

Apple Varieties in Alabama

The apple, rich in folklore as well as history, was a favorite food of the Europeans who settled the New World. And today, no other fruit is more widely grown around the world than the apple. Many books have been written on the history of apples throughout the world as well as in the United States. The story of Johnny Appleseed, for example, describes one reason why so many varieties (over 4,000) were available from the mid-1800s to the early 1900s. Because seeds from so many different fruits were planted across the country, and because apples are heterozygous, a new variety was born each time a seed germinated and developed into a bearing tree. In spite of the many selections that have evolved over time and become named varieties, only a few have made it through the rigorous test of becoming a commercial variety. And even today, although hundreds of varieties are available, only 10 to 20 are regularly seen in supermarkets.

This publication primarily provides an overview of the changing apple variety picture; however, it is worth noting that the production and marketing of apples globally are currently undergoing the greatest dynamic changes recorded in modern history. For many years, the U.S. has dominated worldwide production of apples and continued to do so until 1990. However, as a result of agrarian reforms carried out in the 1980s and extending into the 90s, China has become the world leader in apple production. In 1990, the U.S. produced 4,380,000 metric tons of apples, while China produced almost as much, recording 4,332,000 metric tons (reported by the *World Apple Review*). In 1997, U.S. production increased to 4,639,000 metric tons, but China produced 18,009,000 metric tons, almost four times as much as the U.S.

Currently, the Chinese have an estimated 8 million acres of apples planted, 40 percent of which are nonbearing. This compares with about 0.5 million acres under production in the U.S. According to the Washington Apple Commission, some estimate that new plantings since 1990 could double Chinese production in the next decade. China may account for nearly 40 percent of world production (nearly 27 million metric tons) by the year 2005 (*World Apple Review*) compared to about 10 percent in the early 90s.

As a result of changes in the global apple picture, growers must pay special attention to selection of varieties to provide what the market demands, whether wholesale or retail. Therefore, a thorough understanding of the changing dynamics of apple production and varieties is



Figure 1. The Cumberland Spur, discovered as a sport in Jackson County, Alabama, could become the most outstanding Red Delicious in the East.

a must if growers are to remain competitive and profitable.

A number of noteworthy changes that have occurred during the past 40 to 50 years are fundamental to understanding the ever changing apple variety picture. Among these changes are the use of spur-type varieties (Figure 1), the change from large to small tree size, and the market acceptance of some poorly colored, rather unattractive but highly flavored varieties.

When spur-type trees were first discovered by producers some years ago, they were discarded because the goal at that time was for 30- to 40-foot trees that could produce 30 bushels or more. Spur-type trees grow slowly, are compact, begin fruiting at only 2 to 3 years of age, and ultimately produce small trees that yield only 2.5 to 15 bushels, depending on the rootstock used. However, the current trend worldwide is to move toward smaller tree size and higher-density orchards to reduce labor inputs and overall cost. One of the primary ways to maintain small, compact tree size in commercial as well as home plantings is to grow spur-type varietal strains such as RedChief Red Delicious.

In addition to the use of spur-type varieties, the other approach to maintaining small but productive trees is the use of dwarfing rootstocks. Among the common temperate tree fruits, the apple is the only one that has truly effective dwarfing rootstocks. This is important because many popular varieties do not have superior spur types, so the use of dwarfing rootstocks is the method of choice for maintaining small tree size. Spur-type varieties are also propagated onto some of the dwarfing rootstocks, creating rather small but highly productive trees.

