

AVOCADO VARIETY TRIALS AT RIVERSIDE AND GREENSPOT

W. B. Storey

Associate Horticulturist, University of California Citrus Experiment Station, Riverside

The University of California Citrus Experiment Station has two avocado variety orchards under close observation in a study of varietal performance in the intermediate valley climatic zone of southern California. One orchard is located on the Experiment Station's campus at Riverside. The other is located at Greenspot in San Bernardino County, about seven miles east of the city of San Bernardino, on property of the East Highlands Orange Company.

The intermediate valley climatic zone is designated "Area VIII" by the Avocado Variety Committee of the California Avocado Society. It comprises the western portion of Riverside County and the southwestern portion of San Bernardino County. It is regarded as marginal to commercial avocado production, and, at present, the Committee's recommendations of varieties for planting are more or less tentative. They suggest planting Hass in warm locations, and Bacon and Zutano in locations too cold for Hass.

The two variety trial orchards provide the opportunity to evaluate the performance of varieties which seem promising for planting in Area VIII, as well as newly registered varieties, accessions from out-of-state sources, and varieties which presently are designated experimental for all areas. Some of the varieties in these orchards are being evaluated by growers in the area in their own orchards. The growers' trials provide a supplementary source of information on performance.

RIVERSIDE

The early history of avocado variety trials at Riverside was reported by Winslow and Enderud (1) in the 1953-54 California Avocado Society Yearbook. They reported establishment of a first orchard in 1919, and a second orchard in 1943. The first orchard was removed in 1951, and the land was reassigned for use in studying avocado diseases. The second orchard continues in operation, and is the one upon which this report is based.

Winslow and Enderud (1) reported initial planting of the 1943 orchard to consist of 36 varieties, with one variety, Fuerte, represented by 17 strains. In 1955, when the trees were 12 years old, they (2) reported on flowering behavior and yields of some of the varieties. The composition of the orchard has changed considerably in the past 10 years. In some cases, trees of unsuitable varieties have been pulled out to reduce crowding. In other cases, trees of unsuitable varieties have been topworked to newer varieties. In a few instances, young, nursery-grown trees of new varieties have been planted in places where older trees were removed. At present, the orchard consists of

96 trees, with 43 varieties under observation.

A piece of land for a new planting has been set aside on the Experiment Station campus. This will be planted following installation of an irrigation system. A new orchard is both desirable and necessary because the present orchard is overgrown and overcrowded; many trees are used for experimental purposes by members of several departments of the Station; the orchard is a convenient source of fruit, seed, and budwood for experimental use; the limited number of trees does not permit addition of a new variety without removal of an older one; and, finally, development of U.S. Highway 60 into a freeway and its realignment in front of the University will result in destruction of one-fourth to one-third of the present orchard.

Because of the wide differences in size and age of trees and the multiple purpose role of the present orchard, accurate yield records are difficult to obtain over a protracted period. Varietal performance, therefore, particularly with regard to yield, can be discussed only on a relative basis. Reasonably good estimates can be made, however, from more or less superficial observations.

Trees of the following varieties are in the orchard, but, for the most part are too young to give any indication of performance: Allmeat, Arturo, Dewey, Indio, Lois, Mesa, Mexicola, Peg, Sexton, and Susan. Brief notes on other varieties follow.

Bacon—Tree a consistent bearer, producing moderate crops annually. Attractive, good quality, green fruit, but subject to blossom end spotting. Season of maturity: November to January. When left on the tree beyond January, severe checking and cracking of the skin occurs toward the blossom end, coincidental with softening and breakdown of the flesh.

Bondoso—Tree a consistent moderate bearer. Season of fruit maturity: October and November. Dull green fruit with good flavor. Corkiness and russeting of the skin develop early, and is pronounced when fruit is fully mature.

Clifton—Tree variable in bearing, producing heavy crops in some years, light or no crops in others. Season of fruit maturity: September, October. Fruit dull green. Flavor fair. In 1957, a heavy crop year, all fruits dropped without reaching 8.0% oil. Corkiness of skin pronounced at full maturity.

