

Taming the Wild Beach Plum

Richard H. Uva

Beach plum is a conspicuous shrub of coastal plant communities in the north-eastern United States because of its prolific bloom, prized fruit, and perseverance in a seemingly hostile environment. Several attempts have been made to bring this wild fruit into cultivation.

I've known the beach plum (*Prunus maritima* Marsh.) since childhood on Cape Cod, where it was the only woody plant in the sea of dune grass that separated the ocean from the rest of the world. Michael Dirr writes in his *Manual of Cultivated Plants* that "This species abounds on Cape Cod, Massachusetts, and is one of the Cape Codder's cherished plants." In fact, I would say that Cape Codders feel a sense of entitlement to the species and its fruit. The beach plum is much appreciated for its profuse white bloom in spring, but it is in late summer, when people gather the fruit from the wild for jelly and other preserves, that its importance to the local culture becomes most apparent. The long-time gatherers have secret spots and favorite bushes, and strangers carrying pails in the dunes are viewed with suspicion. In a good crop year the race to harvest is so competitive that the fruit is sometimes picked when barely ripe.

In 1996 I began to study *Prunus maritima* for my doctoral dissertation in horticulture at Cornell University. I was fascinated by this long-lived species' ability to thrive in environments with salt, apparent drought, and frequent disturbance, where its neighbors are often short-lived, stress-tolerant herbaceous plants like American beach grass (*Ammophila*



The fruits of Prunus maritima are small plums—one-half to an inch (1.5 to 2.5 cm) in diameter—that ripen from late August through September.

breviligulata), beach pea (*Lathyrus maritimus*), and seaside goldenrod (*Solidago sempervirens*). When I learned that William Clark of the Cape Cod Cooperative Extension and a small group of farmers in Barnstable County, Massachusetts, were working to bring beach plum into cultivation, I focused on fruit production methods and the ecology of the species, together with its usefulness for land restoration.¹

Beach plums were noted by several European explorers, conspicuous, perhaps, because of their location along the coast. The earliest account is from Giovanni da Verrazano, who in



White flowers appear in mid May on reddish-brown twigs. They are pollinated by insects.

1524 recorded “damson trees” in what today is southern New York State.² Since then, several coastal land masses have been named after the beach plum: Plum Island, a barrier beach and conservation area near Newburyport, Massachusetts; Plum Island, an isolated speck of land off the northeastern tip of Long Island, New York, which is home to the USDA’s Plum Island Animal Disease Center; and Prime Hook, a barrier beach in Delaware whose anglicized name is derived from the Dutch settlers’ *Pruime Hoek*, which would more correctly translate to Plum Point.

Several species of native plums were used by indigenous people and by settlers across North America.³ The fruits are cherry-sized plums with a flavor that varies from astringent to relatively sweet when ripe. Plums are rarely eaten raw, but their tartness gives jam and jelly a distinctive taste. Today, jelly production from wild fruit persists as a cultural tradition in coastal communities throughout the species’ range,

with hotspots on Cape Cod, eastern Long Island, and at the New Jersey Shore’s Island Beach State Park and Cape May. It is also used for dune stabilization and other conservation programs.

The Extreme Variability of *Prunus maritima*

Plums grow pretty much as they please and the botanist has to take them as he finds them.