Market acceptance of new varieties has also changed apple

Table 1. Suggested Apple Varieties—Standard Selections¹

Variety	Commercial		Home	Area
	Wholesale	Farm Retail	Garden	Adapted ²
RED DELICIOUS				
(spur types)				
RedChief (Campbell strain)	X	X	X	C,N
RedChief (Mercier strain)	X	X	X	C,N
Oregon Spur II	X	X	X	C,N
(nonspur types)				
Early Red One	—	X	X	C,N
Sharp Red	—	X	X	C,N
GOLDEN DELICIOUS				
(spur types)				
Goldspur Delicious	—	—	X	C,N
Starkspur Golden Delicious	—	—	X	C,N
(nonspur types)				
Smoothie	X	X	X	C,N
Firmgold	X	X	X	C?,N
Lysgolden (Goldenir)	X	X	X	C?,N
Stark Ultra Gold	?	?	X	C?,N
Stark Golden Delicious	?	X	X	C,N
Grimes Golden	—	X?	X	C,N
JONATHAN				
Nured	X	X	X	C?,N
Jonnee	X	X	X	C?,N
GRANNY SMITH				
Granny (Standard)	X	X	X	S,C,N
Spur Granny	—	—	?	S,C,N
ROME				
Law Rome	X	X	X	N
ARKANSAS BLACK				
Arkansas Black				
(Standard)	X	X	X	C,N
Spur Arkansas Black	X	X	X	C,N
EARLY GREEN TYPES				
Lodi	—	X	X	C,N
Twenty Oz. Pippen	—	X	X	C?,N
Horse	—	—	X	C,N
Winter Banana	pollinator only	pollinator only		C,N
OTHER VARIETIES				
(unless indicated, all are nonspur)				
Ozark Gold	X?	X?	—	C,N
Mutsu (Crispin)	X	X	X	C,N
Dorsett Golden	—	X?	X	ES
Anna (spur)	—	X	X	ES
Mollies Delicious	—	X	X	S,C,N
Saint Clair	—	—	X	S,C,N
Wiregrass	—	—	X	S
Brogden	—	—	X	S
Yates	—	X	X	S,C,N
Black Twig	—	X	X	C,N
LuraRed	X	X	X	C,N
Melrose	—	?	X	C?,N

¹X means variety will work in these categories; X? means there is a good possibility variety will work in these categories (based on preliminary data or other information); ? indicates outside performance is promising, but variety is untested in the state.

²Refer to Figure 2 for zone map of adaptation (N = north, C = central, S = south, and ES = extreme south).

production. For many years, Red Delicious and Golden Delicious have been the varieties of choice in the wholesale apple business. After their introduction as promising dessert varieties, Red Delicious and Golden Delicious soared in popularity, and improved sports of these two selections have helped them maintain dominance in the industry. There are currently over 100 different

However, the consumers proved them wrong, and today, Granny Smith is the third-leading commercial variety in the U.S.

The next challenge to the dominance of Red Delicious and Golden Delicious in the marketplace was the introduction of varieties that produce some rather poorly colored, unattractive, and somewhat small fruits but that have superb to outstanding fla-

selections. Thus, it appears that the American consumer is no longer buying apples just on the basis of appearance, but rather on their flavor and other attributes. It should be noted that in Alabama, apples are normally harvested at the tree-ripe stage and are therefore at least equal and usually superior in flavor to fruits harvested less mature and maintained in long-term, controlled atmosphere (CA) storage. For this reason, Red Delicious and Golden Delicious selections are still highly favored in Alabama.

For discussion purposes, we can divide apples into three categories: commercial wholesale, commercial farm retail, and home garden. Table 1 lists some standard selections that are suggested for each of these categories. Table 2 lists some of the more popular recent introductions from several other areas. A number of these are already proving popular among growers while others continue under evaluation.

The wholesale market demands apple varieties that are fairly attractive, that have rather widespread consumer recognition and acceptance, and that have a good shelf life, meaning that they are quite firm and can be stored for weeks to months. As a result, it is quite common for consumers to see no more than 5 to 10 varieties in supermarkets at any one time.

Growers who manage farm retail markets can produce somewhat unique varieties not commonly seen in supermarkets and that fit their particular niche marketing program. Fruits of some of these varieties may not be as large, attractive, or firm as those in supermarkets, but they have unique characteristics that are highly appealing to the consumer, such as distinctive flavor or aroma, outstanding cider quality, or antique or heirloom recognition.

Table 2. Suggested Apple Varieties—Recent Introductions¹

Variety	Commercial		Home Garden	Area Adapted ²
	Wholesale	Farm Retail		
RED DELICIOUS				
Scarlet Spur	X	X	X	C,N
Cumberland Spur	X	X	X	C?,N
FUJI				
Fuji (Standard)	X	X	X	C,N
Red Fuji (B.C.2)	?	?	?	C?,N
Red Fuji (Nagafu #12)	?	?	?	C?,N
Red Fuji (Nagafu #6)	?	?	?	C?,N
Myra Fuji	?	?	?	C?,N
Lynd Spur Fuji	?	?	?	C?,N
UltraEarli Fuji	?	?	?	C?,N
GALA				
Gala (Standard)	X?	X	X	S,C,N
Royal Gala	X	X	X	S,C,N
Gale Gala	?	?	?	S?,C,N
Ultra Red Gala	?	?	?	S?,C,N
Galaxy Gala	?	?	?	S?,C,N
Imperial Gala	?	?	?	S?,C,N
Buckeye Gala	?	?	?	S?,C,N
Big Red Gala	?	?	?	S?,C,N
OTHER VARIETIES				
Jonagold	X	X	X	C?,N
Braeburn	X?	X?	X?	S,C,N
Ginger Gold	X	X	X	S,C,N

¹X means variety will work in these categories; X? means there is a good possibility variety will work in these categories (based on preliminary data or other information); ? indicates outside performance is promising, but variety is untested in the state.

