

Notes on the Fruits of Seventy-five Puebla Seedlings

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When the writer joined the Citrus Experiment Station in 1928, it seemed desirable to have a few avocado trees which might be available for disease studies, in the same way as the Station had an orchard given over for the study of citrus disease problems. Thinking to perhaps have some uniformity in the plants, the Puebla variety was chosen and some 75 seedlings from various sources were raised and set in a row across our orchard. The use made of the trees has not proved very destructive to date and most of them still survive. The characteristics of trees and fruit have been noted from time to time but no precise or systematic study has been undertaken. The seeds were from fruits of the Puebla variety but no record was made of the source of the fruits from which they were taken, and the observations made on the resulting trees were of a general nature. The reason for not undertaking more elaborate study was that my responsibility was with the pathological problems and it was desired to make only such observations as might bear on the use of the trees in that connection. Studies of the trees themselves was confined to such as might be made incidentally and at odd times. Studies of Nirody, Robinson, Stout and others had indicated that anything in the way of plant breeding or genetic studies of the avocado would probably be more difficult and require much time and elaborate planning. (See Calif. Agr. Ext. Circular 43, pp. 49 and 50. 1930.)

Since the source of the seeds was unknown except that they were of the Puebla variety, it was realized that only the pistillate or female parent was known. The pollen which fertilized the fruits, so far as we could know, might have come from the Puebla variety itself, since nearly all avocado flowers have both pistils and stamens, or it might have been carried by various agencies from some other tree to the Puebla, in which case the fruit would be cross-pollinated and the resulting seedling might have been as much or more of the qualities of the pollen parent as of the Puebla.

Most of the trees from these Puebla seeds have produced some fruit and (needless to say) so far as noted it is all good, at least for home use. One tree at 3 years from planting the seed had 12 half-pound fruits—however, it has not been outstandingly productive through the years since. The trees have become crowded and probably have not entirely shown their normal characteristics, though the avocado, like citrus, is not seriously injured by some shading and crowding, providing other conditions are good. Some observations may be of interest to the amateur:

- (1) Not any of the seedlings is a true Puebla though a few have a considerable resemblance and could probably pass for it in the market. This is in marked contrast with many citrus species in which most of the seedlings come as true as buds, being actually produced vegetatively within the seed—the so-called apogamic seedlings.
- (2) With 2 (or perhaps a few other) exceptions, all of the fruits are distinct. Numbers 7

and 129 are similar, large robust trees with green fruits considerably larger than Fuerte, and very shy bearers. Numbers 25 and 133 are small delicate trees with small ovate, pear-shaped green fruits and over-productive to the point of devitalizing themselves. Where they have been grafted into more robust trees, size of fruit appears to be improved and bearing steadied.

(3) Color of fruit is extremely variable: green, green with some Purple, approximately the color of Puebla, one (107) a bright mahogany red, and some purple black closely resembling Mexicola.

(4) Size of fruit is exceedingly variable from larger than Fuerte, to small, though all are large enough, where the tree is in health, for home use. None of the massive types, like Queen or Linda, occur.

(5) Form of fruit is also variable from long, slender-necked to near round. One (No 121) considerably resembles Topa Topa, though more pear-shaped and is probably a more solid and better fruit. The tree is vigorous and production good and consistent. One (No 111) is similar in size and color to Puebla, though somewhat oval, and is probably more consistently productive.

(6) In type all are thin skins, like the Puebla, except No 19, which is leathery skinned like Fuerte (intermediate or hybrid type). No. 19 may represent an error in handling the seeds as exceptional precautions were not taken to avoid mixing seeds.

(7) In season, all are approximately in the season of Puebla except No. 19 which is a winter fruit.

(8) In type of tree and foliage, the trees vary widely but the long leaf and long petiole of Fuerte have not been noted. The anise odor of the leaves occurs in most, though notes have not been made for all, but not in No. 19 referred to above.

At one time some effort was made to classify the trees as to flower opening program into A type like Puebla, or B type as Fuerte (See California Agr. Extension Service circular 43, 1930). Many variations in flower behavior were noted. Comparison with the flowers of named varieties did not give much help. Flowers of various varieties and even of Guatemalan and West Indian types seem to have considerable similarity so far as noted by the writer, and it was decided that the program of flower opening is too intricate a matter to be determined without more careful and extended observation than it was practical to give in the time available.

Seeds were planted from some of the trees referred to above on account of certain interesting characteristics, and some of the Puebla grandchildren have fruited. Puebla seedling No. 23 is a medium small, nicely turned green fruit adapted to make an attractive pack in a 5-lb. basket. One of its seedlings gives crooked long-necked, rough, black fruits, perhaps the most grotesque thinskin yet noted by the writer. Several of the seedlings of later plantings are albinos as to most of the stem but with enough green in the leaves so that the trees are able to survive. One of these albinos bore a fair crop this year of oval yellowish white fruits which seemed about like other avocados but with a strong tendency to shrivel before softening. On account of some suggestion of similarity to **sunblotch**, a few of these are being studied further.

In order to have a few additional trees some Fuerte seeds were planted later and some

of the seedlings have fruited. The fruits are various and none has much resemblance to Fuerte. Trees vary considerably and the long leaf and long petiole characteristic of Fuerte is shown by some of them.

When plant breeders have mastered the difficulties introduced by the very great number of flowers compared with the number of fruits matured and the delicacy of the flowers for handling, there should be some interesting things to tell about the laws of heredity for the various varieties of avocados, both when flowers are fertilized with their own pollen and when they are fertilized with pollen of other known varieties.