Testing and Evaluation of Plum and Plum Hybrid Cultivars

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Introduction & Methods

This report is a continuation of plum, and interspecific hybrids research first started by the senior author in 1989 and continued through 2011.

The Japanese type plum varieties adapted to the milder temperate climates of the Northeastern US are of great diversity. Many of these plum varieties are the result of interspecific hybridization. Most plums described as Japanese are the result of crosses of the Japanese plum, *Prunus salicina*, with the American plum, *Prunus americana, or the Apricot plum or Simon plum, Prunus simonii.* More recently the Chickasaw plum, *Prunus angustifolia,* has been used by southern breeders to improve adaptability.

Generally, the Japanese type plum varieties grow on upright spreading, or spreading to drooping trees and produce round to heart-shaped fruit (pronounced apex) with yellow, to red, to almost black skin color. Plumcots are interspecific hybrids of Japanese plums, *Prunus salicina,* and apricots, *Prunus armeniaca*. Plumcot is a generic term for these hybrids coined by Luther Burbank. Pluots® are later-generations that show more plum than apricot characteristics; the fruit's exterior has smooth skin closely resembling that of a plum. Pluots were developed by Floyd Zaiger and Zaiger Genetics, and "Pluot" is a registered trademark of Zaiger Genetics. Apriums® are complex plum-apricot hybrids that show more apricot traits; genetically they are often one-fourth plum and three-fourths apricot. Aprium varieties were developed in the late 1980s by Floyd Zaiger and Zaiger Genetics, and "Aprium" is a registered trademark of Zaiger Genetics. NectaPlums are hybrids between plums and nectarines, *Prunus persica*. These also have been developed by Zaiger Genetics. The European, or common garden plum, *Prunus domestica* varieties are more upright in growth habit and produce oval- to ovate-shaped plums with blue to black skin color. Some varieties have a dry texture, very high sugar content, and are processed into prunes. For this reason, many of these cultivars are commonly called prunes. A botanical species, *Prunus insititia* or damson plum, is one of these cultivars. Varieties of the American, or wild, plum grow on spreading trees and produce small, round fruit of various colors. These later two species have not been extensively evaluated in New Jersey and thus will not be discussed in this report.

Varieties

The Japanese type varieties grown on available rootstocks are generally short-lived and relatively unproductive (there are exceptions). The trees are easily stressed by many of the same problems affecting peach trees, namely winter injury, spring frost, moisture stress, nematodes, root rots, and short life. Some Japanese varieties also experience latent incompatibility with available rootstocks and decline slowly.

Fruitfulness is also a problem in Japanese plums because of bloom variability, pollen incompatibility, and sensitivity to variation in temperatures and sunlight. The Japanese varieties bloom earlier than other plum species. Plumcots generally bear earlier than most Japanese type plums.

The following varieties have been suggested for small commercial plantings. **The early season varieties are**: Early Golden, Methley, and Shiro. **The midseason varieties are Crimson Beauty (USDA BY 8158-50),** Au Rosa, Santa Rosa, Black Ruby, Red Ace, Redheart, Ozark Premier, Black Amber, Wickson, Queen Rosa. **The late season varieties are;** Rubysweet, Vanier, South Dakota, Ruby Queen, and Fortune.

There are many other Japanese and Japanese X American hybrid varieties that have not been observed or tested in New Jersey.

Pollination

All Japanese plums benefit from cross-pollination.

Methley, Shiro and Early Golden will set heavy crops in some years without cross-pollination. All other varieties should be planted in an orchard design with at least three varieties.

Do not pollinate Japanese type plum varieties and the interspecific hybrids with European plum varieties.