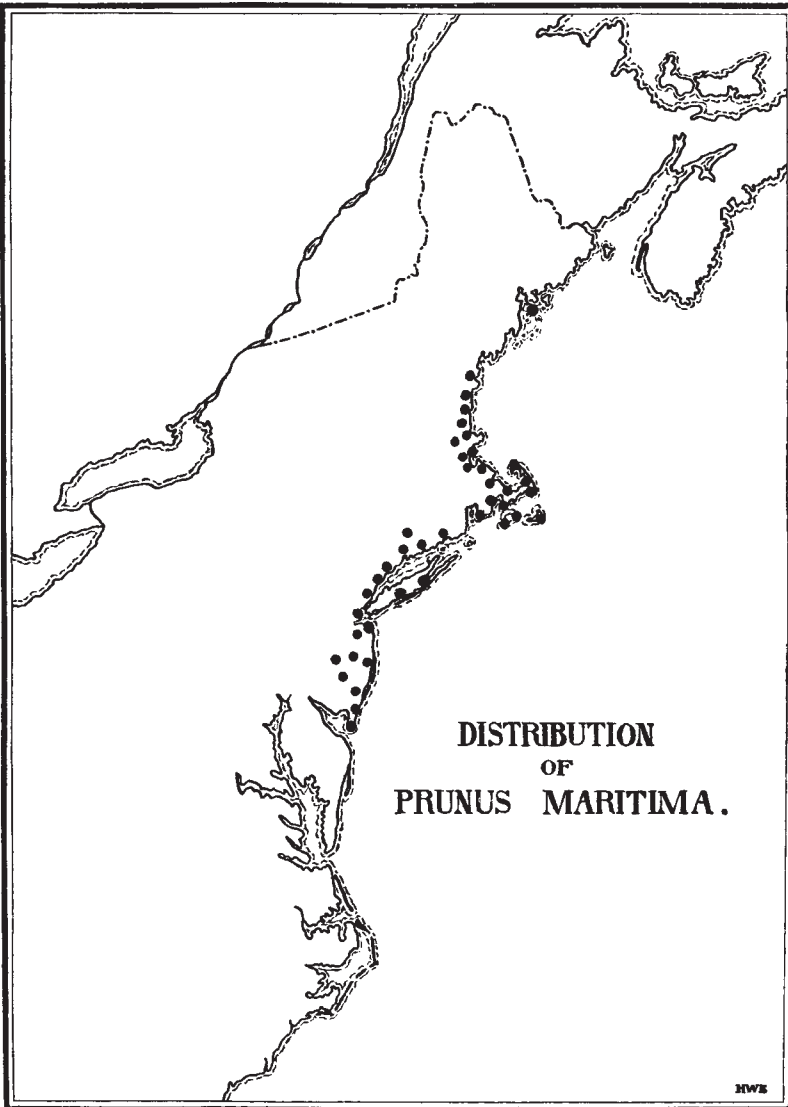
— F. A. Waugh, *Plums and Plum Culture*, 1901

Ever since it was first named in 1785, there has been confusion over whether *Prunus maritima* is indeed a single species, presumably because of its many variations in habit, fruit color, and size. In 1897 J. K. Small described as a new species a specimen that he had discovered in Connecticut, on a ridge near Long Island Sound, and named it *Prunus gravesii* in honor of Charles B. Graves, a Connecticut physician and amateur

botanist.⁴ *P. gravesii* still appears as a separate species in manuals today, although Small’s was the only individual ever found. Described as having orbiculate rather than the usual lanceolate leaves, it was recently determined to have been a mutant of *P. maritima* and therefore a variety rather than a species.⁵

One early attempt to document the beach plum’s many variations in the wild was that of J. M. MacFarlane, who was inspired by reading Darwin’s *Animals and Plants Under Domestication* and by the wide variation in fruit quality he had found within individual sites.⁶ Later a student of MacFarlane, John Young Pennypacker, drew up an evolutionary hierarchy based on fruit variations, but the nine taxonomic varieties he proposed were never accepted in the horticultural literature.⁷

Edgar Anderson, a geneticist on the staff of the Arnold Arboretum, saw in beach plum variation an opportunity to explore such questions as, is a species more variable at the center of its



In the wild, beach plums occur only on North America's Atlantic Coast, chiefly in Massachusetts, New York, and New Jersey. This distribution map is from Anderson and Ames' 1932 article in the Arnold Arboretum's Bulletin of Popular Information.

distribution or at the periphery? Are unusual forms found with greater frequency in one part of its range than in another? Using beach plum as his model, he might even get at one of the core questions of biology: What is a species?

