

Cranberries — The Last One Hundred Years



Vaccinium macrocarpon. From *Hortus Kewensis*, Vol. II, by William Aiton, 1789.

(The following article is excerpted from a talk presented at the Arnold Arboretum during the January 1972 meeting of the Northeastern Section of the American Society for Horticultural Science. Ed.)

It is difficult for us to picture the state of the cranberry industry one hundred years ago. Observing my loss of hair and the graying of what is left I sometimes think I should be able to tell you from personal recollection what it was like. We know, however, that berries were hand-picked by fingers, that foremen saw to it that each picker harvested every berry in his allotted patch and that these were all shipped in wooden barrels of 100 lbs. (or 100 quarts) each. Horse and cart took them to rail terminals where they were stacked four high in the freight car. There was no market for processed cranberries so all were shipped dry except for some packed in water-filled barrels for

steamship transport to the west coast and overseas. I can still remember seeing the last of the hand-picking gangs in the early 1930's; about 160 men, women and children in a long, irregular line across the bog picking into 6-qt. pails and most talking continuously.

Statistics are hard to find for this industry a century ago. Farm operations in general and cranberry production in particular required much hard labor for long hours by many people, all of which may well account for the paucity of records. I think it is perhaps true that my audience may not want a long string of statistics so I will try to review some of the more significant events.

It was just a hundred years ago in 1872 when the Wisconsin cranberry crop exceeded that of Massachusetts for the last time. My source of data refers to the Wisconsin crop as from "the West". It was in 1894 that New Jersey's crop beat that of Massachusetts for the last time. It was not until 1924 that Pacific Coast production reached proportions that merited recording. Since 1949 the records of production in Washington and Oregon are reported separately. It is undoubtedly a blessing that cranberry production appears impractical in California. So five states are, and have been, important in this industry and it is probably significant with respect to Black Monday, November 9, 1959, when the notorious "cancer scare" broke, that the industry could count on support from only 10 of 100 senators. I will say more on this later.

In 1907 cooperative license #1 was granted to the American Cranberry Exchange with the Eatmor brand name. Much as I abhor such a name, this established a trend toward cooperative marketing in cranberries, a trend that has persisted to the present to the great benefit of both cranberry growers and consumers. In 1909 the Cranberry Experiment Station was founded with Dr. H. J. Franklin providing the talent and industry as both chief and Indian. Originally he slept at the Station, the better to work long hours seven days a week. He came to be known as "Mr. Cranberry" and I can vouch he was a most difficult person to follow as head of the Station. Two significant events date from 1913. The first can of Ocean Spray cranberry sauce was produced in that year, and Chester E. Cross was born! The Ocean Spray name began under Marcus L. Urann and was the trade name of his company, the United Cape Cod Cranberry Company. By combining the canning interests of this and others, the canning cooperative, "Cranberry Cannery, Inc.", was founded in 1930. Thus the industry came to have

two large cooperatives, one for fresh fruit and one for processing, and while many efforts were made to keep these functioning amicably, there existed great rivalry. Cranberry Cannery, Inc. became the National Cranberry Association in the mid-1940's to undertake the cooperative marketing of both fresh and processed cranberries. In the 1950's the National Cranberry Association bought the New England affiliate of the American Cranberry Exchange, and under the new name of Ocean Spray Cranberries, Inc. now markets about 85% of the total U.S. crop.

The cranberry industry's growth in acreage shows a steady increase in Wisconsin, Washington and Oregon, reaching currently to 7,000, 1,250, and 875 acres respectively. In New Jersey the century began with 9,000 acres, increased slowly until after World War I when the false blossom disease struck. From the 1920's to the 1950's many of New Jersey's cranberry bogs were converted to high bush blueberry culture, the cranberry acreage declining to 2,500 acres in 1958. With control of the false blossom disease and a conversion to flood harvesting, New Jersey's acreage is now up to 3,800. In Massachusetts the cranberry bog acreage started this century at 11,300 and now has the same total! It rose to 15,000 in the late 1940's but, as competition increased, marginal bogs (chiefly those with limited water supplies) were abandoned.

