gation and orchard management, in order to insure normal, healthy cultivar/rootstock combinations. In many cases, these combinations have been blamed for failure, when the real cause was an oversight or poor technique in propagation or orchard management.

Literature Cited

1. Mosse, Barbara and N. V. Labern. 1960. The structure and development of vascular nodules in apple bud unions. Annals of Botany, N.S. 24(96):500-507.
2. Simons, R. K. 1968. Phloem tissue development in the stock/scion union of East Malling IX apple rootstock. Hort. Res. 8(2):97-103.

Peaches for Warm Climates

R. H. SHARPE AND W. B. SHERMAN

Peaches that can fruit with very little winter cold have been available to the plant breeder for many years. Their fruit has been of very limited commercial value because of small size, soft flesh or other undesirable qualities. A breeding program to develop new low chilling peach varieties adapted to central Florida was initiated in 1952, after tests disclosed that varieties from other areas were not adapted. Numerous crosses were made, and some 20,000 seedlings were grown from 1952 to 1961. Only one variety was released from these selections. Another 20,000 seedlings have been tested for desirable fruit qualities and quite a large number of rootstock types since 1961.

No commercially satisfactory selections were obtained in the first two or three generations of breeding, because of poor fruit characteristics of the low-chilling-requiring parent plants. In subsequent generations, selections used in breeding have been closer to commercial quality, and a useful new variety can be expected from perhaps each 4000 seedlings.

Through 1969, nine peach and nectarine varieties adapted to Florida conditions have been released. Of these, six peach and one nectarine variety were released for central Florida trials, and one peach and one nectarine for north Florida. Emphasis on nectarine breeding has increased since 1965, and several promising selections are now under trial.

An ideal peach for fresh market should be firm, two inches or larger in diameter, with yellow flesh, capable of a week long shelf life, and with 70 percent or more attractive surface blush. It should also be freestone and, for Florida, needs to be adapted to local conditions, and early enough ripening to market before other peach areas. Present varieties represent some compromise of these desirable traits. Varieties considered most suitable for commercial use are discussed briefly below, and others, useful for home planting, are listed in Table 1.

'Flordared': This peach is adapted to south central Florida with a 100-hour chilling requirement. Is first ripe April 18 to May 1. It has a medium-firm, white flesh sprinkled with heavy red skin blush, and is freestone. Fruit size is mostly two inches and up. The bloom period is long, normally peaking by February 1. "Flordared" was released in 1970 by the Florida Agricultural Experiment Station (R. H. Sharpe).

'Early Amber': This variety is adapted to central Florida, requiring

Table 1. Variety Characteristics

	Normal Ripening Date*	Flesh Color	Stone Freeness	Flesh Firmness	Principal Use†	Approx. Chilling Require
Red Ceylon	Mid-June	White	Free	Soft	H	50
Okinawa	Early June	White	Free	Soft	H, R	100
Flordared	Late April	White	Free	Medium	H, L, C	100
Flordabelle	Late May	Yellow	Free	Firm	H, L, C	150
Flordawon	Late April	Yellow	Free	Medium	H, L	150
Flordasun	Late April	Yellow	Semi-free	Medium	H, L	300
Sunred Nectarine	Mid-May	Yellow	Semi-free	Firm	H, L, C	300
White Knight 2	Early May	White	Cling	Soft	H, L	250
White Knight 1	Late April	White	Cling	Soft	H, L	300
Jewel	Late May	White	Free	Soft	H, L	300
Desertgold	Mid-May	Yellow	Cling	Medium	H, L, C	300
Early Amber	Early May	Yellow	Cling	Medium	H, L, C	350
Tejon	Early May	Yellow	Cling	Medium	H, L	400
Flordahome	Late May to Early June	White	Free	Soft	H	400
Rochon	Early May	Yellow	Cling	Medium	H, L	450
Bonita	Mid to Late June	Yellow	Cling	Medium	H, L	500
Rio Grande	Early June	Yellow	Free	Firm	H, L, C	500
Flordaqueen	Early June	Yellow	Semi-free	Medium	H, L	550
Earligold	Early to Mid-May	Yellow	Cling	Medium	H, L	550
Sungold Nectarine	Mid-June	Yellow	Free	Medium	H, L, C	550
Springtime	Early May	White	Cling	Medium	H, L	650
June Gold	Mid to Late May	Yellow	Cling	Medium	H, L, C	650
Maygold	Late May	Yellow	Cling	Firm	H, L, C	650
Suwannee	Mid-June	Yellow	Free	Firm	H, L, C	650
Sunhigh	Late June	Yellow	Free	Firm	H, L	650
Bonanza (dwarf)	Early June	Yellow	Free	Medium	H	650

*Ripening periods vary considerably with season. Dates given are considered normal for the areas where the varieties are best adapted.

