may be involved in extensive production of Delicious in Ontario have recently been reviewed (3).

"Newer" cultivars that are becoming prominent in Ontario are Idared, Spartan and Empire (Table 5).

**Quebec.** Quebec's two major cultivars are McIntosh and Cortland (Table 2). The Quebec Provincial Government is sponsoring a subsidy program to encourage growers to shift from McIntosh production to other cultivars. In general terms, subsidies will be paid if growers remove McIntosh and replace with Cortland, Empire, Spartan and Jerseymac. Despite this new program, some growers continue to plant McIntosh using the spur-types Morspur and Macspur rather than the regular strains (Granger, personal communication).

**New Brunswick.** In New Brunswick total production declined in the last decade. The same cultivars continue to be grown (Table 2).

**Nova Scotia.** Nova Scotia probably grows more apple cultivars than any other Province. While the major cultivars are McIntosh, Delicious, Northern Spy, Cortland and Gravenstein (Table 2) many others are grown in quantity. These include Wagener, King, Ben Davis, Rome Beauty, Greening and Spartan. Since the major outlet for Nova Scotia's apples is processing (Table 1), there is a preponderance of cultivars suitable for this purpose. With the larger population centers in Quebec and Ontario already amply supplied with their own dessert apples it is unlikely that Nova Scotians will change their production practices.

## Conclusions

While McIntosh continues to be the leading apple cultivar grown in Canada, it could be replaced by Delicious in the next decade. "Newer" cultivars being planted are Spartan, Idared and Empire. In parts of Canada where production for the processing market is important, Northern Spy, Winesap and Gravenstein are grown for this need.

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# Apple Varieties and Production Trends in the Midwest

JEROME HULL, JR.[1]

The 1974 USDA census reveals the 12 midwestern states had a total of 126,824 acres of apples or 25% of the total U.S. apple acreage (Table 1). The census report shows that 21% of the nation's apple trees are planted in the midwstern area. 45% of the trees were listed as dwarfed apple trees. This percentage varied depending upon the midwestern state.

Unusual climatic variations in the midwest during the last five years have resulted in wide variations in annual apple production. However, in 1975, a year of relatively abundant production throughout the country, the 12 midwestern states produced slightly over 17% of the nation's crop (Table 2).

[1]Department of Horticulture, Michigan State University, East Lansing, Michigan 48824. MSU Journal article No. 8820.

Table 1. Apple acreage and tree numbers for twelve midwestern states.*

| State | ACRES | | TREE | |
|---|---|---|---|---|
| | | | Total | % Dwarf |
| AR | 1,890 | 34.4 | 143,473 | 53.4 |
| IL | 9,721 | 31.3 | 623,181 | 44.4 |
| IN | 6,611 | 36.3 | 415,440 | 52.6 |
| IA | 2,246 | 32.5 | 156,550 | 57.0 |
| KS | 2,144 | 25.9 | 123,735 | 42.4 |
| KY | 2,510 | 41.0 | 199,473 | 57.4 |
| MI | 64,682 | 26.0 | 4,008,184 | 44.3 |
| MN | 4,088 | 23.1 | 305,757 | 33.6 |
| MO | 6,674 | 27.0 | 402,970 | 39.3 |
| OH | 14,627 | 29,9 | 915,435 | 52.2 |
| TN | 2,741 | 34.5 | 181,186 | 50.8 |
| WI | 8,890 | 25.2 | 608,863 | 42.8 |
| Total | 126,824 | 28.0 | 8,084,247 | 45.7 |
| % of U.S. | 25% | | 21% | |

*Source: 1974 USDA Census.

Table 2. 1975 apple production in 12 midwestern states.

| State | Bushels (1,000) |
|---|---|
| AK | |
| IL | |
| IN | |
| IA | |
| KS | |
| KY | |
| MI | |
| MN | |
| MO | |
| OH | |
| TN | |
| WI | |
| Total | |
| U.S. | |
| % of U.S. | |

The Jonathan variety leads in production in the midwest, followed very closely by Delicious (Table 3). McIntosh and Golden Delicious are also major varieties followed by Rome Beauty and Northern Spy.

Nearly 75% of the 1975 U.S. Jonathan crop was produced in the midwest, the nation's predominant production area for this variety. This same area produced slightly over half the Northern Spy crop and nearly 20% of the nation's 1975 McIntosh and Cortland apples. It also produced slightly over 13% of the nation's Golden Delicious and Rome Beauty volume and slightly less than 10% of the Delicious crop.

