Blanc du Bois

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Overview

'Blanc du Bois' is a white hybrid grape cross developed by Dr. John A. Mortensen at the University of Florida's Central Florida Research and Education Center (Leesburg, FL) in 1968. In Mortenson's original release document, he indicated three descriptors of significance for 'Blanc du Bois': (1) early ripening; (2) grows well on its own roots (though rootstocks may be necessary on some soils and for nematodes); and of greatest significance, (3) resistance to Pierce's disease. In addition, and also of major importance, 'Blanc du Bois' has very good wine making qualities. It was named in recognition of Emile DuBois, an immigrant from France to Florida, who planted >150 grape cultivars in the Tallahassee area and produced award-winning wines in his time. 'Blanc du Bois' is considered one of the best southeastern cultivars for premium wine due to its balanced flavor and resistances to both Pierce's disease and powdery mildew. It grows vigorously with a semi-erect growth pattern and produces medium-sized clusters with large berries. 'Blanc du Bois' ripens mid to late July in areas of Georgia west of Atlanta and will yield 1.8-4.5 metric tons (2-5 tons) per acre with good viticultural practices. It is grown throughout the Southeast but is most common in Florida, Georgia, Louisiana, and Texas. Though well adapted to the southeastern climate, it is still highly susceptible to anthracnose. The soluble solids content is on average lower than *Vitis vinifera* cultivars.

Origins and History

'Blanc du Bois' is a hybrid between native Florida grape cultivars and *V. vinifera* selections. It originated from the grape breeding program at the Central Florida Research and Education Center from a cross between 'Florida D6-148' and 'Cardinal' in 1968 (Fig. 1). The resulting hybrid was first transplanted to a vineyard in 1970 and was selected in 1974 for further testing under the name H18-37. The cultivar was named 'Blanc du Bois' and officially released in 1987. The main selling point for the cultivar is resistance to Pierce's disease, a fatal vascular disease of *V. vinifera*, numerous hybrids and some native grapes. Pierce's disease is prevalent in the Southeast at lower elevations and latitudes, as warmer winter temperatures allow for winter survival of *Xylella fastidiosa*, the responsible bacterium. The introduction of 'Blanc du Bois' allowed for production

of a white wine with vinifera-like qualities in regions where vinifera grapes could not be grown previously, due to Pierce's disease.

Vine and Fruit Characteristics

As originally reported, 'Blanc du Bois' has a semi erect growth habit and grows vigorously, requiring a Watson training system or similar (high-wire bilateral cordon). The leaves average 9 cm (3.5 in) long by 12 cm (4.7 in) wide. The adaxial (upper) leaf is dark green and moderately rugose, while the abaxial (lower) leaf surface is dull green and sparsely covered by hairs. Teeth on the leaf margins are bilaterally convex. Internodes vary from 4-10 cm (1.6-3.9 in) (Fig. 2), and fruit is usually borne on the second and third nodes of the shoot. 'Blanc du Bois' wood ripens to brown. This cultivar is self-fertile (Fig. 3), and fruit clusters have medium compactness, allowing for good spray penetration (Fig. 4). Clusters are medium-sized and have an average weight of 133 grams (0.3 lb) and 45-55 berries per cluster, with each berry averaging 2.9 grams (0.1 oz). Individual fruit are round, light green, and juicy, with skins slipping easily from the pulp when ripe. Like most wine grapes, 'Blanc du Bois' berries have large seeds that render them undesirable as table grapes, and seeds per berry average 3.2.

In the Vineyard

'Blanc du Bois' readily roots from cuttings, and rooted cuttings can be grown out and planted in a wide variety of soils. For good growth and optimum fruit production, it prefers more acidic soils in the 5.5 to 6.5 range, though it can tolerate more alkaline (calcareous) soils with pH of 7.0 or greater with the aid of rootstocks (e.g. 1103P or 5C). Appropriate training systems for this cultivar are high trellises of around 1.7 m (1.8 yd) with a divided canopy to account for its vigorous growth (Fig. 5). As mentioned, a Watson training system of a high-wire bilateral cordon with a horizontally divided canopy works well. 'Blanc du Bois' normally breaks bud in March, and harvest occurs in mid to late July in areas west of Atlanta and a week or two earlier in southern Georgia; however, these parameters may vary based on latitude and other parameters. In northern Florida, harvest dates range from June 30th to July 7th. Since budbreak occurs early, 'Blanc du Bois' is susceptible to cold and frost damage in many areas. This cultivar is self-fruiting and very productive; when a full crop is possible, yields are projected at 11.9 metric tons per hectare (5.3 tons per acre). 'Blanc du Bois' ripens well even with hot days and warm nights, making it well suited for areas at low latitudes. However, caution and testing should be conducted with higher elevations and latitudes, as early, severe cold conditions may limit productivity. 'Blanc du Bois'

requires 110-125 days from bud break to fruit maturation, meaning that it is a short-season grape. With extended hang time, grapes can "shell" from the clusters, resulting in lost production.