†H=Home; L=Local; C=Commercial; R=Rootstock. For commercial use, emphasis is on ripening with or before 'Maygold' and ahead of principal producing areas in Georgia. Home and local use varieties are soft-fleshed or too late-ripening for the early market.

about 350 hours of chilling. It is first ripe May 1 to 10, and is yellow-fleshed, with a blush covering most of the highly pubescent surface. It can be readily sized to 1⅞ and possibly two inches under good culture. It has fairly firm flesh and is a clingstone. It is suggested for 'Tejon' season because of lower chilling requirement and better shipping quality. Plant Patent 2458.

'Desertgold': This yellow-fleshed clingstone peach appears to be adapted to central Florida, with a chilling requirement of approximately 300 hours. It will ripen in early to mid-May. It has an attractive red blush, but lacks size, as few fruit reach two inches in diameter. Introduced in 1969 by the U.S. Department of Agriculture (J. H. Weinberger).

'Sunred': This is a nectarine with chilling requirement of about 300 hours. It is first ripe May 10 to 15, and has yellow flesh with nearly solid red skin blush. It is firm, has excellent flavor and is semi-freestone. Most fruit should size over 1¾ inches in

Table 2. Areas where central Florida peach varieties and seedling selections are under test.

	Area	Varieties
USA:	California	Sunred, Flordabelle
	Hawaii	Sunred and others
	Arizona, Texas	Flordasun, Early Amber and others
CENTRAL AMERICA:	Mexico (mostly Monterrey area)	Sunred, Flordasun, Early Amber
	Guatemala	All varieties, several selections
	Costa Rica	Sunred, Flordasun and others
SOUTH AMERICA:	Venezuela	Flordawon, Flordasun, Sunred, Flordabelle, Flordared, several others
	Colombia	Flordawon, Sunred and others
	Peru	Sunred, Early Amber and others
	Equador	Flordasun, Sunred, Flordabelle, Flordared, several selections
	Brazil	Most varieties, some selections (1969)
	Argentina	Flordahome, Flordasun, Flordawon, Sunred
ASIA:	Israel	Flordared, Flordabelle, Sunred, Sungold, Flordasun, several selections
	India	Several varieties and selections (1968) (not sure if established)
	Iran	Flordasun, Sunred (not sure if established)
SOUTH AFRICA:		Sunred and others (not sure if allowed through quarantine)
AUSTRALIA, NEW ZEALAND:		Sunred, Sungold, Flordasun, Flordawon, Flordaqueen selections
EUROPE:	Spain, Valencia	Flordasun, Sunred
	Italy	Flordawon, Flordahome, Flordasun, Flordaqueen, Sunred
	Canary Islands	Flordasun, Sunred, Flordabelle, Flordared, several selections

diameter, with a few two inches. Released in 1964 by Florida Agricultural Experiment Station (R. H. Sharpe).

'Flordabelle': Adapted to central Florida on sites with 150 hours chilling requirement. It is normally first ripe in late May producing firm, freestone fruit of 2¼ to 2½ inches. It is yellow-fleshed with a dull green ground color at picking. During storage or shipment, the ground color turns yellow. Released in 1970 by Florida Agricultural Experiment Station (R. H. Sharpe).

'June Gold': This peach is for north Florida, requiring about 650 hours chilling. It is first ripe mid to late May and has yellow, clinging flesh, with good blush skin color. It is subject to pit breakage in which small pieces of pit cling to flesh. It has good appearance, fair shape, is quite firm, and has good size for an early peach, with many fruit over two inches. Plant Patent 1884.

'Maygold': This is the principal peach variety for north Florida. It is quite firm, and ships well, with most

fruit 1⅞ inches to two inches and over in good seasons. This variety is usually productive except in years of marginal chilling. Introduced in 1953 by the U.S. Department of Agriculture (J. H. Weinberger).

