



**Cape Cod Cooperative
Extension**

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Railroad Avenue
Barnstable, MA 02630



The Beach Plum

A History and Grower's Guide

Cape Cod Cooperative Extension – Barnstable County, UMass Extension
and USDA cooperating.

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Contributions and Acknowledgements

Contributing Authors

Roberta Clark

*Extension Educator
UMass Extension - Barnstable County
Barnstable, MA 02630*

David Simser, BCE

*Simser Pest Management
Barnstable, MA 02630*

Richard Uva

*College of Agriculture and Life Sciences
Department of Horticulture
Cornell University
Ithaca, NY 14853*

Production

Cover Photographs – David Simser

Manuscript Preparation and Design – Amy Chadburn

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Information and technical review:***

William F. Clark

*Director
Cape Cod Cooperative Extension
Barnstable, MA*

Dr. Frank Caruso

*Extension Cranberry Pathologist
Umass Cranberry Experiment Station
East Wareham, MA*

Ron Smolowitz

*Owner-Operator
Coonamessett Farm
Hatchville, MA*

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Prunus maritima

The Beach Plum

A History and Grower's Guide

Forward

The beach plum, *Prunus maritima*, is native to the sandy North Atlantic coast, from Newfoundland to North Carolina . Most beach plums populations are found from northern Massachusetts to southern New Jersey. The beach plum is an excellent conservation and erosion-control plant that can grow in poor soil. It is also grown as an ornamental. Until recently, Cape Cod was famous for its beach plum jelly. Today, many so-called beach plum jellies and jams contain no beach plums. The recent interest in native plants, dune stabilization and sustainable crops has led to renewed interest in the beach plum. A number of studies of this plant are underway at Cornell University, Rutgers University, the University of Massachusetts Cooperative Extension, the Cape May (NJ) Plant Materials Center of the US Natural Resources Conservation Service, and private nurseries and farms. It is our hope that the beach plum can become an important new crop for growers in the Northeastern U.S.

Chapter 1

The Beach Plum

History

Beach plums were among the first of the New World plants the Colonists saw when they came ashore in the 1600s. According to an early account Henry Hudson reported seeing an abundance of blue plums in 1609 on the banks of the river, that today we know as the Hudson River. The beach plum was described and given the species name *Prunus Maritima* in 1785 by the plant taxonomist Humphrey Marshall.

The beach plum is extremely variable, as the *American Agriculturist* observed in its November 1872 issue: "The fruit varies in different plants, not only in color and size, but in quality-some specimens being quite pleasant to the taste, and others harsh and acerb." The publication went on to note that the beach plum was "highly prized by those who live near the shore for making preserves, and it is often seen offered for sale in the markets of seaport towns."

In the 1800's, several attempts were made to produce beach plum cultivars with outstanding fruiting properties. J. Milton Batchelor, who worked for the Hill Culture Division of the Soil Conservation Service of the U.S. Department of Agriculture, scouted the east coast for high quality varieties to bring into production. Further selections were made after World War II by members of the Cape Cod Beach Plum Growers Association. This group selected and named several cultivars, including 'Eastham', 'Cotuit', and 'Wheeler Sensation #6' (7). As far as we know, these selections have been lost.

In the 1940's, there was a resurgence of interest in the economic development of the beach plum, according to horticulturist George Graves of Martha's vineyard, Mr. Graves, writing in *National Horticultural Magazine* in 1944, said enough was known about the plant to "warrant planting *Prunus maritima* on a considerable scale, and for itself alone, since its fruit flavor is unmatched by that of any other fruit known to the jellymaker or fruit preserver." At this time, the Arnold Arboretum of Harvard University and the University of Massachusetts began work to develop the beach plum in the hope that this would lead to the development of a small fruit industry on Cape Cod. Cultivars were selected, diseases and pests of the plant were documented, and propagation and cultural methods were developed. On Cape Cod there was a great deal of interest in the beach plum - in growing it, improving its yield and harvesting its fruit. In 1841, 15,000 bushels of beach plums were harvested in Barnstable, Dukes and Nantucket counties (2). Bertram Tomlinson, the Barnstable (Cape Cod) County agricultural agent, reported in 1948 that the making and selling of beach plum jams and jellies was a sizable commercial activity based mostly on Cape Cod. "Much of the Beach Plum jelly is made by thrifty housewives, who discovered that a tidy sum could be realized by selling direct to consumers at modest road stands," he wrote, "but a few commercial concerns have also found jelly to be profitable, and their products are distributed throughout the country."

