ing forward to see if the Association can improve the services to its members. There is much to be done in the field of propagating virus-free varieties and rootstocks. Patenting of the introductions of experiment stations is becoming more popular now and this presents a problem for the Association; this problem is being studied. Patent laws do not lend themselves to the present Fruit Testing Associaion procedures. For example, patented varieties may not be propagated and sent out to whomever would like to try them. Royalties from the sale of patented new varieties do provide some income in times of reduced research budgets, which is important. So it becomes a question of: is it better for the fruit growing industry to get an early and widespread testing of new varieties or to license a commercial nursery to propagate and promote a patented variety and receive the profits from it? At the New York State Agricultural Experiment Station, fruit breeders feel that the former is the better plan. The testing of a new variety takes many years at best and the Fruit Testing Association offers the best means of speeding up this process on the most equitable basis.

Evaluation of Selected New Summer Apple Cultivars in Tennessee

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Several new summer apple cultivars have recently been evaluated in Tennessee. Summer cultivars are those which mature their fruit in July or August. No summer cultivar is listed among the 15 major apple cultivars grown in the U. S. Fruit of established summer cultivars is soft, has a rapid respiration rate, and storage life is usually short. The soft fruit is easily bruised and is hard to harvest and ship without damage. Fruit color is usually poor due to the high temperatures encountered during fruit maturation.

Increased use of controlled atmosphere (C. A.) storage has decreased demand for summer cultivars because the higher quality winter apples compete directly with them. However, local market demand for summer cultivars remains strong in some areas.

This article describes performance of 10 new summer apple cultivars tested in screening trials at the University of Tennessee Plateau Experiment Station near Crossville, Tennessee.

Materials and Methods

The 10 cultivars including the rootstock, year planted, and number of trees planted are listed in Table 1. The planting was established between 1969 and 1970 with two or three trees of each cultivar being planted. All were on a clonal rootstock. Rootstock selection was limited with the new cultivars. Rootstocks included were M. 7, MM 106, and MM 104. Trees on M. 7 and MM 106 have usually started production a year earlier than trees on MM 104.

The orchard site is at 1900 feet elevation. Soil type is Hartsells sandy loam. Rainfall has averaged 54 inches annually with rather favorable distribution. Day temperatures have seldom

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been above 90°F. Nights are relatively cool, even in summer. Conditions have generally been favorable for relatively good fruit color of summer cultivars. Past experience has shown that fireblight and winter injury can be quite severe with susceptible cultivars.

This screening trial was made to determine fruit and tree characteristics of each cultivar. Data will generally be limited to descriptive performance of each cultivar.

Results and Discussion

Bloom and harvest dates, fruit color, and flavor characteristics of each cultivar along with Red Delicious as a standard are shown in Table 2. A description of each cultivar follows.

Summerred. Harvest date for Summerred has been slightly over 2 weeks later than for Lodi. Fruit has been medium in size, conic in shape and bright red in color. Many prominent white dots have been visible in the skin. Fruits have had a good flavor. Fruit firmness has been exceptional for a cultivar ripening in July. Summerred has performed well.

Table 1. List of 10 summer cultivars tested including rootstock, year of planting and number of trees planted.

Cultivar	Rootstock	Year set	No. trees set
Summerred	M. 7	1968	2
Raritan	M. 7	1968	2
Polly Eades	MM 104	1970	2
Dakota	MM 106	1968	3
Paulared	MM 106	1968	2
Mollie's Delicious	MM 106	1970	3
Hardrick	MM 104	1970	2
Red Paducah	MM 104	1970	3
Holiday	MM 106	1967	2
Jonamac	MM 106	1968	2

Raritan. This cultivar has matured with Summerred. Fruit has been large in size and had a light red stripe over rose color. Fruits have had a bland flavor and have been very soft. Fireblight was so severe that all Raritan trees were removed in 1977.

Polly Eades. Fruit of Polly Eades has ripened the last of July. Fruits have been large, flat, and bright yellow in color. Fruits have been fairly firm but have ripened rapidly. This

Table 2. Bloom date, harvest date, fruit color and fruit flavor of 10 summer apple cultivars tested compared to the Red Delicious cultivar.

Cultivar	Av. bloom date 1975-77	Av. harvest date 1975-77	Fruit color	Fruit flavor
Summerred	Apr. 14	July 20	bright red	excellent
Raritan	Apr. 20	July 22	striped rose	poor
Polly Eades	Apr. 18	July 27	yellow	fair
Dakota	Apr. 16	July 29	dark red	poor
Paulared	Apr. 16	July 31	med. dark red	excellent
Mollie's Delicious	Apr. 16	Aug. 4	red blush	excellent
Hardrick	Apr. 17	Aug. 6	lemon yellow	fair
Red Paducah	Apr. 21	Aug. 16	dark red	good
Jonamac	Apr. 14	Aug. 22	med. dark red	excellent
Holiday	Apr. 17	Aug. 27	dark red	fair
Red Delicious	Apr. 16	Sept. 12	dark red	excellent

cultivar has fruit characteristics similar to Winter Banana, but ripens over a month earlier. Bitter rot was quite severe in 1977. Polly Eades has had some good features but is not one of the best cultivars tested.

Dakota. Fruits have ripened with Polly Eades. Fruit has been large with a shape similar to Stayman. Color has been solid dark red at maturity. Fruit has been soft and a little tough. Trees have had a slight amount of fireblight. Trees have yielded extremely well, but other characteristics make Dakota an unfavorable cultivar.

Paulared. Paulared fruit has matured with Polly Eades and Dakota. Fruit has been fairly large and flat like McIntosh. Color has been a dark red blush over most of the fruit. Fruit has been fairly firm. Paulared has colored much better than McIntosh in the test and fruit quality has been very good. The characteristics of Paulared make it a very promising cultivar.

Mollie's Delicious. Fruit of Mollie's Delicious has ripened about a week after Paulared. Fruits have been very large, pointed much like Red Delicious, and red striped with a red blush developing at maturity. They have been sweet in flavor and firm in texture. This cultivar can be best described as an early maturing, large, light red colored Red Delicious. Mollie's Delicious is very promising.

Hardrick. Fruit of Hardrick has matured just after Mollie's Delicious. The fruit has been medium to small in size, conic in shape, and slightly tart in flavor. Texture has been soft. Fruit color has been lemon yellow. Trees have had little fireblight and have yielded well. Overall, performance of Hardrick has been somewhat unfavorable.

Red Paducah. Maturity of Red Paducah has been about a week after Hardrick. Bloom date has been late like Rome Beauty. Fruit has been very large, flat, and medium red in color, and somewhat rough. Eating quality and yields have been good. Red Paducah has shown some promise.

Jonamac. Fruit has ripened on August 22, about a week after Red Paducah. Fruits have been similar to McIntosh in shape and flavor. Fruit color has been much better for Jonamac than for McIntosh and Cortland. Fruit size has been fairly large and fairly firm. Yields have been high. Jonamac has performed well.

Holiday. Fruit has ripened about a week after Jonamac. Holiday is related to McIntosh and shows many features of McIntosh. Fruit color has been dark red striped with white dots visible in the skin. Fruit has been slightly rough. Yields have been good. Trees have been slightly rough and low in vigor for the past 2 or 3 years. Holiday has shown little promise.

Conclusions

Most promising of the 10 new summer apple cultivars tested are Summerred, Paulared, Mollie's Delicious, and Jonamac. Further observations will be made on each cultivar.

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