Management

The first test block of Japanese type plums was planted in a commercial orchard in Hardingville, New Jersey. Four tree replicates of popular commercial varieties on Lovell and Halford peach rootstocks on an old peach orchard site. The block received normal care and attention similar to the care given adjoining peach blocks. Fruit, flower and foliage characteristics were evaluated over the next five years but tree decline and death resulted in the trees being removed after six years. In 1987 the first of a series of Japanese plum hybrids were received from Dr. William "Dick" Okie. Research Horticulturist and Fruit Breeder with the USDA – ARS Southeastern Fruit Research Station in Byron, Georgia. Trees of these selections and other commercial varieties were planted over a 22 year period as two to four tree replicates in four research blocks interspersed with peaches and nectarines on commercial farms Most blocks received normal care and attention throughout the season by the management of each farm. There are currently 40 varieties under test in these blocks, some that have duplicates. Other old varieties have been removed. A few varieties were evaluated in test blocks at Adams County Nursery in Aspers, PA.

The following are selections and cultivars that were or are currently under test or have been evaluated.

PLUMS AND PLUOTS OF INTEREST (In Order of Ripening)

Tasty Rich Aprium – No fruit on these three year old weak trees. All trees died in 2009.

Spring Satin – A globose ovate, medium, 90-100% purplish red overcolor with light yellow to clear flesh (some red pigmentation around edges ripening from

June 28-July 1. The skin has light pubescence. The flesh is medium firm, juicy, grainy and very sweet with very good flavor. The trees are vigourous, spreading, and have been productive particularly for a plumcot. Fruit size was respectable for an early season plumcot over 2 inches in diameter. It is susceptible to bacterial spot.

USDA BY 96M514 – A yellow-fleshed clingstone plum ripening on June 20. The average fruit weight was 78 grams with 100% below 2 ¼ inches. Soluble solids concentration (SSC) was 9.6% in 2010.

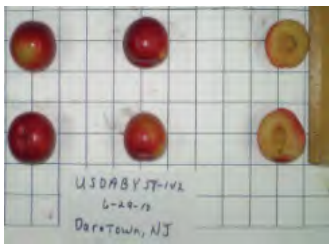
USDA BY 88Z1092 – A globose, small, 100% dark bluish black, clingstone yellow-green-fleshed plum ripening on June 27-July 6. The flesh is medium firm, juicy, melting and sweet with good flavor. The tree is spreading, vigorous, and lightly productive. Average fruit weight was 26 grams and 9.6% SSC in 2010.

Honey Rich Aprium – This ovate, small, yellow-orange skinned fruit with a prominent suture ripens from July 1-7. The flesh is yellow, meaty, sweet and of excellent flavor. The trees bloom very early and are of low vigor, upright spreading and lightly productive. SSC was 16.7 % in 2010, Very few fruit in 2011. This variety blooms very early so another very early blooming apricot is needed for pollination. It blooms so early it may have little use in New Jersey.

Earliqueen plum – A globose, small to medium small; 100% dark reddish purple, light yellow-fleshed clingstone plum ripening on July 2-8. The flesh is medium firm, juicy with fair flavor. The tree is vigorous, spreading and lightly productive and very susceptible to bacterial spot. After 15 years all of the trees were removed. This variety has never been consistently productive,

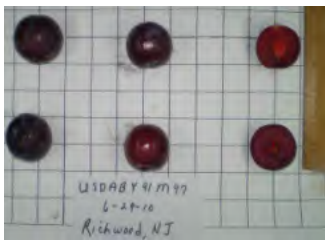
USDA BY 8158-54 – A globose to heart shaped, medium small, 90-100% purplish red overcolor with a greenish red groundcolor, red-fleshed semi clingstone ripening on July 2-6. The flesh is medium firm, melting, stringy, sweet and acidic with fair to good flavor. The tree is upright spreading, vigorous, moderately productive with high susceptibility to leaf spotting.

USDA BY 8158-142 – A globose, small 50 to 80% bright red over yellow undercolor, clingstone reddish yellow-fleshed plum ripening on July 2 to July 8. The flesh is medium firm, juicy, melting and moderately sweet with fair to good flavor. The tree is spreading. Vigorous and lightly productive with moderate susceptibility to bacterial spot. The average fruit weight was 32 grams with 100% less than 2 ¼ inches. SSC was 12.6% in 2010.



