Domestication of the Highbush Blueberry at Whitesbog, New Jersey, 1911 – 1916

by Mark Ehlenfeldt, Ph.D., U.S. Dept. of Agriculture

In 1911, a cooperative project to domesticate the highbush blueberry was initiated between Elizabeth C. White of the J.J. White Company of Whitesbog, New Jersey and Frederick V. Coville of the U.S. Department of Agriculture, Washington, D.C. Selection and evaluation progressed rapidly and was based on three key factors: 1) selection of superior wild germplasm with the help of native pickers, 2) production of progeny from systematic crossing, and 3) clonal propagation by multiple methods. The first domesticated blueberry crop, marketed in 1916, represented a significant advance in blueberry quality and launched the modern blueberry industry.

Few other crops have as complete a record of their development from their inception to current day as does blueberry. Elizabeth White and Frederick Coville, who together domesticated the highbush blueberry, were both eloquent writers, so in assembling this summary, it seemed desirable to let their words about the domestication of blueberries tell the story.

On Basic Research in Blueberry Culture

Coville (1937): “Although every gardener today knows that blueberries, as well as hundreds of other kinds of plants associated with blueberries in their wild habitats, thrive only in acid soil, that fact apparently was not known to American horticulturists prior to these (Coville’s own) experiments with blueberries.”

White (1920): “Attempts to cultivate blueberries have most frequently failed however because the plants were set in soil of neutral or alkaline reaction which is best for most garden crops.

Blueberries require an acid soil, preferably one composed of peat and sand. This is the most important discovery made by Mr. Frederick V. Coville of the U.S. Dept. of Agriculture, who has made a careful study of the fundamental laws governing the growth of blueberries.”

Coville (1937): “...and by the end of 1910, when the first bulletin was published, the blueberry had been grown successfully from seed to fruit; selected plants had been propagated by grafting, budding, division, layering, twig cuttings, and root cuttings; methods of pollination had been devised and applied; and wild plants with superior fruit had been chosen as the basis for breeding experiments.”

On the Co-operation Between Elizabeth White and Frederick Coville in Developing Blueberry Culture

White (1920): “After reading Mr. Coville’s bulletin "Experiments in Blueberry Culture", I wrote the Department of Agriculture offering to co-operate in further experiments. The letter was based on the idea that my father and I could contribute experience that would be valuable in the development of this new culture, and that when tamed, blueberries would make for us a valuable secondary crop. Our primary crop is cranberries – for three generations we have grown them at Whitesbog. All along the dams and about the margins of the cranberry bogs, the highbush blueberry or swamp huckleberry as we call it in New Jersey grows wild. Blueberries and cranberries are close kin.

For ten years we have worked in close co-operation with Mr. Coville. When his breeding work developed so that
was desirable to try the seedling plants in the field, the trial grounds were rented at Whitesbog. I believe the co-operation of science with experience in commercial culture of a closely allied fruit has hastened the development of better blueberries.

In this co-operative development my part has consisted chiefly in the selection of fine wild plants; and in developing methods of field culture and of propagation on a commercial scale.”

On the First Plants Used as Parents

Coville (1937) (regarding ‘Brooks’ highbush): “In flavor, the berry was exceptionally good. It was sweet, but sufficiently acid to be decidedly superior to the mild-flavored fruit of the lowbush blueberry, *V. angustifolium* Ait., yet not sour like the Canada blueberry, *V. canadensis* Kalm (syn. *V. myrtilloides*), and it possessed in a high degree the flavoring ester that is the special characteristic of the best wild blueberries of New England. The delicious flavor of this wild blueberry from New Hampshire appears in all the cross-bred named varieties of blueberries except ‘Jersey’ and ‘Wareham’, and the flavor of those two varieties would be more delicious if ‘Brooks’ had been included in their ancestry.”