In 1949 James R. Jewett, a professor emeritus of Arabic at Harvard University and a long-time summer resident of Cape Cod, gave the Arnold Arboretum \$5000 to establish a fund to develop beach plums or other native fruit-bearing trees or shrubs. Because the beach plum was closest to Dr. Jewett's heart, the Arboretum established two prizes with the income from his grant. The prizes, one for \$100 and the other for \$50, would be awarded annually to the two individuals who had done the most to exploit the beach plum. The first awards, presented in 1941 went to Cape Cod residents, a Mrs. Wilfred C. White of Vineyard Haven, and a Mrs. Ina S. Snow of Truro.

That same year, Mrs. White, who had conducted experimental beach plum plantings, successfully petitioned the Massachusetts Legislature for funds for beach plum research to be conducted by the state Agricultural Experiment Station. The Legislature allocated \$500, which was used to start several projects that involved studying the propagation, pest control and general culture of the beach plum. There was still much to learn. As Tomlinson pointed out, the beach plum was "still the wild, native fruit it was when first discovered over four centuries ago." One of the greatest frustrations of growing beach plums as a commercial plant was its unpredictable yield. "Heavy crops of plums may be three or more years apart, and up to the present time, no one has a satisfactory explanation for this situation," Tomlinson writes in a 1948 issue of *Horticulture Magazine*. Another challenge was to learn more about the plum gouger to better control this pest. Most of the test plots for the state-funded research project were located in East Sandwich at a farm owned by William Foster, who had already "done considerable work as a pioneer grower" according to Tomlinson.

Tomlinson and Graves were founding member of the Cape Cod Beach Plum Growers' Association, a group that formed officially on November 17, 1948. On that day, fifty beach-plum fans gathered at the Brewster Town Hall to adopt a constitution and elect officers. They voted on a life membership fee of \$1, and the topics that most interested them: "pruning, spraying and otherwise caring for existing bushes; learning improved methods; studying modern methods of propagation and planting; and seeking the best methods of protection from inferior and adulterated beach plum jellies and jams".

The Cape Cod group held a contest for school children to design a logo for "Pure Beach Plum Products," The Association reports in its *Bulletin #10* of 1958. "Outstanding designs were received, and prizes were awarded for the best ones which were incorporated into a design." The Massachusetts Department of Agriculture authorized the Association's seal of guaranteed quality to be used for identifying Fancy Grade Pure Beach Plum products. The Association started a Registry of Beach Plum Varieties to help continue with the development and propagation of the best-yielding plants. The group proposed, in its *Bulletin #10*, setting up test plots of the best varieties of beach plums. The members even included in this *Bulletin* a recipe for beach plum jelly. But for reasons that history does not record, *Bulletin #10* is the last known written record of the Cape Cod Beach Plum Growers' Association.

Chapter 2

Plant Growth and Development

The beach plum is still largely a wild unexploited plant. As with any wild plant grown from seed, its vigor, growth habit and size, and the size and quality of its fruit varies. The beach plum grows in a tree-like form or as a low, bushy spreading plant that can reach widths of 10 to 15 feet. As a bush, the beach plum can grow to a height of 10 feet. It can have recumbent branches and often sends up many vertical shoots from the roots. The tree types may grow singly or in thickets. The root system of the beach plum 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 tap root that extends deeply into the soil (2).