Dickinson—Tree an extremely light bearer. Fruit of good quality; mature May to July.

Dr. White—Tree produces light to medium crops annually. Season of fruit maturity: September, October. Fruit a typical dark-skinned Mexican type. Quality fair.

Duke—Tree variable in bearing, having fairly heavy crops in some years, light crops in other years. Season of fruit maturity: September to November. Checking and breakdown occur if one leaves fruit on the tree after November. Fruit green. Quality fair. Lately, this variety has attracted attention as a source of seed for rootstock rather than of fruit for market.

Edranol—Tree an extremely light bearer. Fruit season: May to July. Quality very good. Skin subject to considerable corkiness.

Elsie—Tree consistent bearer of moderate crops. Season of fruit maturity: April, May. Fruit green. Appearance and quality good, but fruit tends to run to large sizes.

Emerald—Tree tends to be strongly alternate bearing, with a heavy crop one year, and a light crop or no crop the following year. Fruit season: January, February. Fruit attractive green in appearance but only fair in quality. No observed tendency toward end spotting or corkiness.

Fuerte—As noted previously, this variety was, until recently, represented by 17 strains which were selected earlier by growers as being bud variations which were more productive than the original parent introduction. At Riverside, there are no discernable differences among the strains with regard to habit of growth, season of fruiting, and fruit characters, excepting one known as Carter Bud Sport which is conspicuously different in fruit and foliage characters. All trees are highly variable in productivity, and, although all set some fruit every year, the best crops tend to be light to only moderately heavy. The harvest season extends from November through February, during which time quality is excellent. By the end of February and thereafter, the fruits become russeted and begin to deteriorate at the blossom end. They cannot be left on the tree for harvesting from March to May as is done in some of the more nearly coastal districts.

Gehee—Tree bears heavy crops annually. Fruit season: March to May. Quality good. Corky spots begin to develop on the skin toward the end of March.

Geib—Tree shows signs of being a shy bearer. Season of fruit maturity: September to December. Quality fair. Skin develops early corkiness.

Halsted—Tree an annual producer of light to medium crops. Fruit season: December through March. Quality fair. Subject to considerable corkiness.

Harms—Tree produces light crops annually. Fruit season: June to September. Fruit quality good. Green fruit of medium size. Skin becomes corky early.

Hass—Trees produce light to fairly heavy crops annually. Season of maturity: May through July. Fruit begins dropping by August and cannot be stored on the tree longer as is done in coastal districts. Quality excellent. Skin remains free from corkiness and other blemishes right up to the end of the harvest season.

Irving—Tree variable in production, with no crops or light crops in some years, heavy crops in other years. Season of fruit maturity: December, January. Fruit smooth and shiny, and very attractive in appearance; free from corkiness and other blemishes. Quality is good.

Jalna—Trees young, but indications are that they will be moderately good bearers. Fruit must be harvested in September and October before checking of the skin sets in. Quality fair.

Lodge—Tree sets light to medium crops annually. Season: December, January. Fruit fairly large, dull green in appearance. Corkiness of skin develops early. Quality good.

MacArthur—Produces light crops annually. Season: May to July. Fruit often has a fairly long, crooked neck. Corkiness of skin develops early. Quality very good.

Mayo—Tree produces fairly good crops annually. Season of maturity: October to December. Skin develops considerable corkiness. Quality fair.

Nowels—Tree strongly alternate bearing, with a very heavy crop one year and virtually

no crop the next year. Fruiting season: September to November. Fruit attractive and free from blemishes, but in heavy crop years tends to be rather small. Quality good.

Regina—Trees bear light to fairly heavy crops annually. Season: December to February. Skin corkiness develops quite early. Quality fair.

Rincon—Trees young, and indicate a tendency toward alternate bearing. Season of maturity: February, March. Fruit dark, dull green, but attractive in appearance; free from skin blemishes. Quality very good.

Routh—Tree young, but tends to set light to moderate crops annually. Season of maturity: December to March. Fruit dull green but attractive in appearance, and free from skin blemishes. Quality very good.

