

Citrus Rootstock-Scion Compatibility and Characteristics

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Mulholland Citrus Trees, Orange Cove, Ca. 93646

HISTORY

The genus *Citrus* originated on the Asia continent, with tales of early movement from China, Burma, Malaysia, and Vietnam area to Mesopotamia and Palestine, sometime between the 9th and 6th Century B.C. The Biblical reference “hadar” suggests the citron to be the first citrus used, moved, and cultivated in new regions and by the Second Century the “Persian apple” was extensively distributed around the Mediterranean. During Constantine the Great (274-337 AD) mosaics of lemons and oranges were found. Albertus Magnus (1193-1280) described the sour orange with the name Arangus, the first description of *C. aurantium*, and later the term became the word orange.

Sometime in July 1518 citrus was planted in the Americas and it was during this time of expansion many new varieties were transported via seed.

Descriptions from travelers in Florida during the mid 1700s tell of citrus fruits growing spontaneously over the countryside. The majority of these trees were of the sour orange type. By the 1830s a topworking technique was introduced on the D.D. Dummitt grove in order to change the old sour wild groves to new selections which were now being commercially grown. With many markets being made available during a population growth, there was now a reason to develop a citrus industry. During this time budding replaced seed propagation as the primary form of propagation.

Also during this era the California citrus industry was halted for a short time as the Missions maintain control over all citrus propagation. In 1834 Jean Louis Vignes planted 35 sweet orange trees at his residence and through his cooperation eventually citrus was spread to new orchards. Today citrus is produced in over 100 countries on six continents with current world production exceeding the total volume of deciduous tree fruits.

Cultivated citrus in the 1990s has evolved from the experience of the past scientific and horticultural responses observed and consequently adjusted. The combining of a rootstock and scion, through the predominately used T-bud process, has changed very little, while the actual cultivar has remained the quandary of even the present. The scientists want to produce the ultimate plant tissue for horticultural expediency and the market wants the ultimate in fruit quality. Consequently, many new *Citrus* varieties are constantly being developed and introduced. Unfortunately, the process in developing new varieties is slow due to a number of years required for adequate testing and evaluation.

In any case the citrus nursery tree is the foundation of the citrus industry. The proper beginning will reward the orchardist in their efforts to supply a quality commodity with energetic public acceptance.

The responsibility of the nursery manager is to maintain the two most important rules of plant propagation:

- Observe the characteristics of propagation material and obtain only true-to-type budwood and seed source.
- Select budwood and seed from disease-free and tested material, preferably from one of the many foundation and budwood certification programs.

Citrus rootstocks are primarily grown from seed due to the highly predictable nucellar embryo germination. *Citrus* produces both polyembryonic and monoembryonic seeds. All non-pollinated embryos are from maternal genetic material and are asexual. The genetically identical nucellar embryo germinates predominantly in the most often used rootstocks of choice. A rouging of zygotic seedlings still is important to keep seedling uniformity.

There are six commercial species of *Citrus* and within these species hundreds of cultivars and budlines are used around the world. Some of these varieties have been created from either natural hybridization or human selection; many are products of spontaneous mutations. Presently, citrus mutations can also be artificially induced by irradiating seed.

CLONAL PROPAGATION

Taking advantage of a single, superior plant by asexual reproduction is most easily done by selecting a cultivar and budding onto a nucellar seedling. Because of genetic uniformity, predictable results may be obtained in orchard conditions.

There are three main purposes for using a rootstock while propagating *Citrus*:

- Mitigating juvenile characteristics. Trees grown from seedlings tend to be upright in growth pattern, vigorous, and thorny. When selecting budwood from scion trees there is a reduction in these effects.
- Environmental adjustments. Rootstocks have the ability to differ in tolerances to various pathological, soil, and climatic conditions. These limitations may directly affect the growing location of citrus.
- Horticultural traits. The relationship of rootstock on the scion has many direct effects on the quality of the fruit, the growth and precociousness of the tree, and productivity.

CONCLUSION

In selecting a scion/rootstock combination, research the conditions in which the tree will ultimately be grown and use the current information gathered by the cooperation of growers and scientists. The combination of many years of experience will help in making the correct choice. It takes many years to benefit from the fruition of your choice so do it wisely.

LITERATURE CITED

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