The Cape Cod Cranberry Industry

PUBLISHED BY
CAPE COD CRANBERRY
GROWERS' ASSOCIATION

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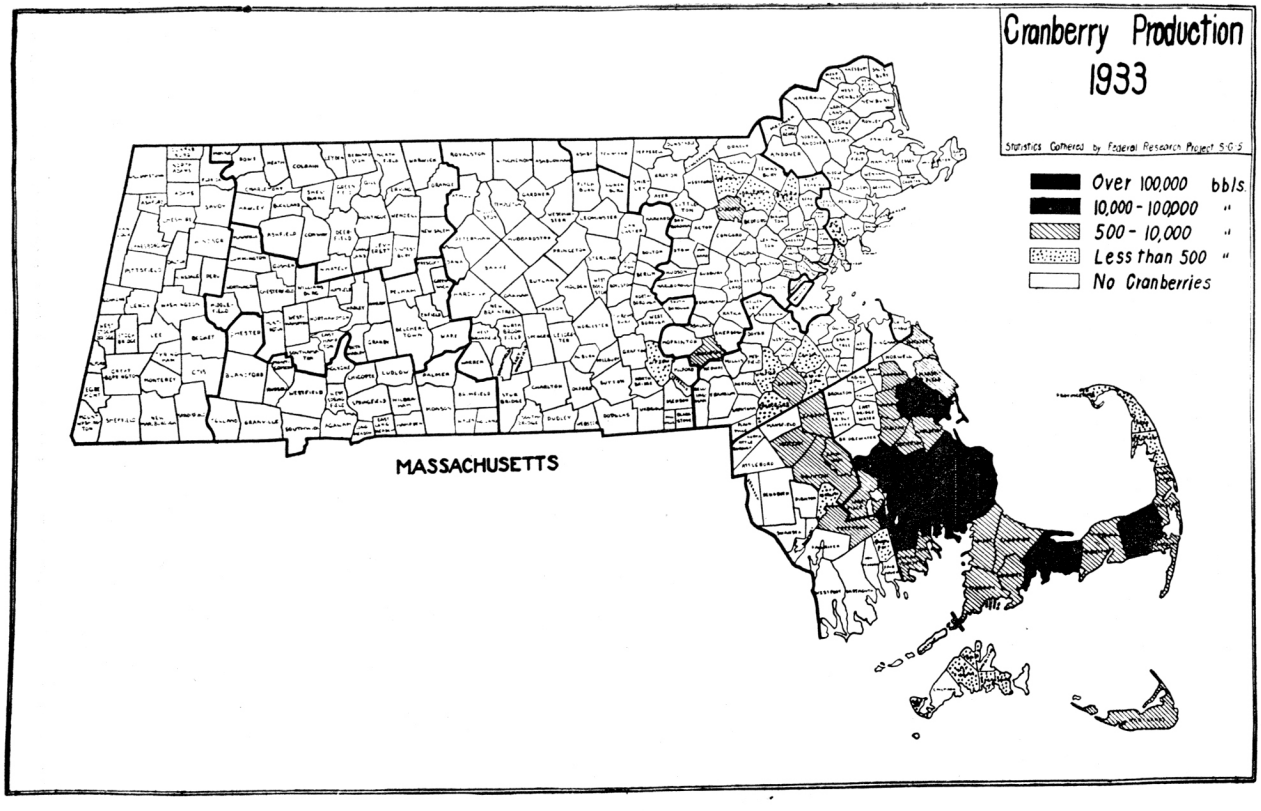
of the world's cranberry crop.

—o—

Published by
THE CAPE COD CRANBERRY GROWERS' ASSOCIATION
With the cooperation of the
Extension Services of Barnstable County,
Plymouth County, the Massachusetts State College,
and the United States Department of Agriculture.


Cranberry Production
1933
Statistics Gathered by Federal Research Project S-C-5
Over 100,000 bbls.
10,000 - 100,000 "
500 - 10,000 "
Less than 500 "
No Cranberries
MASSACHUSETTS

FOREWORD

THE CAPE COD CRANBERRY GROWERS' ASSOCIATION is very proud to be able to present to the general public this statement or program of the progress of the cranberry growers of Massachusetts.

For fifty years now, the growers of Massachusetts have been largely associated in the Cape Cod Cranberry Growers' Association, and the progress to date is really a statement of the things which that association, through its membership, has been enabled to accomplish.

