Blackberry Variety Selection Opportunities

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Introduction

Blackberries offer another small fruit option for eastern US growers for a range of markets. The major issues for Pennsylvania and Mid-Atlantic growers when considering blackberry varieties include winter hardiness, maturity date, quality, yield, berry size, and overall adaptation. I will share some information in general about blackberries, some market and production changes in the US, and finally some variety thoughts for Mid-Atlantic growers.

Blackberry and raspberry plants are rather unique in the fruit world in that they have a perennial root system but have biennial canes. This means the canes live two years and then die. The two cane types are primocanes, or first-year canes, and floricanes, which are second-year canes. In red raspberry, primocane- and floricane-fruiting varieities exist and both have substantial commercial value. In blackberries, floricane-fruiting has been the basis of all blackberry production and commercial primocane-fruiting varieties did not exist prior to the release of Prime-Jim®, Prime-Jan®, and Prime-Ark® 45 by the University of Arkansas. Primocane fruiting offers the opportunity for late summer and fall production, to complement summer production of blackberries. However, there is much to be done in the improvement of primocane blackberries and all the answers are not in place yet for Mid-Atlantic growers.

Aspects of Blackberry Production History

A survey of eastern U.S. (east of the Rocky Mountains) production in 1990 indicated blackberries were marketed in the following ways: 62% pick-your-own, 36% pre-picked fresh market (mainly on-farm or local fruit stand sales), and 2% processed. The survey results did not indicate that any production was for shipping to distant markets or grocery stores. In this survey, production area increased 56% from 1980 to 1990, with a further projected 66% increase in production area from 1990 to 2000. Again, this increase was envisioned to be largely marketed locally. In the early 1990s, blackberries were not found on grocery store shelves across the U.S (some were present on the west coast), due mainly to the lack of postharvest handling capability of varieties released prior to that time, but also because blackberries had never made much headway into the competition for commercial grocery shelf space.

Some of the new varieties beginning to be planted in the early 1990s were found to have fruit firmness adequate for shipping. Chester Thornless displayed a good level of firmness and shelf life, and in the world picture became a major shipping berry later in the decade. The Arkansas-released Navaho was found to have excellent shelf life. Subsequent releases from Arkansas included 'Arapaho' and 'Apache', each of which had fruit capable of withstanding shipping. These varieties contributed to a major shift in the production outlook for shipping of blackberries from that of a local-marketed crop to one shipped for retail marketing.

A major development occurred during the 1990s: the shipping of blackberries to the U.S. from Chile and Guatemala. Soon thereafter, the development of production technology in Central Mexico increased availability of eastern US-developed blackberries. Mexican production is centered in the highlands of the state of Michoacan and Jalisco, and utilizes a number of techniques to force the Brazilian variety Tupy (an offspring of the Arkansas variety Comanche) to flower and fruit in an area of no chill. The fruit is harvested from mid October until May or early June in this region, and currently provides fresh blackberries for U.S.

grocery shelves during the winter months. Mexican production has supplanted Chilean blackberry shipping to the U.S. due to less expensive transportation costs of trucking fruit from Mexico compared to air freight required to move blackberries from Chile. Production area in Mexico is estimated to be 6000-8000 acres. The presence of berries in the marketplace in the winter and late spring enhanced the consumer's awareness of blackberries as a grocery item rather than a local item picked on a farm or from wild plants. The bottom line is that now blackberries are a year-around produce item!

American berry shippers (in the eastern and western US) also took note of the expanded potential of blackberries in the shipping market, spurred by the success of the Mexican berries shipped and marketed during the "off" season. These marketers felt that if off-season sales could be this successful, why not have expanded marketing during the "normal" US berry production seasons? This has led to an expansion in acreage grown for shipping since the early to mid 2000s, particularly in southern Georgia, Arkansas, Texas, and North Carolina. California greatly increased production in recent years also.

Local production for pick-your-own, farmers markets, or on-farm sales has also increased recently, though it is difficult to determine trends in this area due to few production statistics being available. However, the expanding number of thornless variety options, enhanced fruit quality, and increased interest in berry consumption for human health benefits should positively impact this type of production.

Primocane-Fruiting in Blackberries

The first recorded occurrence of a primocane-fruiting blackberry that I am aware of was a wild plant found by L.G. Hillquist of Ashland, Va. There is no record of breeding with this plant until Dr. Jim Moore obtained it in the mid-1960s while accumulating germplasm for the University of Arkansas breeding program. Although primocane fruiting was not pursued for many years in Arkansas breeding, seedlings evaluated in 1997 resulted in Prime-Jim® and Prime-Jan®, released in 2004. Primocane fruiting has been vigorously pursued in Arkansas breeding since the late 1990s, and great headway has been made in improving fruit quality, incorporating thornlessness, and shifting the fruiting period to both earlier and later ripening.