In the Cellar

'Blanc du Bois' has the capacity to make premium white wines that are similar to some vinifera wines. The berry flavor profile was originally described as similar to Muscat cultivars; since Muscat is in the heritage of 'Blanc du Bois', this should come as no surprise, and the taste profile of 'Blanc du Bois' wines likely derives in part from this background. Wine tasting panels have put it in the very good range for its favorable sugar:acid balance and spicy notes. 'Blanc du Bois' will make a spicy wine with floral, citrus flavors. It can also make a sparkling wine or a sweet wine fortified in the style of Madeira. Harvest generally takes place at 16° to 22° Brix, 6-10 grams per liter titratable acidity and pH 3.2-3.3 in Georgia, though Texas reports a juice pH of 3.4-3.8. By comparison to *V. vinifera*, 'Blanc du Bois' does not have high soluble solids. The juice oxidizes within an hour after pressing to a dark brown color, but it will lighten during fermentation. It can serve as a blending grape as well.

Diseases and Pests

'Blanc du Bois' is highly tolerant to Pierce's disease, meaning that the bacterium can be found in the xylem without producing symptoms, death, or yield reductions. Based on observations wherever grown, it appears to have strong resistance to powdery mildew as well. However, it is highly susceptible to anthracnose. Other common diseases observed on 'Blanc du Bois' are black rot, bitter rot, ripe rot, sour rot and downy mildew, but all of these diseases can be managed by cultural practices and proper use of fungicides. Cultural management is important for control of most grape diseases. Nursery plants should be inspected and be free of viruses and crown gall. Among the cultural practices of particular importance in the vineyard, dropping mummified fruit to the ground during pruning operations is critical. Diseased canes should be pruned out each winter, and these should then be destroyed outside the vineyard. Both of these practices will reduce carryover inoculum that can initiate new infections in the spring of the following year. Throughout the year, any practice that increases airflow and reduces drying time within the canopy or clusters will be of value for disease management. To adequately control diseases, fungicides should be applied every 10 to 14 days when conditions are dry and every 7 to 10 days when conditions are wet.

Common insect pests include Japanese beetles and grape root borers. Bees and wasps can be problematic in rotted clusters as well. Grape berry moth is reported as a primary pest in Texas, but 2-3 insecticide applications have been reported to provide control where needed. Mortensen originally reported that 'Blanc du Bois' is tolerant of nematodes, and though not mentioned by Mortensen, there is no report of Phylloxera damage on self-rooted vines – dispelling the need for rootstocks in some venues. However, relative nematodes, recent research in Georgia indicates that several nematode species do build up to levels which are assumed to be damaging. In the absence of more defined research, rootstocks should at least be considered for nematodes.

Downy mildew: In an early publication (Mortenson 1987), 'Blanc du Bois' was reported to be resistant to downy mildew, but this is not the case; it is not as susceptible to disease development as *V. vinifera* cultivars, but downy mildew is definitely a significant pathogen of 'Blanc du Bois'. Caused by the oomycete *Plasmopara viticola*, downy mildew can cause extreme crop loss, as it attacks both leaves and fruit. Infected leaves have oily yellowish spots on top and a subsequent white downy growth on the bottom – the fruiting structures and spores that provide inoculum for secondary infections (Fig. 6). Young berries are very susceptible to infection, but berries develop ontogenic (age-related) resistance as they develop, meaning that roughly pea-size berries start to become resistant to infection. Without regard, the vines must be sprayed season long to preserve leaves, as complete defoliation can occur on unsprayed vines. Premature defoliation can result in issues with quality fruit production, but winter injury and kill can also be observed in vines that are weakened due to lack of carbohydrate production and storage. Several fungicides are registered for downy mildew management. Among these, mancozeb and captan products provide the backbone for any downy mildew management program. Phosphonate fungicides are also active, but phytotoxicity can result at higher concentrations; following label directions relative final fungicide concentration limits should help to prevent damage.

Anthracnose: The fungus *Elsinoe ampelina* causes anthracnose and will attack all green plant tissues, but the most important damage is observed on fruit (Fig. 7). 'Blanc du Bois' is very susceptible to anthracnose, and anthracnose is particularly problematic in warm, wet climates – those where 'Blanc du Bois' is often grown. Anthracnose forms black leaf spots that eventually make shot-holes in the leaves. On the berries, lesions start as small, purple spots that eventually encompass the berry. Complete losses are possible on unsprayed plants. Use of calcium polysulfide (lime sulfur) products during the late-dormant period just prior to bud break provides one of the

major means of disease management for this fungus. Calcium polysulfide products also provide significant control of Phomopsis cane and leaf spot. As with downy mildew, mancozeb and captan products provide the backbone for management of anthracnose, Phomopsis, and black rot diseases. However, there are numerous other fungicides available, so consult spray guides for your region when developing spray programs.