Leaves are alternate, simple, ovate to obovate, 1 inch to an inch and a half long, serrate, dull green above, and lightly pubescent or glabrous beneath. In mid May before the leaves sprout, white flowers about three-quarters of an inch in diameter appear in clusters of two to five.

The edible fruit, which ripens from late August through September (8, 4), ranges in size from a half an inch to an inch in diameter. The fruit color can be red, purple, deep blue, and, rarely, yellow. The plum has a tart acidic flesh.

Habitat

The wild beach plum's environment is characterized by low-nutrient and low-water-holding soil, high winds, blowing sand, unstable substrate and high salt levels. Under such seaside conditions, the plant grows very slowly and does not bear fruit regularly. The beach plum is not limited to sandy soil, it may be planted in any fertile, well drained soil. Its growth in such soil will be more vigorous and we believe crop size may be improved. Full sun is required for fruit production.

Pollination

Most beach plums are considered self-sterile and require cross pollination for good fruit set. It is also thought that closely related bushes from within a limited area will not cross pollinate. Wild bees are the most common pollinator, followed by bumble bees, honeybees and syrphid flies (2).

A wild beach plum may bloom profusely for one year but not the next. The reasons for this are not well understood. It has been hypothesized that the influence of weather at the time of bloom is a critical factor. A frost may destroy the blossoms. Cold wet weather at the time of bloom inhibits the activity of pollinating insects. Cold temperature may also inhibit the shedding of pollen or, if pollination has occurred, the growth of the pollen tube, which causes the ovule to degrade before it can be fertilized (2). One report indicated that many flowers are androdioecious, i.e., they have only male reproductive structures (10). This alone would account for the fact that plants may bloom profusely yet fail to set any fruit. More recent observations have not supported this statement (12).

An alternative explanation could be the phenomenon known as alternate bearing (or biennial bearing), which is a common problem in apple, cherry and other tree fruits. Flower buds for the next spring are developing as the current year's fruit is ripening. A heavy fruit set one year can lead to a carbohydrate shortage which will produce a scarcity of flower buds set for next spring. Also, the size of a crop can be affected by nutrients available to the plant. A nitrogen deficiency can lead to a lack of flower bud initiation one year thus setting off the alternate bearing cycle. Traditionally horticulturists have managed these problems by supplying the plant with adequate fertilizer and by thinning out heavy crops thus balancing the yield from year to year. We have no long term yield data on beach plum therefore we can only speculate on the causes of irregular bearing.