USDA BY 86M516 - A small, globose, 80-90% pinkish red with a slight yellow green ground-color yellowish, red-fleshed, clingstone, plum ripening on July 2 -9. The flesh is medium firm, sweet, acidic with very good flavor. The tree is very vigorous, spreading and has produced only light crops. It has never exhibited much leaf spotting. Average fruit weight was 27.1grams or 100% less than 2 ¼". SSC was 10.3% in 2010.

USDA BY 91M97 – A small globose, 100 % reddish deep purple, clingstone red-fleshed, plum ripening July 3- 10. The flesh is medium firm, sweet, acidic with very good flavor. The tree is large, vigorous and spreading and lightly productive with medium susceptibility to bacterial spot. Average fruit weight was 42 grams with 100% less that 2 ¼ inches. SSC was 14.7% in 2010.



USDA BY96M1275 – A globose to slightly heart-shaped, 80-100% light speckled red over a yellow green ground color; pinkish-yellow fleshed plum ripening on July 10-16. The flesh is medium firm, melting, juicy, sweet with very good flavor. The tree is vigorous, spreading, and lightly productive with medium susceptibility to bacterial spot. SSC was 16.9% in 2010. The average fruit weight was 56 grams with 100% less than 2 ¼ inches in diameter.

Shiro - It is a globose to heart shaped, medium-sized (mostly 2 inches) yellow skinned plum ripening July 12-19 or 10 days after Early Golden a similar but smaller fruited variety. The yellow semi- clingstone flesh is soft but juicy with very good flavor. It is partially self-incompatible and pollinated by, Methley, Vanier and Ruby Queen. Shiro is a good pollinizer for other early blooming plums.

USDA BY 93M364 - A globose, small, 90-100 % purplish red over greenish yellow ground color; yellow-fleshed clingstone plum ripening on July 14-20. The flesh is firm, melting, and acidic with good flavor. The tree is vigorous, upright, and productive with medium susceptibility to bacterial leaf spot. SSC was 11.2% in 2010. The average fruit weight was 39 grams with 100% of the fruit less than 2 ½ inches.

Methley – It is a globose purplish red plum with red clingstone flesh ripening July 15-22. The fruit is small to medium size. The soft juicy flesh has fair to good flavor, although the skin has a slight aftertaste. It has the virtue of being self fertile and very productive and will pollinate other early blooming varieties of Japanese plums. Direct market growers will plant it because of its long lived- tree and productivity.

USDA BY 8150-50 – A globose, medium small 90% pinkish red overcolor red- fleshed semi-clingstone plum ripening on July 15-22. The flesh is firm, melting, sweet tart with good flavor. The tree is vigorous, spreading, and moderately productive, with medium susceptibility to bacterial leaf spot. SSC was 10.7% in 2010. The average fruit weigh is 89 grams with 83 % less than 2 ¼ inch and 7 % 2 ¼ inch.

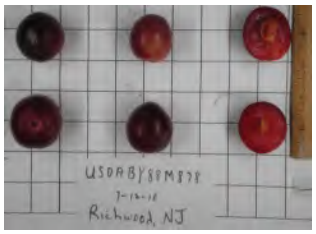
USDA BY 8327-65 - A globose to heart shaped, small, 100% dark reddish purple, red-fleshed semi clingstone plum ripening on July 18-24. The flesh is medium firm, stringy, sweet mild, with very good flavor. The tree is spreading, vigorous, and moderately productive with low susceptibility to bacterial spot. The average fruit weight is 59 grams with 100% less than 2 ½ inches SSC was 15.9% in 2010.

Bubblegum Plum(R) Plum *Prunus salicina* hybrid 'Toka' cv. It is a small bronze red globose plum ripening on July 20-26. The flesh is soft, clingstone and yellow with a good but gummy texture. The tree is upright, vigorous, lightly productive, and self incompatible and needs a pollinizer of one of the other American x Japanese hybrids. Bubblegum is a registered trademark of Paul Friday, Coloma Michigan. This cultivar blooms early, flowers heavily but has not set much fruit.