Black rot: The current scientific name for the pathogen that causes black rot is *Phyllosticta ampelicida*. Until recently, it was also known as *Guignardia bidwellii*, so much of the scientific literature will reference it as such. The fungus can infect all new growth, but it is predominantly a problem on leaves and fruit (Fig. 8). Lesions can occur on petioles, pedicels, shoots and tendrils of the grape plant. Symptoms include discolored lesions that are brown to black, with pepper-like pycnidia showing up in the lesions. On leaves, round to irregular spots are tan to brown and also contain pepper-like pycnidia within the spot. Tan to brown discolored spots on fruit will expand to cover the entire fruit and will eventually produce mummies that are bluish-black and appear as raisins. Again, pepper-like, raised pycnidia are observed in the spots as they develop and mature. Under a hand lens or dissecting scope, these pycnidia appear as raised pimple-like structures arising from the fruit skin. Mancozeb and captan products provide the backbone for black rot management as well, though mancozeb is more active than captan. Several other fungicides are registered, and use of these can provide increased disease control when needed, especially under wet conditions.

Bitter rot: This rot is difficult to distinguish from black rot on fruit clusters. Caused by the fungus *Greeneria uvicola*, it is yet another of a series of rots that can impact 'Blanc du Bois' production. The acervuli fruiting structures appear similar to those of black rot, though they do look different to the trained eye when viewed under a hand lens or microscope. As the berry rots, it forms a hard, black, raisin-like structure that is virtually indistinguishable from that formed by black rot (Fig. 9).

Sour rot: This disease is caused by acetobacter (acetic acid) bacteria and yeasts that enter wounds in the fruit. Wounding can be caused by fruit flies, birds, machines, excessive rain resulting in splits, etc. When sour rot occurs, the juice in berries essentially forms vinegar, resulting in a vinegar-like smell that further attracts more insects (Fig. 10). Overall loss of fruit quality is observed, and harvested sour-rotted fruit will severely reduce wine quality. Use of insecticides for control of drosophilid fruit flies has shown promise in reducing this disease.

Ripe rot: This disease is caused by fungal species in the genus *Colletotrichum*. Again, mancozeb and captan products are critical for management. However, under wet conditions, additional fungicides should be considered. Symptoms of the disease are reddish-brown spots on fruit that eventually develop salmon-colored oozing spore masses (Fig. 10). As with black rot, berries shrivel to form mummified fruit.

Viruses: Limited information is available relative to viruses that infect 'Blanc du Bois', but they do occur. Among these, grapevine leafroll-associated virus and grapevine red blotch virus are commonly observed on *V. vinifera* as well, though symptoms may be moderately different on 'Blanc du Bois'. Viral leaf symptoms include crinkling to curling, tattered leaves with red to necrotic discoloration, and mosaic to yellow spotting (Fig. 11). Unfortunately, virus symptoms can be readily confused with nutritional issues, though nutritional issues are often more uniform across a vineyard block, whereas virus symptoms may initially be confined to limited numbers of scattered vines. Diagnostic clinic testing may be required to confirm whether viruses are present, as well as which viruses are involved. Clean plant material should always be utilized to start vineyards, and vector management (e.g. mealybug control for grapevine leafroll-associated viruses) may be considered.

Bunch stem necrosis: Some regions have experienced bunch stem necrosis (Fig. 12), an ill-defined condition that results in significant yield losses. No definitive cause has been determined, but nutritional imbalance, cold-damage, insect damage, etc. have been implicated. Shatter or necrosis of the blooms can occur early, and fruit set and total fruit number are reduced.

Grape root borer: Larvae of the grape root borer *Vitacea polistifromis* attack the root system and crown (Fig 13). They are not visible, so they often go unnoticed for some time until vines decline and die. Control is limited, with use of mating disruption being one of the few tools that remain for managing this insect. As compared to muscadines and some other hybrids, 'Blanc du Bois' succumbs readily to a limited infestation of grape root borer – resulting in dieback and death in 1-2 years on unmanaged vines.

Japanese beetle: Occurring yearly, Japanese beetles (*Popillia japonica*) attack foliage and will skeletonize leaves if left untreated (Fig. 14). They are very active in the summer, and though vines

can take a considerable amount of damage without affecting yields, damage in 'Blanc du Bois' can be extreme in some years. Japanese beetles prefer smooth-leaf cultivars, so that may be a reason for excessive damage in 'Blanc du Bois'. Foliar insecticides can provide effective management of this insect. In addition to Japanese beetles, June beetles, which can also feed on the fruit, can be problematic in some locations, such as southern Mississippi and Georgia.

Synopsis

'Blanc du Bois' has made a significant contribution to wine production in southeastern regions where Pierce's disease is prevalent. Though possessing resistance or tolerance to Pierce's disease, Phylloxera, and powdery mildew, this cultivar is not without fault, and it does require an intensive integrated pest management (IPM) program. Weed management, with a weed free strip under the vines and with mowed row middles, is also important in order to decrease drying times and reduce diseases. We cover here the major issues observed with this cultivar to date, but other periodic pests, such as spider mites, may also be observed. Scouting is always of value, and should you come across new issues or have trouble identifying diseases, insects or weeds associated with your vineyard, do not hesitate to contact your local County Extension Agent. They possess a wealth of information and are able to bring numerous resources to bear to answer your questions.

