain the dominant early-season cultivar until a new cultivar with better flavor characteristics is released.

### Early- to Mid-Season Cultivars

While the harvest periods of Duke and many mid-season cultivars overlap, growers have needed a new fresh-market cultivar to fill the early- to mid-season harvest window for many years.

Michigan growers typically harvest two older cultivars, **Blueray** and **Bluejay**, in this window. Blueray is slightly more popular than Bluejay, likely explained by its higher survey ratings in all traits except fruit firmness. Due to its lower fruit firmness, Blueray is primarily a U-pick and processing cultivar, while Bluejay can be machine harvested for the fresh market.

**Spartan** and **Patriot** are U-pick cultivars because of their great flavor, but they have soft fruit, which limits their use in commercial production.

**Huron** and **Osorno** are relatively recent MSU releases that are not widely planted in Michigan, though Osorno in particular is catching on in other parts of the U.S. and the world. **Blue Ribbon** and **ArabellaBlue** are two newer releases from Pacific Northwest breeding programs that have firm fruit and potential for success in this harvest window.

### Mid-Season Cultivars

The most important blueberry cultivar in the Michigan blueberry industry over the past half-century has been **Bluecrop**, which ripens in the middle of the harvest season. Nearly all Michigan blueberry growers surveyed (95.5%) have some acreage of this cultivar, and it comprises over 25% of the state's blueberry acreage.

Growers rate Bluecrop higher than average for cold-hardiness, vigor, yield, and flavor. It also tolerates a range of soil pH conditions and has a low need for cross-pollination, resulting in reliable yields.

Bluecrop is completely resistant to stem gall wasp and never develops galls. However, it is very susceptible to anthracnose and *Phomopsis* stem



canker and intermediate in its susceptibility to mummy berry. Bluecrop also has below-average fruit firmness and can produce fruit with attached stems in later harvests, limiting its use for the fresh market.

**Draper**, a cultivar released in 2004, has superior fruit quality characteristics and is one of the only cultivars that can be reliably machine harvested for the fresh market without significant bruising or drop in shelf life. These qualities have led to its use as a parent in many northern highbush breeding programs. Since its release, Draper has replaced a large portion of Bluecrop acreage in the Pacific Northwest, and was once expected to do the same in Michigan. That expectation hasn't been met, however, for two reasons:

- Draper grows slowly, which makes it hard to establish in Michigan. In fact, growers gave it the lowest vigor rating among all cultivars in the survey. It takes years longer to reach full maturity and production than other cultivars. This may be because Draper produces more whips (first year canes) than most cultivars. The abundance of whips limits cane growth, requires more extensive pruning, and results in a wide crown that is not suited for machine harvesting.
- Draper suffers more extensive frost damage than most cultivars, according to growers, and experiences a green fruit drop disorder in some years.



Today, Draper accounts for only about 5% of blueberry acreage in the state, but its popularity and acreage are increasing due to its high fruit quality characteristics.

**Calypso**, released in 2015, is a cross of Draper and Elliott that has a similar cold hardiness to Draper. Michigan growers rate Calypso fruit quality high compared to most cultivars. Despite the positives Calypso brings—very large fruit and intense flavor—its berries can be tart (a trait passed down from Elliott). Many growers in the Pacific Northwest allow Calypso to hang longer than most cultivars before harvesting to help the acidity to drop to a more suitable level.

**Bluegold** is a high-yielding cultivar with good flavor but soft fruit, which makes it preferable for U-pick farms and processing. **Valor** is a newer cultivar that does not have significant acreage in Michigan, and little is known yet about how it performs in Michigan.

**Toro** never became popular because its canes and clusters produce many lateral leafing and fruiting branches that make the canopy dense and hard to harvest and prune. **Katahdin** and **Capella** are two relatively new mid-season MSU cultivars that are not widely planted in Michigan.

### Mid- to Late-Season Cultivars

Like Bluecrop, **Jersey** has been a staple variety in Michigan for decades. It represented more than 25% of the state's blueberry acreage until recent years. As one of the earliest successful blueberry cultivar releases (in 1928), Jersey drove the first growth of blueberry production in Michigan. It is a very cold hardy variety that produces highly flavorful fruit, but the fruits are also soft and have a very short shelf life.

Jersey is susceptible to *Phomopsis* stem canker, moderately susceptible to anthracnose, and between resistant and intermediately resistant to mummy berry. As blueberry market prices have shifted in favor of fresh-market fruit, Jersey has become less profitable. The cultivar's declining



yields and susceptibility to stem gall wasp infestation have led growers to remove many fields of Jersey since 2018.

**Rubel** and Jersey have similar backgrounds. Elizabeth White released Rubel in 1912, and the baking industry highly favored its small fruit, but only limited acreage of Rubel is still grown in Michigan.