To address these questions Anderson first needed to map the beach plum's range, but after a week of driving around Boston's South Shore he had located few large colonies. To save time, he enlisted Oliver Ames (son of Oakes Ames, then head of the Arboretum) as pilot in order to

map the population from the air in mid May when the prolific, bright-white bloom revealed the species' location. In 1932 Anderson and Ames published "Botanizing from an Airplane" in *The Bulletin of Popular Information*, the forerunner to *Arnoldia*.⁸ The article included a detailed map of beach plum distribution, along with the claim that the two authors were the first to map a species' distribution from the air. Any further work that Anderson may have done on variation in beach plum was never published.

Cultivating Beach Plum: Previous Attempts

Commercial production of native plums began in the 1800s. Over the course of the century, as many as two hundred native species may have been selected for cultivation.⁹ More than seventy bulletins devoted wholly or in part to native plums and cherries appeared between 1888 and 1900. Passage in 1897 of the Hatch Act, which funded agricultural experiment stations, led to even more research and more additions to the literature. But no publication influenced the culture of the native species more than the 1892 *Cultivated Native Plums and Cherries* by L. H. Bailey (Wight 1915).¹⁰ F. A. Waugh, U. P. Hedrick, and W. F. Wight also

produced encyclopedic works that appeared early in the twentieth century.¹¹

Beach plum, however, was not among the first native plums selected for cultivation, even though its distribution on the East Coast made it better known than plums native to areas settled later. According to Bailey, the beach plum, along with all other species native to the East Coast, was passed over because imported European plums were already thriving there, and little need was seen for "inferior" native



The shifting sand of coastal dunes often partially buries the plants.

species. Improvement of native plums began only when the population of the country spread into climates such as that of the prairie states and the South, where old-world plums could not survive.¹²

The first sign of interest in beach plum as a cultivated crop dates to 1872, when an article in *American Agriculturist* displayed an illustration of beach plum and noted its potential for hybridization.

Our principal object in calling attention to this plum is the promise it holds out of being useful as a stock on which to bud or graft the cultivated varieties . . . it would flourish upon the poorest soils and it is very likely that it would prove a dwarfing stock.¹³

In that same year, the first cultivar of beach plum was introduced: ‘Bassett’s American’, a chance seedling with large fruit found in Hammonton, New Jersey; it seems to have been largely ignored by both planters and horticulturists.

But it wasn’t until the 1890s, when Luther Burbank began to hybridize them with Japanese plums, that serious work was done on beach

plum as a potential commercial product. Burbank had moved to California in 1875 from Worcester County, Massachusetts, and established a nursery in Santa Rosa, where he went on to become a famous horticulturist and plant breeder. He described his work with beach plum in his 1914 book, *How Plants Are Trained to Work for Man*, attributing his interest in the species to its hardiness, late blooming, and productivity, as well as its ability to withstand adverse conditions. He reported that he grew beach plum seedlings by the hundred thousand and by continuous selection had produced varieties bearing fruits nearly an inch in diameter, pleasing in form and color and delicious in flavor. He crossed his improved varieties with a hybrid Japanese plum to produce what he called the ‘Giant Maritima’ and reported fruit up to eight-and-one-quarter inches in circumference. Unfortunately, ‘Giant Maritima’ could not be commercialized—it lacked the firmness necessary for long-distance transport. It was by crossing the Japanese *Prunus salicina* with the Chinese *P. simonii* and *P. americana* that Burbank achieved a plum with the qualities

required for shipping, thereby initiating a new industry in California that sent plums all around the world and led to the demise of plum growing in most other states.¹⁴

