LOOKING TOWARDS BEACH PLUM CULTIVATION

The beach plum, *Prunus maritima*, in typical form, is a rugged bush native to the coastal areas of northeastern United States. As part of the wild landscape in that section it is most showy when in flower during May. So white and so bold is its display of bloom that back in 1932 Edgar Anderson and Oliver Ames of the Arnold Arboretum were able to plot the wild distribution of the plant from the air. (1)

This purely decorative feature has not been overlooked by landscape planters, especially, where fairly large groupings which call for little in the way of maintenance are being considered. Once established, even on poor soil, along roadsides or in informal, unpruned hedges or mass plantings elsewhere, the beach plum will pretty much take care of itself, and bloom well every year.

Later in the season, except, perhaps, on the double-flowered form which Wilfrid Wheeler has found growing in Falmouth, Mass., the flowers give way to small plums which have long been prized for jelly making and preserving. Whereas, the show of bloom is an annual event, pollination failure, pests or other causes prevent the blooms from eventuating in clean, ripe fruit on all plants every year. Seaside residents who have for generations picked beach plums from the wild as a delightful and useful part of nature’s bounty know that a good crop or "throw" oftener than one year in three is exceptional.

Whether or not intensive cultivation with its attendant pruning, feeding and spraying will always result in better fruit-set and more regular bearing remains to be seen. Pruning to keep the tops of the plants well furnished with two and three-year branches, feeding to increase the nitrogen supply and spraying to protect the fruits which do form have shown beneficial effects where tried. (2) (3)

Still to be further investigated is the matter of pollination as it may become a factor in planning plantings to avoid crop failure due to self-sterility which seems common among beach plums. (4) Also, there is the question of the influence of
weather at flowering time as it may affect the activities of pollinating insects and also prevent the complete fertilization of the flowers after actual pollination has taken place. Failure of complete fertilization may explain why, in some years, fruits form but are quickly aborted.

Such a study should prove especially important if plantings of clonal stocks are to be made. Clonal stocks are the vegetatively produced progeny of certain individual plants selected for increasing because of fruits of outstanding quality, heavy or regular bearing or other desirable properties. Such young plants, being actual pieces of the parent plants, should resemble them in every respect. Before extensive plantings of this sort are made it will be well to learn something definite about the behavior of the particular clones or varieties being set as regards self-sterility and, also, crossing with each other. In order that information may be gained on this subject, plants of the numerous clonal varieties now being named are being assembled at the Arnold Arboretum for observation in an area where beach plums do not grow wild. Where the plant does appear plentifully in a wild state in nearby fence rows, pollination of beach plum flowers during a season favorable to insect activity may be expected to present no problem.

Nor should there be any pollination difficulty when the soil conservationist's practice of planting seeds in rows on the contour to grow to maturity in place is followed. According to this scheme, a planting should be thinned after fruiting has started, leaving only sturdy plants which bear high quality fruits. In this way, size of fruit, smallness of seed, desirable color and approximately simultaneous blooming can be established throughout a planting. Because every individual in such an assemblage is a separate seedling, cross pollination seems likely to be assured, as may be impossible where entire plantings are made up of vegetative progeny of one or, at most, a few parent plants.

There is difference of opinion as to whether it is more satisfactory to plant seeds or to go to the trouble of vegetatively propagating outstanding individual plants. Those who depend upon seeds as a means of increasing beach plums say that the average quality of the general run of fruit on their plants is not sufficiently lower to justify the bother and expense involved in vegetative propagation. In this they have caught the correct attitude that the beach plum is purely a processing fruit which is wanted in volume pretty much as it now is in the wild. They recognize that the failure of numerous past attempts to put the plant into widespread cultivation can be charged to the mistake of placing it in orchard competition with dessert plums of other kinds, and of trying to "improve" it according to orchard ideas. What is wanted, they say, are beach plum plants in quantity and at low cost.

On a vast scale, this attitude may be all right but the planter who makes a limited setting has little opportunity to select by thinning. He wants to know the potentials of the few plants on which he spends money, labor and space.