Unlike the scarcity of suitable early-season replacement cultivars, Michigan growers can choose from many varieties when they want to replace Jersey and Rubel plantings.

The first mid- to late-season replacement cultivar that was planted in significant acreage was **Liberty**. Like Draper, Liberty has superior fruit quality traits, making it suitable for machine harvesting for the fresh market. However, the flower structure of Liberty limits its pollination efficiency, so yields are often lower than expected in the absence of a pollinizer variety for cross-pollination. Liberty is also relatively susceptible to winter cold damage and stem gall wasp. Growers are removing some Liberty acreage in favor of hardier and more pest-resistant varieties.

**Legacy** is an exceptionally vigorous and high-yielding cultivar with superior fruit quality characteristics. Due to its high vigor, this cultivar needs more aggressive winter pruning than others. Michigan growers rated Legacy as the least cold hardy of the cultivars named in the survey. In fact, some respondents referred to it as a southern

highbush variety. Growers who produce this cultivar understand that some cold damage and consequent yield loss is inevitable each year.

**Chandler** is not widely produced in Michigan. Growers have reported that Chandler produces very large fruit, but like Legacy, it is not cold hardy enough to survive Michigan winters.

**Talisman** is a recent USDA program release with similar yield and fruit quality traits to Duke. But Talisman has inferior flavor traits compared to many other mid- to late-season cultivars. So far, growers have not planted Talisman widely in Michigan.

**Nelson** is a cold-hardy variety with average yields and slightly below average quality. It is an excellent cross-pollinator and is often planted with other varieties that bloom at the same time to improve its yield.

**Bonus** is a sport of Elliott that was discovered in Michigan. It has an earlier harvest period and larger fruit than Elliott, according to growers, who also report that it is low yielding. Bonus is not widely planted in Michigan.

**Cargo** and **LoretoBlue** are newer cultivars from Pacific Northwest breeding programs. They are not yet widely planted in Michigan. First reports about new Cargo plantings in Michigan suggest that its short and stocky architecture may make it suitable for machine harvesting for the fresh market.

### Late-Season Cultivars

The lack of late-season cultivar releases compared to mid- or mid- to late-season cultivars has made Elliott and Aurora popular despite their drawbacks. Growers rated both cultivars lowest in fruit flavor of all cultivars in the survey (probably due to their high acidity and low aroma). **Elliott** also has pollination issues due to its late-blooming flowers, which lead to small fruit in later harvests. On the plus side, Elliott is resistant to anthracnose and the foliar infection phase of mummy berry. It is intermediately susceptible to *Phomopsis* stem canker and susceptible to the flower infection phase of mummy berry.



No matter their faults, Elliott and **Aurora** often command high prices because of declining supply at the end of the North American growing season. Michigan has one of the latest harvest seasons in the northern hemisphere, and Elliott and Aurora have accounted for more than a quarter of blueberry acreage in the state for decades. Today, however, South American imports with better fruit quality have lowered late-season prices, making Michigan growers less likely to plant new acreage of late-season cultivars.

**Last Call** is one potential replacement for Elliott and Aurora that some Michigan growers have planted in recent years. The cultivar has also gained popularity in the Pacific Northwest. Michigan growers rated Last Call yield and flavor slightly higher than they did Elliott and Aurora in the survey. New plantings are still scarce in the state, however, mainly due to economic limitations and the cultivar's inconsistent yields.

**LunaBlue** is a new late-season cultivar that has not yet been widely tested in Michigan.

### MSU Blueberry Breeding Program

The MSU blueberry breeding program aims to address the challenges the industry faces, including the need for new blueberry cultivars with:



- Superior fruit quality.
- Improved resistance to diseases such as anthracnose fruit rot and to insects such as the blueberry stem gall wasp.

The U.S. blueberry industry has named the development of new cultivars with improved fruit quality as its top research priority and the key to continued economic success. Growers are seeking fruit with firm texture, good flavor, appealing color and size, disease resistance, and longer shelf life.

The MSU blueberry breeding program has mapped the blueberry genome to find the genes associated with superior fruit quality. Researchers hope to guide breeding efforts to address the industry challenges named earlier.

Producing blueberries with improved yield, fruit quality characteristics, and disease and pest resistance will:

- Increase profitability and sustainability throughout the supply chain
- Enhance the global competitiveness of Michigan growers
- Help sustain the economies of rural communities across Michigan.
- Provide consumers with a consistent supply of affordable and nutritious fruit with the quality, taste, and appearance they prefer. These improvements should lead to higher blueberry consumption and improved human health and well-being.

The MSU blueberry breeding program has developed new breeding populations that address Michigan growers' priorities, including:

- Superior fruit quality traits (such as flavor, aroma, and machine harvestability)
- Complete resistance to anthracnose fruit rot and blueberry stem gall wasp
- Improved winter hardiness

These individuals will serve as foundations for future cultivar releases.