## Apple Tree Surveys

Apple tree survey figures are available for some midwestern states. A 1968 **Ohio** survey showed a slight overall increase in tree numbers with Delicious, Rome Beauty, Jonathan and Golden Delicious the dominant varieties in young plantings. Nonbearing tree numbers indicated some grower interest in the Melrose variety.

The 1968 **Indiana** apple tree census showed growers planting heavily to Delicious, Golden Delicious and Jonathan. Rome Beauty and Winesap were also important. Idared was of some importance in nonbearing plantings.

The 1968 **Illinois** tree census showed about equal numbers of Jonathan, Golden Delicious and Delicious trees, but the Delicious and Golden Delicious trees were the more prominant varieties in the younger tree ages, particularly for dwarf and spur type trees.

A 1974 **Minnesota** survey revealed many young apple trees in that state with heavy emphasis on dwarf or semi dwarf trees. Haralson, Connell Red, Mac Spur, Delicious and Regent were popular varieties in younger plantings.

A 1974 **Wisconsin** survey showed 19% of the apple trees to be less than 4 years of age with McIntosh and Delicious the major varieties. Cortland ranked third in tree numbers. Paulared and Viking were important summer varieties in new plantings.

## Michigan Production Trends

Over half of the midwestern apple crop is produced in Michigan (53.7% in 1975). Dr. Donald Ricks, MSU Department of Agricultural Economics, and a student, Susan Karony, made some future projections of Michigan Apple Production based upon existing tree numbers and tree age distribution in 1966 and in 1973 tree surveys and expected tree removal rates. They suggested that Michigan's total apple production in the future will probably gradually increase (Fig. 1).

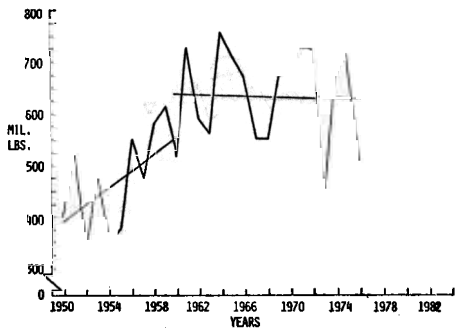


Fig. 1. Michigan Total Apple Production.

While the increase in tree numbers on standard rootstock between the two census periods was fairly small, there was a substantial increase in trees on size-controlled rootstock. These tree numbers in 1973 were over 4 times greater than those existing in 1966. The trees on size-controlled rootstock in 1973 comprised 14% of Michigan's total apple acreage of bearing age trees and 57% of the acreage of nonbearing age.

The large number of young size-controlled trees indicates a potential for a gradually increasing total apple production in Michigan. Anticipated significant removal of old standard trees will probably be reflected in decreased production of Jonathan, McIntosh and certain processing varieties.

Michigan's Delicious production is expected to increase during the next few years, as many young bearing trees reach full bearing maturity (Fig. 2). Between 1966 and 1973 there was a significant increase in Delicious trees on both size-controlled and standard rootstocks.

In 1973, 85% of the size-controlled Delicious trees were under 13 years

Table 3. 1975 apple production by variety in 12 midwestern states.

| State | Delicious | Jonathan | McIntosh | Golden Del. | Rome | N. Spy | Stayman | Winesap | Cortland | R.I. Green. | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | (Bushels 1,000) | | | | | | |
| AR | 121 | 245 | | 55 | | | | 7 | | | 107 |
| IL | 619 | 786 | | 857 | 119 | | | 24 | | | 333 |
| IN | 650 | 421 | 31 | 340 | 219 | | 90 | 55 | 33 | | 255 |
| IA | 55 | 100 | 2 | 29 | | | | | | | 36 |
| KS | 107 | 114 | | 86 | 7 | | 7 | 33 | | | 45 |
| KY | 131 | 52 | | 136 | 79 | | 52 | 17 | | | 57 |
| MI | 2,717 | 4,450 | 2,833 | 983 | 833 | 1,310 | 450 | | 317 | 300 | 2,050 |
| MN | 114 | 48 | 45 | 14 | | | | | 17 | | 202 |
| MO | 540 | 802 | | 310 | | | | 71 | | | 110 |
| OH | 690 | 619 | 214 | 548 | 643 | | 405 | | 119 | | 571 |
| TN | 83 | 5 | | 62 | 17 | | 40 | 10 | | | 21 |
| WI | 262 | 57 | 571 | 62 | | | | | 214 | | 357 |
| Total | 6,089 | 7,699 | 3,696 | 3,482 | 1,917 | 1,310 | 1,044 | 217 | 700 | 300 | 4,144 |
| U.S. | 62,660 | 10,350 | 16,640 | 26,553 | 14,485 | 2,445 | 6,617 | 4,604 | 3,512 | 3,586 | 14,245 |
| % of U.S. | 9.7 | 74.4 | 22.2 | 13.1 | 13.2 | 53.6 | 15.8 | 4.7 | 19.9 | 8.4 | 29.1 |