It will probably surprise you to know that here "in the land of the free and the home of the brave" the cranberry industry is unlikely to have any further wide fluctuations in acreage. Under a federal marketing order dated August 1, 1968, no cranberries may be sold from new plantings made after the effective date. A similar regulation has been adopted in the chief cranberry-producing provinces in Canada. The present surplus of cranberries was clearly foreseen in 1967, and the national referendum showed nearly unanimous support for the order.

The cranberry industry, therefore, resembles other branches of American agriculture in showing great increases in production efficiency. The success of food production in the U.S.A. may prove to be its bane, for the producer has now become a scattered minority. A newspaper article of last summer projected the present decline of farmers and farm workers (the decade of the 1960's showed a decline of 1.2 million farmers and a decline of 2.8 million farm workers) to the year 1986 when farmers would number near zero. It suggested that the U.S. Department of Agriculture is no longer needed, and the

few remaining farmers could be transferred to the U.S. Department of the Interior where they could be placed on the Endangered Species List and be protected accordingly!

When Dr. Franklin founded the Cranberry Experiment Station in 1909 the average production per acre was 20 bbls. When he retired in 1952 productivity had doubled to average 40 bbls. per acre. The 1970 and 1971 Massachusetts cranberry crops averaged over 90 bbls. per acre, and this State's crop is just under half of total U.S. production. Combining these data with the acreage figures which show 11,300 acres in both 1900 and 1971, the efficiency of Massachusetts cranberry production becomes clear. In my opinion, three cultural improvements are primarily responsible for the increasing production per acre: frost injury prevention, improved harvest technology, and modern control of insect pests.

On September 10-11, 1917, an estimated 50% of the Massachusetts cranberry crop was frozen on the vines just prior to harvest. The very next spring on the night of June 20-21, 1918, an estimated 55% of the coming crop was destroyed. The terrible frost of May 18-19, 1944, came shortly after the widespread winter-killing of the previous winter. Together they reduced the crop about 65% to 159,000 bbls., less than average production back in 1900. On the night of Memorial Day, 1961, a sudden hard frost reduced the crop by one-third, and in that year the Wisconsin crop came within 10,000 bbls. of equalling that of Massachusetts. While these are just the greater frosts, lesser ones occur almost every year. Clearly, such losses cannot be absorbed in a highly-competitive, narrow-profit business.

A frost warning system was developed by the Cranberry Experiment Station in cooperation with the U.S. Weather Bureau, which computes twice daily the minimum expected temperature (accuracy 1°-3°F.) and issues a warning by telephone to subscribing growers, and as a public service by radio. With heavy capital outlay growers have supplemented or replaced the slow and sometimes wasteful method of flood frost protection with solid-set, low-gallonage sprinkler systems. These are fully protective about four minutes after starting and continue to protect buds and berries as long as they continue to operate, even though ice forms and coats the vines when ambient temperatures fall below 27°F. Buds, flowers and small green berries are known to tolerate 29.5°F., while under continuous sprinkling at 50 gallons per acre per minute the temperature of plant tissues remains at 30.5°F. or higher. Over 7,000 of Massachusetts' 11,000 acres of cranberries are pro-

tected in this way, using only about 10% of the water required by frost flooding. Cranberry growers here and in other states have impounded vast quantities of fresh water and therefore may be thought of as effective, eager conservationists.

