



Production and Marketing of Beach Plum, a Heritage Fruit Crop

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GEOGRAPHIC RANGE:

Northeastern U.S.

Introduction

Beach plum (*Prunus maritima* Marsh) is one of several shrubby plums native to North America. It produces small, distinctively flavored fruit that are collected from the wild along the Northeast coastline for small-scale jam production in home and commercial kitchens. The jams command premium prices at farm stands and specialty markets, even in comparison with jam made from other locally grown fruit. However, the wild-collected supply of fruit does not meet this niche market's demand.

Beach plum naturally occurs on sandy, excessively drained, nutrient-poor sites. This habitat strongly suggests that beach plum has untapped potential as a low-input crop for marginal land. Under seaside conditions, the plant grows very slowly and does not bear fruit every year. However, the beach plum is not limited to sandy soil; it may be planted in any fertile, well-drained soil. Full sun is required for fruit production.

The market for many commodity crops has such low margin that growers struggle to stay profitable, especially in the urbanized Northeastern US. Some believe that the future of agriculture in this region lies in high-value, niche market crops, especially those with underserved regional markets, and the potential for value-added processing. The existing high value of beach plum products suggests economic sustainability, even at small scale.

Current demand for the fruit exceeds supply by a large margin, due in no small degree to the dwindling number of accessible natural stands and collectors willing to pick. Prior to our work, cultural guidelines for beach plum production were not available. Improved selections have not been systematically tested and are not available in the nursery trade. Production of

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SARE Agricultural Innovations are based on knowledge gained from SARE-funded projects. Written for farmers and agricultural educators, these peer-reviewed fact sheets provide practical, hands-on information to integrate well-researched sustainable strategies into farming and ranching systems. The articles are written by project coordinators and published by SARE.



Wild beach plum, 'on the edge,' in the harsh coastal environment of Montauk Point State Park, New York.

beach plum to supply a limited high-value niche market may be a viable component of a diversified farm operation. However, future profitability of large-scale production to accommodate the expansion of the market, as with any entrepreneurial venture, remains to be seen.

General Description

Beach plum is still a wild, unimproved species. As with any wild plant grown from seed, its vigor, growth habit and size, and the size and quality of its fruit, vary. Beach plum may grow in a tree-like form or as a low, spreading shrub. On sandy soils, the root system is mainly composed of several coarse lateral roots with few fibrous roots. The lateral roots may extend some distance from the main trunk. The plant usually has a large taproot that extends deep into the soil [1].

Leaves are alternate, simple, usually oval-shaped, 1 – 1 1/2 inches long, toothed, dull green above, and lightly hairy or smooth beneath. In mid-May before the leaves emerge, white flowers about three-quarters of an inch in diameter appear in clusters of two to five.

The fruit, which ripens from late August through September (4), ranges in size from a half an inch to an inch in diameter. Fruit color varies from red, purple, deep blue, and, rarely, yellow. The plum has a tart taste.

In the wild and under cultivation, biennial bearing has been observed in beach plum. The flowers are self-sterile and require cross-pollination for good fruit set. It is also thought that closely related bushes within a limited area will not cross-pollinate. Wild honeybees are the most common pollinator,

followed by bumblebees, honeybees and syrphid flies [1].

Our approach to beach plum crop development has been focused on two main areas: developing cultural methods for orchard production and marketing the crop and products.

Cultural Methods

Commercial production of beach plum is possible in the Northeastern U.S. using standard stone fruit production techniques. Beach plum does not thrive on poorly drained soils. Because beach plum is new to horticulture production, keeping records and photos of your practices and yields will help you develop a system that works on your farm. Beach plum has similar cultural requirements and pests to other commercially grown plums, although for pruning, peach may be a better model because like beach plum, peach fruit is not borne on spurs (short, fruiting shoots).



Fruit ripen in early September and are 3/4 inch or less in diameter. Fruit color is usually purple although yellow, red and dark blue forms occur.