Cultural Practices

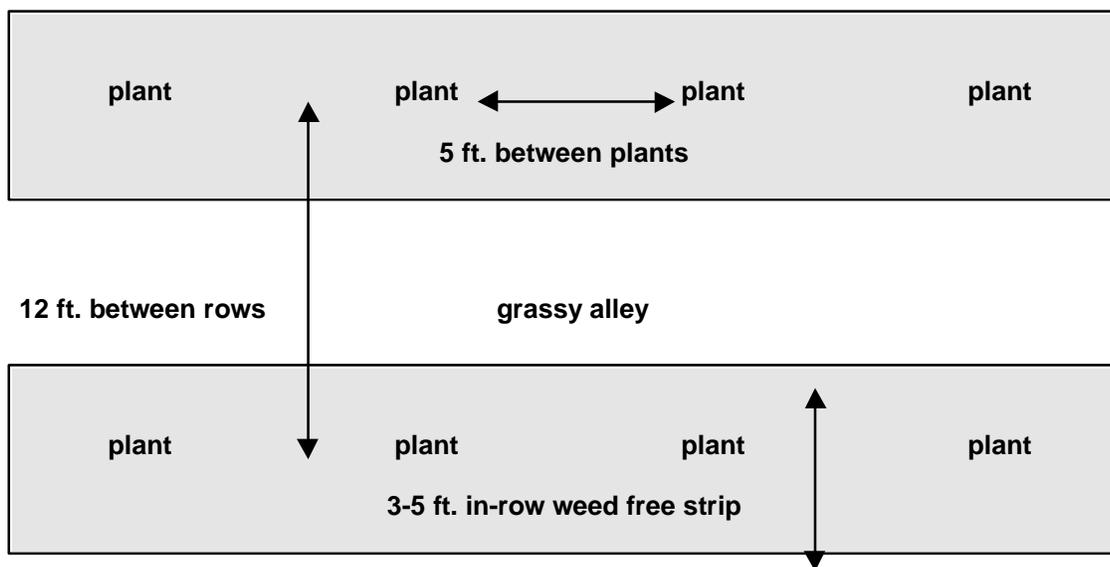
Site Evaluation and Preparation

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 plums typically develop a shrubby form we recommend a close plant spacing more typical of blueberry or currants than that of conventional European or Japanese plum orchards. This design requires a large number of small plants and will produce a hedge-row production system. Plant one to two year old bare root or container grown beach plums. Wider spaced larger plants are also an option.



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. On sandy, nutrient poor soils where beach plum is being considered weed growth is often at a minimum. Hand hoeing once per month should be easy for a 1/8 acre or smaller planting. If irrigation is desired we recommend a drip or micro-sprinkler type 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. Incorporation of lime and fertilizer into the root zone before planting is very important. 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 serves as an important source of magnesium for the plums. Lime raises the soil pH causing nutrients to be more available to the plant and it is also an important source of magnesium and calcium.

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.

Application of organic material to the soil can improve water and nutrient holding capacity. However, a common source of organic matter, compost, often contains large amounts of weed seeds. Test samples of any organic matter for weed growth before applying them to your soil. Avoid introducing new weed species to your farm from compost or plant potting mix.

Early fall before planting

Seed grass between row allies to prevent erosion over the winter.

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 4-6 ounces of calcium nitrate or 2-3 ounces of ammonium nitrate to the surface of the soil (13).

Fertilization

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. Home gardeners not wanting to conduct a soil test can apply a complete fertilizer such as 10-10-10 or its equivalent but it can create nutrient imbalances by suppling too much of one nutrient and not enough of another(7). In general, 40-60 lbs. per acre per year of nitrogen should be sufficient for beach plum fruit production. As nitrogen is easily leached from the soil it should be applied under the drip line of the plums in the weed free strip. If too much nitrogen is applied excessive vegetative growth could occur at the expense of fruit. On sandy soils nitrogen might be best applied as spilt applications over 2-3 weeks to minimize loss due to leaching. On soils with a greater clay and organic matter content smaller applications of nitrogen may be sufficient.

Fertilizer recommendations are usually given in pounds of element per acre. Because fertilizer products do not contain 100% of any element, you need to calculate the amount of product needed for your planting.

Example: Your soil test results indicate that you need to apply Phosphate (P₂O₅) at 90 lbs. per acre. You want to apply triple-superphosphate which contains 46 % Phosphate.

90 lbs. Phosphate per acre / 0.46 = 195.65 lbs. of triple-superphosphate per acre

You only have a 1/4 acre of beach plum therefore:

195.65 lbs. X .25 = 48.91 lbs. of triple-superphosphate needed.

Some Fertilizer Products and their Composition

ammonium nitrate	33.5 % Nitrogen (N)
calcium nitrate	15.5% Nitrogen (N)
dolomitic lime	20% Calcium (Ca) 10% Magnesium (Mg)
sul-po-mag	0% Nitrogen (N) 0% Phosphate (P ₂ O ₅) 22% (Potash) (K ₂ O) 11% Magnesium (Mg)
superphosphate	0% Nitrogen (N) 20% Phosphorus (P ₂ O ₅) 0% (Potash) (K ₂ O)
triple-superphosphate	0% Nitrogen (N) 46% Phosphorus (P ₂ O ₅) 0% (Potash) (K ₂ O)

