HORTICULTURE

Dwarf Trees for Orchards

New developments in dwarfing fruit trees mean that suburban homes can have an orchard with a large variety of fruits. Forty dwarf apple trees grow in place of four standards.

By HORACE LOFTIN

➤ LIKE SNOW WHITE'S seven dwarfs, dwarf fruit trees never grow up. This is why they are important to the home gardener.

The development of dwarfed varieties of fruit trees has made it possible for any suburban dweller with a small plot of land to have his own orchard of apples, pears, peaches, plums and sweet cherries. An area 30 by 30 feet is now enough to raise all these fruits an average family may preserve, can and consume conveniently in a year.

And if there is not that much room available, dwarf fruit trees can be trained to grow along walls and fences, adding decoration as well as tasty fruits to the home.

A dwarf fruit tree is made by grafting the bud of a standard fruit tree to a rootstock of a dwarfing variety that does not yield a desirable kind of fruit. As the rootstock determines the size of the tree and the grafted bud the nature of the fruit, it is possible to juggle fruit trees around until you get a dwarf variety of almost any standard fruit you like.

Of course, there are many practical difficulties to overcome before a satisfactory dwarf is obtained. The chief trouble comes in the selection of a proper rootstock. Many that otherwise would make excellent dwarfing stock have a tendency to throw up suckers from the roots, develop a weak root system or lack hardiness in cold climates.

Develop New Varieties

Other rootstocks make trees that are too small to support the weight of the fruit. Sometimes a rootstock and the standard bud can not be grafted together directly. Then a third kind of fruit must first be grafted to the rootstock, and the standard bud later grafted onto it.

Plant scientists and commercial nurserymen are constantly working to produce better dwarf fruit trees. Just recently, Dr. Karl Sax of the Bussey Institution, Harvard University, announced the development of new dwarf peaches, plums and sweet cherries that are sturdier and more practical than any produced up to now.

Although dwarfs of these stone fruits have been known and used before, they all somehow fell short of the needs for hardiness, size, flavor of fruit, or commercial considerations. Dr. Sax believes the new dwarfs will fill the bill better to make these fruits practical for home orchardists.

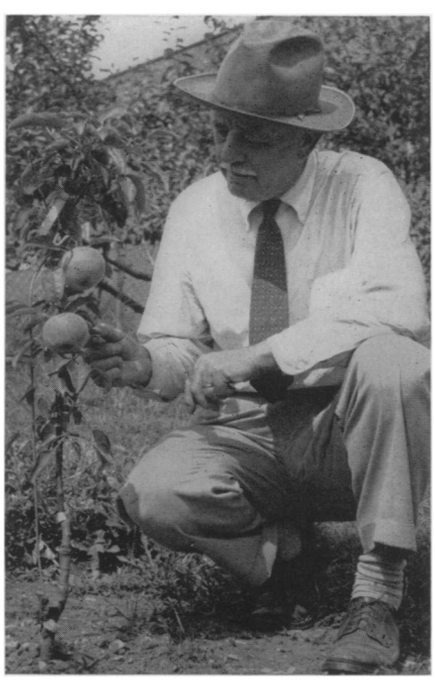
The new dwarf stone fruit trees differ from the old ones by the kinds of rootstock used. Standard varieties of peaches and plums, budded on a rootstock of the dwarf flowering almond or the Nanking cherry, bore fruit on the second year's growth. A sweet cherry dwarf was made by budding with the beach plum, but it has not been tested long enough to be sure how it will behave in later years.

Apples and pears have been dwarfed successfully for hundreds of years in Europe, where lack of space made smallness of fruit trees almost the first thing to be considered in an orchard. As a result, apple and pear rootstocks for dwarfing have long been standardized, and are available at commercial nurseries along with ready-prepared dwarf trees. One of the most popular apple rootstocks is the "Malling IV."

In this country the dwarfing effect on apples is produced by using Malling IV or Malling VIII as an interstock. Such trees consist of three sections—a seedling root and a short stem section, about six inches of dwarfing interstock, and on top of this the commercial variety.

Pears are usually dwarfed by grafting on quince rootstocks, but different dwarfing stocks are currently being tested at the Bussey Institution.

An interesting and attractive variation of the dwarf fruit tree is the "espalier," or ornamental dwarf. Espaliers are dwarf fruit trees that have been trained to grow against walls, fences, and trellises. By controlled pruning, bending and tying back, these trees can be made to grow flat against a wall, U-shaped, Y-shaped, palm-like and in other beautiful designs.



DWARF TREE — Dr. Karl Sax towers over an extreme dwarf which is less than three feet tall and bears two large Cortland apples.

Espaliers Are Popular

Espaliers are very popular in Europe where they have long served the double function of providing food and decoration. Many of the famous old-world gardens feature espalier fruit trees against ancient walls and buildings. The "Belgian fence" is made of criss-crossed Y-shaped espaliers grown in a row.

It takes about six years to train an espalier dwarf. For this reason, most home orchardists prefer to buy them from commercial nurserymen after at least three or four years training. Many large nurseries have them on hand or can supply them.

The varieties of dwarf apple trees that are readily available at commercial nurseries are amazing. There are, to name a few, Cortland, Golden Delicious, Melba, McIntosh, Macoun, Jonathan and Stayman types that are excellent for eating out of hand or for salads. For cooking, there are dwarfs of Crimson Beauty, Duchess, Gallia and Baldwin.

Dwarf pears on the market are Bartlett, Gorham, Conference, Dana Hovey, Bosc and Winter Nelis, all calculated to make your mouth water.