Even in sizable plantings, the use of clonal varieties can simplify operations.
PLATE IX
One of the earliest American illustrations of the beach plum appeared in the American Agriculturist of November 1872.
All plants of such a variety grown under the same conditions in the same place will have their blooms open and fade at about the same time. Thus spray applications may be more readily timed for effectiveness against pests and the greater protection of pollinating insects. Anyone who has made plantings of beach plum plants collected at random from the wild only to have them bloom each on its own schedule between early May and late June will appreciate the value of more uniform behavior of the flowers of whole plantings for purposes of pest-fighting alone.

Where flowering dates vary from plant to plant, it seems necessary to apply the first insect spray (after a general dormant fungicidal application early in the season) just before the first blossoms open anywhere in the planting and repeat the same spray every seven days until the last one has faded. In order to protect all plants as many as eight applications may be necessary, and some open flowers may be covered with poison. On the other hand, if uniformity of flower-opening occurred, perhaps four sprays would do the job—just before blossoms open, when the shucks split, when the shucks fall, and seven days later. Incidentally, the materials used can be those recommended for peach tree protection. On Russell B. Stearns' planting on Chappaquiddick Island this past season a combination of materials suggested by Warren D. Whitecomb of the Massachusetts Agricultural Experiment Station gave good results. It consisted of 2 lb lead arsenate, 2 lb 50% wettable DDT, 4 lb wettable sulfur, and $\frac{3}{2}$ lb Fermate in 100 gallons of water.

It appears, then, that there is plenty of reason for the vegetative increase of clonal beach plum varieties. Furthermore, advance indications from tests now in progress are that own-root vegetative progeny are going to be just about as cheap and easy to produce as are seedlings.

To date, perhaps, a dozen or more named varieties are being increased vegetatively. Some of them have been described in print and others are favorite plants which their owners consider worthy of propagation. It is not yet possible to buy plants of any of them freely. Most of these selections have been made on the basis of fruit quality without too much thought having been given to such factors as disease resistance, regularity of bearing and other particulars such as the formation on older plants of spiny, short branches which are annoying to the fruit picker. The time is coming when selections will have to be made from among the first selections.

Most publicized of the named clones are those reselected from the many outstanding plants collected in the years just before the last war by J. Milton Batchelor who traveled the North Atlantic coastal area for the Hillculture Division of the Soil Conservation Service of the United States Department of Agriculture. Since then three varieties have been named and are described as follows:

"Hancock" (HC-1244)—Fort Hancock, N. J.—"Small shrub 3' high; foliage
clean, 4-6" annual growth; fr. 20-25 mm., flavor excellent for eating raw—sweet with little acidity; flesh, juicy golden; pit, small; matures Aug. 17 to 25; yield 1938—1 1/2 qts.; fr. very clean and highly attractive blue. 1938 rating 85.7%. Considered best early maturing selection."

"Safford" (HC-1252)—Plum Island, Mass.—"Prostrate spreading; bush to 4', 30-35' spread; clean-heavy bearer: fruit 23-25 mm., sweet, good flavor, attractive deep blue, matures Aug. 15-28. Mr. Safford "best beach plum on Plum Island." 1938 rating 78.2%. 1939 rating 80.9%.

"Premier" (HC-1358)—Plum Island, Mass.—"Shrub 4' high with 20' spread; foliage generally clean; fruit 24-25.5 mm. diameter (25 fruits averaged 24.5 mm.), good blue, attractive medium productivity, badly infected with brown rot. Best selection observed on Plum Island and the best selection of beach plum from the standpoint of field ratings. 1941 rating 86.5%.

Also collected by Mr. Batchelor but previously named by Mr. Wheeler is:

"Eastham" (HC-1248) (Collins)—Eastham, Cape Cod.—"Bushy habit about 3-4 ft. Inclined to be of spreading habit. Covering area 110 feet across. Stems upright and strong. This selection produced 25 to 30 bushels of fruit in 1941 and is reported to normally bear 15 bu. annually. Carries fruit well off the ground. Leaves bright light green, long, slender. Fruit large (21 to 24 mm. in diameter) to very large average 1 3/4" in diameter, color a deep purplish crimson, very attractive heavy bloom, borne along the stem in heavy masses. Quality tart but ripening to mildly acid. Seed small. Season early September but holding well on the plant in good condition for three weeks. Very attractive in flower, would make a good landscape plant because of its dense growth and enormous clusters of flowers and, later, fruit."