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Figures

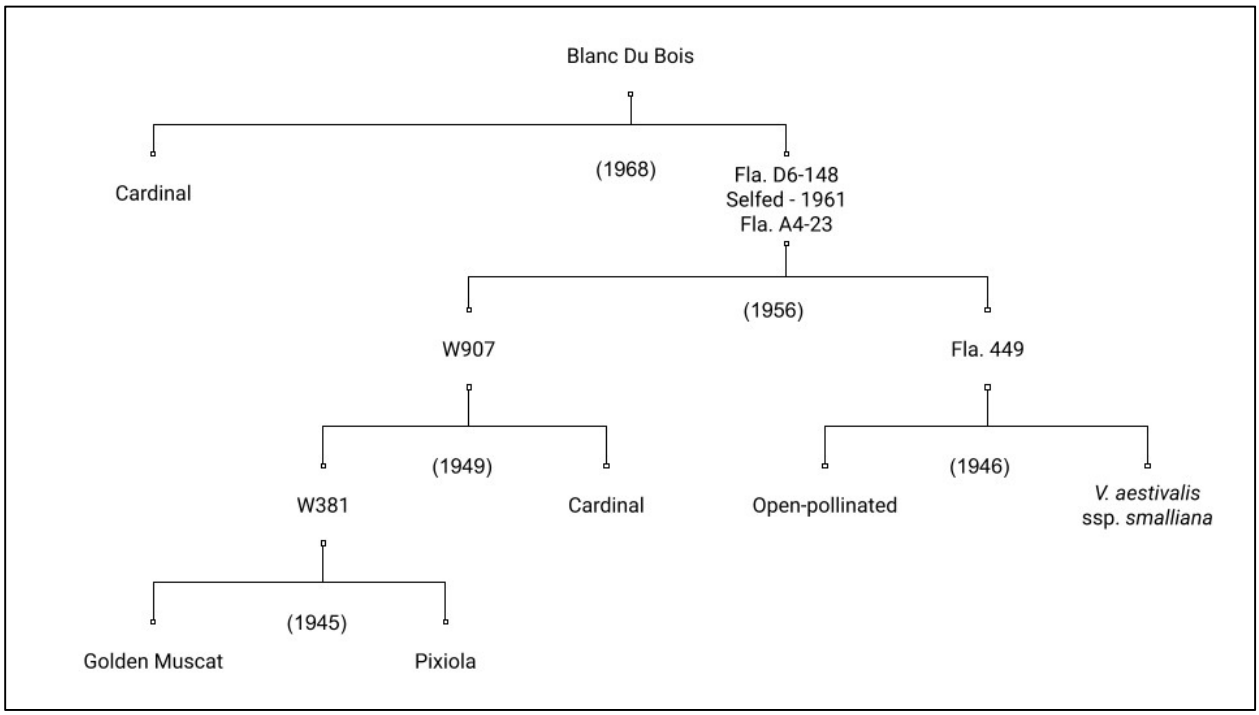

Figure 1. Breeding history of 'Blanc du Bois'. As a hybridized product of breeding from *Vitis vinifera* and native grapes, a palatable grape was produced that is also resistant to Pierce's disease (*Xylella fastidiosa*) and powdery mildew (*Erysiphe necator*) (Mortensen, J.A. 1987). However, susceptibility to anthracnose (*Elsinoe ampelina*), downy mildew (*Plasmopara viticola*), and several other diseases were maintained.