In publishing this program, the Cape Cod Cranberry Growers' Association is endeavoring to present to the public and to the cranberry growers in particular the importance of this industry to Massachusetts and the importance of the problems which have been solved and those which face the industry if it is to retain its present position.

It is with a great deal of pleasure that we co-operate with the county, state, and federal services in presenting this program of the industry to the public.

Paul E. Thompson

President

Things Every Cranberry Grower Should Know

MASSACHUSETTS produces nearly three-fourths of the world crop. The Massachusetts crop ranges from 275,000 to 506,000 barrels annually. Its annual value ranges from $3,000,000 to more than $5,000,000. It is the state's largest export crop.

The false blossom disease threatens to reduce these values seriously. It can and must be checked.

Practical methods of controlling insects, diseases, and weeds have been developed.

Continual research on cranberry growers' problems is being carried on by the Canberry Experiment Station at East Wareham.

The Extension Service makes information on approved practices available to all growers.

Ample credit may be had to develop and protect the industry.

Marketing and educational organizations are at the service of all growers.

Profitable marketing requires sound fruit, carefully handled, well graded, and attractively packed.

A Program for Developing the Cranberry Industry

What the Cranberry Grower Should Do

Learn to recognize the various insect pests.

Practice accepted control measures and encourage others to do so.

Protect his holdings and those of others from the false blossom disease by keeping the blunt-nosed leaf hopper under control.

Apply proved methods of weed control.

Take advantage of the frost warning service.

Attend meetings held to stimulate interest in the industry.

Produce berries of the best possible quality, grade them honestly, and pack them carefully, that demand for the fruit may increase.

What Cranberry Organizations Should Do

Coordinate the work of those trying to advance the industry.

Secure official and public recognition of the importance and needs of the industry.

Take active part in securing proper support for research and extension work serving the industry.

What the Cranberry Experiment Station Should Do

Revise old bulletins and publish new ones on completed projects.

Continue studies to find more effective and less costly controls for injurious insects, especially the fruit worm.

Study weed control and bog renovation.

Continue study of cranberry diseases, including fruit rots, their causes and control.

Continue work on cranberry varieties to develop productiveness, disease resistance, and desirable vine and fruit characters.

Continue the weather studies and frost warning service.

Study further the production, handling and storage of cranberries.

Help the Extension Service prepare circular material, pest control charts, and other information.

Assist at meetings of growers.

What the Extension Service Should Do

Arrange for meetings of growers, lectures, and field demonstrations to teach approved methods and give information.

Prepare and supply to all growers an annual insect and disease control chart.

Send all growers timely letters telling of the development of pests.

Help distribute frost warnings.

Assist in programs of cranberry organizations.

Give individual attention to growers by correspondence, office calls, telephone calls, and visits to bogs.

Show growers how to use the insect net to find and gage insect infestations.

Teach growers to recognize serious pests and to understand and apply treatments.

Secure general adoption of practices that control the False Blossom Disease.

Inform growers about weed controls and show them how to apply them.

(These services will relieve the staff of the Cranberry Experiment Station of many such labors, so their time may be given more fully to research).

SOME FACTS AND FIGURES ABOUT CRANBERRY GROWING

1. The ten-year average price was about $10.00 a barrel, with five depression years included.

2. The trend is toward larger holdings and better flowage facilities.

3. Cranberry acreage in Massachusetts decreased 1.7 percent from 1924 to 1934. Most of this loss was in dry bogs.

In presenting the problems facing those who produce and market cranberries, this report must show the cranberry acreage, the number of bog owners, the size of holdings, and the trends in cranberry production, and give other information picturing this important Massachusetts industry.

Crop Yields and Values

During the ten-year period from 1925 to 1934, inclusive, Massachusetts cranberry production ranged from a record crop of 506,000 barrels in 1933 to 275,000 barrels in 1934. Its total value ranged from slightly less than $3,000,000 in 1926 to more than $5,000,000 in 1929. Massachusetts produces about 70 percent of the cranberries of the world.

It is estimated that about 75 percent of our cranberries go out of the state. Besides being the only Massachusetts crop that meets all the needs of the state, they bring more money into it than any other.