USDA BY 8334-16- A oval to ovate very small, 100% purplish red overcolor, greenish-yellow fleshed clingstone plum ripening on July 22-25. The flesh is firm, melting, and sweet, with good flavor. The tree is very vigorous, spreading, and lightly productive, with high susceptibility to bacterial leaf spot. All trees died in 2009.

Black Ruby - A globose, medium sized, 90-100% reddish black fleshed, semi freestone plum ripening on July 23-30. The flesh is medium firm, melting, stringy, sweet with good flavor. The tree is vigorous, spreading, lightly productive and susceptible to bacterial leaf spot. Productivity improves in NJ with pollination by Ruby Queen, Methyl, Shiro and Vanier. For many years we have been calling a smaller, earlier maturing, red-fleshed clingstone variety Black Ruby. We are confident this variety description and picture fits the true Black Ruby.

USDA BY 88M878 – A globose, small, 100% purplish red, red-fleshed, clingstone, ripening from July 25 -31. The flesh is medium firm, melting, juicy, sweet acidic, with very good flavor. The tree is spreading, vigorous, and lightly productive with medium susceptibility to bacterial spot. The average fruit size was 42 grams with 98 % below 2 ¼ inches and 2% at 2 ¼ inches. SSC was 14.1% in 2010.



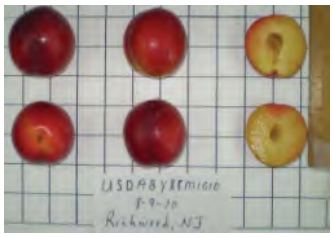
Ozark Premier –It is a globose, large, red skinned plum ripening from August 1- 7. The yellow clingstone flesh has good flavor. The tree is vigorous but crops irregularly. It is self incompatible and needs cross pollination. Vanier is an excellent pollinizer for Ozark Premier.

Fortune - Large, globose, reddish purple blush over yellow ground color, yellow-fleshed clingstone, ripening on August 6-12. The flesh is firm, juicy and sweet with very good flavor. The tree is upright-spreading, vigorous and productive. It is pollinated by other Japanese type varieties.

Coparose Pluot -Evaluated from Adams County Nursery. A globose to slightly ovate, medium to large, bluish red skinned, pluot ripening August 8-16. The flesh is a firm golden flesh, semi freestone, and a flavor that is very good. The vigorous tree requires a pollinizer such as Dapple Dandy according to Dave Wilson Nursery. It has been moderately vigorous and lightly productive. We have limited experience with pollinizers in the eastern US.

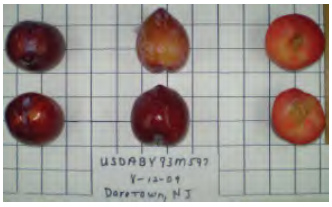
Flavor Grenade Pluot – A globose to slightly ovate, medium sized yellowish green ground color overlaid with a speckled reddish orange, greenish yellow flesh, semi freestone pluot ripening August 10 -18. The flesh is firm, fine grained, sweet, low acid with excellent flavor. The trees are vigorous, lightly productive and susceptible to leaf spotting. The fruit weight was .83 grams with 50% less than 2 ¼ inches and 50% 2 ¼ to 2 ½ inches. SSC was 17.1% in 2010.

USDA BY 88M1010 – A medium, globose, yellow, firm-fleshed, clingstone plum ripening on August 9 -15. The skin is a greenish red. The flavor is very good. The tree is vigorous, upright and moderately productive. The average fruit weight was 69 grams with 100% of the fruit less than 2 ¼ inches in diameter. SSC was 13.2% % in 2010.