Coville (1937): “The second wild blueberry selected for breeding purposes was ‘Russell’. It was brought to my attention in 1909 by Frank Russell as the best lowbush blueberry on his 600-acre mountain farm at Greenfield, N.H. The original plant had become so shaded by the low branches of a young oak tree that it no longer produced fruit, but in the greenhouses at Washington its berries reached a diameter of over nine-sixteenths of an inch. The berries were light blue in color, and they ripened earlier than those of ‘Brooks’. This tendency toward earliness appears in all the progeny of the ‘Russell’ blueberry and is of great commercial importance because the earliest of the improved blueberries often bring the highest prices.”

White (1934)6: “When we started working together, Dr. Coville had no stock of blueberry plants of uniform quality; only a few hundred seedlings produced from two selected plants; one a lowbush, the other a highbush, with which he had been experimenting. My first task, therefore, was to locate fine wild bushes to be divided and tested under cultivation.”

White (1920): “In locating good bushes, I have depended almost entirely on the people who pick wild berries for market, and large size of the berry was the only point considered in making the first selection.”

White (1934): “Three bushes, which appeared promising, were located during the summer of 1911, and the last bush accepted for trial was found in 1916.”

White (1920): “To begin with we accepted plants with berries half an inch in diameter, but they were so easily found that we quickly raised our standard to 16 mm or about ⅝ of an inch.”

White (1934): “During that period (1911-1916) it happened that the total number (of bushes) accepted was an even hundred.”

White (1934): “Each person who brought an acceptable sample of berries was paid a dollar for putting labels on the bush and in addition was liberally paid, according to his idea of wages, for the time spent in guiding me to the bush. Their interest and personal pride was aroused by telling the finder of nearly every bush, “This may prove to be the best bush ever found and I am going to name it for you.”

Berries ¾ inches in diameter were brought me from a wild bush during the summer of 1912. They gave a new vision of the possible size of blueberries. I had never before seen berries much, if any, larger than a half inch in diameter. This variety was named Chatsworth from the village near which it was found and the small plants produced by division were tended with the greatest care. Dr. Coville used it in his breeding. It was a disappointment when passing years proved it of no value as a variety. The berries were soft and mushy; their flavor was poor and the plant was subject to disease. It also proved of little value as a parent in breeding.

The best of the hundred bushes located was that found by Rube Leek. In my notes on the variety, I at first used his full name, but Dr. Coville said Leek savored of onions and used in his notes the name Rube. Rube! What a name for so aristocratic a plant! Finally on Dr. Coville’s suggestion, a happy solution was found in the name “Rubel”; the finder’s first name plus the initial of his surname.”

“White (1920): “Of the hundred odd plants originally selected for the size of their berries, only six proved worthy of propagation for commercial fruit production. These are known as the ‘Rubel’, ‘Harding’, ‘Sam’, ‘Dunfee’, ‘Adams’, and ‘Grover’; each name perpetuating that of the discoverer of the original plant.”

White (1934): “A portion of each of the more promising wild bushes accepted for test at Whitesbog was given to the U.S. Department of Agriculture in order to further Dr. Coville’s work. He used them as parents in his blueberry breeding. When the seedlings resulting from his crosses were as large as they could be grown in two-inch pots they were sent to Whitesbog to be grown in open fields for a testing of
the fruit. No two seedlings are exactly alike, though there is a family resemblance between plants of the same parentage.

The testing of seedling blueberry plants at Whitesbog was done under the terms of a formal contract between the United States Department of Agriculture and Joseph J. White, Inc., first formulated in 1914.

The first five years of blueberry work at Whitesbog was entirely experimental. It began in 1911 and not ’till 1916 did we have any berries to sell. The crop that summer amounted to 21 bushels, and all not used in the family were sold to the Hudson River Day Line.”

White (1934): “We made an effort last year (1933) to locate in other parts of the country, plants with berries ¾ of an inch in diameter, or just the size of a cent. We offered $50.00 each for such plants, packed according to directions and delivered to the nearest express office – we to pay the transportation. The offer was advertised widely and I received hundreds of samples, none of which approached the best New Jersey berries in size. Our $50.00 offer still holds good and the plants would be of great value in the breeding work, especially if they came, from New England, about the Great Lakes, from North Carolina or from some other blueberry center, the climate of which differs appreciably from that of New Jersey.”