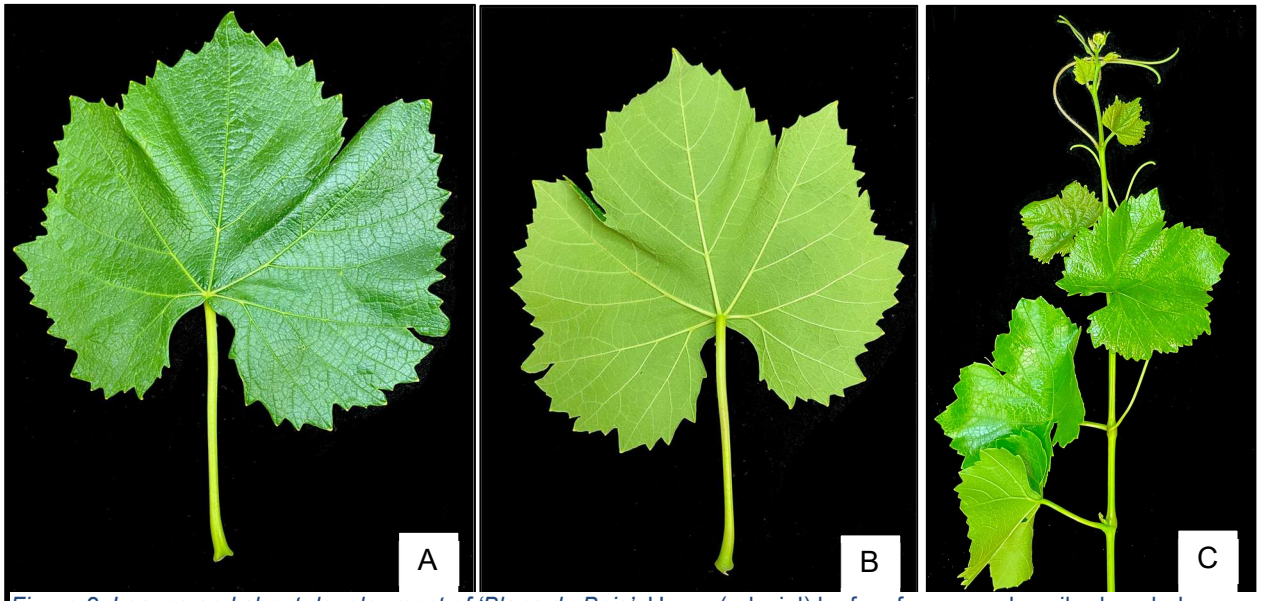

Figure 2. Leaves and shoot development of 'Blanc du Bois'. Upper (adaxial) leaf surfaces are described as dark green and moderately rugose (A), while the lower (abaxial) leaf surface is dull green with sparse hairs (B). Mature leaves average 9 cm long by 12 cm wide. Internodes are 4-10 cm apart, and tendrils are discontinuous and branched (Mortensen, J.A. 1987; photo credit W. Sanders [University of Georgia]).

Figure 3. 'Blanc du Bois' bloom. 'Blanc du Bois' is self-fertile and produces prolific flowers for subsequent fruit production. However, poor pollination due to wet conditions, as well as frost/freeze damage, can be an issue in some regions in some years – resulting in poor fruit set and/or uneven ripening (photo credit P. Brannen [University of Georgia]).

Figure 4. 'Blanc du Bois' fruit cluster characteristics. 'Blanc du Bois' is self-fertile, and fruit clusters have medium compactness, allowing for better spray penetration. Clusters were originally reported in Florida as having 45-50 berries, with each weighing 2.9 gram (133 g cluster weight) (Mortensen, J.A. 1987; photo credit Paula Burke [University of Georgia].

Figure 5. Growth habit of 'Blanc du Bois' in the vineyard. Vigorous growth associated with 'Blanc du Bois' requires appropriate training systems, such as high trellises of around 66" (167 cm [~1.7 m]) with a divided canopy (photo credit P. Brannen [University of Georgia]).

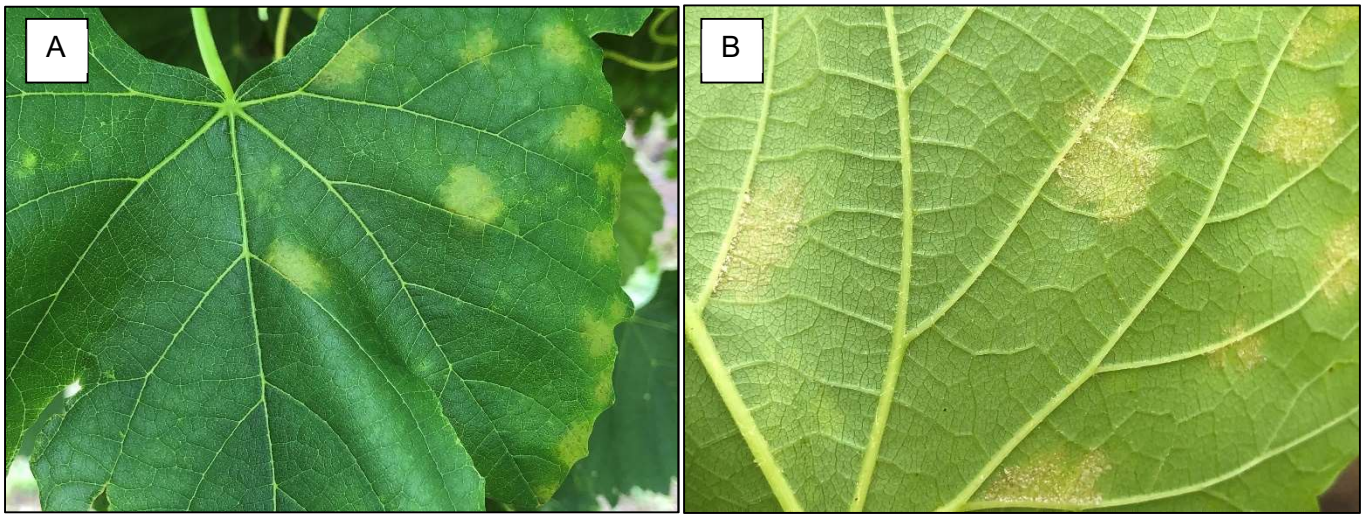

Figure 6. Downy mildew (Plasmopara viticola) symptoms on 'Blanc du Bois'. Initial symptoms of downy mildew are "oil spots" on the upper leaf surface (A), with sporulating lesions on the lower leaf surface (B). Since powdery mildew is not generally associated with this cultivar, any mildew symptoms are likely related to downy mildew. If left untreated, vines will defoliate. Early fruit infection is also possible, though ontogenic resistance is observed, meaning that fruit are largely resistant after pea-size development (photo credit P. Brannen [University of Georgia].