The time-honored method of picking cranberries with the fingers had to be abandoned when the picker could not pick enough berries to equal the value of his time. The wooden or metal-toothed scoop replaced hand-picking in the 1930's, 40's and 50's. It was hard work for knees and back, it was hard on the cranberry vines (some broke off, and the roots of many were pulled up), and some 20 to 35% of the berries was dropped and lost down among the vines. After-harvest flooding retrieved some lost berries as "floats", but costs of clean-up were considerable and the value of such fruit was limited. Right after World War II, and after many unsuccessful attempts, two dry-harvest machines were introduced which late in the 1950's and in the early 1960's came to harvest over 90% of the State's crop. Mechanical damage to the vines was less and the pulling of root systems was almost eliminated by these machines. The efficiency of harvest improved also, so that only 5-20% of the berries was lost. Finally in the late 60's flood harvesting came to Massachusetts and it is certain that this mode of picking, though used on only one-third of the State's bogs, is largely responsible for the two successive record crops of 1970 and 1971. The first national million-barrel crop was raised in 1953, while the first state to raise such a crop is Massachusetts with its 1971 crop of 1,058,000 barrels. It would appear to be appropriate timing that the Massachusetts cranberry industry should produce its first million-barrel crop as the Arnold Arboretum celebrates its centennial year.

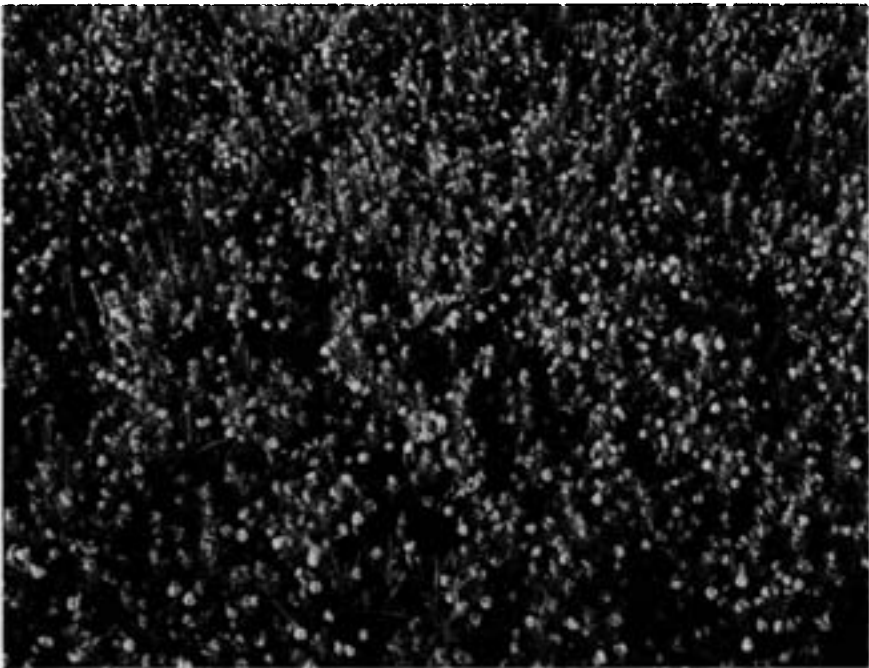
Finally, the control of insect pests must take its place in the forefront of the causes of high productivity. The Cranberry Experiment Station was originally founded by an entomologist to find ways of curtailing devastating losses due to insect depredation. As long ago as 1859, B. Eastwood published his book *The Cranberry and its Culture* in which it is clear that two kinds of "worms" cause extensive damage; one to the vines, the other to the fruit. In the effort to find controls for these and a dozen other insect pests, cultural methods like flooding and winter exposure were first thoroughly explored. By 1933 the following insecticides were in regular use: lead arsenate, Paris green, nicotine sulfate, sodium cyanide and pyrethrum. None of these is now used, but I can recall the smelly, hazardous job of dissolving 7 oz. of sodium cyanide in 100 gallons of water and



Above: Cranberry bog.

Below: Vaccinium macrocarpon in flower.

