VARIETIES

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Variety selection is one of the most critical choices a peach grower can make. Culture and management decisions are of limited value in compensating for an ill-suited variety. Varieties need to be chosen based on climate as well as anticipated marketing window. Although hundreds of varieties have been released in the United States in the last 50 years, most are no longer or were never grown much, and usually for good reason. The trend in peach breeding has been toward more firmness, more red color, and shorter fuzz, which improve eye appeal. However, the selection process has not necessarily led to increased flavor. All varieties have strong and weak points, so a grower must match the variety to his needs. Peach growers should check multiple sources to find out which varieties are likely to best fit their needs. Sources of information include neighbor growers, extension workers, breeders, and nurserymen. Table 1 lists some of the varieties popular at the time of writing. This list will likely be very different in 10 years.

CHILLING REQUIREMENT AND CLIMATIC ADAPTATION

This section is less pertinent to cooler, northern regions of the Southeast or the United States. In these areas, amount of chilling is less an issue than winter bud hardiness.

Peach varieties for southern climates are bred to bloom during seasonal time windows to fit the particular climate. During the winter, flower and leaf buds keep track of the amount of cold weather experienced. When buds have received their pre-programmed amount of cold, they respond to warm weather and bloom. This characteristic is called chilling requirement and is commonly expressed in “chill hours” or sometimes “chill units.” If chill requirement is met early in winter, peaches bloom early and may be killed by later frosts. If the amount of chilling by spring is inadequate, buds develop abnormally and bloom sporadically or, in more severe cases, simply dry up and fall off. In severely under-chilled situations, few fruit are set and only the terminal and a few lateral buds break, leading to a weak tree and a poor crop again the next year. Although the chilling process is not fully understood, the following paragraphs explain the current theory.

Chilling Requirement

The first widely used approach to keeping track of chilling effects on peach buds was that of John Weinberger, former breeder at USDA-ARS in Fort Valley, Georgia. He grouped peach varieties relative to their ability to bloom “normally” and set a crop in winters with varying durations of temperatures below 45°F. A “750 hour” peach needed at least that many hours below 45°F before February 15 to bloom normally. Although Weinberger’s system was useful to gauge the effect of winter on buds, he noted several cases in which the numbers did not match results in the orchard. This system is still used in the Southeast because it is easy to calculate; varieties are ranked relative to their chill requirement, which indicates areas of adaptation. Generally peaches with the same chill requirement bloom together.

In other areas, Weinberger’s system was less useful. E. Arlo Richardson and co-workers developed the “Utah” model (actually several versions), which refined the effects of specific chilling temperatures over a broader range. They defined chilling with a range from 32° to 58°F, with an optimum of 43°F. One hour at 43° gave one “chill unit,” while one hour at a higher or lower temperature resulted in a partial unit. Below 32°F had no effect on chilling, and above 58°F resulted in erasing some of the previous chilling. They later included the effects of heat above 40°F to bring the fully chilled bud into bloom. This model fits bloom data in Utah and other cold climates, but it is a poorer fit in warmer climates, partly because negation by warm temperatures was unlimited.

At Byron, Georgia, the cumulative Weinberger hours and Richardson units are similar in many years. In winters with long spells below freezing, Weinberger hours are higher than Richardson units. In contrast, when winter temperatures between 45° and 60°F predominate, accumulation of Richardson units will outpace accrual of Weinberger hours. Although the Utah model is probably closer to measuring the real effects of temperature on peach buds, it needs modification to accurately predict bloom in the Southeast.

For locations where chill hour accumulations are not available, particularly in warmer production areas, chill can also be estimated by the following formula:

Seasonal Chill Hours = 100 * (18.5 - t)

where t=mean temperature (°C) of January or the coldest month. The mean monthly temperature is the average of the daily highs and lows for the month.

It appears that each shoot of a given variety has buds that vary widely in "chill requirement," perhaps by several hundred hours or more. This range in chill response would explain why bloom is more concentrated in high-chilling years or in northern climates. The length or range of time in bloom is an indication of how adequately trees were chilled. Each added week of chill increases the final percentage of flowers that will bloom, as the proportion of buds that received satisfactory chilling increases. These additional flowers will fall into sync more or less with the initial ones if temperatures are cool enough to promote chilling but not warm enough to provide heat units. As a result, increased chilling contracts the bloom period. If additional chill is interspersed with long warm spells, the first wave of blooms will open while others are tight, resulting in the split bloom seen sometimes in the South.

Generally the first flowers to develop will be those toward the end of shorter horizontal twigs. Flowers on vigorous upright wood typically bloom later.

In low-chill years, growers can prune to favor shorter, flatter, less vigorous wood that tends to have buds with a lower chill requirement. In high chill years, which tend to have early bloom dates, growers can select a higher proportion of more upright, vigorous wood to slightly delay bloom and perhaps avoid some late frost damage.

