

Speaking of weeds; I have worried myself sick at times over weeds that really amounted to very little. I have had to learn their characteristics by experience alone when a few words by some authority a few years ago would have saved us a great deal in worry and money. I fought with the horsetail weed and found none in this state who could give me advice. I have worried over many another weed only to work out my own solutions as best I could. I believe I could write a book on the subject of weeds on a cranberry bog. Although experience is our best source of knowledge, the subject of weeds is one with which we should not have to struggle. Each plant has its peculiar habitat, method of growth, special root system and means of propagation. Each and every one can be conquered if we find the proper weapon. The roots of one, the seeds of another, the amount of moisture required by a third, the length of life of a fourth, and so on, are the points of attack. Without problems the cranberry business would lose much of its interest and there would be an over production. We still have great improvements to make in the marketing end, in more intensive cultivation and in better cooperation. Personally I am an enthusiast. The opportunities appear unlimited. My seven years experience in the business is just enough to make me feel happy that I have about 40 years experience ahead of me.

SPOILAGE OF CRANBERRIES AFTER PICKING

DR. C. L. SHEAR, Plant Pathologist, Bureau of Plant Industry, Department of Agriculture, Washington, D. C.

All cranberry growers are familiar from observation or experience, or both, with the large losses of fruit which frequently occur after picking, and it is in response to the urgent appeals of the Cranberry Growers' Association that the Department of Agriculture has undertaken, in cooperation with the Massachusetts Agricultural Experiment Station and some of the cranberry growers, investigations to determine the exact causes of these losses-and if possible, to devise practical means of preventing them. More or less work bearing on these problems has been carried on by Dr. Franklin and myself for several seasons past. Last season we also had the assistance of Dr. Stevens on the Cape and Mr. Wilcox in New Jersey, where we are also carrying on similar work. The present season, with increased funds and facilities, we hope to obtain sufficient data for the solution of some of these problems.

Spoilage of cranberries excluding insect injury is due in general to one of three causes, or combination of these causes, freezing, fungous rots or premature death of the fruit caused by rapid ripening or suffocation. It is not necessary here to discuss freezing, as its cause and prevention are understood by all.

FUNGOUS ROTS

According to our investigations, extending over a period of fifteen years about one-half of the loss of berries after picking is due to fungi which develop in the fruit and cause a softening or rot. There are several destructive storage rots. The most frequent and important during the past few seasons have been early rot, formerly called scald, bitter rot or Anthracnose and end rot. The organisms producing these rots are parasitic plants, consisting of very small threadlike filaments, which reproduce by means of minute bodies called spores. These are invisible to the naked eye and may be distributed by wind, or water or animal agencies, as insects and birds, and under favorable conditions germinate and grow inside the berries, causing them to become soft and worthless. In most cases where these fungous rots develop, the fruit apparently becomes infected before picking, and the fungus develops later when the condition of the fruit is more favorable for its growth. The surest way of preventing fungous rots is by preventing the infection of the fruit during its growth. This can be most satisfactorily done by spraying with Bordeaux mixture. It has been demonstrated many times in our experiments and also in the experience of growers that sprayed fruit shows much less loss from rot in storage and distribution than unsprayed fruit. Whether sprayed or unsprayed, however, there is always some development of rot after picking, as infection cannot entirely be prevented.

We have found by studying the growth and behavior of these rots fungi under carefully controlled conditions of temperature that most of them make but little growth at a temperature of 55 degrees or less, but develop much more rapidly at higher temperatures. This indicates the great importance of cooling the fruit as quickly as possible after picking and keeping it cool. Next to high temperature, bruising is probably the most important factor in favoring the development of rot.

RAPID RIPENING AND DEATH PROCESSES

Besides the fungous rots, we have found in the last few seasons especially, that there is a considerable amount of loss in stored fruit which is not due to fungi but to premature death of the fruit and the physical and chemical changes which follow, causing it to become soft, discolored, and practically worthless. In many cases, especially late in the season, and during the winter from 25 to 75 per cent of spoiled fruit is due to this cause. The cranberry when picked is a living thing, carrying on active life processes and these are continued under ordinary conditions for a considerable period after the fruit has been picked. In order to keep fruit in the best condition after picking, it is necessary to prolong, as much as possible, these ripening or life processes of the fruit and so prevent its death and the destructive changes which naturally follow.