In cooperation with Barnstable County Cooperative Extension (U. Massachusetts), and local farmers, we installed an experimental orchard on Cape Cod, Massachusetts. Located at Coonamessett Farm, a community supported agriculture producer in Falmouth, MA, this beach plum planting has served as a research and demonstration facility since 1997. Wild-collected seed-grown beach plums were grown in an experiment with the treatments of mulch (4" woodchip), fertilizer (typical orchard rates) and irrigation (1 inch supplemental water/ week). Growth and yield were greater in fertilized treatments. Within fertilized plots, irrigation and mulch did not increase growth or yield.



Beach plums blooming (mid-May) at the Cornell Orchard in Ithaca, NY. Note the small stature when compared to standard plums in the background.

Propagation

Beach plum plants are available from several commercial and state conservation nurseries (Table 1). However, if you would like to produce plants from seed, the following procedures should be followed. Remember that seeds are living organisms and should not be exposed to extreme heat or prolonged soaking in oxygen-poor water. Collect the seeds after the fruit has fully ripened in September. Clean off all of the pulp and skin by rubbing the seed through a coarse screen. Seeds that float are dead and can be discarded. To store seeds, dry them at room temperature for several days. Seal them in an airtight jar and store in a refrigerator kept above freezing.

For the seeds to germinate, they must first undergo a process called pre-chilling (or stratification). This is a cold, moist period when chemical changes take place in the seed. During pre-chilling, store the seeds in moistened peat moss or sphagnum moss. The peat should not be soggy but about as damp as a well-wrung sponge. Mix the seeds thoroughly with the peat moss and store for at least four months in a refrigerator (approximately 40 degrees F), not the freezer. Check the seeds periodically. If roots have emerged, the seeds are ready to be planted. Germinated seed can be held safely at cold temperatures above freezing for some time. Plants obtained

through seed propagation will show variation typical of wild plants. Select the largest, most vigorous plants for your planting.

Vegetative propagation is necessary if you want plants identical to the parent stock. Beach plums may be propagated either by semi-hardwood stem cuttings or by root cuttings. However, results with stem cuttings have been inconsistent and should probably be attempted only by experienced propagators.

Stem cuttings should be taken in the latter part of June when the developing fruit is approximately pea-sized. Cuttings should be between 4 and 6 inches in length, taken from side shoots or non-fruiting branches. Cuttings must be treated with a root-inducing hormone. Rootone (NAA), Dip n Grow (IBA + NAA) or Hormodin (IBA) have all been used for rooting beach plums [2, 3].

Prepared cuttings should be stuck in sand or Perlite in flats and kept under mist or clear plastic sheeting until rooting occurs. At that point, the rooted cuttings should be transplanted into individual containers and misting should be reduced to harden off the cuttings to ambient conditions.

Beach plums may be propagated by root cuttings as well. Three- to four-inch root cuttings about the diameter of a pencil should be taken in late fall and placed

Table 1. Suppliers of Large Quantities of Bareroot Beach Plum Stock

| Nursery Name | Location | Telephone |
|------------------------------------|-------------------|--------------|
| J.G. Akerboom | Cedarville, NJ | 856-447-3346 |
| Princeton Nurseries | Allentown, NJ | 609-259-7671 |
| Concord Nurseries | North Collins, NY | 800-223-2211 |
| New Hampshire State Forest Nursery | Boscawen, NH | 603-796-2323 |

horizontally in soil outside [1]. The propagation bed should be mulched with straw as the ground begins to freeze in the winter.

Site Evaluation and Preparation

Choose a site with good drainage for your beach plum planting. When digging several feet down the soil should not have a rotten egg smell or standing water. Clear brush; remove dead wood including stumps and roots from the soil. The planting should receive full sun. Destroy any persistent perennial weeds before planting.

Take soil samples and submit them to a soil testing service specifying that plums are your crop. Indicate that you want pre-plant lime and fertilizer recommendations for plums.