Blackberry Varieties to Consider

Chester Thornless. Although I would like to recommend an Arkansas variety as my top choice for Mid-Atlantic growers, this variety has provided sustained high yields and good hardiness. The main disadvantage of the USDA-ARS-developed Chester Thornless is overall flavor and quality. It ships exceptionally well, but percent soluble solids is not as high as most fresh-fruit consumers desire and a tart taste is normally noted unless fully ripe. This is a semi-erect-caned type. There are other varieties of this cane type such as Hull Thornless, Black Satin, Thornfree, Dirksen Thornless, and Smoothstem, and all are likely adapted to the Mid Atlantic (they originated in southern Illinois or Maryland), but concerns of tart flavor are often expressed. These varieties tend to be later than Arkansas developments, fruiting in late June to early July in Arkansas.

Triple Crown. The last release of the USDA-ARS varieties, Triple Crown is renowned for exceptional flavor. Some consider this the best-tasting eastern US blackberry. It is moderate to high yielding, appears to have adequate hardiness for the Mid-Atlantic (maybe not quite as hardy as Chester Thornless?), and is earlier in ripening than Chester Thornless (ripens about June 25-30 in Arkansas). The biggest drawback to Triple Crown is berry firmness, and it is not considered a shipping berry. For local markets with short holding times, and pick your own, it is a winner.

Ouachita. If you consider one Arkansas variety, consider this one. It is successful coast to coast in the US, although I have not heard confirmations of its hardiness potential across the entire Mid-Atlantic region. Ouachita produces high yields of high quality berries (6-7 g) with soluble solids of 10-11%. It has erect canes, and ripens about June 10 in Arkansas. It has shown broad adaptation, and has been a major variety in expansion of the domestic shipping blackberry industry.

Navaho. The first Arkansas thornless, Navaho is considered by some to be the best shipping blackberry available. It has medium berry size (5 g) and moderate yield capacity. Sweetness is very good, usually 11-12% soluble solids. Its hardiness has been found to be good in the lower Midwest, and in some areas of the Mid-Atlantic. It is susceptible to orange rust, a fungal disease. It has erect canes, and ripens about June 20 in Arkansas.

Apache. The large-fruited Apache (10-11 g) is ad-

mired by some growers, and it has high vigor, productive, and healthy plant characteristics. It averages 11% soluble solids, and ripens about June 25 in Arkansas. Hardiness is not fully known for the Mid-Atlantic, but possibly information exists on this in trials in the region. The major negative attribute of Apache is that white drupes are often seen on some berries, particularly early in the season. This is a very serious defect for shipping, but local sales are usually not impacted as greatly. Concerns among grower reports vary from major to none on this trait.

Natchez. The newest of the Arkansas thornless , Natchez ripens about June 5 in Arkansas. It has large, long berries, and is eye catching on the vine or in the clamshell. Hardiness is not known on this 2007 release, so care should be taken to determine if it is adapted to the Mid-Atlantic. It averages about 9.5% soluble solids, and berries can be tart if crop load is excessive as it can be in some southern plantings.

Prime-Ark® 45. The first shipping-quality primocane-fruiting blackberry released in 2009, it is hoped that Prime-Ark® 45 will provide the basis for developing a late summer to fall-fruiting blackberry production season in the US. It has large berries (up to 10 g) with good soluble solids (10% commonly) that stay black in storage along with good firmness retention. The floricane crop ripens June 5 in Arkansas, and the primocane crop in mid-August. However, the primocane crop ripe date depends on location. Along the Central Coast of California, first ripe is usually Sept. 1, and in Oregon's Willamette Valley mid-September. This variety has been tested at Penn State Univ. by Kathy Demchak, and a limitation has been getting good yields before cold temperatures develop. High tunnels have helped, but trials are continuing to determine if adequate yields can be attained in the region. Only trials of the variety are suggested at this time.

Prime-Jan®. Released as one of the first primocane-fruiting blackberries in 2004, this variety was originally intended for home garden use. However, limited trials have found it to have some commercial potential. Quality is acceptable, with moderate storage capability and soluble solids on average about 9%. It ripens earlier than Prime-Ark® 45 by about 2 weeks, so has a potential of maturing more of the fall crop prior to frost. However, its crop has not fully ripened (non-high tunnel grown) in upstate New York. Again, testing the variety for specific locations and management (high tunnel or not) is recommended prior to full commercial use is considered.

John R. Clark is a university professor of horticulture at the University of Arkansas. His research responsibilities are his primary appointment, where he directs the University's Division of Agriculture fruit breeding program and manages the intellectual property rights of the program's developments. Crops he works with include blackberries, table grapes, muscadine grapes, blueberries, and peaches/nectarines. His research activities are carried out in Arkansas, several US states, and various countries in the world. He also teaches in the areas of plant breeding and fruit production and advises graduate and undergraduate students. A native of Mississippi, he has BS and MS degrees from Mississippi State Univ. and a PhD from the Univ. of Arkansas.

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