Recommended Varieties

Ideally, a well-adapted variety will bloom in the spring after risk of frost and crop reliably every year. Unfortunately, southeastern winters are quite variable, so that the amount of chilling weather varies greatly from year to year, making it impossible to select a single variety that blooms late in high-chilling years while also receiving adequate chill in low-chilling years. Average chilling at Byron by February 15 is nearly 1,100 hours, but the range is 650-1,600. Growers are advised to spread their risks by planting several varieties with different chill requirements for a given ripening date. Current and historical chilling hours for locations in Georgia are available at http://www.georgiaweather.net.

In general, lower coastal plain growers of the Southeast should choose varieties within a chill range of 350 to 650 hours. For middle Georgia and comparable areas, 650 to 950 hours is optimum. North Georgia piedmont and mountain regions will find 850 hours and up most likely to do well. Spring bud hardiness is probably not related to mid-winter hardiness, but generally speaking, later bloom reduces loss from spring frost. Because the high-chilling varieties often come from northern breeding programs, chances are they also have higher winter bud hardiness and will stay dormant longer in the southern climates, increasing the chances of getting a crop. On the other hand, as a variety is moved south, or to areas with less chilling, there is often an increase in bulging sutures and tips, with uneven firmness, sometimes to the point of the fruit being unmarketable. Fruit shape and firmness are often poorer in low-chilling years.

Pollination

Nearly all modern peach varieties are self-fertile and thus can pollinate themselves. Bees will increase fruit set and may be worth placing in the orchard in years where set is a problem as wild bee populations have declined. The only common exceptions to self-fertility are Delta and J.H. Hale, which require another nearby variety with a similar bloom time for cross pollination.

Disease Resistance

Some peach varieties such as Clayton and Sentinel are relatively resistant to bacterial spot and only show symptoms under severe disease pressure. Other varieties such as O'Henry, Elegant Lady, and other California varieties are highly susceptible to bacterial spot and may be defoliated by the disease if left unprotected. Unfortunately, some of the most spot resistant varieties bear fruit that are no longer competitive in the market due to inadequate firmness or red color. Many varieties have a moderate bacterial spot resistance that will appear resistant in some years and locations, but not

others. California varieties may also be more susceptible to cracking due to rain and to brown rot, making them more difficult to grow successfully in the Southeast.

MARKET WINDOW

Fruit Type

Most commercial peaches grown in the eastern states are yellow-fleshed freestones, except for the early season varieties, which are mostly clingstones. Freestone peaches have melting flesh that becomes soft and juicy as it ripens. Retail and wholesale markets have grown accustomed to yellow, melting-fleshed peaches. Some of the peaches grown in California are used for canning; these have a more resilient flesh texture, known as non-melting because they stay firm as they ripen. Non-melting peaches are suited to canning because the flesh stays intact during processing. Some of the newer fresh market varieties such as Springprince, Gulfprince, and Crimson Lady also have non-melting flesh. All non-melting peaches so far are clingstone, which is not a problem for early season fruit because all are more or less clingstone. Although there are a few mid to late season clingstone peach varieties available for fresh market use, it is not clear how well they are accepted by buyers and consumers accustomed to freestones at that time of the season. However, many popular late season nectarines are clingstones. Non-melting flesh improves the firmness and eating quality in the early season if the fruit is left on the tree longer. However, non-melting varieties may develop off-flavors if allowed to over-ripen on the tree.

In recent years, growers in California have planted white-fleshed peaches, initially for the Pacific Rim export market. More white-fleshed peaches are showing up in domestic markets. The new white varieties are mostly low-acid types, in contrast to most yellow peaches and the white varieties of years past such as Georgia Belle. Generally, the newer varieties are much firmer and with redder skin than the old ones. The low-acid flavor may seem bland to people used to standard peaches, but are often preferred in Asian and some Hispanic communities. One advantage of low-acid fruit is that there is little unripe (green) flavor so fruit can be eaten crisp, and time of picking is less critical to the ultimate flavor. The newest wave of peach varieties from California are low-acid yellow-fleshed peaches.

Peaches grown for long-distance shipping must be firmer than those sold locally. For local sales, size and flavor often are more critical than appearance or firmness. Although there are minor differences in varieties, flavor is much more influenced by ripening season (later is better), climate (sun is good), and cultural practices (thin well and pick riper for more flavor). Proper handling after picking also is important to preserve fruit quality. The extensive red color of many modern varieties makes it more difficult to determine when they are ready to pick, as the traditional changes in the background color are less obvious.

