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Field Performance and Survivability Apricot Cultivars in Southern New Jersey

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Abstract

A study was conducted on an old peach orchard site near Mullica Hill, in Southern New Jersey, comparing tree longevity, flower, fruit and tree characteristics of 21 apricot cultivar rootstock/combinations. Trees of 'Veecot' on apricot and 'Harcot' on apricot lived significantly longer than 'Stella' on Lovell peach. 'Traverse' on apricot lived significantly longer than 'Harcot' on apricot. 'Jerseycot' on peach lived significantly longer than NJA38 on peach. No other significant differences were noted in tree longevity. No differences were recorded in other charactristics because of heavy tree loss after -10°C temperatures on March 12, 1985 following a sustained period of unseasonably warm temperatures. Other characteristics were observed and recorded on most cultivars.

Introduction

Southern New Jersey is the fifth largest fresh peach producing area in the United States. The earliest peaches ripen in mid July with the latest in September. The addition of another quality tree fruit to most peach producing operations would lengthen their marketing season, spread out overhead costs, and utilize the labor force during a lull in activity.

Apricots have occasionally been evaluated with limited success in southern New Jersey. Trees are generally short lived, and unproductive due to late winter and early spring freezing temperatures. Most quality apricot varieties bloom early resulting in freeze damage to developing bud and flowers, and reducing fruit set. Some apricots tested are susceptible to bacterial spot *Xanthomonas campestris pv pruni,* brown rot *Monilinia fruiticola* and Perennial canker, *Cytospora* sp.

Apricot breeding has been undertaken for over forty years at the New Jersey Agricultural Experiment Station. Apricot breeding and evaluation programs have also been operating in Vineland and Harrow, Ontario, Canada, Michigan State University, Washington State University, the New York Agricultural Experiment Station at Geneva, and various commercial fruit tree nurseries.

The objectives of these programs include not only tolerance or resistance to the diseases and problems experienced in New Jersey but also the development of quality cultivars for the commercial fruit industry. Since a comprehensive study of cultivars from these programs has not been conducted in New Jersey, this performance evaluation was undertaken.

Materials and Methods

One year old nursery trees of ten named apricot rootstock cultivars were purchased in 1984. Ten unnamed cultivars and 'Jerseycot' from the New Jersey Breeding Program were propagated. The trees of the commercial cultivars were planted in 1984 and those from the NJAES, in 1985 at Circle M Farms, Mullica Hill, New Jersey. The orchard site was previously planted with peaches. The topography of the land was relatively flat while the soil type was classified as a Westphalia fine sandy loam with 1.2% organic matter. Soil drainage was generally good.

The trees of each cultivar were planted 4.5 meters between trees and 7.6 meters between rows in three adjacent plots. Each plot was a row consisting of one tree of 21 different variety/rootstock combinations laid

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out in a completely randomized design. Each plot was replicated three times for a total of 63 trees in three plots.

All trees were trained and pruned to a modified central leader and received the same care and attention given to an adjoining peach block. Overhead sprinkler irrigation was used during the final growth stage of fruit.

Data was collected and recorded on flower, fruit, and tree characteristics including the presence of disease. Temperatures were monitored and recorded during the winter and spring season.

Results and Discussion

Temperatures of -10°C in 1985 after five days of temperatures above 16°C were devastating. Trunk splitting occurred following these temperatures, causing tree death and eliminating the possibility of statistically analyzing all fruit and most tree characteristics.

Trees began to discolor, decline, and die after these -10°C temperatures. Trunk splitting then followed. Leaf curling, wilting, and yellowing were the common symptoms of decline and death. No primary diseases could be observed nor pathogens isolated as a cause of death. No problems of incompatibility were observed with any cultivar rootstock combinations.

Table 1. Effects of low temperatures on tree longevity of apricot cultivar rootstock combination planted in 1984.

Cultivar/Rootstock	Average no. of years surviving*
Veecot/apricot	
Traverse/apricot	
Gold Cot/apricot	
Wilson Delicious/apricot	
EarliOrange/apricot	
Harogem/apricot	
Harlayne/apricot	
Hargrand/apricot	
Perfection/apricot	
Stella/Lovell peach	
Harcot/apricot	

*Calculated by rating survival each September and averaging years of survival for all replicates.
**Mean separation by LSD 5% level.

Table 2. Effects of low temperatures on tree longevity of apricot cultivar rootstock combinations from the NJAES planted in 1985.