CLASSIFICATION OF CRANBERRY BOGS AS TO FLOWAGE PROTECTION (1924 and 1934)

(From preliminary report on 1934 Cranberry Survey, U. S. D. A., New England Crop Reporting Service)

1924**

Counties	Total Acres	Dry	Winter Flowage Only	Winter and 1 Spring	Winter and 2 Spring	Full Flowage
Barnstable	4,331	927	2,066	101	22	1,069
Plymouth	8,582	540	2,404	725	190	4,723
Other Counties	978	53	339	29	8	497
Total for State	13,891	1,520	4,809	855	220	6,289

** In the 1924 survey, there were 146 acres in Barnstable County and 52 acres in Nantucket County the flowage of which was not indicated.

1934

Counties	Total Acres	Dry	Winter Flowage Only	Winter and 1 Spring	Winter and 2 Spring	Full Flowage
Barnstable	3,533	342	1,447	559	107	1,078
Plymouth	9,066	370	1,784	1,098	844	4,970
Other Counties	1,062	24	165	68	263	542
Total for State	13,661	736	3,396	1,725	1,214	6,590

"The foregoing tables indicate a reduction of 230 acres or only 1.7 percent for the state as a whole since the 1924 survey. If we examine the acreage totals for the counties, we find Barnstable has had a reduction of 798 acres, or 18 percent while Plymouth has had an increase of 484 acres, or nearly 6 percent.

"When we compare the two tables as to flowage facilities we find an increase of 301 acres or 4.8 percent for the state, with full flowage protection. Bogs with winter and two spring flows have increased 994 acres, or more than five times the previous total. Winter and one spring flow shows an increase of 870 acres or about 102 percent. Winter flowage shows a decrease of 1,413 acres, or 29.5 percent. Dry bogs have decreased 784 acres, or 51.6 percent.

"Comparing the trends in flowage protection of Barnstable and Plymouth counties, we find that in Barnstable County full flowage acreage increased only nine acres which is less than 1 percent, whereas in Plymouth County it increased 247 acres, or 5.2 percent.

"In both Barnstable and Plymouth counties there has been a material improvement in flowage facilities during the past ten years. Acreage provided with winter and one or more spring flowages has increased generally, while dry bog or acreage with winter flowage only has been reduced during this period."

CLASSIFICATION OF CRANBERRY ACREAGE AS TO VARIETIES

(U. S. D. A.—New England Crop Reporting Service)

The 1924 survey did not classify the acreage as to variety. The 1934 survey showed that of the 171 acres of new bog built since January, 1932, 115 acres or 67 percent were planted to Early Black, 51 acres or 30 percent to Howes, and 5 acres or 3 percent to other varieties. Of the 263 acres of bog rebuilt since January, 1932, 106 acres or 40 percent were Early Black, 128 acres or 49 percent Howes, and 29 acres or 11 percent other varieties. Early Black and Howes together made up 12,008 acres or 87.9 percent of the cranberry acreage of the state.

	1934 acreage			
VARIETIES	New	Rebuilt	Bearing	Total
Early Black	115	106	6,416	6,637
Howes	51	128	5,192	5,371
McFarlin	4	3	213	220
Smalley Howes	–	1	242	243
Holliston, Mammoth or Batchelder	–	–	79	79
Matthews	–	–	185	185
Bugle	–	–	135	135
Centennial	–	2	55	57
Centerville	–	1	36	37
Early Red	–	1	96	97
Others	1	21	578	600
TOTAL	171	263	13,227	13,661

The following table gives the average per acre yields in recent years:

CRANBERRY YIELD PER ACRE BY VARIETIES (In Barrels)

VARIETIES	1931	1932	1933
Early Black	39.2	33.1	44.4
Howes	32.5	31.4	34.5
All others	24.1	24.0	26.4
State average, all varieties	34.7	31.3	38.3

Size of Bog Holdings

The 1924 cranberry survey showed that 500 bog owners, or 23 percent of the total, had less than one acre each and 489 owners had 1 to 2 acres each. The third largest group of holdings was that of from 2 to 3 acres. The total of these three groups of owners was 1,274 or nearly 60 percent of all the owners of cranberry acreage in the state.

In 1924, the average cranberry area in Massachusetts held by one owner was 6½ acres. The average holding in Plymouth County was 11 1-10 acres and in Barnstable County 3 3-10 acres. Comparative

figures from the 1934 survey are not yet available, but the preliminary report indicates a very definite trend to larger holdings.