**On Breeding**

Coville (1937): “The first cross-pollinations between Russell and Brooks were made in the spring of 1911. Some of the resulting first-generation hybrids were cross-pollinated with each other in 1913. The resulting progeny, about 3,000 hybrids of the first and second generations, was grown to maturity in the field, with remarkable results.”

Coville (1937): “‘Brook’ and ‘Sooy’ were cross-pollinated in 1912. Nearly 3,000 seedlings of this parentage were grown, to maturity in the field. Among them were two plants that when propagated from cuttings became the improved blueberry varieties ‘Pioneer’ and ‘Katharine’.”

White (1920): “Lowbush hybrids resulting from a cross of ‘Brooks’ highbush (Vaccinium corymbosum) from New Hampshire with a selected lowbush (Vaccinium angustifolium) from the same state have been carried to the second generation. From a practical standpoint these lowbush hybrids promise to be very valuable. Among them are plants yielding fruit which ripens in New Jersey as early as that of the native wild lowbushes. The berries of the latter are small and insipid, but the berries of some of the early lowbush hybrids are large and of fine flavor. For New Jersey they promise excellent berries ready for market from June 15th to 20th. Among other hybrids, plants can be selected which will carry the blueberry season in New Jersey up to or beyond the first of September.

What are probably the best of the hybrids are known as 620A (later named ‘Pioneer’) and 830C (later named ‘Katherine’). They were selected from upwards of 3000 seedlings of the ‘Brooks’–‘Sooy’ cross. ‘Brooks’, I have already explained, is a New Hampshire highbush. Its largest berries are 14 mm or more than ½ inch in diameter. ‘Sooy’ is a highbush from New Jersey, the largest berries of which reach 16 mm or about ⅜ of an inch. On each of the two seedlings the largest berries reach a diameter of 18 mm. The berries of 830C are later and average a little larger than those of 620A. Since the parents of these hybrids were crossed, better wild plants have been found. Some plants resulting from crosses of these produced their first berries last summer. Among these one berry 20 mm in diameter was found. This satisfactory progress leads us to believe that the best results of the breeding work rest in the future and to look forward to blueberries an inch in diameter.”

**On Other Characteristics of Individual Plants**

Coville (1937): “Probably the most elusive and difficult thing to judge in a new blueberry is its flavor. After several hours of tasting, all blueberries taste alike, and they all taste sour.” - F.V. Coville -

White (1934): “The individual characteristics which make every seedling blueberry plant distinct from every other are innumerable. In connection with the fruit, the important differences include size, color, flavor, texture and time of ripening. The berries on one plant may be gone before those on another begin to ripen.
Of greatest importance, is the varying ability of plants to resist injury by frost. A remarkable example of this was observed early in my blueberry work. It was past the middle of May when a hard freeze came. Such an event spells disaster for cranberry growers, so the following day my father and I were investigating the extent of the damage when we observed two large blueberry bushes growing so close together that their branches intermingled. On one the young leaves, flowers and buds were uninjured, while on the other they were completely blackened as by fire.

Our selected plants varied in their resistance to frost injury, and the most tender have been discarded. None of them however were very susceptible - we unwittingly secured resistant plants because most of them were located in years when wild blueberries were seriously injured by frost.”

White (1920): “Among the blueberry diseases which are under observation is one which transforms nearly mature fruit into shriveled mummies instead of the luscious berries they would normally become. Certain plants whose other good points led us to consider them as a start for future varieties were found susceptible to this mummy berry disease and were discarded.” (probably the first mention of mummy berry, Monilinia vacinii-corymbosi)

On Future Prospects

White (1920): “The most serious check on the rapidity of this development (i.e. expansion of the industry) will probably be the difficulty of securing plants of the better varieties. You know ten years ago “they” said blueberries could not be started from cuttings. Mr. Coville has proven that “they” were wrong. We have proven that blueberry cuttings can be started with less elaborate equipment than that employed by Mr. Coville, but it is not yet plain sailing by any means, and our losses are heavy. Least year they were 75% of all cuttings put in.

