

The Tangelo

T. Ralph Robinson.

It has been my privilege and pleasure to meet with this society for a number of years as a grower. Before that time for a number of years, I had the good fortune to be associated with the scientific staff of the Department of Agriculture and during a part of that time was associated in work under the direction of Walter T. Swingle whom many of you knew during the early days of Florida.

With the adversity of war, many of the younger men of the Department have gone out into military service and some of the older men have been brought back into the service, we don't know for how long. I have been in Florida long enough to get the sand in my shoes and what regret I have is tempered with the thought that my work will bring me back among you often, and I hope it will not be many years before I will be back here again in a more permanent way.

One of the early results of Prof. Swingle's work in the Department of Agriculture was the creation of the hybrid known as the tangelo.

A cross first made by Messrs. Webber and Swingle between the grapefruit and the tangerine produced the "tangelo." This fruit is being grown commercially in a small way in Florida and warrants special attention at this time. As a class,

these fruits resemble round oranges more than either of their parents, and are exceedingly variable, sister fruits from seeds of a single cross-pollinated fruit often being very unlike. Like some other citrus hybrids however, seedlings of the second generation reproduce the parent plant as though grown from buds.

Two well-recognized varieties of these fruits have been tested out and named, and for a number of years past have been distributed to co-operators for further trial. These tangelos are called the Sampson and the Thornton. They have been grown in a small way only, and, until recently, chiefly for home use. Failure to appreciate their proper stage of maturity has served to disappoint many who have experimented with this new type of fruit. When eaten before fully ripe, the fruit is disappointing, the flavor being disagreeably acid. The fruit colors up early and externally appears mature long before it is really ready for consumption.

The Sampson is, under normal conditions, a decidedly late fruit, maturing in Florida about the time of the Tardiff orange, through March, April, and May. The Thornton is considerably earlier, the time of ripening, however, seeming to vary in different sections, though usually not mature before January or February.

Some trees, however, have lately come to notice, the fruit of which is distinctly early, ripening in November and December.

As commercial plantings are being made at several places in Florida, it is important that citrus growers should have a clear understanding of the characteristics of the two types now under cultivation.

The Sampson tangelo is a slightly pear-shaped, thin-skinned, smooth and shining fruit, of pale orange color, and of variable size, though usually larger than an average orange. The pulp is rather acid or sprightly flavored, aromatic, soft and very juicy, of deep orange color that is very striking and characteristic. If properly grown and picked when fully mature, it is a delicious fruit. It is liable, however, to dry out on one side, a fault assumed to be due to sunscald. This tendency will probably prelude its culture on an extensive scale except by experts for a special market. It has been necessary to throw away as culls a large percentage of the crop of this variety, even in the regions where it grows best. There is some evidence going to show that the tendency of the fruit to sunscald or dry out is less pronounced in occasional trees. Care should be taken to secure bud wood from such trees for further propagation.

Bud selection is especially important in taking up a new variable fruit such as the Tangelo.

The Thornton tangelo is of a very different type, a rather rough, thick-skinned fruit of good size, with light or very pale orange-colored juice, and sprightly-flavored pulp. It has little acidity and resembles a tender, good-flavored orange

more than a grapefruit or tangerine. When fully ripe, it is so tender that extra care may be necessary in packing it for shipment. In this regard and in its rather free rind, it resembles the tangerine. It may be eaten out of hand, like a tangerine, but is doubtless better when halved and eaten like a grapefruit. It requires no sugar, and the pulp is so tender it can be removed with a spoon without cutting the segments. While the Thornton fruit is not quite as attractive in appearance as the Sampson, it is milder in flavor and by some is preferred on this account. Fruit of both sorts should receive thorough spraying to produce clean, bright fruits. Citrus scab is especially disfiguring on the tangelo, which seems to be rather susceptible to this disease.

An early maturing tangelo of good quality is desirable, to furnish a supply throughout the shipping season and in some locations to avoid the danger of freezing before maturity. Buds of the early Thornton trees referred to above will be tested out in different localities to see if this tendency is inherent or due to local conditions. With the large number of similar hybrids still to be fruited out, there is little doubt that desirable fruits will be obtained, ripening throughout the whole season, from November to July.