Vanier - A small to medium globose, bluish-red, yellow-orange-fleshed clingstone, ripening in August 15 -23. The flesh is moderately firm, juicy with good flavor. The fruit hangs on the tree well. The tree is upright-spreading, vigorous, and moderately productive with low susceptibility to bacterial spot. It is self-incompatible and pollinated by Shiro, Ruby Queen, Ozark Premier and Santa Rosa. The average fruit weight was 45 grams and 100% of the fruit is less than 2 ¼ inches. SSC was 14.3% in 2010.

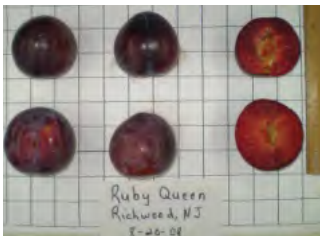
USDA BY 93M597 – A small, globose to heart shaped, 100% reddish purple, greenish yellow-fleshed clingstone plum ripening on August 12-18. The flesh is firm, juicy, and acidic with good flavor. The tree is very vigorous, upright, medium productive, and susceptible to leaf spot. The average fruit weight was 56 grams with 100% less than 2 ¼ inches in diameter. SSC was 14.7% in 2010.



Castleton(European type plum) – An ovate to oval small to medium small, 100% bluish black, yellowish green-fleshed, freestone plum ripening on August 10-18. The flesh is medium firm stringy, dry with good flavor. The trees are is moderately vigorous, upright, very productive, and tolerant of bacterial spot. The average fruit weight is 43 grams with 100 % less than 2 21/4 inches. SSC was 17.3% in 2010. Like many blue black European plums it sometimes gets picked too early.

SpiceZee NectaPlum. Evaluated from Adams County Nursery It is a 2¼ to 2½ inch globose, light bronze, pinkish, red skinned nectaplum ripening from August 15 to 22. The firm freestone cream colored flesh. It has a slightly acidic and spicy sweet flavor. Dave Wilson says it is a beautiful ornamental tree with a tremendous spring bloom followed by dark red leaf in the spring that matures to a rich green-red in late summer. This variety is self-fruitful and very productive.

Ruby Queen - Large, globose, dark reddish-purple, red-fleshed, semi freestone plum ripening in August 17-23. The fruit hangs and ripens over a long period of time. The flesh is firm, and juicy with excellent flavor. The tree is medium, spreading, vigorous, and productive with moderate susceptibility to bacterial spot. It is pollinated with another Japanese type variety like Shiro, Vanier, and Black Ruby. Tested as USDA BY8155-70. SSC was 18.5% in 2010.

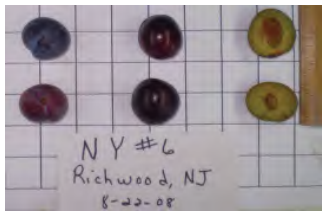


Flavor Queen – A globose, medium to large, yellowish green, semi-freestone light yellow-fleshed plum ripening from August 21 -30. The flesh is firm, juicy, melting, sweet and low acid with excellent flavor. The tree is vigorous, low productivity with high susceptibility to leaf spotting. The average fruit weight was 146 grams with 14% 2 ¼ inches, 15% 2 ½ inches and 40% 2 ¾ inches. SSC was 18.3% in 2010. 2010 was first year out of 12 year that this variety has had a full crop. In 2011 the crop was very light.

USDA BY 8356-33 – A small, globose, 80-90% yellowish red overcolor over a slight greenish yellow ground color yellow-fleshed clingstone plum ripening on August 25-30. The flesh is medium firm, melting, sweet, acidic with very good flavor. The tree is vigorous, spreading, moderately productive, and susceptible to leaf spotting.

Flavor King Pluot – A medium globose to heart shaped small 80-90% purplish red; reddish yellow clingstone pluot ripening on August 22-30. The flesh is firm juicy, melting sweet and low acid with excellent flavor. The tree is moderately vigorous, upright, lightly productive and very susceptible to leaf spotting and shot holing. The average fruit weight was 83 grams with 90 % less than 2 ¼ inches and 10 % over 2 ¼ inches. SSC was 17.7% in 2010.