²Refer to Figure 2 for zone map of adaptation (N = north, C = central, S = south, and ES = extreme south).

strains of Red Delicious. Other varieties, such as McIntosh, Rome, and Jonathan, have been part of the commercial picture but to a much lesser degree.

Granny Smith was the first variety that broke the commonly accepted red and yellow color barrier in the apple market. Many had predicted that U.S. consumers would never eat a green apple.

vor and, quite often, superior firmness and shelf life. The Fuji variety from Japan and the Gala variety from New Zealand are typical examples of these newly introduced, less colorful varieties. Today, there has been a dramatic shift toward planting more Fujis, Galas, and other imported varieties and much fewer Red Delicious and Golden Delicious

Notes on Patented Varieties

For many years, most tree fruit varieties such as apples and pears were nonpatented and free to the public. However, the trend over the past 25 years is toward patenting releases from university breeding programs as well as those from private nurseries and other companies. Operating breeding programs is very costly and involves a long-term commitment. Consequently, many university-operated breeding programs have been phased out, and others probably will be. The trend is toward placing the development and release of fruit varieties, especially stone fruit such as peaches and nectarines, in the hands of private breeders. Naturally, the varieties released through these programs are patented for protection. Some nurseries have agreements with university breeding programs to patent and market their releases. This provides support funds to the universities in the form of royalties.

In the case of the apple, not many U.S. companies have created new varieties that have unique and desirable characteristics in order to reap the wealth generated by patents. However, essentially all new apple selections made available to producers and gardeners are being patented. The vast majority of these selections, such as the recent Ginger Gold introduction, are “grower finds” from within commercial orchards. Growers either patent such promising selections and license certain nurseries to propagate them under an agreement, or they sell the patent to a nursery that wholly controls release of the variety to the public. Some nurseries’ varieties from abroad, such as Gala and Braeburn, may be introduced unpatented or may be sold as a U.S. patented variety. Selections that

are patented are usually sold by certain U.S. commercial nurseries under agreements. The Japanese have begun patenting selections being released from their university breeding programs. A foreign patent is not valid in the U.S.; therefore, if a foreign variety is to have patent protection in the U.S., it must be issued a U.S. plant patent.

There are a number of apple varieties, most introduced during the past 5 to 15 years (but some older ones), that have not been fully evaluated across the state. Some of these may eventually

prove to be of commercial or home value. Growers and home gardeners are advised to limit planting these selections until university or producer tests have proven their adaptability. Included in this group are a number of the “disease-resistant” selections, mainly from the Purdue program, as follows: Jonafree (co-op22), Pristine (co-op32), Redfree (co-op13), GoldRush (co-op38), Enterprise (co-op30), Prima, Liberty, and Empire. Additional releases from producers or other breeding programs include Criterion, Cameo,