PRODUCTION PROBLEMS

1. The false blossom disease seriously threatens the welfare of the industry. Good controls are available and must be applied.

2. Recognition of insects, diseases and weeds is basic to intelligent treatment.

3. New and better ways to meet production problems are being found. Growers must be alert to profit by these changes.

All growers agree that the control of insects and diseases is one of the main problems of the cranberry industry. Modern programs for this are so exacting as to bewilder those who have not followed their development closely.

Little attention was given to pests in the early days of the industry and flooding was the chief reliance. Insect troubles increased with the acreage. This accounts for the establishment of the Experiment Station at East Wareham where a skilled entomologist was employed to find better controls.

Dusting is now a well developed practice and is rapidly replacing spraying as a treatment for some of the more important pests. This change to the use of dust is very marked in Plymouth County and is increasing elsewhere. Since dusting materials and equipment are more efficient against such important pests as the blunt-nosed leaf-hopper and the black-headed fireworm, their use should become general.

Many growers ask how large an acreage one should have to invest in a power duster. Some feel that the expense (about $100) is not justified unless one has ten acres of bog. While a hard and fast rule is not possible, it seems reasonable to assume that, if a cranberry grower owns no spray equipment, he may well consider the purchase of a small power duster even if he has only one acre of bog. Such a duster should give good service for five to ten years. Thus, on a $100.00 investment, if one charges off $10.00 to $20.00 for depreciation and another $5.00 for interest, the yearly overhead of $15.00 to $25.00 is reasonable crop insurance.

The same question arises about spray equipment. Small growers generally hire their spraying done, but it is often impossible for the few men doing this work to serve all customers at the right time.

The need of a cash outlay to employ spraying or dusting labor is often overlooked. A grower who has equipment can use his own labor and save his cash. This should be considered carefully, for small growers often fail to have spraying done if they think the crop or

market prospect is poor. Many bogs get little protection from pests on this account. As a matter of fact, it is only the insects with spectacular feeding habits, like the gypsy moth and fireworms, that are likely to be treated when one hires spraying done. Other pests, such as the blunt-nosed leaf hopper, get little attention. The prevalence of the false blossom disease, carried by this leaf hopper, is largely due to this.

Flooding

Many growers are interested in flooding equipment and facilities. Tables showing the capacities of different pumps and the power required to lift water varying heights would be useful. Information as to the cost of equipment and the comparative features of gasoline engines and electric motors would also help. The Department of Agricultural Engineering at the Massachusetts State College will furnish such matter.

While flooding to check pests still has an important place in bog management, the trend is toward less of it. Flowing in the growing season carries disease infection to the new cranberry growth and tends to reduce and often destroys the crop. It also kills or drives ashore many parasites and predatory enemies of harmful insects and destroys an important fungus parasitic on the black-headed fireworm.

Insect and Disease Chart.

The cranberry insect and disease control chart, first published in 1933, has been a very handy guide. It is revised yearly at a conference of leading growers, Dr. H. J. Franklin and county agents. It is used very constantly and generally by the growers and they want it continued.

Recognition of Insect Pests

The exacting schedules for fighting pests have been mentioned. No one can follow them without knowing the insects he must check. Yet many growers cannot identify pests on their own bogs.

Much progress has been made as a result of bog visits, field meetings, control charts, and special letters from county agents to focus attention on insects, but much more should be done. Specialists from the Cranberry Experiment Station cannot call continually on every grower to determine insects and give specific advice, but growers can come to know the pests themselves and apply controls advocated by the Experiment Station. Each grower should remember this and examine his bogs with an insect net frequently during the growing season to find pests and determine their abundance.

Insect Problems

While growers appreciate the great progress that has been made in insect control, serious problems remain. Efforts to find more effective and less costly treatments must continue.

A surer control for the fruit worm is needed. Records of a survey for 1935, made by the County Agent of Barnstable County, show that 36 growers applied the recommended spray and only half of them had results they listed from "fair" to "good." The other half reported "failure" or "some doubt as to success." This confirms field observations and means that more research is required.

Disease Problems

False blossom is present in some degree on nearly all bogs in southeastern Massachusetts. It has spread so as to cut the yield from 30 to 90 per cent where no effort has been made to stop it. The great decrease in cranberry production in New Jersey is attributed to it. It threatens to ruin the cranberry industry. Its spread can be stopped, and diseased bogs can be restored. Growers should get information on this from county agents or from the Experiment Station.