This year we are making nearly our whole stock of better plants into cuttings. There will, for a few years c...
Celebrating the 33rd Annual Whitesbog Blueberry Festival
by Allison Pierson

Summer food festivals in South Jersey may be commonplace, but there was nothing common about the 2016 Whitesbog Blueberry Festival. Celebrating 100 years of blueberry cultivation in the village where it all happened, and being able to walk through the restored worker’s cottages and the home of Elizabeth Coleman White, the woman who believed blueberries could be grown commercially and partnered with Frederick Coville to make it happen, made it the kind of heritage food festival you can’t find just anywhere. Add to that the focus on local Pinelands music, arts, crafts and community and that the two day festival was run by volunteers ranging in age from 4 years old to their 90’s and you had a wonderful old-fashioned family-friendly country weekend.

Each year Whitesbog Preservation Trust works to enhance the festival to make it more enjoyable for visitors. This year’s Blueberry Festival expanded the good times in many ways:

- Two days of festival: June 25 & June 26
- Extended hours: 9 a.m. - 5 p.m.
- More vendors: 60 artists and crafters, 15 food vendors and gourmet snacks
- More friends groups, authors and artisan woodworkers and weavers
- More live local music: 12 bands on the main stage and a side stage with local artists
- More sponsors: 20 local businesses and families
- More buildings to explore: The Whitesbog Gallery showcased the All Blueberry Art Show in a restored worker’s cottage completed this year
- More historian and ecologist led wagon tours and talks in the Barrel Factory
- More BLUEBERRIES!

While our own crop of blueberries succumbed to late frosts, the local blueberries from Walter Adams Farm in Browns Mills were scooped up by visitors by the case-load and we had to run back over to the farm to restock on Sunday. Our General Store blueberry jams and preserves also sold out and our neighbor Pine Barrens Native Fruits came to the rescue with cases of their Tru-Blue Berry Jam. Blueberry ice cream and sundaes donated by White Dotte Dairy Bar & Grill were a hot item on the warm day and deep fried blueberries from Brother Bear BBQ were amazing. The blueberry baked goods including pies, pound cakes, muffins, cupcakes and cookies were a sweet treat to enjoy while relaxing in the shade of the picnic grove and listening to bluegrass, country, Americana, western, rock, traditional or Celtic music on stage. We also enjoyed two days of blueberry pie eating contests for kids with winners getting festival t-shirts announcing “I Love Blueberries”!

Whitesbog Preservation Trust, the non-profit that cares for and restores the village, depends so much on the Blueberry Festival to allow us to continue our mission of maintaining the village and educating the public about the role it played in New Jersey agricultural history. We depend on many generous community members who help make it happen each year, from the staff at Brendan T. Byrne State Forest (in which Whitesbog Village is located), the educators at the Pinelands Institute for Natural and Environmental Studies at Rowan College at Burlington County (who share use of the village buildings), The Pinelands Antique Engine Association who set up vintage engine displays, provide wagon tours and maintain the blueberry fields year-round.
The Mission of the Trust is to restore, protect and enhance historic Whitesbog Village, in order to preserve the White family legacy and to inspire audiences of all ages to experience:
- the origins and innovations of cranberry and blueberry cultivation
- the rich culture and unique ecology of the New Jersey Pine Barrens.

Friends enjoy some ice cream in the shade of the picnic grove. Photo by J. Pierson.

Native plant lovers found highbush blueberry, pitcher plants, mountain laurel, and more for sale. Photo by J. Pierson.
WHITESBOG EVENT SCHEDULE
For more information call (609) 893-4646.
e-mail us at WhitesbogPreservationTrust@gmail.com
or visit us on the web at www.whitesbog.org