Orchard Design

Because beach plum is shrubby and smaller than other stone fruits, we recommend close plant spacing. This design requires a large number of small plants and will produce a hedgerow system reminiscent of highbush blueberry production. Plant one- to two-year-old bare root or container grown beach plums. A minimum spacing of 5 feet between plants in a row with 12 feet between rows is recommended (Figure 1). A 3 to 5 foot long in-row weed-free strip with a grassy alley between rows will provide adequate groundcover and protection from weed competition. Wider spaced larger plants are also an option.



Beach plums begin fruiting from the third to the fifth year in the orchard. The small stature of the species allows easy picking.

It is important to keep the in-row strip weed free. Weeds will compete with beach plum for water and nutrients. Mulch, herbicide or hand hoeing can be used for weed control. If irrigation is desired we recommend a drip or micro-sprinkler irrigation system as a water conserving measure.

Soil Preparation

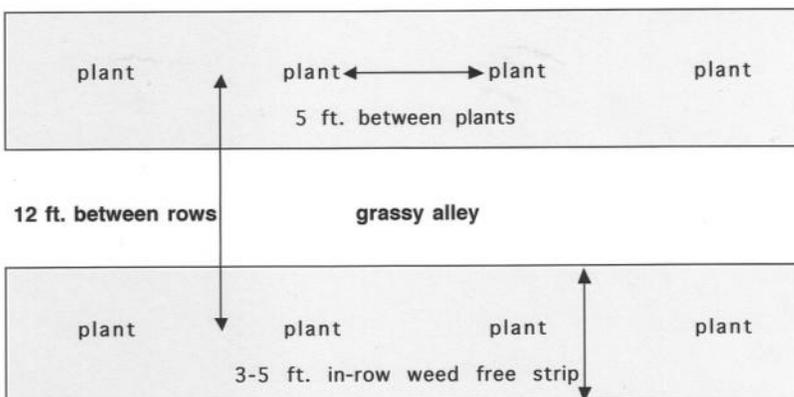
Spring one year before planting

Add lime and fertilizer as specified by the soil testing service and plow it into the soil to 16 inches if possible. In general, a pH of 6-6.5 is recommended for production of most tree fruits. Incorporate lime and fertilizer into the root zone before planting. As with all perennial crops, after planting you do not get a chance to work the soil again. Dolomitic lime (lime with 10% of magnesium or more) is recommended because it raises the soil pH causing nutrients to be more available and it is also an important source of magnesium and calcium.

If needed, the addition of phosphorous before planting is important as it is relatively immobile and may not reach the root system if only applied to the soil surface. Nitrogen on the other hand

is very mobile and if put on at this time will leach through the soil profile long before the plants are installed. Incorporate lime and phosphorus a year before planting. It may be desirable to re-test the soil again before planting to verify pH adjustment and nutrient levels.

Figure 1. Planting Design



Early spring of planting

At the time of planting, water in each plant with water-soluble fertilizer. As foliage develops (mid-May) apply 0.6-1.0 oz. nitrogen per tree, which is equivalent to 4 to 6 ounces of calcium nitrate or 2 to 3 ounces of ammonium nitrate to the surface of the soil (5).

Fertilization

Fertilization needs will vary with soil type and plant size. Application of fertilizer based on soil and foliar nutrient analysis can optimize crop performance by tailoring fertilizer levels to the specific needs of fruit trees. Ample growth of 1.5 feet of shoot growth during the growing season may be desirable for beach

plum. Depending on soil type, fertilizer application rates will vary. Keep track of rates and measure growth every year. Young transplants may be fertilized with 0.6 to 1.0 oz. of nitrogen per tree, as foliage emerges in mid-May. On established plants, 0.1 to 0.2 pounds per tree of nitrogen applied under the drip line may be sufficient for beach plum fruit production. As nitrogen is easily leached from the soil, it should be applied under the drip line in the weed-free strip. If too much nitrogen is applied, excessive vegetative growth could occur at the expense of yield. On sandy soils, nitrogen might be best applied as split applications over two to three weeks to minimize loss due to leaching. On soils with a greater clay and organic matter content, little or no additional fertilizer may be needed once plants are established.

