Performance of the Julyred and Tydeman's Red Apple Cultivars in Tennessee

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Production of summer (June-August) maturing apple cultivars has declined sharply in recent years. This is attributed primarily to poor fruit color, soft fruit, and fruit with a very short shelf life for most summer maturing cultivars. Also through the commercial use of controlled atmosphere (CA) storage, fruit of the generally higher quality fall (September-October) maturing cultivars is readily available throughout the year.

Julyred and Tydeman's Red are two relatively new summer maturing apple cultivars that appeared promising in observational trials at the University of Tennessee Plateau Experiment Station near Crossville, Tennessee (5).

Julyred was released by the New Jersey Agricultural Experiment Station in 1962 (4). The objective of the breeding program was to develop summer maturing cultivars having improved color, firmness and eating quality. Although Julyred did not fully meet these objectives in the breeder's evaluation, it did show improvement over other cultivars available at that time. Tydeman's Red was released by the East Malling Experiment Station, Kent, England in 1945 (1). It resulted from a cross of Worchester Pearman x McIntosh. Tydeman's Red was also called Tydeman's Early and Tydeman's Early Worchester. The Summerland Research Station in Canada tested this cultivar and researchers found it so promising that 80,000 buds for propagation were distributed between 1957 and 1964 (2).

A replicated trial planting of the most promising cultivars and rootstocks tested in the observational trial was established in 1973 at the Plateau Experiment Station. Julyred and Tydeman's Red were the only summer maturing cultivars included. The objective of the study was to compare cultivar and rootstock productivity and longevity.

Procedure

The 1973 planting was on Lilly sandy loam soil with a depth of 30 to 36 inches over solid sandstone. Julyred and Tydeman's Red with Golden Delicious and Red Delicious (Topred strain) for comparison are included in this report. These four cultivars were tested on standard (seedling) and on MM106 rootstocks. Each plot consisted of 3,600 square feet. Plots with standard rootstocks included 6 trees on a 20 by 30 ft. spacing. Plots with MM106 rootstock contained nine trees on a 20 by 20 ft. spacing. Plots were randomized four times in a randomized complete block experimental design.

Trees were trained to a central leader and topped at 12 ft. The soil was quite fertile and fertilization for the first four years was based on soil tests. No fertilizer was used during the six fruiting years. Paraquat plus simazine or terbacil were sprayed under the trees in April for weed control. The row middles were maintained in orchard grass sod with frequent mowing. The spray program recommended by University of Tennessee Agricultural Extension Service was utilized.

Harvest was usually at the tree ripe maturity stage. Tree survival (%) was determined each year. Tree diameter

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Table 1. Effect of apple cultivar-rootstock combination on fruit yield, Plateau Experiment Station, 1977-1982.

Cultivar	Rootstock	Year						
		1977	1978	1979	1980	1981	1982	Mean
		Bu./A.						
Julyred	Standard	11 c[z]	7 cd	10 c	38 cd	139 e	14 a	36 cd
Julyred	MM106	11 c	38 b	57 b	120 b	154 de	53 a	72 b
Tydeman's Red	Standard	0 c	0 d	9 c	30 cd	126 e	11 a	29 d
Tydeman's Red	MM106	0 c	5 cd	20 bc	41 cd	242 cd	26 a	56 bc
Golden Delicious	Standard	0 c	22 bc	26 bc	88 bc	268 bc	6 a	68 b
Golden Delicious	MM106	105 a	177 a	150 a	372 a	443 a	98 a	224 a
Red Delicious	Standard	1 c	1 d	0 c	12 d	130 e	0 a	24 d
Red Delicious	MM106	30 b	30 bc	12 c	113 b	348 ab	0 a	89 b

[z]Mean separation within columns by Duncan's multiple range tests, 5% level.

one foot above ground level was measured each fall. Trees with severe freeze damage were counted in December 1982 and the percentage was determined.

The data were analyzed by ANOVA methods. Means were separated by Duncan's multiple range tests at the 5% level.

Results and Discussion

Trees of Golden Delicious on MM-106 had the highest yield of the 8 cultivar-rootstock combinations for the mean of 6 fruiting years and in every year but 1982 (Table 1). Productivity of Julyred, Tydeman's Red, and Red Delicious cultivars did not differ when on the same rootstock for the mean of six fruiting years. Golden Delicious was the most productive cultivar (Table 2). Except for 1977 and 1978, when Tydeman's Red trees produced almost no fruit, no significant differences were observed among yields of trees of the Julyred, Tydeman's Red, and Red Delicious cultivars. Trees on MM106 had higher yields than trees on standard rootstock.

A significant cultivar-rootstock interaction in yield was found every year but 1982. Perhaps this was due to the magnitude of yield increase which was three-fold for trees of Golden Delicious and Red Delicious on MM106 compared to trees on standard rootstock. The magnitude was only two-fold for Julyred and Tydeman's Red on MM106 compared to trees on standard rootstock.

Yields were reduced drastically in 1982 due to spring freeze damage. Bloom was quite early and, when Red Delicious trees were in full bloom on April 7, a low temperature of 19° F. was recorded, almost eliminating the entire fruit crop.