Fairy ring is a common disease which cannot be cured. It is caused by a fungus in the soil. It can be checked by trenching and is not serious. Other important diseases are rose bloom and various fruit rots. They are being studied carefully.

Vines for Planting

A source of cuttings free from false blossom and rose bloom are much needed for those who set out new bogs or replant old ones. Many new plantings have failed because they were set with diseased vines. Some public agency could well be charged to certify bogs from which vines may be sold for planting. A precedent for such service has been established in the state to protect buyers of nursery stock, and there is a similar program for checking poultry diseases.

Weeds

While progress with weeds has been made, it has been less marked than that in insect and disease control. In the survey in Barnstable County already referred to, 69 per cent of the growers replying considered weeds a serious problem.

Hand weeding is the leading practice. While this is feasible when done consistently each year, it may not be so on bogs that have been neglected and are in bad condition. Chemical treatment has been confined largely to the use of iron sulphate to kill ferns. Recent studies at the Cranberry Experiment Station suggest great possibilities in the use of chemicals on other weeds. Spraying of wild bean with sodium arsenate is found of value. Kerosene promises to control grasses, rushes, sedges, skunk cabbage, loosestrife and horsetail. Research in weed eradication should proceed aggressively.

Re-sanding

This important practice is often neglected, probably because of its cost and the fact that bogs often produce fairly well without it.

Re-sanding cranberry bogs at least every third year is a valuable control of the tipworm and girdler and helps bogs recover from false blossom. It also helps as frost protection and keeps the vines in good condition.

The chief problems seem to be to impress growers with the importance of re-sanding and to work out a system for applying the sand. It is often spread on the ice during the winter and most growers apply it to the vines with wheelbarrows and shovels. Some managers of large areas lay tracks and use cars drawn by a locomotive driven with a small gasoline engine. A study of relative costs might help here.

Bog Renovation

This is a serious problem in Barnstable County and may become so elsewhere. Bogs degenerate rapidly when not cared for properly. Neglect and change of management often develop conditions which make renovation necessary. Bogs ruined by the false blossom disease should be remade.

No literature on bog renovation is available. Research work might determine which of several methods now used is the most practicable. Conditions vary with different bogs, but thorough study should find some helpful general rules.

Frost

The locations of cranberry bogs make them generally susceptible to frost injury. Through the initiative of Dr. H. J. Franklin, who had been studying the possibility of predicting frost, a frost warning program was sponsored by the Cape Cod Cranberry Growers' Association. Beginning with 1920, the association has had a frost warning committee and provided a system whereby telephone warnings were given to each grower paying for this service.

In the spring of 1935, a system of telephone relays became necessary. The Extension Services of Barnstable and Plymouth counties and other agencies cooperated in making this possible. These relays reached 184 growers. Frost warnings are necessary and the service should be more widely available. Considering the growing ownership of radios, it might be arranged to broadcast warnings.

Varieties

There are nearly fifty varieties of cultivated cranberries in Massachusetts, but only seven are commercially important.

1. **Early Black**—The standard early variety. Productive and fairly resistant to false blossom. Fruit with good keeping quality and well-known to the trade.

2. **Howes**—The standard late variety. Productive but susceptible to the false blossom disease. Berries of medium size, attractive, good keepers, and very popular with the trade.

3. **McFarlin**—The best of the fancy varieties. Somewhat less productive than Howes but resistant to false blossom. Berries large, good keepers, and much sought for by the trade.

4. **Smalley Howes**—Grown mostly in Barnstable County. Less susceptible to false blossom and more productive than Howes. A fairly good variety, but with the berries tending to rot on the vines. Has been a good money maker.

5. **Matthews**—Productive, but susceptible to false blossom and tending to run out. Berries large and attractive.

6. **Bugle**—Yielding a good crop only once in four or five years, but one of the best market berries. Susceptible to false blossom.

7. **Early Red**—Productive, but very susceptible to false blossom. Berries rather poor keepers.

Still more desirable varieties of cranberries should be developed. New varieties have been tried at the Cranberry Experiment Station, but Aviator is the only one that seems promising. This variety originated with Lawrence M. Rogers at South Carver on a bog of the Atwood Bog Company. It should be widely tested.