Ripening Date

Peaches have a relatively short shelf life, so growers must plant a sequence of varieties in order to have ripening fruit season long. Peach varieties are available to ripen in Byron, Georgia, from early May until September. Standard varieties for comparison are Redhaven, which ripens at Byron in mid-June, and Elberta, which ripens mid-July. At the season’s extremes, varieties have more weaknesses than mid-season peaches. Early season fruit tend to have low yields and small size with low fruit firmness and quality. Very late fruit tend to crack, drop from the tree, and have dry flesh. Very early or late varieties can be profitable despite their drawbacks if demand is high, or they may be at a profound disadvantage when marketed against mid-season fruit from other regions. Contrary to popular belief, bloom date and ripe date are not necessarily related, although breeders have gone to lower chilling varieties in order to get larger size in very early varieties. For a given variety, bloom date will be correlated with ripe date, given comparable weather from bloom to fruit maturity.

Ripening dates may vary from year to year due to weather factors. Ripening may be delayed due to later bloom, young trees, heavy crop set, late thinning, cool temperatures during the season, and other factors. The sequence of ripening may reverse some years, particularly when bloom occurs earlier or later than normal. For instance, in a low-chill year, a later-ripening but low-chill variety may bloom and ripen early, whereas an early-ripening but high-chill variety will have delayed bloom, which may cause the fruit to ripen after the other variety.

Nectarines

Nectarines and peaches are horticulturally similar. Comments on peaches are relevant to nectarines. However, fewer adapted nectarine varieties are available to southeastern growers. It is difficult and expensive to produce nectarines in the Southeast that are as large and attractive as those grown in California. Disease problems are worse and fruit finish is easily marred by insects and our humid climate.

Table 1. Characteristics of low-chill and medium-high chill peach varieties commonly grown in the Southeast. *White-fleshed varieties in italics*; **nectarines in bold**. Pit is Freestone, Semi-free, or Clingstone; varietal susceptibility to bacterial spot is rated as Resistant (R), Moderately (MR), Susceptible (S).

Variety	Pit	Ripe (+/- Elberta)	Chill Hours	Bacterial Spot Rating	Comments
Low-Chill					
Flordadawn	cling	-60	300	MR	
Flordacrest	semi	-50	425	MS	
Flordaking	cling	-48	400	MR	large, split pits
White Robin	semi	-48	500	MR	
Gulfprince	cling	-41	400	R	non-melting
Medium-high Chill					
Queencrest	cling	-62	650	S	California standard
Camden	cling	-58	750	S	small, split pits
Starlite	cling	-54	650	S	local use
Regal	semi	-54	700	HS	local use
Empress	cling	-52	650	S	similar to Springcrest
Springprince	cling	-50	650	MS	non-melting
Sunbrite	cling	-49	750	S	
Goldprince	cling	-47	650	MR	low vigor
Junegold	cling	-45	650	MR	large, pits split badly
Scarletpearl	semi	-45	750	MS	local use
Rubyprince	cling	-43	850	MR	
Surecrop	semi	-43	950	R	
Summerprince	semi	-42	850	MR	small size
Garnet Beauty	semi	-38	850	MR	
Juneprince	semi	-38	600	MR	
Southern Pearl	semi	-38	650	MR	large size
Sureprince	semi	-35	950	MR	medium size
Coronet	semi	-34	700	S	
GaLa	semi	-34	700	S	
Durbin	semi	-34	850	MR	green ground color
Karla Rose	semi	-28	650	HS	cracks, good taste
Flavorcrest	free	-28	750	HS	
Redhaven	semi	-28	950	MR	northern standard
Bellaire	free	-25	750	R	
Juneprincess	free	-24	850	MR	
Roseprincess	free	-24	850	MS	tart
Harvester	free	-23	750	MR	
Topaz	free	-18	700	MR	light crops
Cary Mac	free	-17	750	MR	light crops
Fireprince	free	-17	850	MR	
Blazeprince	free	-17	750	R	dark red

Winblo	free	-17	850	MR	
La Feliciana	free	-14	600	MR	local use
Redglobe	free	-13	850	MR	
White Lady	free	-12	850	HS	very firm, low-acid
Bounty	free	-12	800	MR	large
Loring	free	-12	800	MR	
Majestic	free	-12	750	R	
Redgold	free	-10	850	MS	attractive
Summergold	free	-10	750	MS	
Ruston Red	free	-8	800	R	local use
Contender	free	-7	1050	MR	hardy
Cresthaven	free	-3	950	MR	lacks red
Dixiland	free	-3	750	S	lacks red
Redskin	free	-2	750	MR	dull color
Sunprince	free	-2	800	MR	large, lacks red
Elberta	free	0	850	MR	obsolete
Jefferson	free	+3	850	R	
Summer Lady	free	+5	850	HS	very red
Fay Elberta	free	+6	750	S	lacks red
Monroe	free	+8	750	HS	
O'Henry	free	+13	850	HS	California standard
Flameprince	free	+14	850	MR	
Big Red	free	+22	750	MR	
Parade	free	+30	800	S	drops prematurely
Fairtime	free	+35	750	HS	
Autumnprince	free	+45	850	MS	