**Table 2. Thirty-three blueberry cultivars available to growers and viable in Michigan, listed in the order of their harvest season window, from earliest in the season to latest. The year of each cultivar’s release, typical uses, and the percentage of survey respondents currently producing it in Michigan are also included.**

Cultivar	Harvest season window	Release year	Typical use	Percentage of respondents currently producing the cultivar
Duke	Early	1987	Fresh/Processing	68.2%
Chanticleer	Early	1997	NDA	<1%
Hannah’s Choice	Early	2005	NDA	<1%
Blueray	Early/Mid	1955	U-Pick	63.6%
Bluejay	Early/Mid	1978	Fresh/Processing	36.4%
Patriot	Early/Mid	1976	U-Pick	9.1%
Spartan	Early/Mid	1977	U-Pick	9.1%
ArabellaBlue	Early/Mid	Pending	Fresh	<1%
Blue Ribbon	Early/Mid	2014	NDA	<1%
Osorno	Early/Mid	2015	Fresh	<1%
Huron	Early/Mid	2011	Fresh/Processing	<1%
Bluecrop	Mid	1952	Fresh/Processing	95.5%
Draper	Mid	2004	Fresh	59.1%
Calypso	Mid	2015	Fresh	22.7%
Valor	Mid	2017	Fresh	4.5%
Bluegold	Mid	1989	Fresh/Processing	4.5%
Toro	Mid	1987	Fresh	<1%
Katahdin	Mid	2019	Fresh	<1%
Capella	Mid	2022	Fresh	<1%
Jersey	Mid/Late	1928	Processing/U-Pick	59.1%
Nelson	Mid/Late	1988	Fresh/Processing	40.9%
Rubel	Mid/Late	1912	Processing	36.4%
Legacy	Mid/Late	1994	Fresh	31.8%
Liberty	Mid/Late	2004	Fresh	31.8%
Cargo	Mid/Late	2014	Fresh	13.6%
Bonus	Mid/Late	NA	U-Pick	<1%
Chandler	Mid/Late	1994	Fresh	<1%
LoretoBlue	Mid/Late	Pending	Fresh	<1%
Talisman	Mid/Late	2020	Fresh	<1%
Elliott	Late	1973	Fresh/Processing	72.7%
Aurora	Late	2004	Fresh/Processing	36.4%
Last Call	Late	2015	Fresh/Processing	18.2%
LunaBlue	Late	Pending	Fresh	<1%

Note. NDA = no data available. NA = not applicable.

**Table 3. Production and fruit quality characteristics of the 14 northern highbush blueberry varieties that Michigan growers rated in a 2023 survey conducted by Michigan State University researchers. The cultivars are listed in the order of their harvest season window, from earliest in the season to latest.**

Cultivar	Harvest timing	Average cold hardiness <sup>a</sup>	Average vigor <sup>b</sup>	Average yield <sup>c</sup>	Average fruit firmness <sup>d</sup>	Average fruit flavor <sup>e</sup>
Duke	Early	2.33	2.73	1.87	1.46	2.33
Blueray	Early/Mid	1.69	2.00	2.07	3.54	2.07
Bluejay	Early/Mid	2.83	2.60	3.17	2.67	2.33
Bluecrop	Mid	1.84	1.90	1.95	3.03	2.05
Draper	Mid	2.83	3.77	2.67	1.18	1.92
Calypso	Mid	3.00	2.00	1.67	1.50	1.60
Jersey	Mid/Late	1.77	2.29	3.14	3.77	2.57
Nelson	Mid/Late	2.56	2.50	3.13	2.50	2.75
Rubel	Mid/Late	2.25	2.75	2.33	3.11	2.33
Legacy	Mid/Late	4.33	1.86	2.14	1.60	1.57
Liberty	Mid/Late	2.83	2.00	2.86	1.40	1.86
Elliott	Late	2.13	2.69	2.63	2.50	3.38
Aurora	Late	2.43	3.50	3.25	2.14	3.13
Last Call	Late	NDA	2.00	2.50	NDA	2.00
<b>Survey Averages</b>	<b>NA</b>	<b>2.52</b>	<b>2.47</b>	<b>2.53</b>	<b>2.34</b>	<b>2.28</b>

Note. NA = not applicable. NDA = no data available.

<sup>a</sup> Cold hardiness scale: 1 (*very hardy*), 2 (*hardy*), 3 (*neutral hardiness*), 4 (*poor hardiness*), 5 (*very poor hardiness*).

<sup>b</sup> Vigor scale: 1 (*very high vigor*), 2 (*high vigor*), 3 (*neutral vigor*), 4 (*low vigor*), 5 (*very low vigor*).

