Fruit Varieties Journal 45(2):98-100 1991

Contemporary Evolution of the New England Apple Industry: Cultivar and Rootstock Trends

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Abstract

The New England apple industry is experiencing a great deal of change. 'McIntosh' will decline in acreage but remain the dominant cultivar into at least the middle of the 1990's. Cultivars such as 'Cortland,' 'Macoun,' 'Empire,' 'Liberty,' 'Gala,' and 'Jonagold' are increasing in importance. From the early 1970's through the late 1980's the industry gradually shifted from seedling-rooted trees to trees primarily in the semi-standard and semi-dwarf size categories. In the 1990's the planting trends will shift to the dwarf size category, which are projected to account for over 60% of acreage planted between 1990 and 1994.

From 1985 through 1989 New England produced approximately 7.7 million bushels of apples annually (3) on 24,000 acres of land (1). Over 58% of this acreage was planted to 'McIntosh.'

In this article I will detail the current cultivar and rootstock trends in New England. In the early part of this century 'McIntosh' was an important cultivar; however, it was not nearly as significant as it is now. For instance, in 1925 39% of the trees in Massachusetts were 'Baldwin,' while only 24% were 'McIntosh' (2). Similar relationships existed throughout New England until the winter of 1933-34, when severe cold damaged or killed many 'Baldwin' trees (6). 'McIntosh' trees were not severely damaged. By 1940, 'Baldwin' only accounted for 29% of the trees in Massachusetts, while 'McIntosh' accounted for 39% (2). This trend continued, so that by 1955 49% of the trees in Massachusetts were 'McIntosh' and only 14% were 'Baldwin' (2).

Many changes are occurring currently in the New England apple industry, and many of these are driven by two factors. The first is the loss of daminozide for preharvest drop control. Daminozide expanded the harvest period for 'McIntosh' from 2 to 4 weeks. Difficulties in harvesting and handling large quantities of a single cultivar over a 2-week period without daminozide has caused growers to look seriously at alternatives, including different cultivars and rootstocks. The second driving factor is the public's concern about pesticides. The close proximity of fruit growing and large numbers of people has led to a more rapid adoption of integrated pest management in New England than other regions of the country, and has increased the interest in disease-resistant cultivars which require fewer pesticide applications.

The trends reported here were established by a survey of apple growers that was conducted during the first 6 months of 1989. Data obtained included the existing acreage of each cultivar and rootstock, the acreage of each cultivar and rootstock planted from 1980-84 and from 1985-89, and the acreage of each cultivar and rootstock expected to be planted from 1990-94. Respondents represented 33% of the acreage in New England. Data from 1970 and 1976 [derived from New England Crop Reporting Service (4, 5)] were used for comparison.

Cultivar Trends

Table 1 presents the portion of the total apple acreage devoted to the top 10 cultivars in 1989, with data from 1970 and 1976 included to show past trends, and projections were made for 1994 based on survey results. The 'Mc-

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Table 1. The top 10 apple cultivars in New England in 1989. Data from 1970 [derived from New England Crop Reporting Service (4)] and 1976 [derived from New England Crop Reporting Service (5)] are included as well as projections for 1994.

Cultivar	Percent of the total acreage			
	1970	1976	1989	1994
McIntosh	55.9	59.0	58.6	53.4
Cortland	8.0	7.8	11.4	12.8
Delicious	17.1	16.4	11.1	9.1
Macoun	1.6	1.9	3.9	4.4
Empire	0.0	0.0	3.1	4.9
Golden Delicious	3.6	3.0	2.3	2.3
Paulared	0.2	0.4	2.0	2.6
Northern Spy	0.9	1.1	1.1	0.8
Rome	1.1	0.9	0.8	0.6
Mutsu	0.0	0.0	0.8	1.0

Intosh' acreage was stable from 1976 through 1989 but will decline by 1994. 'Delicious' acreage declined between 1976 and 1989 and will continue to decline. 'Cortland,' 'Macoun,' 'Empire,' 'Paulared,' and 'Mutsu' will account for larger portions of the total acreage by 1994 than they did in 1989.

Table 1 gives only a broad view of the trends, since only a small portion of the acreage is replanted each year. To more closely study trends Table 2 presents the portion of newly-planted acreage devoted to or expected to be devoted to specific cultivars in the 5-year periods of 1980-84, 1985-89, and 1990-94. Through the 1980's 'McIntosh' accounted for approximately 50% of the acreage planted; however, in 1990-94 it will account for only 37.5% of the planting. 'Cortland,' 'Empire,' and 'Paulared' accounted for smaller portions of the planting in the last half of the 1980's compared to the first half, but all will account for a higher portion of tree planting in 1990-94. 'Macoun' and 'Mutsu' were planted more extensively in the last half of the 1980's than in the first half, but will account for a smaller portion of the planting in 1990-94. The planting of 'Liberty,' 'Gala,' and 'Jonagold' increased slightly through the 1980's but will increase more rapidly in the 1990's. The planting of 'Delicious' declined through the 1980's and will continue to decline into the 1990's.