Yearly Maintenance Schedule (also see pest schedule)

late winter	Prune if needed. Apply lime application if recommended by last August's soil and foliar nutrient analysis.
late April	As nitrogen is mobile especially in sandy soil it might be good to put 1/2 of nitrogen on in mid-late April and the other 1/2 on at flowering. Prepare and activate the irrigation system if you are using one.
mid May	Beach plum bloom time. Begin to scout for pests on a weekly basis (see pest schedule).
summer	Weed the in-row strips and mow the grassy ally as needed.
early August	Collect soil and foliage samples for nutrient analysis.
late August	Begin fruit harvest.
October	Drain and winterize the irrigation system.

Pruning

Beach plums may be pruned in late winter to early spring before bud break. Pruning is done to establish a framework of branches and fruiting wood as well as to eliminate dead or diseased wood. Beach plums form their fruit buds on the previous seasons growth. Once the bushes have become established annual pruning would involve the removal of weak and inward growing branches. Maintain an open center on the plants to facilitate light penetration into the canopy. Low branches may be removed to keep fruit off the ground. 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.

Propagation

Beach plum plants are readily available from commercial nurseries. However, if production of plants from seed is desired, 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. Clean off all of the pulp and skin. Cleaning the seeds can be facilitated by rubbing the seed through a coarse screen. Seeds which float on water are dead and can be discarded. To store seeds, dry them after cleaning at room temperature for several days. Seal them in an air tight jar and store in the refrigerator.

For the seeds to germinate they must first undergo a process called pre-chilling (or stratification). This is a cold moist period where chemical changes take place in the seed. During pre-chilling the seeds will be stored in moistened peatmoss or sphagnum moss. The peat should not be soggy but about as damp as a well wrung sponge. Mix the seeds thoroughly with the peatmoss and store for at least 5 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 at cold temperatures above freezing for some time safely. Plants obtained through seed propagation will be slightly different; select large vigorous plants for your planting.

Asexual or vegetative reproduction is necessary if plants identical to the parent stock are wanted. Beach plums may be propagated both by semi-hardwood stem cuttings or by root cuttings.

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 not treated with a root-inducing hormone will fail to root. Rootone (NAA), Dip n Grow (IBA + NAA) or Hormodin (IBA) have all been utilized for rooting of beach plums (5, 6).

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

Beach plums may also be propagated by root cuttings. Three to four inch root cuttings the diameter of a lead pencil should be taken in late fall and placed horizontally in soil out of doors (2). The propagation bed should be mulched with straw as the ground begins to freeze in the winter.

Chapter 3

Insects and Diseases

The *Prunus* genus is subject to a number of insect and disease problems, the most serious being the plum curculio and brown rot. The following pest information is extracted from *Peaches, Pears and Plums: A Pest Management guide for New England Growers, 1997 - 1998*.

PLUM CURCULIO

The plum curculio is a small weevil. Adult weevils are about 5mm (1 1/4") long, and gray-brown with tiny flecks of white and silver. Curculios have several pairs of humps on their backs and long, curved snouts adapted for piercing fruit and feeding. Adults over-winter in leaf litter near fence rows and the borders of wood lots. They emerge around bloom time when the humidity is high and temperatures average 55~56F for 3 days or 75F for 2 days. Curculios feed on flower parts and foliage. They are usually first seen in the orchard as blossoms begin to open, and their activity peaks 12 to 14 days after petal fall. Feeding injury on fruit appears as small round holes that expand and become corky as the fruit grows.

Egg laying starts when the fruit forms. The female chews a small cavity beneath the fruit surface, turns around, and deposits an egg. She turns again and chews a crescent-shaped cut around this cavity which makes it easier for the larva to grow. Egg-laying activity peaks about two to three weeks after petal fall. The eggs, which are small, cream-colored and elliptical, hatch in about a week.