Pruning

Beach plums may be pruned in late winter to early spring. Remove crossed, shaded, cracked, and down-pointing branches. Diseased branches with cankers and black knot should be removed. If black knot occurs, it should be removed at least 6 inches below the gall, disinfecting the pruning shears with a 10% bleach solution in between cuts.

Maintain an open canopy to facilitate light penetration and air circulation. Keep plants at a size where picking is practical. If biennial bearing is a problem, do your heavy pruning in years where you are expecting a heavy crop. Beach plums form their fruit on the base of one-year-old wood and spur formation is uncommon. Peach also bears on annual wood and could serve as a model for pruning.

Insects and Diseases

Even though beach plum is a native crop, it is subject to a number of insect and disease problems typically found on other cultivated plums—the most serious being brown rot, plum curculio, and plum gouger. Consult guides on plum or stone fruit pests to find more information on these problems and treat them as you would other plums; also, consult the beach plum management schedule (Table 2).

Marketing

A lag time in production for growers has allowed us to explore and expand demand among various market sectors before reliable beach plum yields are available. Work was done in three areas, consumer marketing, gourmet chefs and produce distributors.

Consumer Focus Group

Wen-fei Uva, Applied Economics and Management, Cornell University, conducted consumer focus group research in New York City in the spring of 2002. The discussions were held at a central interviewing facility in Manhattan, and facilitated by a marketing research consulting firm.



Brown rot fungi, *Monilinia* spp., is the most common and most damaging disease of beach plum. The blossom blight phase occurs in spring (top) and the fruit rot phase occurs in late summer.



The beach plum's most serious insect pest is the plum gouger, *Anthonomus scutellaris*. It is similar to plum curculio, and makes a hole in fruit.

Table 2. Beach Plum Management Schedule

Developed by David Simser, Cape Cod Cooperative Extension and Richard Uva, Cornell University

| | |
|--|---|
| February | PRUNING and training as needed. |
| March | Spring clean up. Rake up leaves and remove mummified fruits to eliminate primary fungal inoculum to reduce the probability of BROWN ROT infestations. Apply lime if recommended by last August's soil and foliar nutrient analysis. |
| Late-April (white bud) | Consider applying control measures for BROWN ROT (blossom blight phase). |
| Early-May | Apply FERTILIZER. As nitrogen is mobile, especially in sandy soil, consider applying 1/2 of nitrogen on now and the other 1/2 on in late May or June. |
| Mid-May (Bloom) | Were pollinators present and active during BLOOM? Start to SCOUT FOR PESTS on a regular schedule. Prepare and activate the IRRIGATION system if using one. |
| Late-May (after bloom) | Consider applying control measures for BROWN ROT (blossom blight phase) and for PLUM CURCULIO/PLUM GOUGER. |
| June | Control small WEEDS now instead of big weeds in July. |
| Mid-June (shuck split) | Consider applying control measures for BROWN ROT and for PLUM CURCULIO/PLUM GOUGER. Fruit THINNING may be required to reduce excessive fruit loads and to reduce biennial bearing. |
| Late-June (green fruit) | Consider applying control measures for BROWN ROT and CATERPILLARS (if needed). |
| Early-August (1 st color) | Consider Applying control measures for BROWN ROT (fruit rot phase) as fruit begin to turn from green to yellow in early August. Collect soil and foliage samples for nutrient analysis at this time if desired. |
| Mid-August (pre-ripe) | Consider applying control measures for BROWN ROT (fruit rot phase) if needed. |
| Late-August (ripe) | Begin fruit HARVEST. Because most farms are growing seedling plants (which are all genetically different) there is wide variation in ripening time from plant to plant. Consider protection from BIRDS. |
| September | Remove fallen fruit and premature leaf drop from orchard floor. |
| October | Drain and WINTERIZE the irrigation system. Remove fallen fruit and leaf drop from the orchard floor. Protect plants from browsing/girdling—DEER, VOLES, MICE, etc. |
| PESTICIDES--Pesticide recommendations are for informational purposes only, read the manufacturers' recommendations before use. We assume no responsibility for the use of any pesticide or chemicals. For detailed information on plum pest control consult your state extension service's pest management guidelines for commercial tree-fruit and follow the directions for plum. For New York State the guidelines can be found at: http://www.nysaes.cornell.edu/ent/treefruit/ | |