Figure 7. Anthracnose (Elsinoe ampelina) on 'Blanc du Bois'. Anthracnose is a major disease of 'Blanc du Bois'. Also called "birds eye spot", this disease is particularly problematic on this cultivar. However, optimized fungicide spray programs can provide excellent management (photo credit Justin Scheiner and Fran Pontasch [Texas A&M University]).

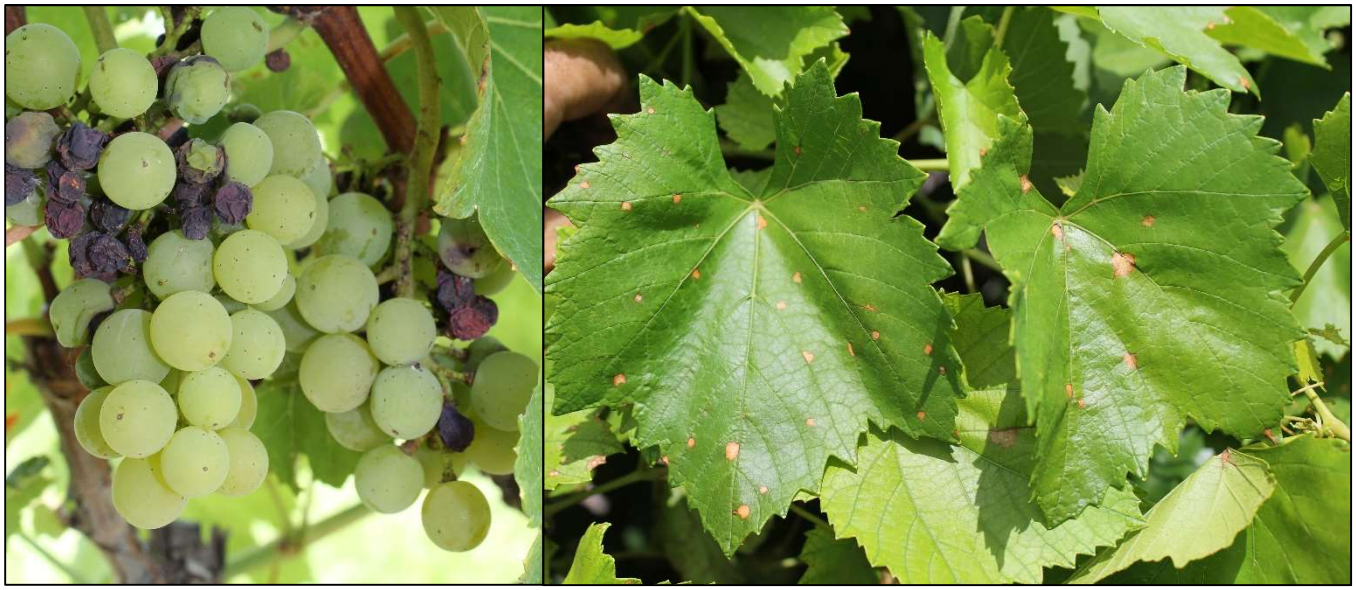

Figure 8. Black rot (Phyllosticta ampelicida) on 'Blanc du Bois' fruit. Symptoms on fruit initially present as brown spots that rapidly turn to black, engulfing the fruit and forming a raisin-like, hard, black mummy (A). Leaf symptoms are relatively easy to identify – brown spots with pepper-like fruiting bodies (pycnidia) scattered throughout the spots (B) (photo credit Justin Scheiner and Fran Pontasch [Texas A&M University]).

Figure 9. Bitter rot symptoms on 'Blanc du Bois' fruit. Acervuli fruiting structures are seen on newly infected and mummified fruit. Bitter rot can easily be confused with black rot, though the fruiting structures do appear different when viewed under a hand lens or microscope (photo credit Justin Scheiner [Texas A&M University]).

Figure 10. Sour rot (yeast/bacterial) and ripe rot (Colletotrichum gloeosporioides) on 'Blanc du Bois'. Sour rot (A) initially resembles black rot, but sour rot is a soft rot that produces vinegar-like smells in rotted fruit. Salmon-colored spore masses give ripe rotting fruit an orange color, but once fruit is mummified, ripe rot is difficult to distinguish from other rots like black or bitter rot (photo credit Justin Scheiner and Fran Pontasch [Texas A&M University]).