Photos: M. Gilmore



applying one gallon of solution to each square foot of cranberry bog in the effort to control root grubs, grape anomala and white grub. Here was a dangerous insecticide, men wading around in it with rubber boots and breathing fumes for the 9-hour work day, but I never heard of a casualty. Ground-rig dusters and aircraft made their appearance with the newer organic insecticides. Dragging hoses and the tramp of the booted feet of the spray gang caused much mechanical damage to the vines, so it was not long before helicopters and planes took over pesticide distribution, and refinements in their technique and a conversion to concentrate spraying has made for very efficient control. In the 1960's the installation of sprinklers has led to precision insecticide distribution through these devices, at the same time permitting treatment at dusk when birds and bees are no longer on the bog. The careful grower loses very little to insect pests today and he can do this with only three to five insecticide sprays * a year.

To read from the above you might gather all is well in the cranberry industry with its record crops, its control of pests, its mechanical harvesting, and even its sprinkler weather controls. Such is not the case, and our problems date back to 1959 and the amino-triazole cancer scare. With the nation's newspapers warning people of the hazards of residues on cranberries, the market died. It made no difference that we had a registered and approved use for the weedkiller that would leave no residue on the fruit, it made no difference that we had a fine educational program to instruct growers in the herbicide's proper use. Headlines across the country proclaimed the hazard. Very few Americans know the sequel. By agreement between the White House, growers organizations, U.S.D.A., and U.S.D.H.E.W., the growers, at their own expense but under supervision of H.E.W., tested systematically the unsaleable 1959 cranberry crop; when proved to be free of residue, it was allowed to be dumped and the grower was paid 8.1 cents per pound for his clean fruit. This was the estimated cost of production, and it cost the

* Unlike some commodities, cranberries in Massachusetts are treated only after insect infestations are discovered and quantitated. A prebloom treatment with Diazinon, Carbaryl or Parathion may be needed to control fireworms, cutworms, Sparganothis fruitworm, gypsy moth, tipworm, green spanworm or red mites. Repeated treatments with the same insecticides may be needed in late bloom or post-bloom to control the cranberry fruitworm, second brood fireworms, girdler larvae and weevils. An after-harvest treatment with Dieldrin may be needed once in five years (with drainage flumes closed) to control any of three species of root-eating grubs.

U.S.D.A. nearly \$10,000,000 to pay for the residue-free berries that had to be destroyed. It was not until 1963 that a whole crop could be sold again. The industry was accused in the headlines; the efforts at amelioration were relegated to the back pages.

The cranberry crisis occurred three years before the publication of *Silent Spring*, described by Dr. Norman Borlaug as “half-science-half-fiction”. Since then environmentalists have been attacking insecticides, and particularly DDT, with misused facts and many fancies. It has been many years since the cranberry industry has made use of DDT, but I was living and working on Cape Cod when the whole Cape was sprayed with DDT in 1949 and the whole of Plymouth County in 1950 for the control of the gypsy moth. I know that the gypsy moth was removed from our list of cranberry insect pests soon after this and that no cranberry bog in either county had to be sprayed for gypsy moth caterpillars for over twelve years. In fact, it was not until 1966 that the gypsy moth again appears on the cranberry insect control chart, and an extension education meeting was called to show the growers what the insect was and what it looked like. Perhaps you can imagine my disgust when I read in the May-June 1971 issue of the Massachusetts Audubon Newsletter in the unsigned article, “Man vs. Gypsy Moth”, “. . . The knock-out punch that man counted on was DDT — but it failed. In fact, biologists now say, it actually spread the gypsy moth, making it more annoying”. This is pure rubbish, like so much of the environmentalist propaganda.

It is literally true that millions of people are alive today because of DDT, and the U.N. World Health Organization feels it cannot continue its programs for world health improvement without DDT. The U.N. Food and Agriculture Organization feels that tens of millions of the world's people would die of starvation if we had a world ban of DDT. The outcry of the environmentalists has been so loud that it is now doubtful if we could get approval and registration of short-lived alternatives to the chlorinated hydrocarbon insecticides. The food production enterprise in U.S.A. is sorely beset by the very people who know the least about it and who at each mealtime take it all for granted.

CHESTER E. CROSS
Professor of Botany and
Head, Cranberry Experiment Station
University of Massachusetts,
East Wareham