The focus group respondents identified themselves as gourmet consumers. Each respondent was the primary shopper for his/her household and regularly buys specialty, boutique or gourmet jams or jellies.

Various conclusions were drawn from the sessions:

1. Market expansion potential exists for beach plum products among gourmet consumers in coastal metropolitan areas.
2. Special packaging with price is the primary marketing tool to communicate that beach plum products are gourmet, gift-worthy and special.
3. Gourmet jams and jellies are purchased from various independent stores or farm markets, not from supermarkets.
4. Jams or jellies made with cultivated rather than wild beach plums will not impede consumers' interests in trying the product.
5. Consumers' interests in beach plum presents market opportunities for new product development.

Gourmet Chef Interviews

In September 2003, Robert Weybright of the New York State Agricultural Experiment Station led a series of interviews with gourmet chefs in the New York City market. The beach plum concept was presented to: 11 chefs (three bakers and eight executive chefs), one restaurant marketing firm, and two food industry advocate groups. Restaurants interviewed could seat from 50 to 120 customers per night, entrees were priced \$30 and up, and chefs favored using locally produced food.

Each chef was given 5 pounds of beach plum fruit to experiment with and invited to share their experiences with us. The chefs were excited about beach plum and, in general, with the process of new crop development. Chefs expressed interest in high quality fresh as well as frozen fruit. They preferred direct purchase through growers and farmers markets, secondarily through specialty purveyors. Concerns and challenges include maintaining a consistent seasonal supply, high fruit

quality, adequate quantities and a viable delivery system. Cost and size of fruit was of concern, especially for bakery use where the cost and feasibility of pitting will be an issue. Six dollars per pound was an easily obtained price for frozen/whole fruit. Fresh fruit must be clean and in consistent packaging. Frozen fruit would need to be quick frozen (IQF) and stored sub-zero and be of the same quality as mentioned above for fresh fruit. One chef asked to purchase additional fruit from us and added a beach plum sauce to his restaurant menu through the 2003 holiday season.

Food Industry Trade Shows

We exhibited at the New England Foodservice & Lodging Exposition and Conference, April 10-12, 2005, at the Boston Convention & Exhibition Center. Thousands of people saw the booth and we had over 200 conversations about beach plum fruit and products. Many were familiar with beach plum and were overjoyed that this local food is now available. We met with two major specialty produce purveyors in the region who want fruit and would be willing to test market small quantities. High price points were suggested. Several chefs, small processors and gourmet product retailers were interested in getting product. The SARE logo was recognized by two of the chefs who are interested in local food and sustainable agriculture.

We also exhibited at the United Fresh Fruit and Vegetable Association's 2005 Produce Expo & Conference, in conjunction with Food Market Institute Show, U.S. Food Export Showcase, the Fancy Food Show, and All Things Organic, May 1-3, 2005, at Lakeside Center at McCormick Place in Chicago, Ill. The total tradeshow attendance was 30,000, and we had more than 100 booth participations. While the booth attendance number in Chicago was lower than the New England show, the quality of interested individuals who have the resources to grow the industry sector was significant. Two mid-Atlantic produce distributors were interested in fresh fruit for their product line. We also met with two primary national specialty produce companies, and they were both interested in working with growers to develop the market. One has scheduled a grower visit to the Northeast.