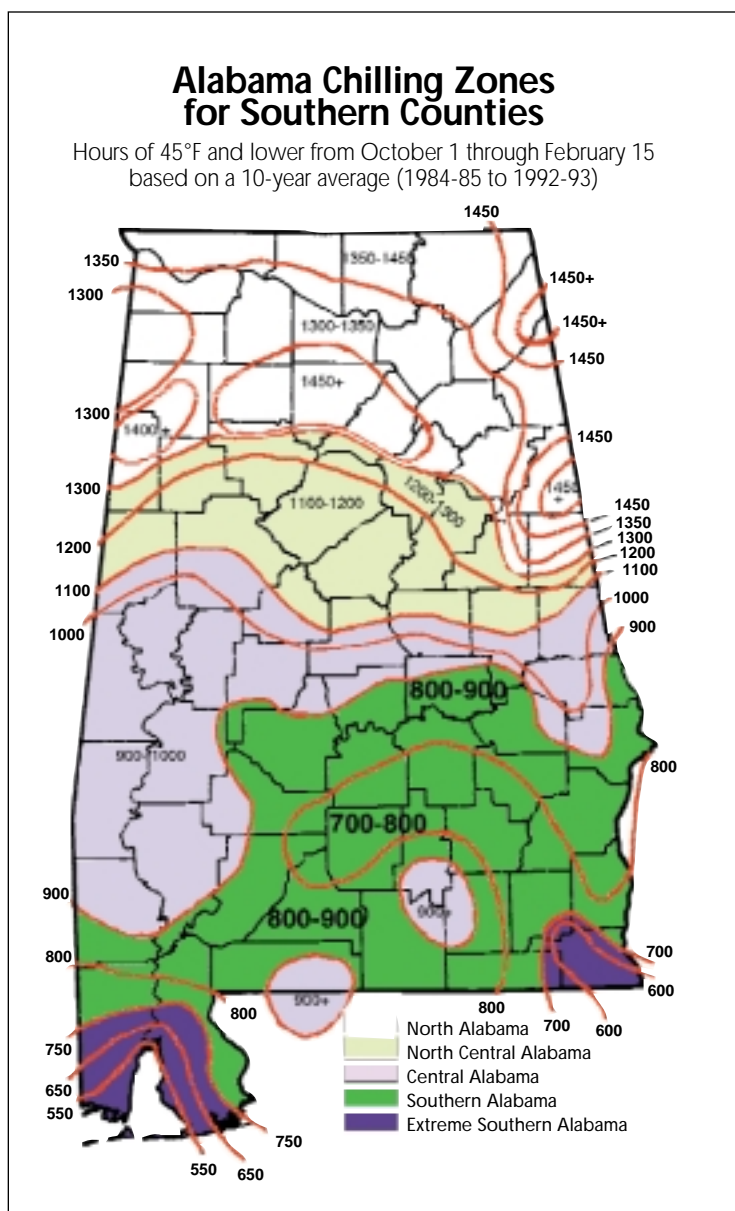


Figure 2. Fruit-growing regions of Alabama based on chilling zones

Table 3. Suggested Apple Varieties—Useful Characteristics

Variety	Season of Ripening ¹	Time of Flowering ²	Chilling Requirement ³	Skin Color ⁴	Food Utilization ⁵
RED DELICIOUS					
Redchief (Campbell)	M	E	M	R	D
Redchief (Mercier)	M	E	M	R	D
Oregon Spur II	M	E	M	R	D
Early Red One	M	E	M	R	D
Sharp Red	M	E	M	R	D
Scarlet Spur	M	E	M	R	D
Cumberland Spur	E-M	E	M	R	D
GOLDEN DELICIOUS					
Goldspur Delicious	M	E-M	M	Y	C/D
Starkspur Golden Delicious	M	E-M	M	Y	C/D
Smoothee	M	E-M	M	Y	C/D
Firmgold	M	E-M	M	Y	C/D
Lysgolden (Goldenir)	M-L	E-M	M	Y	C/D
Stark Ultra Gold	M	E-M	M	Y	C/D
Stark Golden Delicious	M	E-M	M	Y	C/D
Grimes Golden	M	E-M	M	Y	C/D
JONATHAN					
Nured	M	M	M	R	C/D
Jonnee	M	M	M	R	C/D
Jonagold	M	M	M	R	C/D
GRANNY SMITH					
Granny (Standard)	L	E-M	L-M	G	C/D
Spur Granny	L	E-M	L-M	G	C/D
ROME					
Law Rome	L	L	H	R	C/D
ARKANSAS BLACK					
Arkansas Black (Standard)	L	L	H	R	C/D
Spur Arkansas Black	L	L	H	R	C/D
EARLY GREEN TYPES					
Lodi	E	E	M	G/Y	C
Twenty Oz. Pippen	E	E-M	M-H	G/Y	C
Horse	E	E-M	L-M	G/Y	C
FUJI					
Fuji (Standard)	L	E-M	L-M	Y/R	C/D
Red Fuji (B.C.2)	L	E-M	L-M?	Y/R?	C/D
Red Fuji (Nagafu #12)	L	E-M	L-M?	Y/R?	C/D
Red Fuji (Nagafu #6)	L	E-M	L-M?	Y/R?	C/D
Myra Fuji	M	E-M	L-M?	Y/R?	C/D
Lynd Spur Fuji	L	E-M	L-M?	Y/R?	C/D
UltraEarli Fuji	L	E-M	L-M?	Y/R?	C/D
GALA					
Gala (Standard)	E	E-M	L-M	Y/O	C/D
Royal Gala	E	E-M	L-M	Y/R	C/D
Gale Gala	E	E-M	L-M?	Y/R?	C/D
Ultra Red Gala	E	E-M	L-M?	Y/R?	C/D
Galaxy Gala	E	E-M	L-M?	Y/R?	C/D
Imperial Gala	E	E-M	L-M?	Y/R?	C/D
Buckeye Gala	E	E-M	L-M?	Y/R?	C/D
Big Red Gala	E	E-M	L-M?	Y/R?	C/D