The principal vital process which takes place in the fruit after it is picked, as well as before, is what is known as respiration. This consists of the taking in of oxygen from the surrounding air and the giving

off of carbon dioxide. It is essentially the same as respiration in animals. The cranberry breathes in its own way and when it is prevented from so doing by depriving it of oxygen it suffocates and dies. The more rapid the respiration the more quickly does the fruit die and become spoiled. In general, it has been found that high temperature favor increased respiration and thus hasten the death of the fruit. Studies have been made upon respiration in the case of other fruits, but no thorough studies have yet been made of respiration of cranberries and the exact conditions controlling it. In order to determine exactly the effects of temperature, moisture and ventilation upon this vital process, it is necessary to make a thorough study of the respiration of the cranberry. This requires special chemical and physiological knowledge, and we are fortunate in having secured through Professor Brooks interest in these problems, the cooperation of Professor Morse of the Massachusetts Agricultural Experiment Station to undertake this feature of the work. Professor Morse is especially fitted for this, both by training and experience, and we hope that by another season data will be secured which will furnish a basis for definite and practical recommendations as to the best methods of handling cranberries in order to reduce losses from this kind of spoilage.

As already stated it is known in general that high temperature and lack of ventilation tend to hasten the death and destruction of cranberries. Berries in the center of barrels show much more injury than berries near the top and bottom or berries which have been kept in ventilated crates.

More accurate information is also needed in regard to the cause and effect of the so-called "sweating" of the fruit and its relation to the development of rot and spoilage

Many details of experiments made the past season will be found in Dr. Franklin's report and also in a supplementary paper prepared by Dr. Stevens, Mr. Rudolph and myself. Although our investigations are far from complete, still there are certain practical recommendations which we believe can be profitably followed at this time and which will tend to greatly reduce losses of fruit.

COOL THE FRUIT AS QUICKLY AS POSSIBLE AFTER PICKING

It has been found that the more quickly cranberries are cooled after picking, other things being equal the better their keeping quality. Few people perhaps know that the cranberry absorbs a large amount of heat and that the berries picked in the middle of the day are of much higher temperature than the surrounding air. In records made during the past season, it was found that the temperature of the fruit was on an average 10 degrees higher than the temperature of the air. At noon when the air temperatures were 70 degrees, berry temperature were 80 degrees, and when air temperatures were 75 degrees, berry temperature were 85 degrees.

As soon as berries are picked the boxes should be placed in a shady, well-ventilated place, either under trees or under a simple roof

of boards or canvas. They should never be covered by spreading canvas or oil cloth or other covering tightly over the piles of boxes. As much of the hauling to the storehouse should be done in the cool of the day as possible, and the storehouse should be arranged to cool the fruit as quickly as possible and keep it cool by ventilating the storehouse at night and keeping it closed as much as possible during the day in warm weather. It is also desirable to pick as much of the fruit as possible in the cooler parts of the day. There is a difference of opinion as to whether it is beneficial or injurious to pick fruit when it is wet. Most growers apparently regard it as a bad practice. Experiments along this line to definitely determine this question will be carried out this season.

VOID BRUISING

Fruit bruised in any way, either by handling, sorting, or dropping in barrels, or in packing, always shows poorer keeping quality than fruit handled carefully and free from bruising. It has also been found in all our experiments that fruit kept in medium sized, more or less ventilated packages keeps better than fruit packed in barrels.

SUMMARY

Cool as quickly as possible after picking.

Store in a cool, well ventilated place.

Handle carefully to avoid bruising.

Use ventilated packages, especially for early shipments.

RESOLUTIONS

Whereas, The members of the Wisconsin Cranberry Growers' Association who have met at their semiannual meeting are reminded by the absence of their former secretary, Mr. Joseph W. Fitch, of the sad tragedy that befell the home of the Fitch family at the time their home was destroyed last February, and at which time the aged father and invalid William H. Fitch, passed away owing to the excitement and shock caused by this experience, and in which the death of their maid, Miss Sawin, was also caused by the fire and smoke while endeavoring to save the household furniture, and Mr. Joseph W. Fitch passed away later on from the same cause.

Mr. William H. Fitch, father, served efficiently as secretary of this association for many years until he was taken ill and at which time he was succeeded by his son Joseph W. Fitch. Both of these gentlemen were not only efficient but courteous and held the good will and esteem of all the members of the association.

Now Therefore, be it Resolved, That we recognize in the passing away of William H. Fitch and Joseph W. Fitch a great loss to our association and to this community, and