FORECASTING LATE BLIGHT OF POTATO IN THE MONTREAL AREA IN 1961

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Abstract

According to the results obtained at 6 localities in southwestern Quebec, the methods of forecasting developed by Hyre and Wallin again reflected quite well the potato blight situation in that area during the 1961 growing season. As recorded by the two methods, many blight - favorable periods occurred at all stations and an epidemic was predicted. At the end of July, the 95 per cent point of foliage destruction was observed in fields of early varieties and at the end of August, in fields of late varieties, Under the conditions that prevail in southwestern Quebec, it seems that blight-favorable periods occurring before the last week of June are valid for forecasting the first appearance of blight on early varieties but that they might possibly be ignored in forecasting the disease on late varieties.

Introduction

Promising results were obtained in 1960 with two methods of forecasting late blight of potato **(4).** These investigations were continued in 1961 with the aim of eventually establishing a Spray Warning Service for the potato growers of the Montreal area.

Methods and Procedure

The main method used was the moving-graph or rainfall-temperature method devised by Hyre *(2).* A modification was brought to this method because of the fact that, under local conditions, the 5-day average temperature for the growing season seems always to be below 78°F. (5). The temperature, therefore, is always considered to be favorable for late blight except when the minimum is less than 45°F. Rainfall is considered favorable when the 10-day total is 1.20 inches or more. Late blight is expected to first occur 7 to 14 days following a period of 10 consecutive days. when both temperature and rainfall are favorable, provided that the weather continues to be favorable for blight. The count of consecutive favorable days is not interrupted by an unfavorable day due to low temperature; that day is simply omitted from the count. Once the disease is established, 10 favorable days are no longer required for its spread. A degree of flexibility is desirable in applying these criteria.

The second method investigated was the 90 per cent relative humidity-temperature method developed by Wallin *(2,* 3). With this method, hygrothermographs, activated at the time of potato emergence, are located 12 to

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15 inches above ground in shelters placed near potato fields. Severity values for late blight infection are calculated as indicated in Table 1.

Table 1. The relation of the hours duration of given average temperature coincident with relative humidities of 90% or more to the estimated severity of secondary infections of Phytophthora infestans.

Average temperature range, °F.	Hours that produce indicated infection severity				
	1	2	3	4	8
	Trace	Slight	Moderate	Heavy	
45-53	16-18	19-21	22-24	25-29	30-
54-59	13-15	16-18	19-21	22-26	27-
60-80	10-12	13-15	16-18	19-23	24-

Interpretation of cumulated severity values

20 - zero time. First spray
3 per week - Additional spray
1 per week - The blight fungus stays alive
0 for 3 or more consecutive weeks - The fungus cannot survive.

The two methods were used in the three following districts on the muck soil area south of Montreal: Ste. Clothilde, Napierville (St. Blaise) and Farnham (Ste. Sabine). Hyre's method alone was used at Lennoxville (east of Montreal), and Duvernay and St. Thomas (north of Montreal). The results of this study appear in Figure 1.

Results

The forecasting methods investigated gave again this year a good picture of late blight development. It can be seen that, in all districts, numerous blight-favorable periods were recorded by the two methods. Accordingly, growers were advised early not to neglect the spraying of their fields since a blight epidemic was indicated. In fact, at the end of July the 95 peccent point of foliage destruction was observed in fields of early varieties and at the end of August, in fields of late varieties. In almost all localities, blight was first observed on late varieties about one month after it was forecast. As mentioned before (4), this might be due to the difficulty of detecting very early symptoms.

Another explanation might be that early forecasts are more valid for early than for late potato varieties. In England (1), flushes of blight-favorable periods that occur before the last week of June are not considered for forecasting blight on late varieties. The same situation might prevail under local conditions. In the Ste. Clothilde-Napierville district, the 95 percent point of foliage destruction was observed in Irish Cobbler fields at the end of July, indicating that blight must have established itself early in July in accordance with the forecast made using Hyre's criteria.