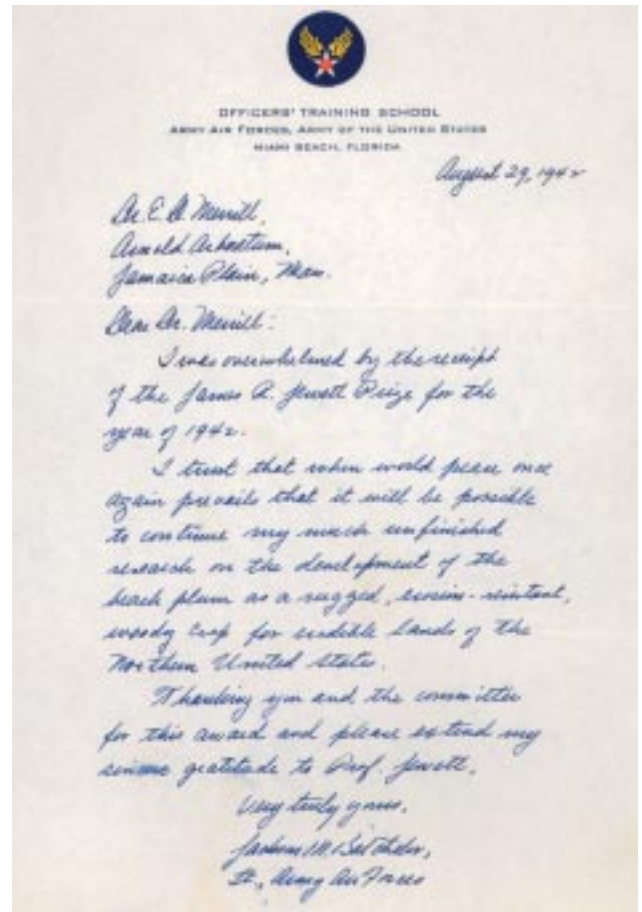
The second attempt to commercialize beach plum was initiated in the 1930s in hopes of adding “a drop in the dry old bucket of New England industry,” in the words of one beach plum enthusiast, Ruth Eldridge White. She summered on Martha’s Vineyard and had observed the success of the cranberry industry on the Massachusetts mainland and wanted to see a similar industry evolve from the beach plum on the Vineyard, where bad economic times had already led to an increase in the number of people selling jelly from wild beach plum.

The development of an industry from this native product seemed a sensible practical idea to me. A great industry had been developed on the Cape through the Cranberry . . . Why shouldn’t the beach plum make as important an industry as the cranberry? The flavor is certainly more appealing. That sweet bitterness comes from a life of hardship, I guess.¹⁵

After unsuccessful attempts to persuade government agencies (the Massachusetts Department of Agriculture, the Commissioner of Conservation, the WPA, and the County Commissioners) to promote beach plum as a crop, White purchased a farm on the Vineyard’s shore and leased it to Dukes County for a beach plum nursery to be operated under the aegis of the State Extension Service. Wilfrid Wheeler of Falmouth, Massachusetts, a former state commissioner of agriculture, was installed as director, and planting began in 1938.

In 1941 White obtained funds for beach plum research from the Massachusetts legislature, and soon thereafter reports began appearing in horticultural journals on propagation;¹⁶ on culture;¹⁷ on processing;¹⁸ and on the history of the species itself.¹⁹

Interest in beach plum was further spurred by the James R. Jewett Prize, established in 1940 at the Arnold Arboretum for research on the species. Jewett, a professor emeritus of Arabic at Harvard University, had become involved with beach plum after learning about it that spring from three men in the region who had experience with the species: Wilfrid Wheeler, the



During wartime J. M. Batchelor accepted the James R. Jewett Prize for his work on beach plum at the USDA Soil Conservation Service.

director of the new nursery on Martha’s Vineyard; Bertram Tomlinson, county agricultural agent for Barnstable County, Massachusetts; and Jackson M. Batchelor, associate horticulturist in the Soil Conservation Service of the United States Department of Agriculture. Jewett hoped to

render good service to Cape Cod by working for the development of the beach plum industry . . . these prizes [are to] be offered primarily for the scientific and empirical improvement of the beach plum (*Prunus maritima*), including however, the social significance of work with this native species or its products.²⁰

The Jewett Prize was awarded regularly throughout the 1940s and early 1950s but was then suspended for some time because of waning interest in the plant. (In 1972 it was awarded



In 1952—to protect identity and guarantee quality—the Cape Cod Beach Plum Growers Association obtained a Massachusetts Department of Agriculture state grade label for their products.

for work done on other native fruits—a stipulation Jewett originally included on advice of Arboretum staff.)