CREDIT

Ample credit, both long and short term, is available to develop the industry along sound business lines.

Plenty of local credit, both long and short term, is generally available to growers operating on a sound basis. It is supplied by local banks and trust companies, cranberry corporations, and individuals.

The Federal Land Bank never has granted long term loans to cranberry growers because of the risk on a specialized crop, but certain long-time financing is done under the Emergency Farm Mortgage Act of 1933. If the need arose, the cranberry industry, with its exceptionally good credit record, should be able to arrange for long term credit like that extended in other lines of agriculture by the Federal Land Bank.

Short-Term Credit

Short-term credit may be had from local banks and trust companies, Production Credit Associations (organized in 1934 and operating under the supervision of the Farm Credit Administration), cranberry corporations, agricultural supply houses and dealers, and individuals.

Cranberry growers should learn about the good types of short-term financing now available and arrange to keep a simple set of accounts that will enable them to file statements showing their net worth. With such records, any grower operating on a sound basis, regardless of the size of his business, should be able to get ample financial help to pay cash for his supplies and so take advantage of discounts. The Extension Service will help those not familiar with desirable accounting systems and give information about sources of credit.

MARKETING

High quality berries, well graded and carefully packed, are the basis of sound marketing.

A table of cranberry crop statistics supplied by Mr. Marcus L. Urann, president of the United Cape Cod Cranberry Company, is presented here for reference. It shows that the average price for the ten years from 1925 to 1934, inclusive, was about $10 a barrel and the average value of the Massachusetts crop was nearly four million dollars.

All growers should follow marketing practices likely to maintain such prices. Good fruit tends to command good prices. Poor fruit not only sells at a low price, but pulls down that of good fruit in the same market. Only satisfied consumers continue to buy.

Conscientious grading and careful packing and handling go far to insure to the purchaser the quality of fruit he has a right to expect. Every grower should take part in this, for it is to the interest of the whole industry.

The table shows that a steadily increasing portion of the cranberry crop is being canned. Canning is improving the market for the fresh fruit by eliminating much of that with poor keeping quality. Research by the Department of Horticultural Manufactures at the State College has done much to advance the science of cranberry canning. It has also developed very valuable information about the food value of the fruit. Further help from this source may be expected.

10-YEAR SUMMARY OF CRANBERRY PRODUCTION AND MARKETING

Year	United States Crop		Massachusetts Crop		New Eng. Cranberry Sales Co.			Other Sales	Canned
	bbls.	Value in dols.	bbls.	Value in dols.	bbls.	% of Mass. crop	Av. price per bbl., dols.	bbls.	bbls.
1925	590,000	6,661,100	429,000	4,843,410	225,754	52.6	10.93	203,246	10,000
1926	746,000	5,251,840	425,000	2,992,000	247,825	58.3	7.16	177,175	13,544
1927	483,000	6,351,450	360,000	4,734,000	214,000	59.4	12.85	146,000	27,500
1928	527,000	7,536,100	328,000	4,690,400	165,050	50.3	14.44	162,950	53.666
1929	544,350	7,326,951	400,000	5,384,000	205,103	51.3	13.38	194,897	35,323
1930	560,400	6,125,172	375,000	4,098,750	213,880	57.0	10.92	161,120	48,333
1931	650,000	4,303,000	459,000	3,038,580	250,815	54.6	6.54	208,185	46,230
1932	575,000	4,496,500	414,000	3,237,480	236,573	57.1	7.75	177,427	53,250
1933	695,100	4,525,101	506,000	3,294,060	276,415	54.6	6.32	229,585	65,946
1934	422,000	4,882,540	275,000	3,181,750	169,415	61.6	11.57	105,585	62,786
10-year Aver.	**579,285**	**5,745,975**	**397,100**	**3,949,443**	**220,483**	**55.7**	**10.19**	**176,617**	**41,658**

CRANBERRY ORGANIZATION

Growers can promote programs to advance cranberry culture most effectively through organization.

The Cape Cod Cranberry Growers' Association has had a leading part in developing the industry. It was organized in 1886 for the "promotion of cranberry culture" and now has about 400 members. It sponsored a movement that established the Cranberry Experiment Station at East Wareham in 1910, and it has cooperated with the Station ever since. It also initiated interest in a program of cranberry extension work. So it started two important developments now dealing with a wide variety of cranberry problems. Membership is open to all growers.