The success of these first two hybrids, using the tangerine and grapefruit as parents, has led to the creation of hundreds of additional hybrids between all the Mandarin types of oranges, including several varieties of tangerines, King and Satsuma oranges, and the better types of grapefruit or pomelo. Among the tangelos resulting from such crosses are

some of much promise but further testing is necessary before any of these can be recommended for general planting.

Besides the crosses with grapefruit or pomelo as one parent many other crosses have been made, some of these fortunately using parents recognized now as distinctly canker-resistant under field conditions, such as the calamondin, the kumquat, and the Mandarin types of oranges. Every effort is being made to push these crosses to the fruiting stage and the desirable forms will be thoroughly tested for canker and cold-resistance. For convenience we may speak of this general class of hybrids as tangelos, though they may not be derived either from grapefruit or tangerine parents.

For the canker-infested portions of the Gulf Coast States west of Florida, there is reason to believe that tangelos will be found of considerable canker-resistance. These will serve as substitutes for the very susceptible grapefruit largely grown for home use in this region. Tests now being made at the College of Agriculture, Los Banos, Philippine Islands, using a large number of tangelos supplied from materials being tested in this country, show a wide range of susceptibility, some of the tangelos being decidedly canker-resistant.

The fact that the *Natsu-mikan*, a fruit similar to a tangelo and possibly a spontaneous hybrid of an orange of the Mandarin type with a Japanese pomelo, seems to be decidedly canker-resistant both in Japan, and in U. S., confirms the belief that canker-resistant tangelos may be with reason expected from Mandarin pomelo crosses, especially when one or

preferably both of the parents are canker-resistant, as would be the case with a cross between the Satsuma orange and the Hirado pomelo.

Hybrids between canker-resistant pomelos and other citrus fruits were made in Japan in 1915 and subsequent years through the co-operation of the U. S. Dept. Agriculture and of the Imperial and Provincial Agricultural Experiment Stations. The resulting crosses are being tested for canker-resistance both in Japan and in the Philippine Islands.

The principle of bud selection for improving standard varieties is so well established by the work of Shamel, Scott, and their associates in California that it hardly needs emphasizing. Any method of treatment that includes bud variation is promising in securing improved strains. There are some cases where the attempt to cross two species of citrus fruits gives rise to a plant in all essentials like the female parent, that is a false hybrid, but with slightly different characteristics, such as a tendency to increased vigor presumably due to the shock of foreign pollen on the mother plant. This method of securing new strains of standard fruits is being studied, and may prove of value in rejuvenating strains of declining vigor, or securing extra hardiness in a standard strain.

The work already done in citrus breeding has been accomplished working only with plants already at hand—those commonly grown in the United States. A survey of the citrus plants and citrus relatives in other parts of the world (which Mr. Swingle has been making for some years) showed that to make this work

thoroughly effective we must become acquainted with a wider range of these plants. Perhaps the very quality we need in a cross exists in a plant cultivated for centuries in some corner of the Orient. In the case of disease-resistance it is usually found that where that disease has longest existed, nature has built up a means of defense—a form of resistance that enables the species to persist. And so it is in combating such a disease as citrus canker we must look to the plants of the Orient to furnish the best breeding material as a starting point. With the co-operative arrangements perfected with agricultural institutions in Japan, China, and the Philippines, and with Mr. Swingle's inspiration and personal supervision to energize the work, the study of citrus plants in a more comprehensive way will soon be possible. New combinations of desirable characters may then be made on a scale never before contemplated, and the future may hold many surprises in the way of superior fruits as

well as fruits of hardy or disease-resistant qualities.

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DISCUSSION.

Mr. —: I would like to know if the gentleman knows anything concerning the Thompson tangelo, which I consider far superior to the two he mentions.

Mr. Robinson: The Thompson tangelo is simply a strain of the Sampson. It is one of the bud sports which has developed in the way other sports develop. As far as I can learn of it, it is a bud sport which is well worth propagation and should be followed up.

Mr. —: I have had a little experience with all three, and I consider the Thompson far superior to any of the others. It more nearly resembles the Sampson. It is a little sweeter and not so bitter as the Sampson. I think it is the most likely tangelo on the market.