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Lustre Elstar, Pink Lady, Sundowner, Spartan, Honeycrisp, Hokuto, Shizaka, Yataka, Senshu, Suncrisp, Stellar, Arlet, and Lady Williams.

To date, many of the Purdue disease-resistant selections and most of the New York McIntosh crosses have proven to have major problems with internal flesh breakdown. Williams Pride (cop23) is an example from this group, and although it has a fine flavor, the flesh breaks down so rapidly that the fruits are of no value. Among Japanese varieties being evaluated, Kinsei will probably be eliminated because of high susceptibility to bitter rot. Although it is a very high-quality fruit and is now very popular in supermarkets, Braeburn will probably diminish in potential because of its high susceptibility to bitter rot, powdery mildew, and sunburn. Within a few years, it should become very clear whether this variety has even limited use in the Southeast.

Certain older (antique type) varieties that may have merit for home gardeners and possibly retail farm markets include Gravenstein, Spitzenburg (Esopus), and Ashmead's Kernel.

Among the standard varieties generally not recommended in Alabama because of fruit cracking, rapid flesh breakdown, or other undesirable characteristics are Stayman, Winesap (Stayman-Winesap), McIntosh, Cortland, York, and Winter Banana (okay as pollinizer).

Table 3 lists additional information concerning the varieties listed. Some varieties are better adapted to more regions of the state than others are. Most growers would agree that it is somewhat easier to produce quality apples in northern areas of the state than in most central areas. Refer to Figure 2 for the zone map of adaptation, which shows how the state is divided

Table 3. Suggested Apple Varieties—Useful Characteristics (cont'd)

Variety	Season of Ripening ¹	Time of Flowering ²	Chilling Requirement ³	Skin Color ⁴	Food Utilization ⁵
OTHER VARIETIES					
Ozark Gold	E-M	E-M	M	Y	D
Mutsu (Crispin)	M-L	E-M	M	Y	C/D
Dorsett Golden	E	E	L	Y	D
Anna	E	E	L	R	D
Mollies Del.	E	E-M	M	R	D
Saint Clair	E-M	E-M	M	R	C
Wiregrass	E-M	E-M	L-M	Y/R	C
Brogden	E-M	E-M	L-M	R	C
Yates	L	M	M-H	R	C/D
Black Twig	L	M-L	H	R	C/D
LuraRed	E	M	M	R	C
Melrose	M	M	M-H	R	C/D
Ginger Gold	E	M	M	Y	C/D
Braeburn	L	E-M	L-M	Y/R	C/D

¹Early (E) = June to July; mid (M) = early Aug. to early Sept.; late (L) = mid-Sept. to early Nov.

²Between each category, blooming may begin from several days to a week apart; early (E), mid (M), and late (L). For optimum fruiting, mix varieties that have similar times of flowering (do not use early flowering types to pollinate late-flowering types). Jonagold and Mutsu have sterile pollen and will not cross-pollinate other varieties.

³Chilling (hours at or below 45°F): low chilling (L) = 100 to 650 hr.; midchilling (M) = 651 to 1,050 hr.; high chilling (H) = 1,050 hr. or more.

⁴Skin color is green (G) to yellow (Y); some varieties have a red (R) or orange (O) overcolor (blush).

⁵Culinary (C) implies fruit's primary value is for cooking; dessert (D) fruits are mainly used for out-of-hand or fresh consumption in salads; both (C/D) implies fruits are multipurpose for fresh and cooking use.



Figure 3. Royal Gala, a sport from the original Gala variety introduced into the U.S. from New Zealand.

into north (N), central (C), south (S), and extreme south (ES).