In 1907, a group of growers formed a cooperative organization for the marketing of their crops. This was incorporated like any capital stock concern and was known as the New England Cranberry Sales Company. In 1919, the Federal Government passed laws granting certain privileges to cooperative concerns, organized as such, and then the New England Cranberry Sales Company became a cooperative membership association in accordance with those laws. It is affiliated with the American Cranberry Exchange, the cooperative selling agent for the cooperative companies in the three main cranberry growing states.

Two cranberry clubs were organized in Barnstable County in 1935, one for the outer Cape and one for the western part of the county. They have finished a year of activity and promise to have considerable influence in the local development of the industry.

The industry seems well organized except that it has not arranged for the general cooperative purchase of tools and supplies to lower production costs. This should appeal strongly to the smaller growers.

THE CRANBERRY EXPERIMENT STATION

This was established in 1910 at East Wareham. Dr. H. J. Franklin has been in charge. Research there has solved many important cranberry production problems. Studies under way promise further aid in many vital matters. Much of the cost of this work is returned to the state each year from the sale of the crop of the station bog.

Projects completed or long pursued:

1. Injurious and beneficial insects affecting cranberries:

(a) Insect pests, their life histories, habits, and natural and artificial controls.

(b) Beneficial insects, including pollenizers and parasites and predaceous enemies of pests.

Bulletin 239—"Cape Cod Cranberry Insects" covers part of this project. Work on the rest is in progress.

2. Cranberry diseases, their characteristics, causes, and controls:

Bulletins on the false blossom disease and fungous diseases are available. Work on fruit rots is under way. Dr. H. F. Bergman of the Bureau of Plant Industry of the United States Department of Agriculture is in charge of this. He is also working extensively on varieties.

3. Cranberry weather relations:

(a) Frosts and frost predicting.

(b) Relation of the weather during the growing season to the development of rot in the fruit.

(c) Relation of the weather to cranberry production.

A bulletin on this may be published in 1937.

4. Cranberry varieties:

(a) The botanical relationships of cranberry varieties.

(b) Correlation of vine and fruit characteristics with productiveness and disease resistance.

(c) Search for more desirable varieties in the wild.

(d) Development of more desirable varieties by breeding.

Work on (a) and (b) is nearly completed. That on (c) and (d) is going on actively.

5. Bog fertilizers: Much work with cranberry fertilizers has been done and is described in annual reports of the Experiment Station.

A mimeographed circular on this subject is available.

6. **Chemistry and food values of cranberries:**

   (a) Sugar, acid, vitamin and iodine content of cranberries, already reported on by Prof. F. W. Morse and Prof. C. R. Fellers of the Massachusetts State College.

   (b) Effect of cranberries on the alkali reserve of the body and on the flora of the intestinal tract now being studied at the State College.

7. **Bog pumping plants:**

   Capacity and efficiency of different makes of bog pumps. Tests made and partly reported on by Prof. C. I. Gunness of the State College. The work is still in progress and a further report may be made in 1936 or 1937.

8. **Use of sand**—described in annual reports of the Experiment Station and elsewhere.

9. **Use of water**—described in annual reports of the Station. This should have more study.

Projects to have more attention:

1. **Bog weeds and their eradication:**

   (a) Kinds of weeds, their characteristics and importance.
   (b) Chemical controls.
   (c) Mechanical controls.
   (d) Other controls.

The Cape Cod Cranberry Growers' Association has appropriated $500 for this work. Dr. William H. Sawyer is assigned to it for the summer of 1936.

A mimeographed circular giving present information is available.

2. **Further development of tests of the keeping quality of cranberries.**
3. **Pre-cooling of cranberries.**
4. **Cold storage of cranberries.**
5. **Bog renovation.**
6. **Bog management.**
7. **Relation of sunlight to the setting of the fruit.**
8. **Possible value of boron, magnesium, manganese, zinc, and other minor chemical elements as cranberry fertilizers.**
9. **Relation of weather to the prevalence of bog pests.**
10. **Factors affecting the value of cranberry cuttings as planting material.**
11. **Value of wind machines as protection for cranberry bogs from frost.**
12. **Possible use of Bordeaux mixture spray and nitrate of soda to make cranberry vines immune from winter-kill.**

New bulletins planned for early publication:

1. **Cranberry Weathers.**
2. **Sauce of Sassamanesh** (a study of cranberry varieties and historical material).
3. **The 1934 Cranberry Survey.**
4. **Bibliography of Cranberry Literature.**
5. **Sanding** (mimeographed in cooperation with the Extension Service).
6. **Manufactured Cranberry Products** (Department of Horticultural Manufactures, Massachusetts State College).
7. **The Acids of the Cranberry** (Department of Horticultural Manufactures, Massachusetts State College).
8. **Gas Content and Catalase Activity of Cranberries as Related to Storage** (Department of Horticultural Manufactures, Massachusetts State College).