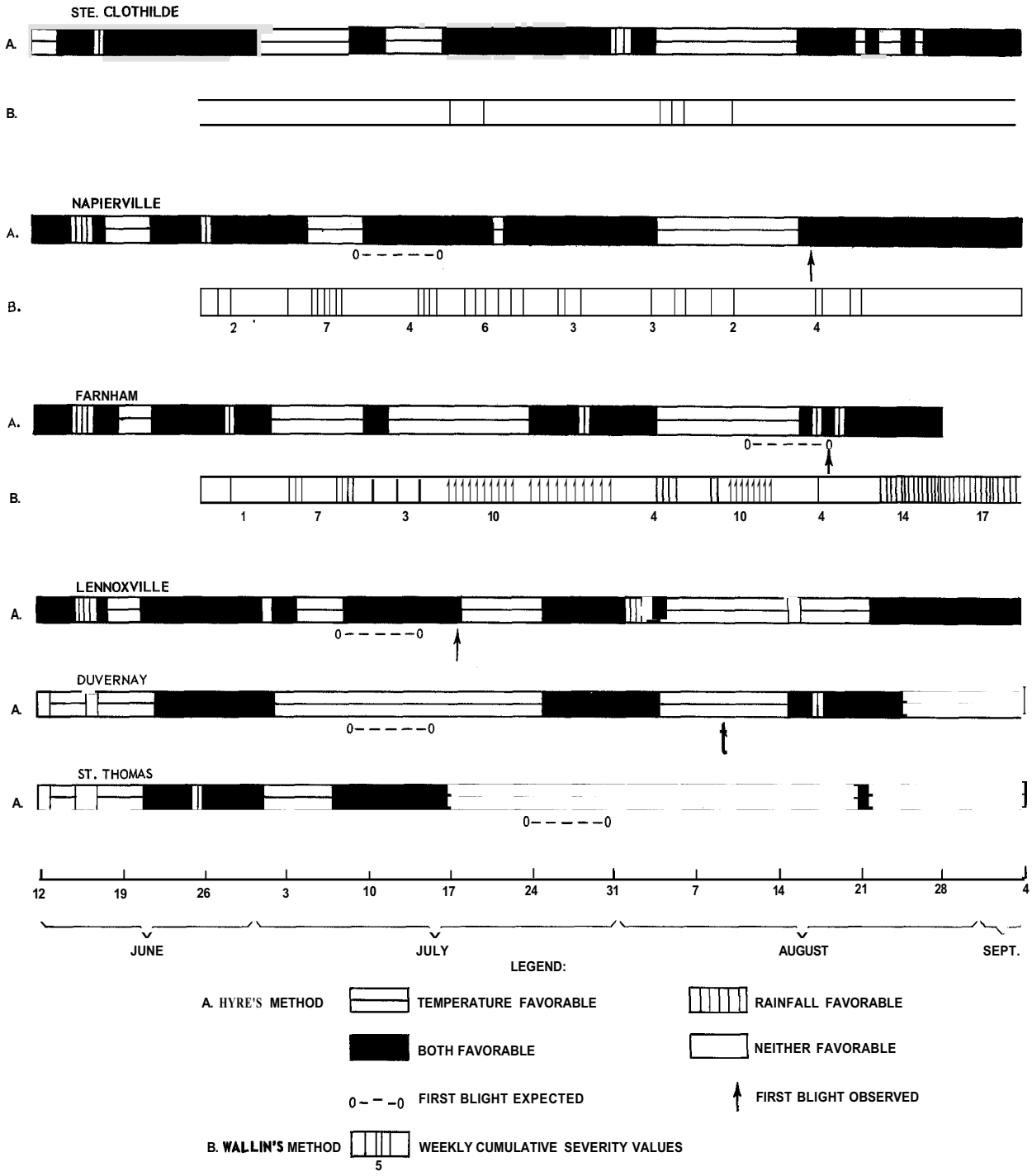

FIGURE 1. FORECASTING LATE BLIGHT

This seems to agree with the results obtained by Wallin's method at the localities where it was used, As noticed in Figure 1, the hygro-thermograph data were only available on June 26. The zero point (cumulated severity values of 20) occurred during the last week of July, that is, a few days before blightwas observed in fields of late varieties. The results of investigations on spraying 'potatoes according to the two forecasting methods (6) seem also to agree with tnis conclusion.

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