

## Rootstocks for the Oriental Persimmon

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Prior to 1919, when the federal plant quarantine went into effect, most of the Oriental persimmon (**Diospyros kaki**) trees planted in California were imported from Japan and were on the kaki rootstock. While extensive planting of this fruit did not occur until after that period, many of the old trees still remain in a condition of good vigor and a few are known which are now between 50 and 60 years old. Though at least a dozen varieties were introduced in these importations, no evidence of a rootstock problem seems to have been reported.

For the past two decades, however, the only rootstock employed commercially has been the lotus persimmon (**Diospyros lotus**). It is not altogether clear why California nurserymen chose this rootstock, though the difficulty of obtaining seed of the Oriental persimmon was probably an important reason. For the Hachiya variety, which has comprised probably 98 per cent of the trees propagated, the results appear to be satisfactory thus far, though the characteristic vigor of the young trees seems to be associated with excessive shedding of the immature fruits.

However, it early became evident that Fuyu, a non-astringent variety of Japanese origin, did not behave like Hachiya on this rootstock. The graft-union was usually poor, and most of the trees grew slowly, came into bearing early, and declined within a few years. Although some thousands of trees have been propagated, it is difficult to find good trees more than 10 years old, and the general experience has been that most of the trees have declined before attaining that age. As typical of the behavior of this variety on the lotus rootstock may be cited two plantings made for experimental purposes at the Citrus Experiment Station, Riverside. One planting, consisting of 72 trees, was made in the spring of 1928 along with a considerably larger number of Hachiya trees on the same rootstock. In the winter of 1936, when the trees were removed, not over a dozen of the Fuyu trees remained alive and none was satisfactory in vigor. The Hachiya trees were in excellent condition, however. A variety collection, planted in 1930, contained eight trees of Fuyu on lotus rootstock; of these only one now remains and is obviously on the decline.

Since a rootstock problem was suspected for this variety, plans for a small rootstock trial were made in 1933 and trees were propagated in 1934. The varieties were Hachiya and Fuyu and the rootstocks **Diospyros lotus**, **D. kaki**, and **D. virginiana**. Unusual incidence of crown-gall infection reduced the number of healthy trees, for planting in 1935, to one pair of Hachiya on each of the three rootstocks, and it was not until 1937

that comparable trees of Fuyu were available. Though the trees are too few and too young to provide more than suggestive evidence, their behavior has differed so strikingly thus far that a report seems justified at this time, especially in view of the fact that some years must elapse before an adequate experiment can be conducted.

## Results

**Hachiya Variety:**—The trees are largest on the lotus rootstock, the 1939 trunk circumference average being 27 centimeters. They are smallest on virginiana, with an average circumference of 12.7 centimeters. The average for kaki is 23 centimeters. The difference in height and spread between lotus and kaki is considerably greater than is reflected in the circumference measurements. However, the greatest difference between these two rootstocks relates to yield. The trees on kaki have borne good crops for the past two seasons. Those on lotus have blossomed satisfactorily but have shed most of the crops while still immature. Their behavior suggests that the lotus rootstock invigorates this variety, at least in early life, and that the use of this rootstock may be a major reason for the existence of the problem of excessive fruit-shedding in the Hachiya variety (1).

**Fuyu Variety:**—Though the trees of this variety are two years younger, the number is larger and their behavior on the different rootstocks has been consistent. They are largest on virginiana, smallest on lotus, and intermediate on kaki. The trees on lotus appear to be dwarfed and are the only ones which have borne thus far. The difference in size between virginiana and kaki is greater than between lotus and kaki for Hachiya.

As soon as these differences became evident, a field survey was made to determine, if possible, the rootstocks of the few outstanding old Fuyu trees previously located. Without exception thus far, where it has been possible to ascertain the facts, these trees have been found to be on the virginiana rootstock or to be trees of other kaki varieties top-grafted to Fuyu.

That other kaki varieties exist which on lotus rootstock behave like Fuyu is suggested by the results obtained in a collection of some 50 varieties, all on lotus, planted at the Citrus Experiment Station, Riverside, in 1930. The original planting consisted of one to six trees of each variety. With many varieties all are still in excellent condition; with some, however, few or none remain. This observation agrees with experimental evidence reported by Tanaka (2).

## Conclusions

The lotus persimmon (**Diospyros lotus**) is not a satisfactory rootstock for the Fuyu variety in California. The native American persimmon (**Diospyros virginiana**) is a satisfactory rootstock for Fuyu in California. The lotus persimmon rootstock invigorates young trees of the Hachiya variety, which may be a reason for their excessive shedding of immature fruits. The Oriental persimmon (**Diospyros kaki**) exhibits a wider range of commercial compatibility than either of the other two rootstocks and may prove to be the most satisfactory for kaki varieties in general.

## LITERATURE CITED

1. Hodgson, K. W. Girdling- to reduce fruit-drop in the Haehiya persimmon. Proc. Amer. Soc. Hort. Sci. 36:405-409. 1939
2. Tanaka, T. Experiments on the rootstocks of the kaki or Japanese persimmon (Japanese-English summary.) Imperial Hort. Exp. Stu. Okitsu (Japan) Research Bul. 14:1-30. 1930.