Bulletins to be revised:

1. **Cranberry Growing in Massachusetts**—Extension Leaflet No. 72.
2. **Establishing Cranberry Fields**—in cooperation with U. S. D. A.—Farmers Bulletin No. 1400.
3. **Managing Cranberry Fields**—in cooperation with U. S. D. A.—Farmers Bulletin No. 1401.
4. **Cranberry Harvesting and Handling**—in cooperation with U. S. D. A.—Farmers Bulletin No. 1402.

THE EXTENSION SERVICE

The Extension Services of the cranberry-growing counties and that of the State College are ready to assist in keeping growers informed on all matters pertaining to the welfare of the industry.

They will maintain up-to-date lists of growers.

They will have for distribution all available bulletins and reports.

They will send growers the Insect and Disease Control Chart prepared annually with the help of the Experiment Station and experienced growers.

They will send growers timely letters or circulars telling of the development of pests and giving control measures and other information. They will work with the Experiment Station in preparing such material.

They will hold meetings of growers, arrange for lectures and field demonstrations, and assist in the programs of cranberry organizations.

They will help distribute frost warnings.

They will serve individual growers by correspondence, telephone calls, office calls, and visits to bogs.

These services have been available in the past. Most growers are familiar with them. As in other lines of agriculture, the Extension

Service will try to show growers how to solve their problems. The following objectives are taken to be of first importance:

1. Secure general adoption of proved methods of control for the false blossom disease.
2. Teach growers how to find and recognize pests and to understand and apply proper treatments.
3. Inform growers of sound methods of weed control.

All available extension facilities will be used to advance this work.

BULLETINS NOW AVAILABLE

Most of these may be obtained from the offices of the Extension Services of Barnstable and Plymouth counties, the Cranberry Experiment Station at East Wareham, and the Mailing Room of the Massachusetts State College at Amherst.

1. **Cape Cod Cranberry Insects**—Bulletin No. 239—By H. J. Franklin.
2. **Cranberry Growing in Massachusetts**—Extension Leaflet No. 72—By H. J. Franklin.
3. **False Blossom**—Extension Leaflet No. 154—By H. J. Franklin.
4. **Food Value of Cranberries and Cranberry Sauce**—By C. R. Fellers.
5. **Nutritive Value of Cranberries**—By C. R. Fellers.
6. **Effect of Cranberries on Urinary Acidity and Blood Alkali Reserve**—By C. R. Fellers, B. C. Redmon, and E. M. Parrott. (Technical).
7. **Relation of Benzoic Acid Content and Other Constituents of Cranberries to Keeping Quality**—By J. A. Clague and C. R. Fellers. (Technical).
8. **Effect of Manufacturing and Preserving Processes on the Vitamins of Cranberries**—By Paul D. Isham and C. R. Fellers. (Technical).
9. **The Cranberry Grower's Interest in Birds**—By John H. May. (May be obtained from the Massachusetts Department of Agriculture, State House, Boston).
10. **Fungous Diseases of the Cultivated Cranberry**—By C. L. Shear, Neil E. Stevens, and Henry F. Bain. (U. S. D. A. Bulletin—Technical—Available from Supt. of Documents, Government Printing Office, Washington, D. C., 25c each).
11. **The Spread of Cranberry False Blossom in the United States**—By Neil E. Stevens and Henry F. Bain. (U. S. D. A. Bulletin—Available from Supt. of Documents, Government Printing Office, Washington, D. C.).
12. **Weed Control in Cranberry Bogs**—Special Circular No. 29—By Bertram Tomlinson and H. J. Franklin. (Mimeographed in cooperation with the Extension Service).
13. **Cranberry Fertilizers**—Special Circular No. 31—By Bertram Tomlinson and H. J. Franklin. (Mimeographed in cooperation with the Extension Service).