Fruit Varieties Journal 48(1):48-49 1994

The Susceptibility of Disease-Resistant Apple Cultivars to Fruit Rot Infection Incited by Three Summer Diseases

JAMES W. TRAVIS* AND JO L. RYTTER

Introduction

Conventional production practices using standard commercial apple cultivars include a regular fungicide spray program throughout the growing season to control early season diseases as well as summer diseases. In contrast, practices involving disease resistant apple cultivars (DRCs) limit the use of these fungicidal sprays. Fungicides are either not applied or the number of applications are reduced. As a result, the potential for fruit rot infection caused by summer diseases exists. This research project was initiated to determine the susceptibility of DRCs to three summer diseases.

Methods

In 1992, apples from seven DRCs were collected and inoculated with three pathogens within the summer disease complex. These included *Botryosphaeria obtusa* (black rot), *B. dothidea* (white or bot rot), and *Glomerella cingulata* (bitter rot). 'Delicious' and 'Golden Delicious' controls were also included. Apples were inoculated under two different conditions. The first inoculation occurred at harvest (H) when fruit were mature as determined by 5 maturity parameters. At this time, an additional subsample of fruit was placed in cold storage. The second inoculation was made after fruit had been in cold storage (S) for 30 days and removed. All fruit were wounded and spore suspensions of the pathogens were placed within each wound. One week after inoculations, the amount of rotted area was measured (cm^2) and determined for each cultivar/pathogen combination.

Results

Significant differences were observed among cultivars and their reaction

Table 1. Susceptibility of DRCs to three summer diseases at harvest and after storage inoculations.

	Fruit rot infection (cm^2)					
	B. obtusa		*B. dothidea*		*G. cingulata*	
Cultivar	H	S	H	S	H	S
Redfree	20.3 e[x]	14.1 e	32.0 e	*	4.0 d	4.0 e
Jonafree	1.4 a	3.8 c	1.1 a	1.6 b	.1 a	.6 c
Freedom	4.4 c	3.0 c	6.4 c	1.6 b	1.5 c	.3 b
Nova Easygro	17.3 e	12.4 e	13.2 d	8.2 d	6.4 f	3.3 e
Williams Pride	10.7 d	13.2 e	9.9 d	9.0 d	5.1 e	4.8 f
Liberty	4.7 c	1.3 b	2.5 b	.4 a	.4 b	.1 ab
Macfree	4.2 c	.6 ab	2.2 b	.5 a	.2 a	.1 ab
Delicious	1.5 a	.5 a	2.1 b	.4 a	.2 ab	.03 a
G. Delicious	3.1 b	6.5 d	2.0 b	1.3 b	1.5 c	.9 d

[x]Means in the same column followed by the same letter do not differ significantly (P = 0.05) according to Duncans Multiple Range Test.

*All apples were completely decayed.

*Department of Plant Pathology, The Pennsylvania State University.

to the summer diseases (Table 1). 'Redfree,' 'Nova Easygro,' and 'Williams Pride' were most susceptible to fruit rot infection caused by all pathogens and at both inoculation times (H and S). The other cultivars varied in susceptibility to each individual pathogen.

Conclusions

The disease resistant apple cultivars tested varied in their susceptibility to three summer diseases under laboratory inoculations performed in 1992. This study is being repeated again this year.

Fruit Varieties Journal 48(1):49-50 1994

Disease Resistant Apple Cultivars: Twelve Years of Observations

R. F. HEFLEBOWER[1] AND C. S. WALSH[2]

In 1980, eight disease resistant apple varieties were planted at the Western Maryland Research and Education Center located near Keedysville, Maryland. Over the past twelve years these varieties have been evaluated for fruit quality.

The Western Maryland Research and Education Center is located in the west, central part of the state and is subject to extremes of heat and cold. Low temperatures in the winter from 0° to 10° are common. High temperature in the summer range well into the 90s and can reach 100°. From 15-20 days above 90° in the summer is not unusual. In 1988 there were 30 days where the recorded high was above 90°. These temperatures typically occur in July and August, and some years into the first two weeks of September. This variation in temperature makes it a challenge to grow apple cultivars that were bred in cooler climates. The following is a description of each variety and how it has performed over the years.

'Freedom': poor tree habit, precocious late season, poor appearance, flesh quality is good.

'Jonafree': moderate tree size, good color, tart flavor, very hard flesh, fruit size is small.

'Liberty': moderate tree size, fruits are small to medium, must be thinned. Good color with sub-acid flavor, best fruit quality of those tested.

'Macfree': moderate tree size, poorly colored fruit, small fruit size but rather nice semi-acid flavor similar to 'Mac.'

'Nova Easygro': moderate to large tree size, overall fruit quality is good, but color is poor.

'NY18491': large, vigorous tree, large fruit, soft and poorly colored.

'Prima': precocious, early maturing, fruit surface is rough, fruit is soft, quality is poor most years.

'Redfree': low vigor, very early, highly colored, small fruits, high sugar.

For the reasons indicated in the descriptions, 'Prima' and 'NY18491' are not recommended in Maryland. 'Redfree' matures in late July and has good qualities when compared to other apples that are harvested at the same time. 'Nova Easygro' and 'Macfree' are both 'MacIntosh' types. In years where the fall is warm, red color is poor. 'Jonafree' is similar to 'Jonathan' in flavor but like other red varieties does not develop good color in warm seasons. 'Liberty' is the best all around apple of those tested so far. The flavor,

[1]Western MD Res. & Ed. Ctr., Keedysville, MD.
[2]University of Maryland, College Park.