One other of Mr. Wheeler's numerous collections has also been described in the National Horticultural Magazine as follows:

"Wheeler Selection No. 6"—Origin Truro, Mass. Plant an upright grower 3-5'. Spreading with strong stems. Leaves large deep green, oval. Fruit medium size averaging 1 3/4", light blue, very attractive. Fruit borne in great profusion all along the stems. Has real beach plum flavor but ripening to a very sweet and good flavored, quality fruit. Seed medium size. This plant has a lot of character and most attractive both in flower and fruit, particularly the latter."

Mrs. Ina S. Snow of North Truro, Mass. has supplied the following information about two selections which she considers outstanding.
“Arrowhead” (A. 10)—An oval, freestone, blue plum with heavy bloom, and a flat pit. The bush is 20 or more years old, on a bank sheltered from north and east, and from west and southwest by pines. The plant measures about 12 feet across and bore a bushel of fruit in 1949.

“Snow” (A. 14)—A roundish blue plum with usual-shaped pit and excellent flavor. The bush is about 25 years old, is 10 feet across and is now beginning to get high in the middle. It is now being pruned for the first time. It is an annual bearer—this year about a bushel, last year about a peck. It has northern exposure and is surrounded by a mixed group of red and purple plums, none of which is very good.

Still another variety which originated as a wild plant in Eastham, Mass. has been distributed by J. H. Putnam of Orleans, Mass. Its description as supplied by notes taken by John S. Bailey of the University of Massachusetts is as follows:

“Putnam” (JHP)—“Medium to large size, largest 1 3 inches in diameter, dark reddish purple, good flavor, clingstone, yellow flesh, large plum-like stone, 1 3 x 2 inches. This looks like an unusually large, promising, well-flavored beach plum. The bush is a vigorous, upright type.”

The New Jersey Agricultural Experiment Station has just made available plants of the following:

“Raribank” (New Jersey 71)—“Selection from the wild near Old Bridge, N.J.: established on New Jersey Horticultural Farm, No. 2 since 1932. Large tree (as large as medium size peach tree), vigorous, purplish red fruit, freestone, good quality. Has been very resistant to brown rot and free of Japanese beetle attacks. Makes excellent jelly, and can be canned as whole plums.” Raribank is self-sterile which necessitates the planting of one pollinator with lots of less than ten or ten per cent pollinizers with larger settings. In New Jersey, two clones which blossom at the same time are being recommended for planting with Raribank. They are New Jersey 729 and New Jersey 730.

As has already been suggested, very high fruit quality and very large fruits may not be the only criteria for the selection of beach plum clones for propagation. Where high fruit quality is linked with annual bearing as is the case with the variety “Snow,” the grower is fortunate. Where it is not, perhaps, regular bearing is the more important factor. A number of observers, notably Mr. Wheeler and Mr. Stearns, have picked out varieties which seem to bear fruits regularly both in the wild and in cultivation, while plants of known better fruit quality nearby do so only occasionally. In the present state of advance of beach plum cultivation, these more dependable, if not so glamorous varieties may sup-
ply a partial answer to the demand for beach plums in quantity and borne regu-
larly, on submarginal land with considerable modification of the rules of textbook
orcharding.

As matters stand, very few beach plum plants are under actual cultivation. Most of the plants are still in the wild. To learn the behavior of the plant we still study it in the wild. We recall that, as Humphrey Marshall pointed out in his original description, "This grows naturally towards the sea coast." It may grow naturally in the area just back from the shore or, at times, high up on the beach itself but that is no hindrance to its being planted in other locations. The beach plum should grow well almost anywhere in this country. During the long history of the successive abortive attempts to popularize this species, it was grown and fruited far from the sea, even as far west as the Plains States.

Usually, transplanting to more fertile soil than that of its wild range makes for vigorous growth and greater ultimate size of plant. Instead of the starved, wind-whipped growth possible in some of its wild coastal stations, a tree-like habit may often be assumed. Sometimes, without being moved from wild surroundings back from the sea but where the soil is poor, volunteer plants have responded to feeding and manuring in the same manner.

