A PHYSIOLOGICAL BREAKDOWN IN BRUSSELS SPROUTS

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Abstract

An internal breakdown of tissues caused serious losses in 1964 in commercial plantings of Brussels sprouts in the Fraser Valley of British Columbia. Wide and rapid fluctuations in day/night temperatures, as well as the chilling effect of low temperatures on certain nights, are considered to be most likely responsible for initiating the breakdown.

Symptoms

The breakdown occurred at the growing tip of the individual sprout or in the tightly-packed leaves immediately above the growing tip. The affected tissues were not exposed in any way to infection from outside. The sprouts in which breakdown had occurred were normal in appearance and damage could not be detected without dissection. The majority of the affected sprouts were physiologically mature and were located on tho lower portion of the plant stem although occasional sprouts on the upper portion of the stem were affected.

The breakdown was similar in appearance to internal "tip burn" of cabbage for which no control measures are known (2). The symptoms were not those of boron defiaiency as the tissues in the stems of plants were normal in appearance and did not show the typical cracking and browing associated with boron deficiency.

Etiology

Growers attributed the breakdown to an imbalance in plant nutrients but no evidence could be obtained to support this view, Samples examined for the presence of nematodes showed negative results and an examination by Dr. H. S. Pepin of the Vancouver Research Station revealed that no pathogenic organisms were present.

An examination of meteorological data obtained from the Canada Department of Transport at the Abbotsford Airport gave strong support to the thesis that the physiological breakdown was caused by environmental factors. A period of cool, rainy weather in September was followed by a period of warm, sunny weather in October. Temperatures of 71, 72, 75 and 78° were recorded between the 4th and 7th of October. These were followed by two days of 70°F on the 11th and 12th of October. During this period the differences between day and night temperatures were as much as 38°F. Injury was most likely due to a combination of large diurnal temperature differences and a chilling effect caused by strong outgoing radiation on clear nights. The recorded temperatures were taken in a Stevenson screen but it is a known fact that the temperature of surfaces near the ground may be 8 to 15 degrees colder than that registered in a screen. The breakdown may be due

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Table 1. Maximum and minimum temperatures in degrees Farenheit and differences between maximum and minimum at Abbotsford Airport, B. C.* from mid-September to earls November, 1964.

Date	Max.	Min.	Diff.	Date	Max.	Min.	Diff.	Date	Max.	Min.	Diff.
Sep 15	59	55	4	Oct 1	58	43	15	Oct 17	54	37	17
16	63	55	8	2	60	43	17	18	61	40	21
17	60	50	10	3	64	35	29	19	68	38	30
18	65	46	19	4	71	40	31	20	67	37	30
19	59	51	8	5	72	44	28	21	66	35	31
20	61	47	14	6	75	42	33	22	67	35	32
21	54	46	8	7	78	40	38	23	62	33	29
22	63	52	11	8	62	53	9	24	52	45	7
23	70	48	22	9	64	53	11	25	53	35	18
24	68	48	20	10	63	51	12	26	52	32	20
25	66	50	16	11	70	44	26	27	54	32	22
26	69	43	26	12	70	41	29	28	51	41	10
27	65	38	27	13	62	47	15	29	53	42	11
28	60	41	19	14	58	47	11	30	56	45	11
29	56	50	6	15	53	38	15	31	65	47	18
30	60	48	12	16	52	41	11	Nov 1	58	43	15
								2	54	40	14

*Meteorological data supplied through the courtesy of the Meteorological Branch, Canada Department of Transport.

to the freezing and rapid thawing effect which would be experienced under the climatic pattern which occurred. On the other hand, it is well known that Brussels sprouts are capable of withstanding mild frost and in mild climates it is common practice to leave the plants in the field or garden throughout the winter (1). The possibility that damage was caused by the higher temperatures experienced can not be ruled out.

Table 1 presents some of the pertinent meteorological data recorded at Abbotsford during the period when injury occurred. The first reports of breakdown came after the warmer weather. The breakdown did not spread markedly to unaffected sprouts, but affected sprouts showed larger areas of injured tissues in early November than was evident in mid-October.

Literature Cited

1. THOMPSON, H.C. and KELLY, W.C. 1957. Vegetable crops. 5th ed. McGraw-Hill Book Co. Inc., New York.
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