Marketing Opportunities for Growers

To capture the gourmet consumer market in coastal metropolitan areas, beach plum product marketers could first target independent retailers, gourmet food stores or farm markets, but not major supermarkets. To present to consumers that



Preserves are made from wild collected and cultivated fruit and are available at roadside stands and specialty markets in coastal areas of the northeastern U.S. Products pictured here originated in Maine, Massachusetts and New York.

the beach plum product is special and gourmet, packaging and price should be designed to reflect that image. Once consumers purchased and tried the product for the first time, quality and taste are the most important factors for return purchases. Gourmet consumers are interested in new products and will-

ing to pay a premium price for them. To sustain this market interest, beach plum product producers should build on high quality jams and jellies and develop complementary new products.

To enter the food service market, beach plum marketers should first identify cutting-edge operations and individuals in this market, such as high-end restaurants that have unusual menus and gourmet chefs who are innovative and willing to try new things. Initial contacts with restaurants should be done directly with chefs and not through produce wholesalers. Providing different forms of product samples such as fresh and frozen fruits in whole and pitted forms for chefs to test recipes is an effective way to establish interest. Work with chefs to develop new recipes and provide them with beach plum lore and publicity that they can use to promote the product on their menus to differentiate their dishes. Chefs tend to use beach plum as sauce or garnish for their premium priced entree dishes or appetizers, so they are willing to pay a premium price for the product, but the volume will be smaller. On the other hand, bakery chefs need higher volumes of fruit for their recipes, and they are more concerned about price of the fruit and the labor involved in pitting the fruit. When selling to food service customers, the key is to make contacts with restaurants a few months before harvest, so the chefs can plan their menus and promotion accordingly and work out a viable delivery system. It is important to maintain consistent seasonal supply, high fruit quality and adequate quantities.



Growers and researchers share information about beach plums, Coonamessett Farm Demonstration Planting, Falmouth, MA.

Another potential market for beach plum fruit and products are wholesale food distributors. Specialty produce purveyors are often willing to test market with small quantities. Initial contact could be done directly with product samples. In addition to product features, native & sustainable are two other attributes that could be used to promote beach plum. Due to the seasonal nature, clear communication about harvest time, quantity and quality will be very important.

Our experience at the food industry trade shows demonstrated that chefs, small processors, gourmet food retailers, and specialty produce wholesalers are the ones who would be more interested in purchasing beach plum fruits and products. All parties at this stage of beach plum market development show interest in premium fruit and fruit products that

would generate relative high returns to growers. Growers should have a clear understanding of the market potential and premium price point. This should help clarify and support the need of continuous development of a grower network as the industry sector develops.

SARE Research Synopsis

As a result of SARE funding, we have found that commercial production of beach plum is possible in the Northeastern U.S. by use of standard orchard production techniques. Beach plum can be grown with cultural methods that are used for commercial plum varieties on soil with good drainage. Wild genetic resources for long-term crop improvement have been collected and are being evaluated for fruit quality and disease resistance at several locations across the Northeast. Marketing research has shown that both consumers and gourmet chefs have interest in beach plum products and we have qualified the parameters needed for success in the respective markets. Beach plum plants have been distributed to more than 40 growers and cooperative extension researchers across the Northeast for production and evaluation. Growers and producers have met and begun a dialogue, which has led to the formation of an industry consortium. The accumulated knowledge of nine years of research will be passed on to the grower consortium for further action at the discretion of the steering committee.

This fact sheet is based on a SARE-funded project.
For more information, please visit
www.sare.org > Project Reports >
Search the database for project LNE01-153



References

For information on beach plum production and marketing, consult the beach plum web site, *Beach Plum: A New Crop for New Markets* <http://www.beachplum.cornell.edu>. It includes more information including, food science reports, pests, history and new articles and contact information for growers and suppliers. Some information presented in this report was first published as, *The Beach Plum: A History and Growers Guide*, by Cape Cod Cooperative Extension.

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