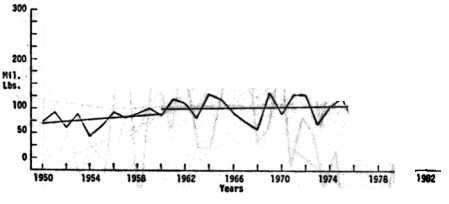


Fig. 2. Michigan Red Delicious Production.

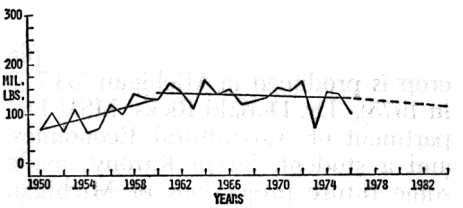


Fig. 3. Michigan McIntosh Production.

of age, as well as 33% of the Delicious trees on standard rootstock. Increased production from the high proportion of young Delicious trees on size-controlled rootstock suggests an expanding production of this variety during the next few years. Of the nonbearing Delicious trees, 83% were on size-controlled rootstock. (This comprised 72% of the nonbearing Delicious acreage.)

Michigan **McIntosh** production is expected to decrease (Fig. 3) Many trees of this variety are quite old. 43% of trees on standard rootstock are over 29 years of age and 94% of the bearing acreage is on standard rootstock. In 1973 nonbearing trees represented 14% of the McIntosh trees but only 9% of the acreage.

About 60% of Michigan's apple production is processed. Two major processing varieties have been Northern Spy and Rhode Island Greening, both considered by processors to be premium processing varieties. 57% of all of these trees in 1973 were 29 years of age or older and if a "normal" removal rate of older trees were to occur, production of these varieties would probably continue to decline gradually in the future (Fig. 4).

Dual purpose varieties such as Jonathan, Golden Delicious, Rome, Idared and Stayman Winesap are grown for either processing or fresh market. Production of these varieties has showed a noticeable increasing trend during the last two decades (Fig. 5) Future production of dual purpose varieties is expected to continue to increase.

Bearing trees of these varieties increased between 1966 and 1973. All of the increase was for trees on size-controlled rootstock. These size-controlled trees in 1973 were three times the number existing in 1966. Size-controlled rootstock now represent 12% of all bearing acres of these varieties.

88% of the trees on size-controlled rootstock were less than 13 years of age. 35% of trees on standard rootstock for those varieties were less than 13 years of age. Thus, a high percentage of the bearing trees of dual purpose varieties are relatively young age. Therefore, the production trend for dual purpose varieties should continue to increase during the next few years.

### Processing and Dual Purpose

The bearing tree numbers of processing and dual purpose varieties combined increased considerably from 1966 to 1973. Nearly all the increased tree numbers were on size-controlled rootstock and size-controlled trees now comprise 12% of the bearing acreage of these varieties and 50% of the nonbearing acreage.

The age distribution of trees in this combined "processing and dual purpose variety" category shows a substantial number of young trees (primarily dual purpose varieties) and about an equal number of old trees

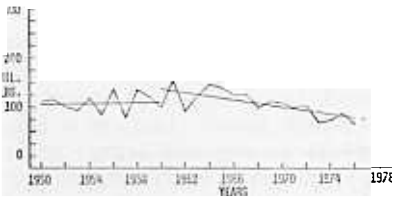

Fig. 4. Michigan Processing Varieties Production.