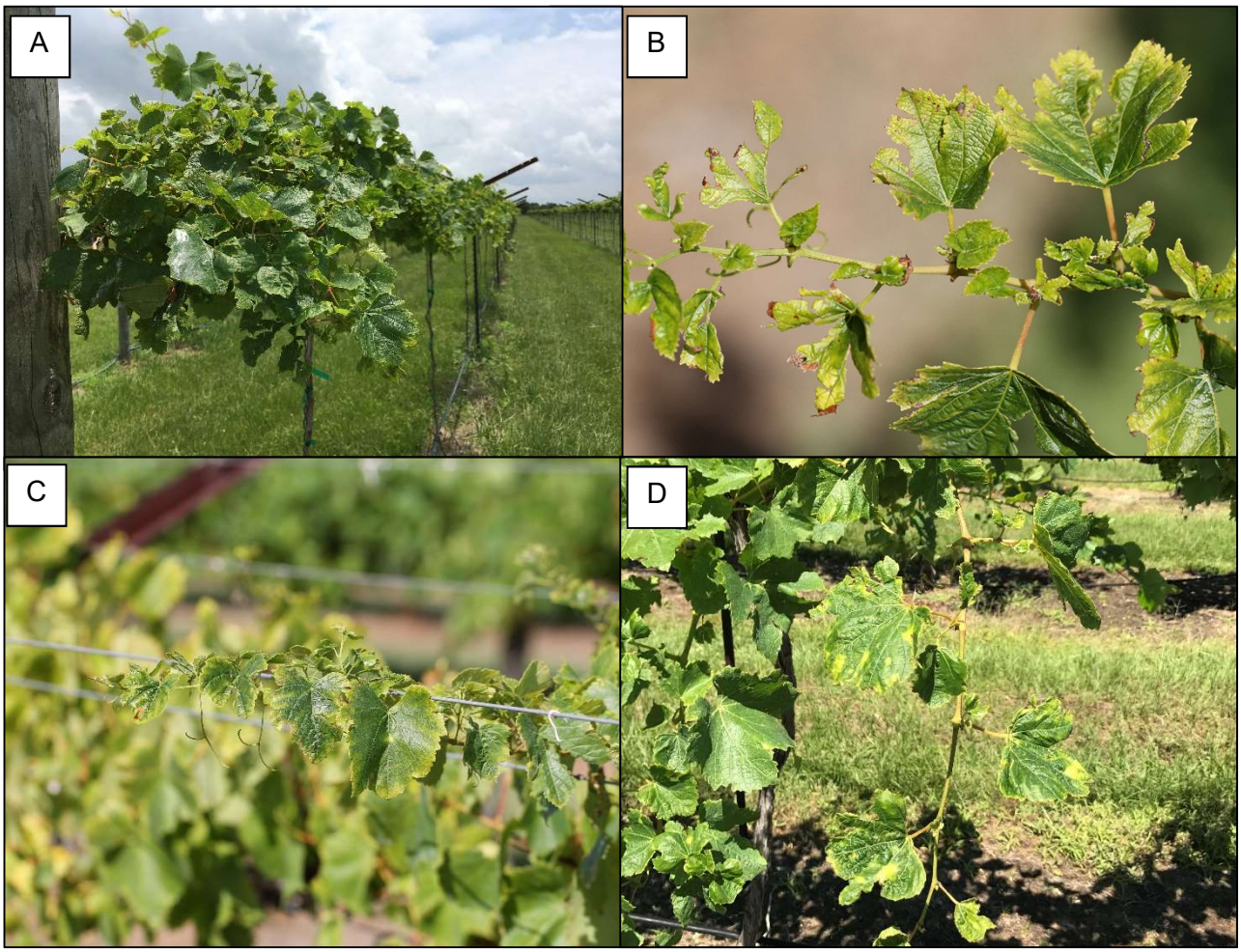

Figure 11. Viral symptoms on 'Blanc du Bois'. Leaf symptoms of viruses can range from crinkling to curling (A; grape leaf roll), tattered leaves with red to necrotic discoloration (B; red blotch), and mosaic to yellow spotting (C and D; mixed infections) (photo credit Justin Scheiner [Texas A&M University]).