'Rio Grande': This freestone peach is being planted in north Florida only on the warmest sites because of its marginal chilling requirement. It is first ripe in early June. It has yellow, firm flesh, has a high percent of red blush, and makes fruit 2½ inches and over. Plant Patent 2888.

'Suwannee': This peach is for north Florida. First ripe about June 10. It is yellow-fleshed, with high blush color, good size and shape. It is the first high quality, freestone type for the area with significant acreage. It is considered to have the same chilling requirement as 'Maygold', but appears less productive under marginal chilling conditions. Introduced in 1962 by U.S. Department of Agriculture (J. H. Weinberger and V. E. Prince).

Central Florida surveys in April 1969 by the Florida Crop and Livestock Reporting Service reported 2865 acres of commercial peaches. 'Early Amber' is a patented variety, one parent of which was an Experiment Station breeding line. Approximately 1140 acres were in current commercial production. 'Sunred' nectarine, released in 1964, was planted on 750 acres, and 'Flordasun' peach, also released in 1964, occupied 590 acres. The balance of the reported acreage, about 10% of the total, was divided between six varieties, none of which is likely to increase greatly. 'Tejon', the only southern California bred variety grown to any extent in central Florida, has declined in acreage and is considered unsatisfactory for commercial shipment. 'Flordasun' and 'Tejon' are becoming obsolete due to softness and insufficient fruit color.

Of the commercially important varieties, 'Sunred' nectarines led in new plantings in 1967, 1968 and 1969. It has good firmness and shape, very high color, and excellent eating quality. There were severe problems of fruit scarring in some orchards in 1969, but others showed little damage. One of the causes was thought to be frost damage, from temperature minimums of 28°F occurring just before shuck-off stage. Another serious type of spotting occurred in orchards receiving no full-bloom or petal fall sprays, suggesting a possible disease problem.

The newest varieties for central Florida have not been grown long

Table 3. Relation of accumulated chilling hours at and below 45°F (7.2°C), from October 1 to February 10, average January temperatures in Florida, and variety adaptation.

45 degree Chilling Hours	Type Area	January mean degrees F (C)	Representative well-adapted varieties
0 to 50	Homestead	66 (20.0)	Okinawa, Red Ceylon (not commercial)
110	Avon Park	64 (17.8)	Flordabelle, Flordared, Flordawon
210	Lakeland	62 (16.7)	Flordasun, Sunred
310	Inverness	60 (15.5)	Early Amber
420	Gainesville	58 (14.4)	Tejon
540	Lake City	56 (13.3)	Flordaqueen, Sungold
660	Quincy	54 (12.2)	Maygold, June Gold, Springtime, Armgold, Suwannee
700	Tifton, Ga.	52 (11.1)	None in Florida
900	Ft. Valey, Ga.	49 (9.4)	None in Florida

fruit 1⅞ inches to two inches and over in good seasons. This variety is usually productive except in years of marginal chilling. Introduced in 1953 by the U.S. Department of Agriculture (J. H. Weinberger).

'Rio Grande': This freestone peach is being planted in north Florida only on the warmest sites because of its marginal chilling requirement. It is first ripe in early June. It has yellow, firm flesh, has a high percent of red blush, and makes fruit 2½ inches and over. Plant Patent 2888.

'Suwannee': This peach is for north Florida. First ripe about June 10. It is yellow-fleshed, with high blush color, good size and shape. It is the first high quality, freestone type for the area with significant acreage. It is considered to have the same chilling requirement as 'Maygold', but appears less productive under marginal chilling conditions. Introduced in 1962 by U.S. Department of Agriculture (J. H. Weinberger and V. E. Prince).

Central Florida surveys in April 1969 by the Florida Crop and Livestock Reporting Service reported 2865 acres of commercial peaches. 'Early Amber' is a patented variety, one parent of which was an Experiment Station breeding line. Approximately 1140 acres were in current commercial production. 'Sunred' nectarine, released in 1964, was planted on 750 acres, and 'Flordasun' peach, also released in 1964, occupied 590 acres. The balance of the reported acreage, about 10% of the total, was divided between six varieties, none of which is likely to increase greatly. 'Tejon', the only southern California bred variety grown to any extent in central Florida, has declined in acreage and is considered unsatisfactory for commercial shipment. 'Flordasun' and 'Tejon' are becoming obsolete due to softness and insufficient fruit color.