Remember that it is only the size of the tree that is dwarfed; the fruits are as large and tasty as on the standard tree.

Space-Saving Advantage

What are the advantages of dwarf fruit trees for the home gardener? The answer is clear when you consider that 40 dwarf apple trees can be grown in the space necessary for only four standard apple trees. Besides occupying less ground space, dwarf fruit trees are shorter, usually from five to seven feet tall. This means they can be pruned more easily, sprayed or dusted with simple equipment, and so given more individual care. As a result the fruit is often larger than on standard trees. Fruits from dwarfs are easier to harvest and there is less spoilage from fallen fruit.

Another important point is that dwarfs usually begin fruiting sooner than standard trees. Dwarf apples, for instance, usually bear fruit within a couple of years, while standard apples may take from five to ten years before they bear. And you can get

more varieties of apples into the allotted space.

But dwarf fruit trees have their disadvantages, too.

Dwarf trees are more expensive than standard trees. Young dwarfs cost up to twice as much as standard trees at commercial nurseries. This is a greater difference than it seems at first sight, because more trees on the same plot of land mean more money put out. To illustrate, four standard apples grow in the same space needed for 40 dwarfs. If the standard apple trees cost $1 each, you would invest $4 in trees to plant the area. But to plant the same ground in dwarf apples at $2 each would cost $80!

Dwarfs require more personal attention than the sturdy standards. Very often their root systems are not strong enough to hold up the weight of limbs, and artificial supports are needed. And dwarf varieties are generally shorter-lived than standard fruit trees.

However, most of these objections are important only to the commercial orchardist. The average home grower will have no need for such large numbers of trees that expense becomes prohibitive. Neither will the question of care prove a burden, because the only garden hobbyists that succeed in growing anything anyway, from petunias to oak trees, are those with time and interest to tend their gardens properly.

Directions for Grafting

Most authorities will recommend that you start out with dwarf fruit trees already developed in a commercial nursery. But if you are dead set on doing your own grafting, here are a few elementary principles.

Choose a good dwarfing rootstock. This is of the greatest importance, as the success or failure of the dwarf tree depends on this selection to a great extent. Your nurseryman or state agriculture department can advise you where and how to find the right rootstock.

Buds should be grafted in late July or August. Make a T-shaped cut into the rootstock bark about four inches above the ground. Meanwhile, prepare a bud shield by slicing off a small piece of bark containing a bud from the juncture of a leaf stem of the standard fruit you want. Then slip this bud shield into the T-cut, and bind the wound with raffia, string or rubber bands to hold the two parts in close contact. The ties can be cut away in 10 days.

Next spring, just before growth will start, cut off all the rootstock above the grafted bud shield. This gives the bud all the growing force of the plant, and it should sprout vigorously in a little while. Make sure that any growths from the rootstock are cut back.

The following spring before growth starts, prune back the branches of the new dwarf tree and transplant it to the orchard if it looks strong enough.

From this stage on, whether you yourself raised it this far or whether you bought your plant, just keep your dwarf tree pruned, thinned, properly supported and mulched, and sprayed—and get a bushel basket ready for your home harvest.

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BIOCHEMISTRY

Fat Chemical Protects From A-Bomb Radiation

➤ PROTECTION AGAINST damage by radiation from X-rays to atom bombs is given by a chemical found in fats. The chemical is linoleic acid.

Discovery of its ability to protect against radiation damage, in rats at least, was made by Drs. Harry J. Deuel, Jr., Amber L. S. Cheng, George D. Kryder and M. E. Bingemann of the University of Southern California, Los Angeles, in research supported in part by the Atomic Energy Commission.

A very small amount of this chemical taken daily enabled male rats exposed to damaging amounts of X-rays to survive for an average of 74 days, compared to a 53-day average survival time for rats without the fatty acid. The female rats survived an average of 74 days with the fatty acid, compared to 58 days without.

The differences are even more significant because the rats given the fatty acid got bigger doses of X-rays than the ones without the fatty acid. The male rats had 45% greater exposure to the X-rays and the females 17% greater.

The experiment was stopped at the end of 14 weeks. The protective effect of the linoleic acid would have shown up as even greater if the experiment had gone on longer, the scientists say. At the end of the 14 weeks, only eight out of the 71 rats in the non-fatty acid group survived, compared to 30 out of 72 in the group that got the fatty acid.

Why this fatty acid protected the rats against radiation is not now clear, the scientists state in *Science* (March 6). But they point out that this and a number of other substances that have proved effective in protecting against radiation damage are substances of considerable importance in nourishing the skin and keeping it in good condition. The other substances are cystine, ascorbic acid, or vitamin C, and vitamin P.

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RADIO ASTRONOMY

Meteor Trails Miles Long in Upper Air

➤ METEORS LEAVE trails behind them, when they enter our atmosphere, some 15 to 18 miles long.

The length of these columns of ionized air, only a few yards in diameter, has been measured through the use of two radio telescopes, one on the Stanford University campus, and another 60 miles away at Turlock, Calif. In all, more than 1,700 meteors were detected in a five-and-a-half-hour period and used for measuring purposes. Calculations, reported in the *Transactions, American Geophysical Union* (Feb.), showed that only 73 of these meteors could be said to have produced echoes at both stations, however.

From comparing the echoes from the two stations, L. A. Manning, O. G. Villard, Jr., and A. M. Peterson of Stanford were able to show that the mean length of the meteor trails was between 15 and 18 miles, and that some trails were probably as long as 30 miles. Their measurements were made at 23 megacycles.

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