New York 6 –A small, oval to ovate, blue greenish, yellow-fleshed freestone plum ripening on August 22 -30. The tree is upright spreading vigorous, spreading, productive, and tolerant to leaf spotting. Trees were removed in 2011.



Crimson Royale Pluot. Evaluated from Adams County Nursery. It is an ovate to globose, red skin over a dull yellow undercolor pluot ripening August 24 to September 1. It has a cream yellow, very firm, semi-freestone flesh with excellent quality and flavor. The trees are vigorous, spreading, and lightly productive. It requires a pollinizer but must be studied further in the Eastern United States.

Arial – A small, globose, yellowish brown russeted plum with yellow green flesh ripening in late August. The trees were very weak and all trees died in the spring of 2010. The trees never produced enough quality fruit to get a good evaluation.

Dapple Dandy Pluot – A globose, medium, red-freckled skin over yellow green undercolor; semi-freestone pink to red flesh pluot ripening August 24 to September 2 The flesh is medium firm,

juicy, acidic and sweet with excellent flavor. The trees are small, moderately vigorous, spreading, with high susceptibility to bacterial spot. The average fruit size was 109 grams with 36% less than 2 ¼ inches and 64 % over 2 1/inches. SSC was 17.5 % in 2010.

Autumn Sprite Aprium – Evaluated from Adams County Nursery. It is a globose to ovate yellowish-pink skinned ripening from August 25 to September 2. The flesh is yellow and freestone with very good sweet flavor. The fruit is medium size, about 2 inches. The tree is vigorous and spreading. Dave Wilson Nursery states that it is self fertile. If this leads to high productivity in the Eastern US this could be a promising variety as young trees had a good crop.

Flavor Rich Pluot – A generally globose, small to medium sized, 100% purplish black greenish yellow-fleshed, clingstone pluot ripening on August 25 to September 2. The flesh has fair flavor but stays so firm it is hard to determine maturity. The tree is vigorous, spreading and of all the pluots is the most productive. The average fruit size is 79 grams with 70 % less than 2 ¼ inches and 30% over 2 ¼ inches. SSC was 13.6% in 2010. Trees were removed in 2011.

Flavor Heart Pluot. Evaluated from Adams County Nursery. It is a globose to heart shaped, large sized, bluish black pluot ripening from August 22 to September 1. The semi freestone light yellow flesh is firm but softens quickly. It has excellent flavor. Flavor Heart requires a cross pollination according to Dave Wilson Nursery. The tree was small with a light crop.

Candy Stripe Pluot – Evaluated from Adams County Nursery. It is a globose medium large sized, pinkish red overcolor with a yellow undercolor ripening September 1-10. The flesh is yellow, freestone, firm, and juicy with a very good acidic flavor. Dave Wilson Nursery says it requires a pollinizer such as Flavorfall. The young trees had a light crop so more work needs to be studied on pollinizers in the Eastern US.

Autumn Giant – A globose to heart shaped, small to medium 80-90% bright orange red over a orange-yellow ground color; yellow-fleshed clingstone ripening in late September. The flesh is melting, very firm, stringy, mild and acidic with fair flavor. The tree is upright and slightly spreading, moderately productive. This plum ripens so late it is hard to get a reading on good quality.

Rootstocks

Myrobalan*(Prunus cerasifera)* seedlings and ***Myrobalan 29C*** clonal stocks are the recommended rootstocks for all European plum varieties. They are also compatible with many Japanese and Japanese X American hybrid varieties, but tend to be shorter-lived on sandy or drought sensitive soils. They are more adapted and longer-lived on loamy or clay-loam soils.

Lovell and Halford peach seedlings are used on many Japanese plum varieties. Trees are short-lived and susceptible to most problems experienced with peach varieties. Japanese plum varieties on Lovell and Halford peach seedlings are better adapted to sandy soils than European varieties on Lovell or Halford.