Ryan—Trees variable in bearing, mostly light to medium heavy crops, but with very heavy crops in occasional years. Season of maturity: May to July. Fruit attractive in appearance, and free from skin blemishes. Quality good.

Stewart—Tree tends toward alternate bearing, with good crops in "on" years. Season of maturity: September to November. Fruit has purplish-black skin, but is of good appearance and free from blemishes. Quality is very good.

Strong—Tree bears light crops annually. Season: January to April. Fruit tends to be large. Quality is good.

Topa Topa—Trees bear fairly heavy crops annually. Season: August to October. Quality is poor, and fruits are used primarily as a source of seeds for rootstocks.

Wilhone—Tree alternate bearing. Season: October to January. Fruit is small and dark, resembling Puebla, the parent variety. Quality fair.

Wright—Tree produces annual crops which are light to fairly heavy. Season: September to November. Fruit color green, but skin develops russeting quite early. The fruit tends to develop a long, slender neck under the environmental conditions at Riverside. Quality fair.

Yama—Tree produces light crops annually. Season: August to October. Fruit dull green, resembling Duke. Quality fair.

Zutano—Trees produce moderate to fairly heavy crops annually. Season: November to January. Fruit is an attractive shiny green. It tends to develop a small brown blossom end spot, which, however, does not materially detract from its appearance. Quality is fair.

GREENSPOT

The avocado variety trial orchard at Greenspot was planted initially to seedling trees of six varieties of the Mexican type on a piece of land belonging to the East Highlands Orange Company. The original purpose of the planting was to add another plot to the extensive series of plots established by Dr. F. F. Halma under a wide range of climatic areas in the avocado growing region of southern California in a comprehensive study of the effects of rootstocks on commercial scion varieties. Seedlings of the following

Mexican race varieties were planted: Blake, Duke, Ganter, Mexicola, Northrup, and Topa Topa. When the trees were ready for topworking in 1956, it was decided to use them for a variety trial rather than topwork them to Fuerte, Hass, MacArthur, and Rincon, the commercial varieties used in the other plots.

After consultation with Mr. Marvin B. Rounds, Chairman of the Avocado Variety Committee, the following eighteen varieties were selected for trial: Arturo, Bacon, Boley, Clifton, Emerald, Gae, Gardner, Gehee, Hass, Jalna, Lois, Mesa, Nowels, Oreo, Rincon, Wright, Yama, and Zutano. Fifty-eight seedling trees were topworked, and twelve nursery grown trees were planted in March and April, 1956, making a total of 70 trees in the planting.

The orchard has received excellent care and is developing beautifully. The trees for the most part are still too young to bear crops, but some fruit was set by Bacon, Clifton, Emerald, Hass, Jalna, Nowels, Wright, Yama, and Zutano. The crop set by Nowels was considered heavy for size of tree. The crops set by Bacon and Zutano were considered medium. It was interesting to note that blossom end spotting of Bacon and Zutano was less pronounced than at Riverside.

This well-managed orchard should provide valuable information on the performance of avocado varieties in inland areas in coming years.

CONCLUDING REMARKS

The above account is intended as a listing of varieties under observation at Riverside and Greenspot, with remarks regarding the performance of some of the varieties. Any remarks regarding varieties apply to these two localities only, and not necessarily to other portions of Riverside and San Bernardino Counties. Nor are any remarks to be construed as recommendations for planting certain varieties, especially where commercial planting is involved.

It is suggested that the recommendations of the Avocado Variety Committee be followed for new commercial plantings in any climatic area. As noted previously, Hass is the only commercial variety presently recommended for Area VIII. Since Hass is less tolerant of frost than Bacon or Zutano, it is suggested that these varieties be tried in situations too cold for Hass.

LITERATURE CITED

1. Winslow, M. M., and Julius Enderud. Avocado variety trials. Calif. Avocado Soc. Yrbk. 38:31-32. 1953-54.
2. Winslow, M. M., and Julius Enderud. Flowering behavior and yields of some avocado varieties at Riverside. Calif. Avocado Soc. Yrbk. 39:133-135. 1955.