August
20 - Fiddlin’ in the Forest Music 6:30 p.m.
The Basement Musicians. 12 & up $5/person, children under 12 are FREE.
20 - Moonlight Walk 7 p.m.
Sturgeon Moon. Listen to the night sounds of the Pines, learn about Whitesbog and experience the seasonal changes of the Pinelands. Walks are 3-5 mi. long, and led by experienced leaders. $5 donation/person, reservations requested.
26 - Whitesbog Paint Party!
Create your own piece of blueberry-inspired art in the Barrel Factory. Advance reservations preferred. $35/person which includes a glass of wine and light snacks. For more details, email WhitesbogEvents@gmail.com.
27 - Fiddlin’ in the Forest Music 6:30 p.m.
Full Moon Risin’. 12 & up $5/person, children under 12 FREE.
28 - Blueberry Music Jam 11 a.m. - 2 p.m.
Calling all music lovers and musicians! Join experienced musicians in an open jam session on the porch of the General Store. All acoustic musicians are welcome from every music genre. FREE activity.

September
General Store Family Fun Activity 10 a.m. - 4 p.m.
Weekends from Sept. to Nov.
Stop into the General Store Classroom for a seasonal family fun activity. Use craft supplies to create a leaf rubbing with leaves from seasonal native plants while you explore the types of fauna at Whitesbog. Free.
3 - Volunteer Work Day 10 a.m. – 3 p.m.
Join our volunteers in outdoor or indoor projects in the village. You can choose from helping to clear trails and garden paths, lending a hand in the General Store or helping to organize our office cottage supplies for events! Everyone shares lunch in the General Store.
9 - Family Hike 10 a.m.
Explore the sights and sounds of our trails. Meet up in front of the General Store on the 2nd Friday of every other month. Reservations encouraged, but not required. You can register via whitesbog.org/calendar; a $5/family donation requested.
10 – Whitesbog Village Tour 1 p.m.
Stroll the Historic Village, learn about Whitesbog’s history, and visit Suningive, Elizabeth White’s historic home, the worker’s cottages and other buildings of Whitesbog’s heritage. $5 donation/person, advance reservations requested but not required - 609-893-4646.

October
General Store Family Fun Activity 10 a.m. - 4 p.m.
Weekends from Sept. to Nov. (See September)
1 - Whitesbog Volunteer Work Day 10 a.m. – 3 p.m.
(See Sept. 3)
1 - Historic Whitesbog Village Tour 1 p.m.
(See Sept. 10).
1 - Tour de Pines 8 a.m.
A multi-day bike tour of the Pinelands organized by The Pinelands Preservation Alliance. The riders will assemble at 8 a.m. and leave at 9 a.m. on either of 2 loops, 18 miles or 50 miles, later returning to Whitesbog Village. For additional details visit PPA’s website:
5- Elizabeth White’s 145th Birthday! 6:30 p.m.
Join us in ECW’s historic home Suningive, for coffee, tea and cake along with WPT archivist and speaker Albertine Senske. Reservations required, $5/person donation. Call 609-893-4646 or email us at whitesbogpreservationtrust@gmail.com for reservations.

17 - Film Screening, Art, and Music Event: ‘Middle of Nowhere’ 5 - 11 p.m.
An outdoor documentary film screening, contemporary art exhibition, and music event that explores our relationship to the remaining American wild places. Tickets available online through Eventbrite and Facebook: middleofnowhere2016@eventbrite.com
17 - Moonlight Walk 7 p.m.
Harvest Moon. (See May 21 listing for details).
24 - Yoga in the Pines 9 a.m.
Join us for a special program in our village green. A rain or shine event, if inclement weather we will relocate the class to the barrel factory. Advance registration is preferred, $10/person and is available via EventBrite.
24 - Smithsonian Museum Day Live! 10 a.m. - 4 p.m.
at the Agriculture Museum
Tour the artifacts of blueberry and cranberry farming innovation. Play with sand bogs and flood water in the sand table and look at original farm implements and historic photographs of farm life in the early 1900's. Fun FREE family activity.
25 - Crafting in the Art Gallery! 1 p.m.
Bring your children for craft time. This month we will explore tree seeds and create something to take home. Pre-registration encouraged, but not required. To register, please visit whitesbog.org/calendar.
Living History events highlight the blueberry and cranberry harvest seasons.
Cranberry Living History Tour – October 23, 2016, 1 - 3 p.m.