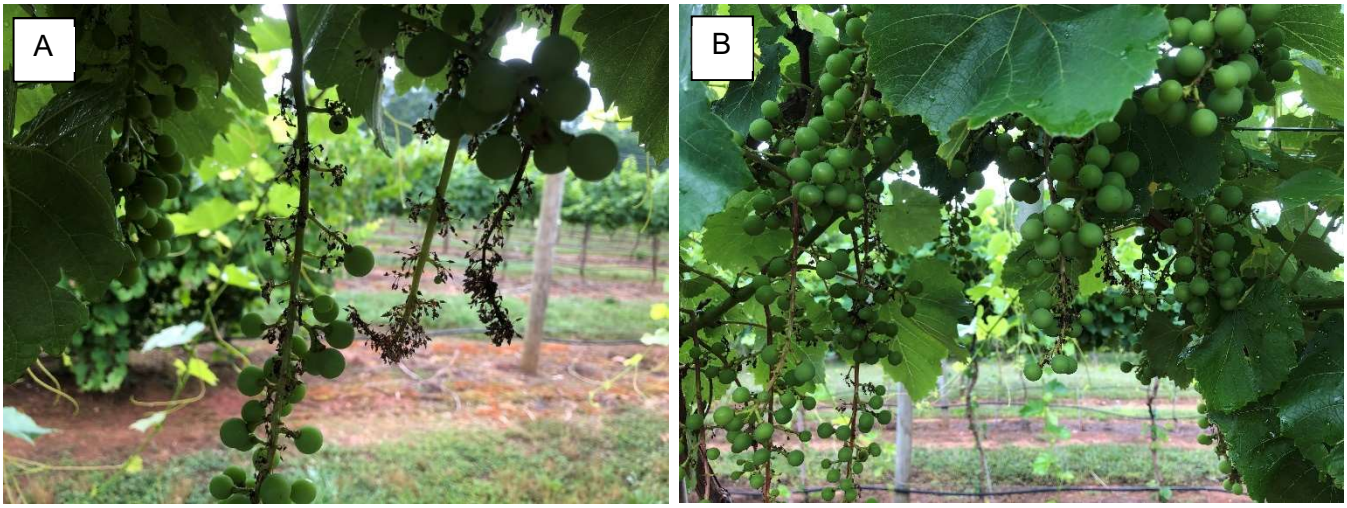

Figure 12. Bunch stem necrosis on 'Blanc du Bois'. Some locations have experienced bunch stem necrosis, an ill-defined condition that results in significant yield losses. No definitive cause has been determined, but nutritional imbalance, cold-damage, insect damage, etc. have been implicated. Shatter or necrosis of the blooms can occur early (A), and fruit set and total fruit number are reduced (B). The issue appears to be regional (photo credit P. Brannen [University of Georgia]).

Figure 13. Grape root borer injury on 'Blanc du Bois'. 'Blanc du Bois' vines with grape root borers (*Vitacea polistiformis*) in the plant crown will gradually collapse over time as borer damage increases (A). Damage develops randomly throughout the vineyard, with initial symptoms presenting as chlorotic, yellowed leaves with reduced growth. Trunk diseases can cause similar symptoms. In symptomatic plants, grape root borers can be found under the bark and root tissue at the plant crown (B) (photo credit P. Brannen [University of Georgia]).

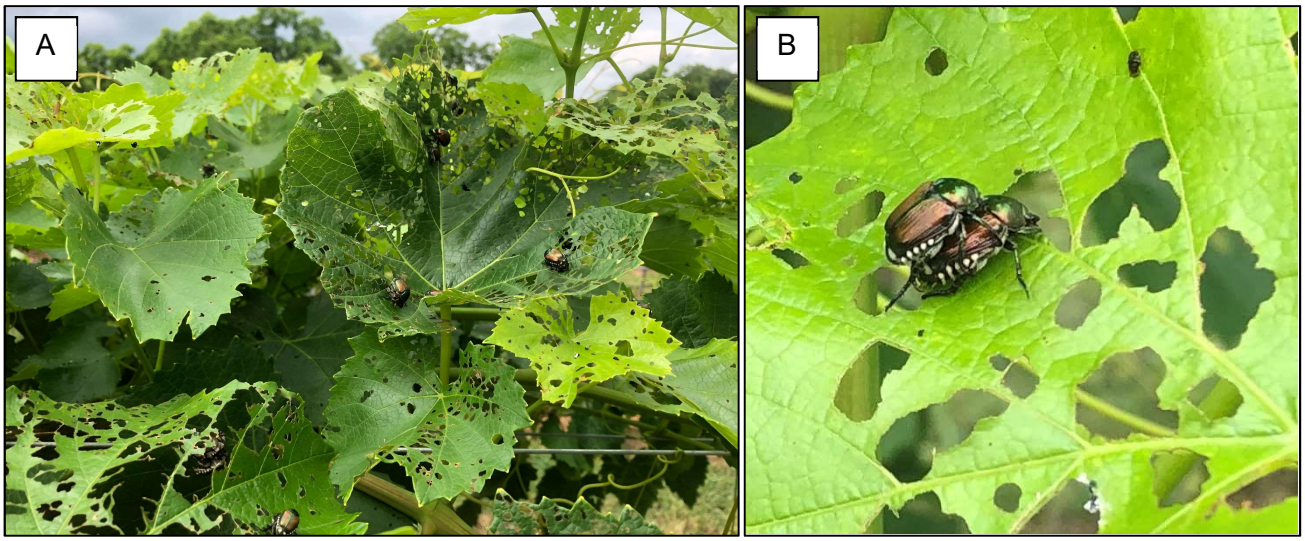

Figure 14. Damage to 'Blanc du Bois' caused by Japanese beetles (Popillia japonica). Yearly infestations of Japanese beetles and damage can be expected in 'Blanc du Bois' plantings (A), but the extent of the damage will vary from year to year. Japanese beetles skeletonize vines (eat leaf material between veins) from the top down (B). Significant damage can result if left unchecked (photo credit P. Brannen [University of Georgia]).