Mariana 2624 clonal rootstock is compatible with most plum varieties. Trees of all varieties are more sensitive to low winter temperatures on this rootstock than other rootstocks.

Citation appears to be a promising rootstock for

semi-dwarf plum trees.

Krymsk 1. A New rootstock from Russia has not been tested in New Jersey but is being offered with Japanese plums as very winter hardy and producing a semi dwarf tree.

Pumiselect is a dwarfing clonal selection of *Prunus pumila* sold with Japanese type plum.

Editors' Note: These plums were evaluated in southern New Jersey, and there, the ripening date is about the same as for comparable trees at Adams County Nursery in Aspers, PA. Northern New Jersey ripening dates range from 5 to 10 days later, depending on location.

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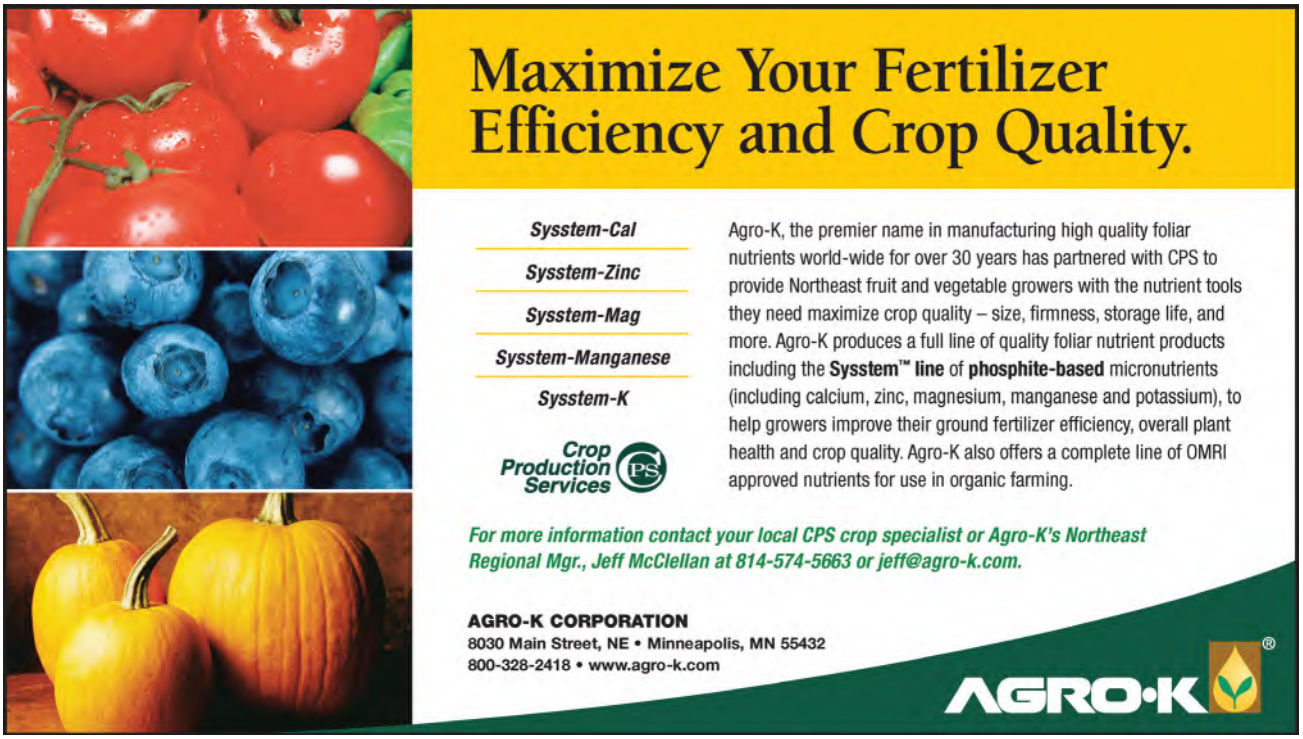
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