Cultivar/Rootstock	Average no. of years surviving*
Jerseycot/peach	4.67 a **
NJA-55/peach	4.00 ab
NJA-54/peach	4.00 ab
NJA-56/peach	4.00 ab
NJA-61/peach	3.67 ab
NJA-64/peach	3.67 ab
NJA-63/peach	3.33 ab
NJA-65/peach	3.33 ab
NJA-60/peach	2.33 ab
NJA-38/peach	2.00 b

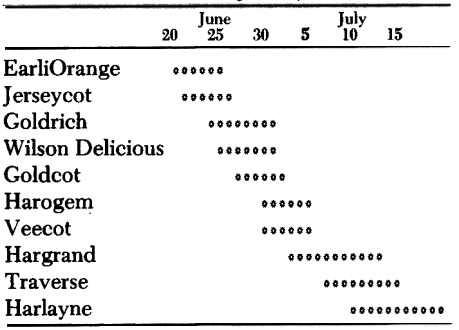
*Calculated by rating survival each September and averaging years of survival for all replicates.
**Mean separation by LSD 5% level.

Trees were generally irrigated during late June and early July and then received rainfall the remainder of the year. Trees experienced late season moisture stress in the summer and fall of 1985 and 1986 probably hastening decline and death. Loring peach on Lovell peach seedlings in adjoining block of Westphalia fine sandy loam with the same irrigation and moisture stress did not experience the severe decline and death observed on many apricot cultivars.

All apricot rootstock combinations were evaluated after the completion of the growing season for survivability and statistically analyzed for the number of years or growing seasons they survived which is recorded in tables 1 & 2.

'Harcot' on apricot rootstock survived fewer years than 'Veecot' and 'Traverse' on apricot rootstock. 'Stella' on Lovell peach rootstock survived fewer years than 'Harcot' on apricot with no difference in survival of other cultivars received from commercial nurseries. 'Jerseycot' on peach survived longer than NJA-38 on peach with no difference in survivability and other selec-

Table 3. Season of ripening of ten named apricot cultivars evaluated in southern New Jersey.



tions from the New Jersey Breeding Program.

No significant differences were recorded in trunk circumference between any cultivar/rootstock combinations before or following the major tree loss.

The following summaries of tree and fruit characteristics of surviving trees that fruited in 1987, 1988, and 1989 are described:

Cultivar Descriptions

'EarliOrange'—A globose, compressed medium size (4.2 to 4.4) cms. The skin is bright orange with a slight 10-15% scarlet red blush. The flesh is deep orange, medium firm and of very good quality (13-14% SS), free from the stone. 'EarliOrange' ripens early from June 22 to 26 and is susceptible to bacterial spot. It has produced light to medium crops. The tree is large, upright and very vigorous.

'Jerseycot' (NJ 44)—A globose to slightly ovate, uniformly shaped, small (3.5 cm to 4 cm) apricot. The skin is a light yellow orange with no blush. The flesh is light orange with medium firmness, fair to good quality, and free from the stone. 'Jerseycot' is an early ripening variety June 23 to 27th. Some bacterial spot was recorded on the fruit. Productivity has been good. The tree is vigorous and spreading.

'Goldrich'—An oval, compressed large (5.5 cm) apricot. The skin is bright orange with no blush. The flesh is orange, firm, of fair quality, and free from the stone. 'Goldrich' ripens June 25 to July 1 or early midseason. Young trees have produced only light crops of fruit.

'Wilson Delicious'—A globose, compressed medium size (4.0 to 4.5 cm) apricot. The skin is orange yellow with a slight blush 10%. The flesh is orange, medium soft and of excellent quality, free from the stone. The stone has a sweet kernel. 'Wilson Delicious' ripens June 27 to July 3 or early midseason. Trees produced light to medium crops of fruit.

'Goldcot'—A globose, slightly compressed, and small to medium size (3.6 to 4.2 cm) apricot. The skin is a washed out orange yellow with no blush. The flesh is orange, medium firm, fair quality and free from the stone. 'Goldcot' ripens June 27 to July 2, or midseason. Slight bacterial spot was observed on fruit. Productivity is good. The tree is medium, somewhat upright and very vigorous.

'Harogem'—A glogbose to oval, compressed, medium size (4.2 to 4.5 cm) apricot. The skin is a deep orange with prominent red blush (20 to 25%). The flesh is orange, very firm, of excellent quality (14.2 to 15% SS) with a strong flavor, free from the stone. 'Harogem' ripens July 1 to July 8, or late midseason. No bacterial spot was recorded on this variety. It has been of medium productivity. The tree is large, slightly upright, and vigorous.

'Veecot'—A globose, slightly compressed with medium size (4.5 cm) apricot. The skin is an attractive yellow orange with a faint red blush. The flesh is a light orange, medium firm, very good quality, and free from the stone. 'Veecot' ripens-late midseason from July 1 to July 8. 'Veecot' had bacterial spot on leaves. It has been the most productive variety. The tree is large, moderately upright and vigorous.