Jewett's tutors had already done substantial research on beach plum. Batchelor had selected ten beach plum genotypes from collections throughout its range and distributed five of them to the Arnold Arboretum and other institutions to evaluate for erosion control and fruit quality when World War II interrupted his work. Nevertheless, after receiving the Jewett Prize in 1942 Batchelor wrote to E. D. Merrill, Arnold professor and director of the Arnold Arboretum, from the Air Force Officers' Training School:

I trust that when world peace once again prevails that it will be possible to continue my much unfinished research on the development of the beach plum as a rugged, erosion-resistant, woody crop for erodible lands of the Northern United States.²¹

Another of Jewett's advisors, Tomlinson, had assembled information on the species in 1938 and passed it on to hundreds of residents in the Cape Cod area. In 1941 he reported that he had received over 500 requests for information about beach plum—more requests over the past twelve months than for any other crop. Tomlinson was nevertheless cautious about promoting commercial beach plum cultivation to growers. In a letter to Merrill, he wrote: "I have consistently discouraged such projects,

as I feel the research work has not progressed far enough to give us practical information the commercial grower would need." His request that more research be done on beach plum by the state experimental facility was refused because of limited funds. However, Tomlinson began forming the Cape Cod Beach Plum Growers Association with a group of fruit collectors, jelly makers, and farmers. An initial meeting was held in October 1941, but interest in beach plum was soon overshadowed by the need to concentrate on standard crops during the war and the new organization

did not officially form until 1948. By 1952 the Association had over ninety members, and the Massachusetts Department of Agriculture had granted a state grade label as an assurance of product quality for beach plum fruit. By 1955, however, after three poor crop years, interest had waned again and the Association became inactive.²² In its last bulletin, the association reported that beach plum suppliers had not been able to satisfy market demand because rapid land development was taking "good beach plum land" away from pickers.²³ Apparently most fruit was still being collected from the wild, with very few beach plum plants under cultivation.²⁴

Cultivating Beach Plum: The Current Efforts

To the student, our native and domestic plum flora will long remain the most inviting, perplexed and virgin field in American pomology.

— L. H. Bailey, 1898, *The Evolution of Our Native Fruits*

In 1997 I received funding from the Jewett Fund for work on my dissertation, done under the direction of Thomas Whitlow at Cornell University. That research has since been expanded into a full-fledged program led by Professor Whitlow and myself to develop this species as a commercial crop.

Today, plenty of plums are produced in California and cultivation of native American selec-



A 20-year-old beach plum in a mature orchard at Briermere Farms, Riverhead, Long Island.

tions has nearly ceased. So why develop beach plum as a new crop?

The increased income enjoyed by consumers in the second half of the twentieth century brought changes in the way they view food, using it to satisfy not only their hunger, but also their emotional and social needs. Beach plum fits with this view because it is seen as a unique product—a heritage crop that comes from a

special place by the shore. To be competitive, farmers in the Northeast need to supply this kind of high-end crop, and we believe that beach plum can develop into a specialty product suitable for diversified farming operations.

The goal of our program, then, is to develop a sustainable beach plum industry that covers the gamut from fruit growing to processing to marketing, along with the required education of growers, processors, and marketers. The research falls into three main categories: fruit production; quality evaluation and processing; and economics and marketing.

Our research so far has borne out our optimism about the potential for this new industry. Horticultural research has shown that plant size and fruit production are increased by fertilization, while irrigation and mulch have no effect; this finding confirms that beach plum is a stress-tolerant crop that can be grown successfully without irrigation, even on sandy, low-nutrient soils. (Beach plum also flourishes away from the shore, on typical orchard soil, but good drainage is a must.) Brown rot fungus (*Monilinia* sp.) was found to be the most serious disease problem for fruit production. Growers can be reluctant to accept a new crop if pest control practices are not well developed. Fortunately, however, beach plum's pests are similar to those

of commercial plums and control techniques are already available.