In coastal areas where beach plum plants abound there is great variability displayed in habit from plant to plant. On upland areas back from the shore, differences in stature can often be the result of mere differences in age. Just what the life expectancy is is a matter for conjecture. Surely, it is much greater than that of he who sets the plants or picks fruit from them. More than one seaside patriarch can point out wild plants from which he has been picking fruit for as long as he can remember. Such ancient specimens hold on to life, apparently, because they are so deeply rooted that passing surface conditions like drought affect them almost not at all. Then, too, especially away from the beach on more loamy land, they throw out far-ranging shallow roots which often send up suckers to cause extension of the main plant into a thicket-like patch with the passing of the years. It is surprising that from the vast numbers of ripe fruits which fall to the ground beneath such plants, few seedlings spring up.

Sometimes, at the other extreme of habit, beach plums appear as wide-spreading patches of upright growths less than a foot tall. This can be explained by both age and environment. Such low patches are usually found both building and binding dunes just back from the high water mark of the sea but could occur in other places where the surface soil is not stabilized. Anyone who digs into such a planting soon discovers that there is much more plant beneath the soil surface than there is above it. The sequence of development was that seedlings got started on the spot long ago when the surface was level and not too far above the beach. As the wind-blown sand or soil was caught by the low branching of the beach plums and by beach grass and other vegetation, much of the top growth of the beach plums was buried, leaving only the growth of a year or two above.
In the years that followed, the struggle to keep from being engulfed continued as the soil piled up. Plants taken from such a location have shown great vigor when transplanted to the strong soil of an inland location. Another interesting fact about these all but buried plants is that they fruit more regularly. This suggests that the reflected warmth of the sand may have some helpful influence on flower pollination, and that low plants are more desirable than tree-like ones in some locations.

While environment is probably the greatest influence making for variability of branching and growth habit, inheritance of genetic factors in varying combinations is a probably more significant cause of differences, plant to plant. Time of blooming can be varied by environment but seems also to be genetic. Foliage characters, time of ripening, color of fruit, size and shape of fruit, size and shape of seed, resistance to disease and other such inherited variables differ so much from plant to plant that it is an easy conclusion that no two beach plum plants are alike. Perhaps, they are not but data published about thirty years ago by John Y. Pennypacker show that these characteristics are associated in a sufficiently systematic manner to establish eight major varieties—small- and large-fruited blue, purple, red and yellow. Selections of the large-fruited blue variety seem to have the greatest economic promise.

From the above review of the behavior and characteristics of the wild beach plum, it may be possible to reason out a few rules for the handling of the plants under cultivation. First, it would appear that whether they be trees, large bushes or low bushes depends somewhat on the planter's preference and somewhat on the location of the planting. Varieties of peach-tree size and habit are going to become available for inland gardens. On the other hand, for soil-binding operations or for windy, sandy seashore planting, low spreading plants seem preferable.

As for feeding, it appears that more good will be accomplished on poor, leached soil than on stronger land. Even so, there seems to be a point beyond which repeated feeding will result only in vigor of questionable value to the economy of the plants as bearers of usable fruit. Tests, as yet unfinished, indicate that liming is beneficial where the soil is very sour, as it is where most beach plum plants grow wild.

After the first few years, mulching, cultivation and other purely soil surface treatments seem to have little effect because of deep rooting. However, during the year or two after setting, while the newly transplanted plants are reestablishing themselves, such practices, plus watering, are important. Beach plum plants on their own roots do not have many fine roots or well balanced radially distributed root systems. Both seedlings and plants grown from layers or cuttings usually develop one or two major roots which during the first few years after transplanting run in the direction in which they are aimed at planting time. Therefore, the understanding planter will point these roots, or what is left of them after digging, up or down the row so that he will know where the roots are.
PLATE X

*Prunus maritima* in full bloom by mid-May as it grows at Duxbury, Massachusetts.
during the next few years in case he wishes to water, feed or mulch. As for planting interval, bush-type plants can be set 10 by 10 feet, although, it is considered in poor soil areas that setting closer in rows on the contour and, perhaps, 10 feet apart may be more suitable. The greater interval will be necessary on strong inland soils where peach orchard spacing may be necessary, at least, for the tree-like varieties.