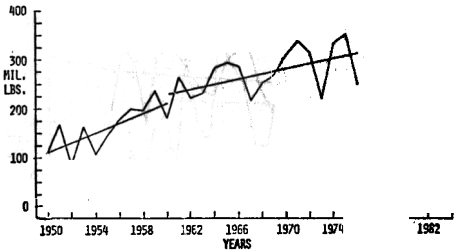


Fig. 5. Michigan Dual Purpose Varieties Production.

(which are primarily processing varieties). Future production of dual purpose varieties should continue to increase (Fig. 6).

### Summer Varieties

A significant increase is projected for future summer variety production in Michigan. As a result of new plantings, young bearing trees and nonbearing trees represent a very high percentage of the total trees for summer varieties. In 1973, 56% of the trees on standard rootstock and 98% of the trees on size-controlled rootstock were under 13 years of age. Nonbearing tree numbers comprise 50% of the bearing acreage in 1973.

The high percentages of young trees indicate a potential for substantial increases in productive capacity of summer varietes compared to recent levels of production (Fig. 7). However, this variety category will remain fairly minor in relation to the total Michigan apple industry.

### Nursery Sales Trends

Nursery tree sales provide an indication of present planting trends and variety preferences.

A major Michigan nursery indicates that Delicious dominates their apple tree sales, primarily spur type strains. The introduction of a spur type McIntosh has enhanced McIntosh tree sales. A recently introduced spur type Rome has increased interest in this dual purpose variety.

Idared has increased rapidly in Michigan plantings and has become one of the growers' most profitable varieties. An annual bearer with the ability to size its fruit and possessing excellent storage quality, Idared has become an important late season marketing variety. Michigan production in 1978 will exceed one-half million bushels and production will expand in future years.

Empire is another variety about which growers are expressing some interest. It is being planted as a storage type McIntosh. Growers are impressed with the tree's characteristics, its ability to develop wide angled scaffolds and the early production. There is concern about its medium-sized fruit and how this may ultimately affect yields per acre.

Smoothee has been planted as a substitute for Golden Delicious. It is a dual purpose variety that produces at an early age and fruit has not russeted as severely as Golden Delicious. Grower, processor and consumer acceptance has been favorable for this variety.

Another major midwestern nursery reports Delicious continues to dominate its apple tree sales. Its marketing of Jonathan and Golden Delicious trees in the midwest seems to have leveled off. Idared tree sales have

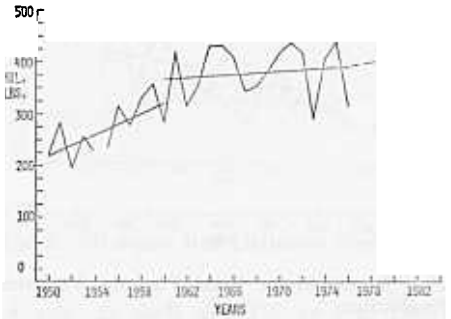


Fig. 6. Michigan Processing and Dual Purpose Varieties Production.

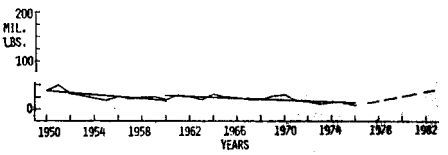


**Fig. 7. Michigan Summer Varieties Production.**

been acceptable in Michigan and other midwestern areas that are favorable for coloring of this variety. Ozark Gold is being planted to a limited extent in the southern midwestern states as an early maturing yellow variety.

Availability of spur type McIntosh has increased sales of this variety in Michigan and Wisconsin where acceptable McIntosh fruit can be produced. This nursery also reports a strong interest in Empire and in summer varieties. Orchardists, particularly those with local or roadside markets, express interest in Jerseymac for early season sales. Some of the more southern states have expressed a limited interest in Granny Smith, a variety considered to require a growing season of 200 or more days to mature.

Both nurseries indicate strong grower preference for spur type trees and size controlled trees wherever available.

## Summary

The midwest is an area of diversified apple variety production. Changing marketing patterns offer opportunities for some varieties not readily adapted to traditional chain store marketing requirements. Expanding roadside marketing has increased interest in early season varieties to market with peaches and late summer produce. These same markets have been very successful with high quality apple varieties that lack eye appeal or name recognition but can be successfully merchandised with personal marketing efforts.

Management and the performance of trees on dwarfing rootstocks and under dense planting systems will influence the success of many younger plantings. This will influence future apple production levels in the midwest.

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