Preliminary market research on processed products has also had favorable results. In focus group discussions held in New York City, beach plum products evoked positive associations with beaches, New England, Cape Cod, vacations, and summertime and indicated that at least among gourmet consumers in coastal

**BEACH PLUM, *Prunus maritima* Marsh.
Rosaceae (Rose Family)**

ORIGIN

Northeast U.S. coastal sand dunes

HABIT

Sprawling shrub to small tree, with a large tap-root system on coarse soils

CULTURE

Tolerates coarse, low-nutrient, low water-holding soil; thrives on rich soil but not on wet sites or in shade

INTEREST

Profuse white bloom mid May. Edible fruits (1.5–2.5 cm), purple (rarely yellow), ripening in early September in the northeastern U.S.

HARDINESS

USDA plant hardiness zones 4–7 reported

PROPAGATION

Four months' cold, moist stratification after seed is hydrated, softwood cuttings early in the season or late-summer budding.

SIMILAR SPECIES

Several species of plum are distributed across North America and have a similar history of wild collection. *Prunus subcordata*, Oregon and California; *P. americana*, central and eastern U.S.; *P. angustifolia*, southern U.S.; *P. nigra*, northern U.S. and Canada.

critical factor, since cold, wet weather can inhibit pollinating insects. Or beach plum's pattern of alternate-year bearing (biennial bearing) may be at fault. This term is used for a phenomenon common in many perennial fruit species in which flower buds for the following spring develop as the current year's fruit is ripening; a heavy fruit set during one year can therefore lead to a carbohydrate shortage and fruit scarcity the next year. It is hoped that when beach plum is grown under cultivation, away from the rigors of the dune environment and with adequate nutrition and pruning to avoid unusually heavy crops, yields will become more regular.

The program is also placing heavy emphasis on cultivar selection. Wild fruit has been sampled throughout the species' range to delineate the desirable traits available for selection in this highly variable species. Fruit color in our samples has shown differences in intensity and in hue (red to dark blue, rarely yellow). Fruit size has ranged from 13.5 to 25 mm in diameter, with pulp yield varying from 81 to 91 percent. All samples were high in phenolic content and acidity and showed good potential as a source of antioxidants.

Wild seed from 21 sites across the species' range was also collected to screen for variations in resistance to brown rot, consistency of yield, and

metropolitan areas, potential exists for expanding into new product categories such as sauces, sorbet, ice cream, and blends with other fruits.

Market research is continuing and a beach plum consortium is being developed under the sponsorship of the USDA's Sustainable Agriculture Research and Education Program (SARE). One important question that remains to be answered concerns beach plum's tendency to bear irregular fruit yields: can it be controlled? As noted earlier, a wild beach plum may fruit profusely one year and not at all the next. Various hypotheses have been proposed to explain this. The weather at blossoming time may be a

level of antioxidant content. In the spring of 2003, these seeds were planted in trial plots at research facilities and on private farms in Massachusetts, New York, Connecticut, and Maryland. We would also like to include in our evaluations some cultivars from the 1940s that are mentioned in the literature of that time, but I have been unable to locate many of them. If a reader knows of the existence of any of this material, I would appreciate hearing about it.

Once horticultural trials are finished, reliable techniques for cloning our final selections will be needed. Keith Vanderhuy, who received the Jewett Award in August of 2003, has begun tack-

ling this problem under the direction of Kenneth Mudge as part of his work for a master's degree at Cornell University; he will investigate both vegetative propagation and grafting.

It is obvious that we have not yet solved all the problems associated with commercializing beach plum, but successful orchards have already been established and approximately forty farms are growing beach plum in the eastern United States. Individual plantings are relatively small, the largest being 0.5 hectares and the smallest having only ten to fifteen plants. In addition, the Cape May Plant Materials Center (Natural Resources Conservation Service) has released a cultivar of beach plum known as 'Ocean View' that was selected for coastal sand dune stabilization and is being distributed as open-pollinated seed to nurserymen.

Readers are invited to visit our website (www.beachplum.cornell.edu), which serves as our primary outreach tool and is intended to bring together everyone with an interest in beach plum. It includes photos, contacts, reports, a grower's guide, and news articles.

Notes

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