<sup>c</sup> Yield scale: 1 (*very high yield*), 2 (*high yield*), 3 (*neutral yield*), 4 (*low yield*), 5 (*very low yield*).

<sup>d</sup> Fruit firmness scale: 1 (*very firm*), 2 (*firm*), 3 (*neutral firmness*), 4 (*soft*), 5 (*very soft*).

<sup>e</sup> Fruit flavor scale: 1 (*very good flavor*), 2 (*good flavor*), 3 (*neutral flavor*), 4 (*poor flavor*), 5 (*very poor flavor*).







**Table 4. Pest and disease resistance of blueberry varieties available to Michigan growers.**

Cultivar	Harvest timing	Anthracnose <sup>a</sup>	Mummy berry (foliar) <sup>b</sup>	Mummy berry (flower) <sup>b</sup>	<i>Phomopsis</i> stem canker <sup>c</sup>	Stem gall wasp <sup>d</sup>
Duke	Early	Moderately resistant	Resistant	Intermediate	NDA	Moderately susceptible
Chanticleer	Early	Susceptible	NDA	NDA	NDA	Resistant
Hannah's Choice	Early	Moderately susceptible	NDA	NDA	NDA	Moderately susceptible
Blueray	Early/Mid	Susceptible	Susceptible	Susceptible	Susceptible	Resistant
Bluejay	Early/Mid	Moderately susceptible	Resistant	Resistant	Susceptible	Susceptible
Patriot	Early/Mid	Susceptible	NDA	Resistant	Susceptible	Moderately susceptible
Spartan	Early/Mid	Susceptible	Intermediate	Intermediate	Susceptible	Resistant
ArabellaBlue	Early/Mid	NDA	NDA	NDA	NDA	NDA
Blue Ribbon	Early/Mid	NDA	NDA	NDA	NDA	NDA
Osorno	Early/Mid	NDA	NDA	NDA	NDA	NDA
Huron	Early/Mid	NDA	NDA	NDA	NDA	NDA
Bluecrop	Mid	Susceptible	Intermediate	Intermediate	Susceptible	Resistant
Draper	Mid	Resistant	NDA	NDA	NDA	Resistant
Calypso	Mid	NDA	NDA	NDA	NDA	NDA
Valor	Mid	NDA	NDA	NDA	NDA	NDA
Bluegold	Mid	Susceptible	Susceptible	Resistant	NDA	NDA
Toro	Mid	Susceptible	Resistant	Susceptible	NDA	NDA
Katahdin	Mid	NDA	NDA	NDA	NDA	NDA
Capella	Mid	NDA	NDA	NDA	NDA	NDA
Jersey	Mid/Late	Moderately susceptible	Resistant	Intermediate	Susceptible	Very susceptible
Nelson	Mid/Late	Moderately susceptible	Resistant	Intermediate	NDA	Resistant
Rubel	Mid/Late	Moderately susceptible	Resistant	Intermediate	NDA	Resistant
Legacy	Mid/Late	Resistant	Resistant	Intermediate	NDA	Moderately susceptible
Liberty	Mid/Late	Resistant	NDA	NDA	NDA	Moderately susceptible
Cargo	Mid/Late	NDA	NDA	NDA	NDA	NDA
Bonus	Mid/Late	Moderately susceptible	NDA	NDA	NDA	NDA
Chandler	Mid/Late	NDA	NDA	NDA	NDA	NDA
LoretoBlue	Mid/Late	NDA	NDA	NDA	NDA	NDA



Cultivar	Harvest timing	Anthraco <sup>a</sup>	Mummy berry (foliar) <sup>b</sup>	Mummy berry (flower) <sup>b</sup>	<i>Phomopsis</i> stem canker <sup>c</sup>	Stem gall wasp <sup>d</sup>
Talisman	Mid/Late	NDA	NDA	NDA	NDA	NDA
Elliott	Late	Resistant	Resistant	Susceptible	Intermediate	Resistant
Aurora	Late	Moderately resistant	NDA	NDA	NDA	Moderately susceptible
Last Call	Late	NDA	NDA	NDA	NDA	NDA
LunaBlue	Late	NDA	NDA	NDA	NDA	NDA

Note. NDA = no data available.

<sup>a</sup> *Michigan Blueberry Facts: Anthracnose Fruit Rot (Ripe Rot)* (Miles & Schilder, 2008).

<sup>b</sup> *Michigan Blueberry Facts: Mummy Berry* (Schilder et al., 2008) based on artificial inoculations.

<sup>c</sup> Based on mortality rate from Baker et al. (1995) from artificial inoculations: Susceptible (0% to 20% survival), Intermediate (21% to 50% survival), and Resistant (>50% survival).

<sup>d</sup> Based on samples reported in *Michigan blueberry facts: Biology and management of stem gall wasp in highbush blueberries* (Fanning et al., 2020) and found in more recent cultivar screening.

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