cause serious injury. Therefore, when the worms appear to be numerous enough to warrant it, I would recommend that you precede the treatment which I have suggested for the pupa stage, with treatment for the young worms, either by flooding (perhaps repeated if the hatching of the eggs is very uneven), or by spraying with arsenate of lead.

As I know of no other insect problem which presents features of striking interest to you I will cease tiring you with a discussion of these matters. I am aware that there may be minor questions of particular interest to various growers here, which I have neglected to discuss. I shall be happy to answer as best I can any questions which you may desire to ask.

I thank you for your kind attention.

Comment Upon Mr. Franklin's Address by C. B. Hardenburg.

A careful perusal of Mr. Franklin's article, in which he gives us such an able description of the conditions, prevailing upon the Wisconsin marshes and those in the Cape Cod region, shows us, that at the present there is little hope for combating our troublesome insect pests successfully. For the FRUITWORM, late holding of the water, the only successful method in the East, is apparently of no avail in our region, and spraying, judging from the results obtained in the Cape Cod district, is not sufficiently beneficial to warrant its application here, where the conditions are so much less favorable for a thorough spraying. Mr. Franklin also states, that altho this season was one of unusual severe fruitworm injury, the damage was such that it would be considered only average in Cape Cod.

The fruitworm injury this year amounted to 30 per cent of the entire Wisconsin crop, as stated by a reliable authority. This includes marshes where the fruitworm was not present at all. On bogs where the fruitworms were present in injurious numbers, the damage has amounted to from 50 per cent to 60 per cent; and on some sections as high as 75 per cent and more. Such a percentage may be truly said to be considerable, and we are anxious that it should not become "average" here.

Late holding of the water is apparently not of any benefit in checking the appearance of the fruitworm. One of the reasons for this is probably the one Mr. Franklin suggests, namely the presence of too many dams, which form favorable hibernating and hatching places. The injury is almost invariably greatest near the dams, but, as the millers are good flyers, and have been seen to fly across two sections, even when not followed by the observer, it could be supposed that fruitworms found in the middle of the section, have come from eggs laid by millers which had hatched on the dams.

However, we find that, even in the center of the section, a spot, slightly higher than the area, immediately surrounding it, shows invariably a greater degree of infestation. The difference in level may be only a few inches, and such as to be hardly noticeable. To explain this on the grounds just mentioned, would presuppose that the millers, in flying across, select such spots for depositing their eggs. in preference to other. But another reason may be, that such spots, when the water is drawn off, dry
quicker than the surrounding parts, having slightly the advantages in drainage, and the heat of the sun start the pupae in their development, while comparatively dry; while those in surrounding parts are stimulated to development, while still moist. That cold water does not injure the pupae is amply proven by the fact that they will withstand a submersion of several months during the winter, but the effect of comparatively warm water upon the pupa during their development may be injurious. This may also be the reason why sanded sections are generally more infested with fruitworm than not sanded ones; the sand being dry while peat is still moist. We have therefore reason to believe, that, even with our late holding of the water, fruitworm millers hatch all over the section, and not on the dams alone. The danger of the dams is not so much in their presence as such, and the inability to flood them, as in the presence of cranberry vines with fruit on those dams. If these vines were removed, the danger would be to a great extent, eliminated, as the fruitworms, as a rule, do not travel, to hunt a favorable spot, before going underground.

As flooding during the time of greatest fruitworm activity, is found with too many dangers, we could not advise a treatment of this kind, and our only resort is spraying. Our experience with spraying on the experimental station plots, indicates, that the method may prove to be successful; if the marshes are in a condition approaching clean culture. In our experiments we have been able, by three sprayings to reduce the fruitworm injury from 60 per cent to 14 per cent; the mixture being the same as that advocated by Mr. Franklin in his article. The greatest effect of spraying results when the spray is applied before the egg hatches; the poison gathering around the place of attachment of the berry to the hook, which is the place where the fruitworm generally enters. Later sprayings may poison the worm while eating its way into a fresh berry, but the chances are that it will find a spot, where there is no poison adhering to the fruit.

The presence of many dams, dividing the marsh in narrow sections, gives us the advantage in the application of the spray, over our eastern growers, as the spray can be put on with less tramping down of vines and less dragging of long leads of hose.

For the fireworm, the remedy mentioned by Mr. Franklin, as being successful in the East, namely, covering the surface with water during the period of pupation, is of no avail here, because the fireworm, in Wisconsin, does not go underground to pupate, as a rule. But a thorough resowing, soon after the first brood eggs hatch, repeated about a week later, so as to drown those worms which have hatched later, can be depended upon as being an efficient check; as was shown by this last spring’s experience. If, for some reason, flooding is not used as a means of combating the first brood, and a second brood develops, or, if a second brood starts from eggs laid by millers, invading the bog from surrounding areas, the spraying for the fruitworm, will, at the same time, be a check for the fireworm.

Spraying is to be preferred to flooding, as a sprayed area will be protected against infestation from the surrounding upland, or neighboring bogs which have not been treated. Also spraying will check the progress of many other vine eating insects.
But, whether spraying, or flooding or a combination of both is resorted to, an essential factor toward success is an eradication of the weeds, grasses and sedges on the bogs. Only when we approach more nearly a condition of clean culture, can we hope to successfully combat the different insect pests, which at present levy such a heavy tax from the cranberry growers in Wisconsin.

Through the courtesy of the National Fruit Exchange we submit the following as the nearest estimate of the 1908 crop at present obtainable.

<table>
<thead>
<tr>
<th>Location</th>
<th>Estimate (bbls.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cape Cod</td>
<td>225,000</td>
</tr>
<tr>
<td>New Jersey</td>
<td>65,000</td>
</tr>
<tr>
<td>Wis.</td>
<td>12,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>302,000</strong></td>
</tr>
</tbody>
</table>

---

**LIFE ROLL**

**GROWERS**

ARPIN CRANBERRY CO., Grand Rapids, Wis.

Growers and dealers in choice varieties of cranberries. Grown on sanded marshes exclusively.

J. TURNER BRAKELEY, Horners Town, N. J., Lahaway Plantation.

ALEXANDER BIRSS, Prairie, Skagit Co., Wash., Shipping station Thornwood.

I. W BUDD, Pemberton, N. J.

M. M. CHEW, Williamstown, N. J.

Real estate, surveyor and conveyancer. Grower and dealer in cultivated cranberries.

W. B. CLAFLIN & CO., Hopkinton, Mass.

E. E. DANO, Mather, Wis.

J. J. EMMERICH CRANBERRY CO., Grand Rapids, Wis.

Growers of cultivated cranberries. Address all communications to Geo. W. Pauls, Secretary and Treasurer, Grand Rapids, Wisconsin.

R. A. EVerson, South Hanson, Mass.

Grower and dealer in high grade fruit and vines and manufacturer of Cape Cod Champion Picker.

W. H. FITCH, Cranmoor, Wis.

President Cranmoor Cranberry Co. Cultivated marshes.

L. J. FosDICK, 29 Bedford. St., Boston, Mass

Proprietor Springbrook Cranberry Meadows, North Carver, Mass.

ILLIKET is our trade mark for Aunt Lucy's Cape Cod Cranberry Sauce. Put up in glass jars hermetically sealed with cork lined cap. Sold by first class dealers.

ALFRED EDGAR FREEMAN, Island Heights, N. J.

P. O. Box 1224. Cranberry Grower.