There are constant reports that beach plum plants do not survive transplanting in most instances. Or, if they do, they are very slow to recover and to send up new, well balanced top growth without severe pruning or actual cutting to the ground. One way to get easier reestablishment is to set plants which have been grafted or budded on the roots of some other species. One of the most likely of such understocks is *Prunus tomentosa* which is now being so used by Dr. Karl Sax, at the Arnold Arboretum. It has a radially balanced root system which is less affected by surface conditions during the year or so after planting. Also, it will make for faster top development which may lead to earlier fruiting. F. L. O’Sourke of the Michigan State College has reported that Myrobalan plum is a satisfactory understock in Michigan. Professor O’Sourke in years past was also successful with *Prunus americana*, *P. hortulana* and *P. angustifolia* as root stocks for beach plum. Just what the final outcome of setting beach plum plants worked on roots of other species will be remains to be seen. Set deeply enough, scion roots should form. If they do not, one wonders about the longevity of plants so propagated.

Because the beach plum is naturally so long-lived, it is the author’s inclination to use plants which are own-root from the start. It is beginning to be evident that they can be made to establish themselves satisfactorily by adopting a change in planting method. Instead of setting them in the natural vertical position, this writer now plants them—spring or autumn—flat on their sides on the ground in a wide hole or a furrow about eight inches deep. The roots are buried but the horizontally placed stems are left exposed to the light until new growth has started, as it will pretty much along the whole length of the stems. During the first growing season, the soil is gradually filled in about the new shoots as they extend upwards, until the soil surface is again level. By following this method, few, if any, plants have been lost and newly set plants finish the first season of growth after transplanting with up to as many as a dozen new shoots from below ground level instead of the one or two stems on plants planted in the conventional manner, if the latter are still alive. Also, under this system, the one or two root stubs on a poorly rooted plant can be aimed down at moisture if so desired. There is nothing new about this method of planting. It was recommended for the setting of holly hedges centuries ago. Even so, it is a technique of present value, especially for beach plums which are being planted for soil conservation purposes with the hope of eventual fruit to repay some of the cost and trouble of placing them to bind the soil.
It seems, then, that with the precedents set by those other two native plants, cranberry and blueberry, something in the way of economic development may be expected from the beach plum. There are many people who think so. Fortunately, these beach plum enthusiasts are no longer working in isolation. In New England, at least, they are now organized as the Cape Cod Beach Plum Growers Association. This organization, under the guidance of Bertram Tomlinson of Barnstable, Mass. is now coordinating present efforts to bring to reality something that has been talked about for generations. An earlier important step towards the exploitation of the beach plum was the establishment of the James R. Jewett prizes in 1940. Doctor Jewett, Professor of Arabic, Emeritus at Harvard University turned over the sum of five thousand dollars to the Arnold Arboretum, the income from which is to be used for the development of beach plums. Two prizes have been offered annually for the two individuals who, in the opinion of a special committee have done the most towards the exploitation of Prunus maritima in the previous twelve-month period. These are known as the James R. Jewett prize and the Vieno T. Johnson prize, the latter commemorating an old employee of Dr. Jewett.

Neither prize has been awarded every year since. Those who have won the James R. Jewett prize are Mrs. Wilfrid O. White, Vineyard Haven, Mass., 1941; J. Milton Batchelor, then of the Hillculture Division of the Soil Conservation Service of the United States Department of Agriculture, 1942; Wilfrid Wheeler, Falmouth, Mass., 1943; Bertram Tomlinson, County Agent of the University of Mass. in Barnstable County, Mass., 1944; George Graves, 1945, 1948; Cape Cod Beach Plum Growers Association, 1949.

The Vieno T. Johnson prize was won by Mrs. Ina S. Snow, North Truro, Mass., 1941; William Foster, East Sandwich, Mass., 1942; Peter Hansen and his sister Miss Anna Hansen, Truro, Mass., 1944; Fred F. Dill, North Eastham, Mass., 1945.

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*Editor's Note—

Mr. Graves became interested in the beach plum over ten years ago and has done a great deal of work with it in the form of propagation, growing and experimentation during the course of that time. This article, together with the information contained in the bibliography, should bring our information up to date concerning this plant.