An Overview of Apple Variety Performance in Alabama

Alabama growers have generally followed the trends of the U.S. as a whole in regard to establishing apple varieties. Sports of Red Delicious have largely dominated apple production in the state for many years, with selections of Golden Delicious being second in importance. Other varieties such as Jonathan, Rome, and Arkansas Black are grown but are secondary to the Reds and Golden.

Historically, Alabama as well as the entire Southeast has had problems producing Red Delicious selections that develop acceptable red skin color for the wholesale market. The heat of August and early September is largely responsible for the poor red finish of Red Delicious grown in the South. And the shape or “typiness” of eastern-grown Red Delicious, which tend to be more round than elongated, have been considered inferior to Red Delicious grown in Washington state.

Washington has done an excellent marketing job over the years, convincing consumers that the beautifully shaped and highly colored Washington-grown Red Delicious are superior to all others. Washington's climate enables them to produce apples that have superior attractiveness and eye appeal, and apple producers and marketers have capitalized on this ability. However, tree-ripened eastern-grown Red Delicious have equal to superior flavor as the same varieties grown in Washington.

Golden Delicious selections grown in Washington also have beautiful, smooth, russet-free skin, whereas many Golden vari-

eties grown in the Southeast develop a rougher, russeted appearance although their internal quality is fine.

Southeastern apple producers have adjusted to the competition in producing Reds and Golden Delicious by selecting outstanding varieties. In the case of Red Delicious, the most highly colored and superior performing spur-type varieties are Redchief (both strains), Oregon Spur II, and, more recently, Scarlet Spur. Sharp Red and Early Red One are also acceptable, but because they are nonspur types, growers have largely stopped planting them.

In general, only spur-type Red Delicious selections are usually acceptable to the industry today. There is no doubt that additional Red Delicious varieties will emerge in the future. Cumberland Spur, a spur-type Red Delicious variety discovered as a sport in Jackson County, Alabama, (and recently patented) could well become the most outstanding Red Delicious in the East.

In contrast to the use of spur-type selections of Red Delicious, the commercial industry primarily uses nonspur selections of Golden Delicious. Among Golden Delicious selections grown in the Southeast, Smoothee has become the commercial producers' variety of choice. Firmgold and Lysgolden (Goldenir) have also performed well and are being grown commercially. All of these selections produce attractive, mostly russet-free fruit of high quality.

Although the following standard varieties are less popular, a number continue to be grown successfully in the state:

- Granny Smith performs quite well (standard, nonspur Granny Smith variety preferred).



Figure 4. Ginger Gold, a very popular early season Golden delicious type variety discovered in West Virginia.

- Ozark Gold, generally considered an early type of Golden Delicious, does well and has attractive golden fruit, but it possesses only fair flavor that is not nearly as good as Ginger Gold.
- Mutsu (a Japanese-type Golden Delicious) grows well and produces very high-quality fruit, but it seems to perform best in northern counties. Low yields have been a problem in central counties as well as northern counties.
- Several Jonathan selections have been grown in the state. Nured and Jonnee appear to be among the best varieties, and both have done quite well, especially in northern counties.
- Rome, particularly the Law Rome variety, and Arkansas Black (spur and nonspur selections) perform quite well as late varieties.

Among newer varieties introduced in the 80s and 90s, certain ones have performed quite well and are already being used by commercial producers. The latest selection to gain prominence is Ginger Gold, which will most likely develop into the leading early Golden type grown in the Southeast. It produces high yields of quality fruit that have already been accepted by the wholesale industry.

Another very promising variety is Jonagold (Golden Delicious X Jonathan). Upon its release, it was not considered to be a variety for the Southeast because of the heat, but it continues to show promise as a commercial variety. It may well become a standard variety in the future.

Fuji (and its sports) has adapted well to southeastern conditions and continues to be planted by commercial producers. Since its appearance is secondary and its internal quality is outstanding, growers remain optimistic about its future and are already successfully marketing the fruit.

Gala (and its sports) has proven just as successful as Fuji, and it is already being marketed by commercial growers. Gala has rapidly become the early season variety of choice. Although Royal Gala is the most heavily planted sport, it is anticipated that most of the other recently released sports will also perform well. With the emergence of Gala and Ginger Gold, growers now have two of the most outstanding early season varieties ever grown in the Southeast.

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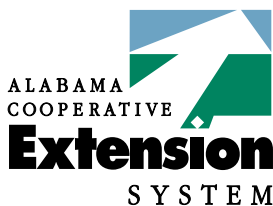
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