LOSSES FROM STORAGE ROT OF McINTOSH APPLES IN NOVA SCOTIA, 1962-68[1]

C.L.Lockhart, C.A.Eaves, and F.R.Forsyth

Abstract

Rot of 'McIntosh' apples in storage at 32 F (0 C) was assessed for each of the years 1962 to 1968. The average loss from rot during the 7-year period was 4.8%. Gloeosporium album was the most common cause of rot, followed by Penicillium spp., Botrytis cinerea, and Gloeosporium malicorticis.

Introduction

The annual average production of 'McIntosh' apples in the Annapolis Valley of Nova Scotia from 1962 to 1968 was 550,000 bushels. Other than a report (1) of pockets of rot occurring in a 7,000-bushel controlled atmosphere storage in 1963, there have been no published reports of losses by rot of stored 'McIntosh' apples during this period. Rot losses have been reported on other varieties. Four lots of 'Golden Russett' apples averaged 4.7% loss due to rot in January 1964 (2), and in December 1964 a 10% loss of 'Rome Beauty' apples from rot in a cold storage was reported (3).

This paper is a report of the losses caused by rot of 'McIntosh' apples in cold storage in each of the years, 1362 to 1968.

Methods

Each year, beginning in 1962, samples of apples were harvested from the same five trees in each of 12 different orchards in various parts of the Annapolis Valley. They were arranged on a wooden tray in a single layer and placed in cold storage. Samples usually consisted of 100 apples per tree for a total of 500 apples per orchard per year. After six months at 32 F (0 C), the apples were examined and the number showing rot recorded, The cause of each rot was identified from fungus sporulation on the apple or by isolation on potato dextrose agar.

Results and discussion

Rots caused by Penicillium spp., were observed on apples after 4 to 6 weeks in storage. Rots caused by Gloeosporium spp. and Botrytis cinerea Pers. usually started to develop after 3 months. Generally after 6 months- the cause of the rots could be identified by the fungus fruiting structures which developed on the decayed area of the apple.

During the 7-year period, the average total loss from rot in 'McIntosh' apples was 4.8%. The largest number of rots were caused by Gloeosporium album Osterw., followed by Penicillium spp., B. cinerea, and Gloeosporium malicorticis Cordley (Table 1). Rots due to Gloeosporium spp. and B. cinerea were more prevalent in 1962, 1963, and 1964 than in the other storage seasons (Table 2).

Except for 1967, there was a positive correlation between the apple rots caused by G. album and the total rainfall for the 3 months prior to harvest (Tables 2 and 3). Above average rainfall in 1962, 1963, and 1964 favored field infections of 'McIntosh' apples with G. album. In those years, several periods of wet weather lasting for 4 or 5 days occurred during July, August, and September. Total rainfall for July, August, and September of 1967 was above average but few rots were caused by G. album. The wet periods in 1967 occurred in July and early August, when fungicide cover sprays would still be effective in preventing field infections. Ross and Lockhart (4) have shown that two late cover sprays of captan give complete control of G. album storage rot. The data in this paper suggest that these sprays would be economical for G. album in years of high rainfall in August and September. Growers who usually have an above average incidence of this disease and who have yields of 500 bushels per acre or more should seriously consider adopting this practice.

Since 4.8% of stored 'McIntosh' apples may be lost from rots, the annual loss of revenue to growers of this variety in the Annapolis Valley could be $39,600, based on an average price of $1.50 per bushel. The actual loss of revenue may be less than estimated since 70% of these apples are usually sold by the end of January. However 30% of the crop is now held until June in controlled atmosphere storage, so loss of revenue due to rots should be close to the estimate. Storage costs have not been considered.

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Table 1. Average percentage rot in McIntosh apples after storage for 6 months at 32F (OC), 1962-1968

Grower	% rot caused by					
	Gloeosporium album	Gloeosporium malicorticis	Botrytis cinerea	Penicillium spp.	Others*	Total rot
A	1.8	0.3	1.2	1.5	0.0	4.8
B	1.3	0.1	0.8	1.2	0.2	3.6
C	3.5	0.6	0.7	0.9	0.3	6.0
D	2.2	0.2	1.7	1.3	0.1	5.5
E	1.6	0.5	1.2	1.6	0.2	5.1
F	1.5	0.9	0.7	1.2	0.0	4.3
G	2.2	1.1	2.9	0.6	0.3	7.1
H	1.7	0.3	0.8	0.9	0.0	3.7
I	1.1	0.1	0.2	0.7	0.1	2.2
J	2.6	0.5	0.2	1.2	0.0	4.5
K	1.6	0.5	1.1	1.3	0.3	4.8
L	3.1	0.9	1.1	1.1	0.1	6.3
Avg	2.0	0.5	1.0	1.1	0.2	4.8

* Includes Alternaria sp., Sphaeropsis malorum, Sclerotinia sp., and Gloeosporium sp. (perennans?).

Table 2. Average percentage rot in individual years

Years	% rot caused by					
	Gloeosporium album	Gloeosporium malicorticis	Botrytis cinerea	Penicillium spp.	Others*	Total
1962	3.9	0.9	1.3	1.2	0.1	7.4
1963	2.8	0.7	1.3	0.4	0.1	5.3
1964	2.4	0.7	3.4	1.0	0.1	7.6
1965	1.6	0.4	0.3	1.7	0.4	4.4
1966	1.9	0.2	0.3	1.7	0.4	4.5
1967	0.6	0.1	0.4	0.3	0.1	1.5
1968	0.5	0.1	0.3	1.7	0.2	2.8
Avg	2.0	0.5	1.0	1.1	0.2	4.8

* Includes Alternaria sp., Sphaeropsis malorum, Sclerotinia sp., and Gloeosporium sp. (perennans?).

Table 3. Total rainfall* in inches for 3 months prior to harvest

Month	1962	1963	1964	1965	1966	1967	1968	50-year average
July	3.14	2.27	2.70	1.62	2.08	4.26	0.82	2.71
August	6.38	7.18	5.22	2.63	1.33	3.18	1.36	3.56
September	6.37	3.68	3.62	0.56	3.23	3.79	2.74	2.74
Total	17.89	13.13	11.54	4.81	6.64	11.23	4.92	9.01

* Rainfall recorded at CDA Research Station, Kentville, N.S.

Literature cited

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