Tree survival (Tables 3 and 4) averaged 91% and did not vary due to cultivar-rootstock combination, cultivar, or rootstock. Trees of Tydeman's Red on standard rootstock had the largest trunk diameter of the rootstock-cultivar combinations (Table 3). Tydeman's Red trees had the largest trunk diameter of the four cultivars (Table 4). Golden Delicious and Red Delicious trees had the smallest trunk di-

Table 2. Effect of apple cultivar and rootstock on fruit yield, Plateau Experiment Station, 1977-82.

Cultivar-rootstock	Year						
	1977	1978	1979	1980	1981	1982	Mean
	Bu./A.						
Cultivar							
Julyred	11 b[z]	22 b	34 b	79 b	146 b	34 a	54 b
Tydeman's Red	0 c	2 c	14 b	36 b	184 b	18 a	42 b
Golden Delicious	52 a	100 a	88 a	230 a	356 a	52 a	146 a
Red Delicious	16 b	16 b	6 b	62 b	239 b	0 a	56 b
Rootstock							
Standard	3 b	8 b	11 b	42 b	166 b	8 a	40 b
MM106	40 a	62 a	60 a	162 a	297 a	44 a	111 a
Interaction[y]	**	**	**	**	*	N.S.	**

[y]Cultivar x Rootstock interaction not significant (N.S.), significant at 5% level (*), or significant at 1% level (**).
[z]Mean separation within columns of cultivar or rootstock significant by Duncan's multiple range test at 5% level.

Table 3. Effect of apple cultivar-rootstock combination on tree survival, tree diameter and trees with severe freeze damage, Plateau Experiment Station, December 1982.

Cultivar	Rootstock	Tree Survival	Tree Diameter	Trees with severe freeze damage
		%	ins.	%
Julyred	Standard	88 a[z]	7.2 b	30 b
Julyred	MM106	89 a	6.3 cd	71 a
Tydeman's Red	Standard	88 a	7.8 a	10 bc
Tydeman's Red	MM106	84 a	7.2 b	14 bc
Golden Delicious	Standard	96 a	6.4 c	13 bc
Golden Delicious	MM106	94 a	5.2 e	12 bc
Red Delicious	Standard	92 a	5.7 de	0 c
Red Delicious	MM106	97 a	5.5 e	0 c

[z]Mean separation within columns by Duncan's multiple range tests, 5% level.

Table 4. Effect of apple cultivar and rootstock on tree survival, tree diameter, and trees with severe freeze damage, December 1982.

Cultivar-rootstock	Tree Survival	Tree Diameter	Trees with severe freeze damage
	%	ins.	%
Cultivar			
Julyred	88 a[z]	6.8 b	50 a
Tydeman's Red	86 a	7.5 a	12 b
Golden Delicious	95 a	5.8 c	12 b
Red Delicious	94 a	5.6 c	0 b
Rootstock			
Standard	91 a	6.8 a	13 b
MM106	91 a	6.0 b	24 a
Interaction[y]	N.S.	N.S.	*

[y]Cultivar x rootstock interaction not significant (N.S.), significant at 5% level (*), or significant at 1% level (**).
[z]Mean separation within columns of cultivar or rootstock significant by Duncan's multiple range test at 5% level.

ameter. These data indicate that trees of the summer maturing cultivars Tydeman's Red and Julyred were extremely vigorous. The two trees of Julyred on standard rootstock in the observational planting had a trunk diameter of 18 ins. after 18 growing seasons further attributing to the vigor of Julyred trees. Julyred on MM106 rootstock had 71% of the trees showing severe freeze damage in December 1982 which was greater than with any other cultivar-rootstock combination (Table 3). Julyred had more freeze damaged trees (50%) than any other cultivar (Table 4). More trees on MM-106 rootstock (24%) had severe freeze damage than did trees on standard rootstock (13%). The significant cultivar-rootstock interaction was most likely due to the high percentage of freeze damage to trees of Julyred on MM106. Freeze damage to fruit crops has been a serious problem at this location (3, 5, 6) and is always a serious concern.

Bloom dates averaged April 18 for Julyred and April 21 for Tydeman's Red. The average bloom dates were April 21 for Golden Delicious and April 19 for Red Delicious. Julyred fruit maturity averaged July 10, about a week after fruit of Lodi. Tydeman's Red fruit was harvested about August 2. At this location Red Delicious has been harvested about mid-September.

Julyred trees had wide branch angles and were heavily branched. Tydeman's Red tree growth was long and leggy with few side shoots in this test and in Canadian tests (2). Tydeman's Red wood was moderately susceptible to fireblight. Julyred fruit was rather soft but color and flavor were very good. The fruit and leaves appeared to be rather susceptible to apple scab. Tydeman's Red fruit had outstanding color with moderate firmness. Eating quality was good. Several harvests of both cultivars were required as fruit maturity was over a relatively long period. Although both cultivars lacked the quality of fall maturing cultivars, both performed acceptably for summer maturing cultivars.

Conclusions

The summer maturing cultivars, Julyred and Tydeman's Red yielded as well as Red Delicious but less than Golden Delicious. Trees of Julyred and Tydeman's Red had a larger trunk diameter than trees of Golden Delicious and Red Delicious. Julyred trees had severe winter damage, especially when on MM106 rootstock. Julyred fruit was harvested on July 10 compared to August 2 for fruit of Tydeman's Red. Tydeman's Red trees had considerable fireblight injury. Both Julyred and Tydeman's Red produced soft fruit, but both compared favorably with other summer maturing cultivars.

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