Larvae are white, leg-less with a brown head and tapered at both ends. When mature, they measure 6-7mm (1/4"). Larvae bore into the fruit, feeding near the pit. Larvae mature in about 2 weeks, and leave the fruit to pupate in the soil. New adults appear from August through September. They begin their search for over-wintering sites in late September.

Monitor the beginning and end of Curculio season by checking fruit for the scars of fresh feeding and egg laying. Carefully inspect unsprayed plants and plants that border stone walls and wooded areas. Adult populations of curculios can be monitored by placing a sheet under a tree and striking a limb with a rubber mallet. Adults will fall from the tree onto the sheet, appearing to be dead.

BROWN ROT

Brown rot is the most common disease of stone fruits in New England. This disease is caused by a fungus that over-winters on the tree or in mummified fruit. In the spring, coinciding with tree growth, the fungus begins to grow and produces two types of spores, conidia and ascospores. Conidia are produced abundantly from old infections on the tree; ascospores are produced in the mummified fruit. Surface moisture on plant tissue allows infection. Flowers are particularly susceptible. The fungus invades and kills the flowers, or may grow down the flower and eventually girdle and kill the twig. Many infections may remain dormant until the fruit ripens, and then fruit rot will develop. Mature fruit may also be infected directly by the fungus. Generally, the disease occurs in two phases, the blossom blight phase and the fruit rot phase.

The spores which cause blossom blight come from over-wintering cankers in the tree or on the ground and from mummified fruit. Removing these sources of infection reduces primary inoculum, decreasing the disease pressure. Reducing early season infections also greatly reduces the inoculum available during

the fruit rot phase of the disease. Generally, fungicides are best applied on a protective basis, since the brown rot fungus requires only three to seven hours of tissue wetness to infect. If the disease pressure is high, fungicide sprays should be applied at early bloom, full bloom and petal fall. A combination of temperatures greater than 60 F, frequent rain, and a large amount of inoculum from the previous season is enough to create heavy disease pressure. In the absence of these conditions, the use of blossom blight sprays may be reduced.

Generally, one to three applications of a fungicide applied from the time the flower is pink to early petal fall will be adequate to control blossom blight. These sprays are important, even though symptoms usually do not show. If the bloom period is wet, then the number of sprays may be increased. For a period of two to three weeks from shuck split, the small fruit are susceptible to brown rot. Then for a period while the fruit are green, they are not very susceptible. When the background color of the fruit starts to indicate ripeness and the pit hardens, the fruit become susceptible again. Fruit rot fungicides should be applied at this time. Depending on the material, applications every seven days are usually adequate. Wet weather may require more frequent applications, especially as the fruit nears harvest ripeness.

Infections that occur early in the season provide most of the inoculum for the fruit rot phase of brown rot. As the fruit approaches ripening, it becomes more susceptible to the disease. Fungicide coverage is important during this period. If infections start, materials which will suppress spore production should be used.

BLACK KNOT

The first symptoms of black knot are small light brown swellings on the current or last season's growth. By the following spring, the knots gradually assume an olive-green color and develop a velvety texture. This phase is short-lived and the knots soon grow darker. By fall, the knots are coal-black and hard.

At first, the knots are less than one inch across and cover only one side of the twig. By the time the knots turn black, they may be four to six inches long and completely encircle the limb. The knots continue to expand in following years until the branch becomes girdled and dies. Older knots are frequently invaded by wood-boring insects. Both the healthy and the injured woody tissue of the current season's growth can become infected. The infection spores arise from the olive-green or black knots, and are spread by wind and rain. Infection may be present from bud break until shuck split.

Cultivated beach plums should be protected by removing infected wild plum and cherry near the orchard. In addition, all knots should be pruned out. Fungicides can provide protection at bloom, petal fall and shuck split.

Pest Census

During 1998, the following injurious arthropods and pathogens were recorded from plants under study and from random observation of beach plums on Cape Cod (12).