These data show that the cultivar picture in New England is evolving. In the middle of the 1990's 'McIntosh' will continue to be the dominant cultivar; however, its acreage will decline. 'Delicious' will continue to decline, and the lost 'McIntosh' and 'Delicious' acreage will be planted to older cultivars, such as 'Cortland' and 'Macoun,' and new cultivars, such as 'Empire,' 'Liberty,' 'Gala,' and 'Jonagold.' It is interesting to note that 4 disease-resistant cultivars ('Liberty,' 'Redfree,' 'Prima,' and 'Priscilla') together will account for 10% of the acreage planted in 1990-94.

Rootstock Trends

Table 3 shows the percentages of the total acreage devoted to trees on various rootstocks in 1970, 1976, and 1989. Also, a projection is made for 1994 based on survey results. From 1970 through 1989 the most prominent changes were the decline in the acre-

Table 2. The 10 most prominent cultivars planted during the 5-year periods, 1980-84 and 1985-89, and expected to be planted during the 5-year period, 1990-94.

Cultivar	Percent of acreage planted in each 5-year period[z]		
	1980-84	1985-89	1990-94
McIntosh	46.0	52.3	37.5
Cortland	14.7	10.4	13.4
Empire	8.2	6.8	11.5
Macoun	6.8	8.3	5.4
Liberty	0.0	0.6	5.0
Paulared	5.0	1.6	3.5
Gala	0.2	1.8	3.4
Jonagold	0.0	1.1	3.3
Delicious	7.5	3.0	1.8
Mutsu	1.6	3.5	1.1

[z]In 1980-84, 4080 acres were planted; in 1985-89, 3120 acres were planted; and in 1990-94, 3840 acres are expected to be planted.

Table 3. Relative percentages of the total New England apple acreage planted to trees on various rootstocks. Data from 1970 [derived from New England Crop Reporting Service (4)] and 1976 [derived from New England Crop Reporting Service (5)] are included as well as projections for 1994.

	Percent of the total acreage			
Rootstock	1970	1976	1989	1994
Seedling	91.6	84.3	41.7	28.1
MM.111	0.3	1.0	7.6	8.1
MM.106	2.6	4.1	11.9	12.3
M.7	5.1	7.2	27.7	31.4
Interstems	0.0	0.5	4.0	4.4
M.26	0.0	1.6	3.0	6.4
Mark	0.0	0.0	0.5	5.1
M.9	0.4	1.3	1.1	2.4

age of seedling-rooted trees and the increase in the acreage of trees on clonally propagated roots. In the first half of the 1990's the acreage of seedling-rooted trees will decline further, and the acreage of trees on MM.111, MM.106, and M.7 will increase only a small amount. An increase will occur in the acreage of trees on M.26, Mark, and M.9.

To study these trends more closely, Table 4 shows the percentages of newly planted acreage devoted to or expected to be devoted to various rootstocks in the 5-year periods, 1980-84, 1985-89, and 1990-94. From 1980-89 seedling, MM.111, MM.106, and M.7 accounted for over 80% of the acreage planted; however, from 1990 through 1994 they will account for only 38% of the planting. While interstems, M.26, Mark, and M.9 only accounted for approximately 16% of the planting in 1980-89, they will account for 62% of the planting from 1990 through 1994. Mark is expected to be the most used rootstock in 1990-94.

There is a clear trend in New England to a small tree. The large seedling-rooted trees and the trees in the semi-standard (MM.111 and MM.106)

Table 4. Planting of trees on various rootstocks during the 5-year periods, 1980-84 and 1985-89, and planting expected during the 5-year period, 1990-94.

	Percent of acreage planted in each 5-year period[z]		
Rootstock	1980-84	1985-89	1990-94
Seedling	1.8	1.1	0.0
MM.111	13.2	12.7	4.8
MM.106	14.5	10.8	5.6
M.7	52.4	59.3	27.5
Interstems	11.9	3.7	3.4
M.26	4.0	4.6	21.2
Mark	0.0	4.1	28.9
M.9	1.9	2.5	8.6

[z]In 1980-84, 4080 acres were planted; in 1985-89, 3120 acres were planted; and in 1990-94, 3840 acres will be planted.

and semi-dwarf (M.7) size categories require too much time for harvest, produce poorly colored fruit, and require a large volume of pesticides per acre.

The New England apple industry is undergoing great change. The data presented here show that much of this change will occur in the next few years. The primary reasons for the change are the loss of daminozide and the concerns about pesticide application. It appears that most orchardists have decided to face these new challenges rather than abandon apple growing.

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