'Hargrand' — A globose, slightly compressed large size (5.5 to 6.5 cm) apricot. The skin is a pale yellow orange with no blush. Bacterial spot was recorded on the skin. Some cracking has also been noted. The flesh is orange, medium firm, good quality (14.8 to 15.5% SS), and free from the stone. 'Hargrand' ripens late from July 7 to 14. It has been of medium productivity. The tree is large, slightly upright, and very vigorous.

'Traverse' — a globose to oblong, slightly compressed medium size (4.0 to 4.5 cm) apricot. The skin is an attractive orange-yellow with slight blush (5-10%). Slight cracking has been recorded. The flesh is orange, very good quality (17 to 18.5% SS), medium soft, free from the stone. 'Traverse' ripens-late from July 9 to 16. It is susceptible to bacterial spot and of medium productivity. The tree is medium sized, somewhat upright and vigorous.

'Harlayne'—An oblong, compressed medium size (4.2 cm) apricot. The skin is orange with a slight red blush. The flesh is orange, firm, of good quality, and free from the stone. 'Harlayne' ripens-late from July 10 to 17. It has produced very light crops. The tree is large, spreading, and very vigorous.

New Jersey Apricot 54—A globose, small sized (3.2 to 3.5 cm) apricot. The skin is bright orange with a faint blush. The flesh is deep orange, firm and of very good quality, free from the stone. NJA 54 ripens early from June 20 to 27. No bacterial spot has been recorded.

New Jersey Apricot 55—A globose, very slightly compressed medium size (4.2 to 4.7 cm) apricot. The skin is orange with no blush. The flesh is orange, medium firm, and of very good quality, and free from the stone. NJA-55 ripens in early midseason from June 24 to July 1.

New Jersey Apricot 61—An oblong, compressed medium to large size (5.6 to 6 cm) apricot. The skin is orange with no blush. The flesh is yellow orange, medium firm, of fair quality, the stone clings to the flesh. NJA-61 ripens in midseason from June 27 to July 31. No bacterial spot has been recorded.

New Jersey Apricot 56—A globose to ovate, very compressed, medium sized (4 cm) apricot. The skin is a pale orange with no blush. The flesh is orange, medium soft, fair quality, and free from the stone. NJA-56 ripens on July 1 to 8 in late midseason. It is susceptible to bacterial spot.

New Jersey Apricot 64—A globose, slightly compressed medium sized fruit (4 to 4.4 cm) apricot. The skin is orange with red spots. The flesh is deep orange, firm, and of good quality, with a different flavor, the flesh is free from the stone. NJA-64 ripens in midseason from July 2 to 8. The variety is susceptible to bacterial spot.

Cultivar Descriptions of trees that did not survive or fruit

New Jersey Apricot 63, 65, 60, and 38—These varieties have not fruited to make evaluations.

'Harlayne'—All of the 'Harcot' trees died before a through evaluation of tree or fruit could be made.

'Stella'—The apricot never produced any fruit, the tree is medium, very spreading and vigorous.

'Perfection'—is a large, spreading tree of medium vigor. Surviving trees never produced any fruit to evaluate.

Most of the cultivars developed in the New Fruit Breeding Program, compliment the season of ripening of the named cultivars secured from commercial nurseries.

No significant difference on bloom date could be rated and recorded because of tree loss and variability of vigor. All cultivar/rootstock combinations bloomed between March 20 and April 1 over three years in southern New Jersey approximately 8 to 14 days before peaches and nectarines. During this period, frequent low tem-

peratures reduced flower survival and fruit set.

Cytospora canker was not a significant problem on any surviving trees nor was it a cause of tree death.

Conclusion

Apricot culture does not hold much promise in southern New Jersey's loamy sand and sandy loam soils with the cultivar rootstock combinations tested. Management practices to reduce summer and fall moisture stress and protect trees from low temperatures in winter and spring may help prolong tree life. Most cultivars bloom too early to set consistent crops.

Continued efforts in breeding must be focused on cultivars with greater retention of winter hardiness and late blooming characteristics.

Literature Cited

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Cold Hardiness in Grape Cultivar Development

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Abstract

The selection process in grape breeding programs must include consideration of cold hardiness for temperate region cultivation. Traditional breeding methodology has addressed cold hardiness problems through long-term evaluation before cultivar release. Two cultivars from the University of Arkansas grape breeding program, 'Mars' and 'Saturn,' differ in appearance and cold hardiness response. 'Mars' which has a *Vitis labrusca* L. appearance acclimated sooner and to a greater degree of hardiness than did 'Saturn,' which has vine and fruit characteristics more closely resembling many *V. vinifera* L. cultivars. Screening advanced selections of grapes using differential thermal analysis has been incorporated at the University of Arkansas to reduce selection time.