

Tydeman x Tydeman	6.9%
Tydeman x Red Delicious	20.4%
Tydeman x Golden	32.8%

More detailed figures are presented in Table 1.

Since the number of flowers used in this study was relatively small, and because no weather data for the two years of the experiment were collected, the results are not conclusive. However, it can be said that, during the two years in which this study was

made, the Tydeman's Red apple appeared to be only partially self-fruitful; and from this evidence, it would probably be wise to have another variety in the orchard with it as a pollinizer.

To more conclusively determine the pollination requirements of Tydeman's Red, these experiments should be repeated on a larger scale, meteorological data should be collected, and other pollinizing varieties should be tested.

A Method of Finding the Most Likely Parents of Chance Seedlings of Fruits

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Amateur and professional fruit breeders like to know the parentage of varieties that they plan to use in their work. But many kinds are chance seedlings, and the search for their parents is usually unsuccessful.

We still do not know how all of the traits that make up the genetic pool of fruits are inherited. However, we do know that sooner or later, "like" produces "like." This may not occur in the first generation; and the "like" may be an isolated trait, with most of the other characters being derived from other ancestors. Yet it is reasonable to believe that a characteristic is more apt to be derived from a variety visibly showing it than from one that doesn't. The following method of determining the most likely parents is based on this assumption.

One must first estimate the date when the seedling that you happen to be investigating was started. This period is always longer with chance seedlings than with varieties developed by controlled breeding, due to the incessant browsing and cutting that the average wildling has to en-

sure. From personal observation of pasture clump seedlings, I believe that it takes about fifty years from the time the seed is deposited until such time that the seedling begins to attract attention. Therefore, all varieties introduced after the estimated date of origin could not have been the parents. One must also rule out triploid varieties like Baldwin and Gravenstein, since their seedlings are too weak to survive.

A list should then be made of the many characteristics of the seedling selection. By this time, one will have a fair idea as to which older varieties it most nearly resembles. It is well to carefully examine the actual fruit and tree of the probable parent varieties, while following the descriptions used in the best pomological books available. For American apple varieties, "Apples of New York," published by the N. Y. Agr. Exp. Station, is unquestionably the best there is for this purpose. Next, the various traits of the old kinds that it most closely resembles should be written down, comparing these with the list first made.

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On a third sheet, a list should be made of the characteristics of the seedling selection which are unlike those of the suspected parent, taking into account such qualities as hardiness and disease resistance as well as morphological characteristics.

The next step is really a job for a computer, but if time is available, one should go over the descriptions of the many older candidates and locate the variety with the greatest proportion of traits in which the new seedling differs from the one it is most like. This will give a pretty good indication of which variety probably is the other parent.

With many varieties, the seed parent is known but the pollen parent obscure. The Wealthy apple for example, was supposed to have grown from seed of a tree of the Cherry Crab grown by Albert Emerson, in Bangor, Maine, in 1860. The late L. H. Bailey was of the opinion that it was a pure *Pyrus malus* seed which was mixed in with Cherry Crab seed by mistake. However, Wealthy is very scab resistant, and it could not have derived this trait, as well as its superior hardiness, from the Russian apples, because these were not imported until ten years later. The Cherry crab is not pure *P. baccata*, so that Wealthy is probably three-fourths cultivated apple. The list of possible pollen parents was narrowed down to Fall Pippin and Sops of Wine, both having an equal number of the Wealthy traits not expressed by the Cherry Crab. However, Wealthy seedlings have often shown red or pink streaks in the flesh, which tipped the scales in the direction of Sops of Wine.

Some other varieties useful in apple breeding that I have investigated in this manner are as follows: Jonathan—probably a Esopus Spitzenburg-Winesap seedling; McIntosh—an apparent cross of the "cousin" varieties Fameuse and Detroit Red; Delicious—seems a

cross of Yellow Bellflower x Jonathan; Golden Delicious—probably a seedling of Grimes Golden x Yellow Bellflower; Winter Banana seems to be a Gloria Mundi x Tolman Sweet cross; Northwestern Greening is probably a seedling of Golden Russet and Alexander.

To test the validity of this approach with a more recent apple variety of known parentage, I took some fruit of Cortland, listed its characteristics, and then lined them up with those of its parents, Ben Davis and McIntosh. The various strains of Ben Davis look alike, but do not appear to be a single clone, some producing a much larger proportion of good quality seedlings than others. The Ben Davis used in making Cortland was probably a cross of the original Ben Davis and Shiawassee. Nonetheless, out of 56 noticeable traits, Cortland could have inherited 50 from its known parents. Relative identity of characteristics exist for tree form, twig, bark, bud, calyx tube, skin and color, stamens, core, carpels, seeds and flesh of the fruit. Only the oblate shape and the five small knobs that Cortland often has within the basin of the fruit, and the abortive buds it sometimes shows, were apparently derived from more remote ancestors.

Frank Owen reported on a survey of peach varieties at the February meeting of the National Peach Council in N. J. Hort. Society Hort. News. The following list shows the leading varieties and the number of states east of the Rockies in which the variety is of major importance:

Redhaven: 17
 Elberta: 17
 Halehaven: 11
 Redskin: 10
 Sunhigh: 9
 Golden Jubilee: 8
 Rio Oso Gem: 6