Of the commercially important varieties, 'Sunred' nectarines led in new plantings in 1967, 1968 and 1969. It has good firmness and shape, very high color, and excellent eating quality. There were severe problems of fruit scarring in some orchards in 1969, but others showed little damage. One of the causes was thought to be frost damage, from temperature minimums of 28°F occurring just before shuck-off stage. Another serious type of spotting occurred in orchards receiving no full-bloom or petal fall sprays, suggesting a possible disease problem.

The newest varieties for central Florida have not been grown long

Table 3. Relation of accumulated chilling hours at and below 45°F (7.2°C), from October 1 to February 10, average January temperatures in Florida, and variety adaptation.

45 degree Chilling Hours	Type Area	January mean degrees F (C)	Representative well-adapted varieties
0 to 50		66 (20.0)	Okinawa, Red Ceylon (not commercial)
110		64 (17.8)	Flordabelle, Flordared, Flordawon
210		62 (16.7)	Flordasun, Sunred
310		60 (15.5)	Early Amber
420		58 (14.4)	Tejon
540		56 (13.3)	Flordaqueen, Sungold
660		54 (12.2)	Maygold, June Gold, Springtime, Armgold, Suwannee
700	Tifton, Ga.	52 (11.1)	None in Florida
900	Ft. Valey, Ga.	49 (9.4)	None in Florida

enough in other areas with warm winters for satisfactory evaluation. A partial list of areas where budwood or trees of named varieties and advanced selections have been sent is listed in Table 2. 'Okinawa' rootstock seed has also been sent to several areas where rootknot nematodes are a problem. Observations are spotty as many growers have not reported successes or failures in these trials.

In considering trial plantings, it might be helpful to compare chilling requirements as commonly described in the U.S.A. [accumulated hours during dormancy at and below 45°F (7.2°C)] with the coldest month mean temperature. It seems certain that very low-chilling-requirement peaches can perform perfectly well without any hours below 45°F, requiring only perhaps some winter cold in the range of 55°F (12.8°C). For these reasons, the material presented in Table 3 is given for suggested comparisons, based on Florida observations and limited reports from other areas. Differing lengths of the cold period, dormancy induced by drought or defoliation, and local effects such as fog or lack of extremely warm periods can be expected to modify the comparison of Florida with other areas. However, the table suggests a starting point for locating variety trials of these Florida varieties.

There could be some very interesting developments in peaches and nectarines in tropical and sub-tropical areas. There are numerous advantages in being able to produce peaches and nectarines in an area free of frost hazards to trees and young fruit. Examples would include timing of date of maturity, or the possibility of producing two crops a year with control of water and defoliation. Also, there are potentials for processing if suitable varieties can be found or developed.

Nomenclature of the 'Salt Creek' Grape

N. H. LOOMIS[1] AND LLOYD A. LIDER[2]

A grape rootstock commonly called 'Salt Creek' is very resistant to nematodes and phylloxera. Vines grafted on it are extremely vigorous. It has been used extensively in California as a rootstock for *Vitis vinifera* cultivars, particularly on the lighter soils where weaker rootstocks fail.

Lider (4) noted in 1960 that this rootstock was a *V. champini* grape, and not the same as the original 'Salt Creek' variety derived from *V. doaniana,* as introduced by T. V. Munson in the nineteenth century.

There is an early reference to 'Salt Creek' as *V. champini* by Nougaret (7) in 1923. Since *V. champini* and *V. doaniana* are entirely different species, the *V. champini* 'Salt Creek' grape rootstock appears to be misnamed.

It seemed probable that the *V. champini* 'Salt Creek' was one of the seven named *V. champini* cultivars which include Barnes, De Grasset, Dog Ridge, Jolly, Ramsey, Vermorel, and Viala (5). They have been cultivated and tested to some extent as rootstocks (3). All but Viala and the true *V. doaniana* variety, 'Salt Creek', were compared at Fresno, California.

The *V. champini* clone obtained from the Illinois Agricultural Experiment Station and designated as Ramsey appears to be identical in all respects with the *V. champini* clone now

[1]Plant Science Research Division, U. S. Department of Agriculture, Fresno, California.
[2]Department of Viticulture and Enology, University of California, Davis, California.