Listing of pests noted during 1998

<u>Initial date</u>	<u>Arthropod/pathogen</u>	<u>Damage</u>	<u>Type</u>	<u>Severity Index¹</u>
5 May 1998	Eastern Tent caterpillar	indirect	chewing	? (anecdotal)
6 May 1998	Lacebug	indirect	sucking 1	
6 May 1998	Hemispherical scale	indirect	sucking 1	
6 May 1998	Thrips	direct	rasping	1
13, 20 May 1998	Plum aphids	indirect	sucking 10	
13 May 1998	Leaf tiers	indirect	chewing	10
15 May 1998	Tarnished plant bug	indirect	sucking 1	
20 May 1998	Plum gouger	direct	chewing	100
27 May 1998	Gypsy moth	indirect	chewing	1
13, 27 May 1998	Spittlebug	indirect	sucking 10	
27 May 1998	Treehoppers	indirect	sucking 1	
27 May 1998	Eriophyiid mites	indirect	sucking 10	
3 June 1998	Plum gouger	mating		
3 June 1998	Mealybug	indirect	sucking 1	
4 June 1998	Plum pockets	direct	fungal	100
4 June 1998	Forest tent caterpillar	indirect	chewing	1
10 June 1998	Plum aphids	indirect	sucking 10	
10 June 1998	Plum curculio	direct	chewing/ovip.	100
17 June 1998	Brown rot	direct	fungal	100
1 July 1998	Bacterial canker (Gummosis)	direct	bacterial	100
8 July 1998	Japanese beetles	indirect	chewing	100
15 July 1998	Red Humped Caterpillars	indirect	chewing	100
13 August 1998	Red Humped Caterpillars	indirect	chewing	100
10 September 1998	Japanese beetles	indirect	chewing	10

¹The 'Severity Index' is based upon a scale of 1-10-100, where 1 indicates that the presence of one or several individuals was noted but control efforts are probably unnecessary; 10 indicates that a population may become damaging and 100 indicates that control must be effected to prevent crop loss or plant damage, as substantial feeding defoliation is noted.

Pests are also identified as **direct** where fruit is being damaged or consumed, or **indirect** where leaves, roots or vascular tissue is being consumed.

Beach Plum Management (12)

	<u>Proposed Action</u>
January/February	Prune; remove any canker or black knot gall
March	Apply Ultra-fine or Superior Oil at labeled rate
April	Apply fertilizer Apply fungicide at label rate for brown rot before bloom
May	Apply fungicide at label rate for brown rot at PETAL FALL Apply cover insecticide (Phosmet or other listed materials) for control of plum curculio; re-apply in 7 - 10 days If necessary, apply <i>Bacillus thuringiensis</i> (B.t.) for caterpillars such as gypsy moth, leaf tier, tent caterpillars, at label rate; re-apply in 7 - 10 days If necessary (aphids noted on new growth), apply Safer's Soap at label rate and re-apply in 3 - 5 days
June	Apply fungicide at label rate for brown rot at green capsule stage Apply cover insecticide for control of plum curculio; re-apply in 7 - 10 days If necessary, apply B.t. for caterpillar pests; re-apply in 7 - 10 days If necessary, apply Safer's Soap at label rate and re-apply in 3 - 5 days
July	Apply listed cover spray for Japanese beetle; re-apply as necessary If necessary, apply B.t. for caterpillar pests Apply fungicide at label rate for brown rot as fruit starts to yellow
August	Apply listed cover sprays for Japanese beetle; re-apply as necessary If necessary, apply B.t. for caterpillar pests; re-apply in 7 -10 days
September	Remove all fallen fruit or premature leaf drop from understory
October	Remove all fallen fruit or leaf drop from understory Protect plants from deer, vole, mouse, etc., winter browsing/girdling.

Mention of trade names and commercial products is for educational purposes; no discrimination is intended and no endorsement is implied. 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.

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