

The Temperate Fruits of China*

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China is one of the most important centers of origin of cultivated fruits, yet plant resources of this huge country are not fully investigated. During the first half of the 20th century, inland expeditions were difficult and dangerous because of constant foreign and domestic wars, and widespread banditry.

One of the most important projects which is given a priority in Chinese scientific agriculture is the investigation of indigenous plant resources. Among others, many interesting fruit plants have been found resistant to low temperature and disease, late blooming, with fruits of good storage qualities, and so on.

These new pomological discoveries are very little known in the West. That is why thanks to an agreement between the Polish and Chinese Academies of Science, my trip was arranged for 1957 in such a way as to show me most of these new discoveries. I have collected and brought with me seeds of many species and varieties of fruit plants. Seeds and scions of other forms will be sent to me later.

I am firmly convinced that in 20 or 30 years—when new plantations will come into full bearing—China will become one of the biggest and most important fruit exporters in the world.

At the present time, jujube ranks first in the number of fruit trees in China, followed by Japanese persimmons, pears, citrus fruits and apples. As far as yield is concerned, however, persimmon comes first because of its exceptional productivity.

Persimmons are grown from Peking in the North down to Canton in the South. The persimmon season extends from the end of September until the end of December. At this time it is, together with jujube, the cheapest and most popular fruit.

Jujube grows from Southern Manchuria in the North, down more or less to Yang-Tsi-Kiang in the South. It ripens in September and October. It is eaten fresh but large amounts of it are dried, smoked or preserved with sugar. Candied jujubes are called Chinese dates and are very delicious.

Pome Fruits

Apples grown in China may be divided into two groups. The first and most important consists of European large fruited type coming from European and Western Asiatic *Malus pumila*. I shall call them European for convenience's sake although most varieties grown now in China are of North American origin. Almost 70 percent of present Chinese large-fruited apples come from the old American variety Ralls. In new plantations, Jonathan, Delicious and Golden Delicious predominate.

Cultivation of European apples in China is comparatively new, not more than 80 years old. Two kinds of local apples were previously grown in China. One kind consisted of Chinese large-fruited *M. pumila*, the other of small-fruited cultivated forms of *M. prunifolia*, *M. asiatica*, *M. micromalus*, and more recently of crab apples—

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Russian and American hybrids, mostly between *M. baccata* and European large-fruited varieties.

Chinese indigenous *M. pumila* is not growing wild at the present time in China. Cultivated large-fruited forms are still common in the Northwest, and bear fruits weighing four to eight ounces. They are summer apples ripening in August, and soft and sweet, cannot be stored longer than for two to four weeks. Chinese *pumila* is slowly disappearing. No more new trees of this type are planted and old trees are now being topworked to the European type.

Small-fruited Chinese apples, however, are still being grown to a very large extent. At the present time their crop is equal to that of European types. This proportion is, however, changing very rapidly in favor of European apples. In new plantations one finds almost exclusively European apples with the exception of the extreme cold climates.



Figure 1. Ben Davis apples growing near Yellow Sea in southern Manchuria.

These new apple plantations are very extensive. Liaoning Province, on the Yellow Sea in Southern Manchuria, which at the present time produces about 70 percent of apples in China, is the best illustration. At the present time the number of bearing apple trees in that province amounts to five million, and the annual production to 160,000 tons. The number of young non-bearing trees amounts to 11 million. This number shows how vigorous is the development of fruit production in new China, and Liaoning province is not the only one bent on such an increase in fruit production.

The reason for such extensive planting of apples in China are obvious. The conditions for their development are all there: mild, sunny climate, fertile soil, enough of irrigation water, intelligent, industrious peasants and no scab.

In the Northeast, around Kung-chuling the climate is rather severe. Varieties like Ralls, Jonathan, Delicious and Ben Davis, that did so well at Hsin-cheng, cannot be grown here at all. In fact, very few large fruited apple varieties are cultivated in this area. The list is short, including Yellow Transparent, Titevka, Grushovka Moskovskaya, Haralsen and a few others. Crabs predominate in the few apple orchards that can be found.

Climate in Harbin, also in the Northeast, is still more severe. The average temperature for January amounts to -20°C . Snow cover in winter is very light, which makes it even harder. No large-fruited apples can be grown here what-so-ever. Even varieties as hardy as Antonovka freeze in Harbin every few years. Only crab apples of Soviet and American origin are cultivated in the home and uncommon commercial orchards.

In the Northwest, Chinese *Malus pumila* was cultivated since time immemorial. The botanists think that Chinese pumila crossed with *baccata* gave rise to such species as *M. prunifolia* and *M. asiatica*. I saw the largest Chinese *Malus pumila* tree, at least 200 years old. It was spreading like a big linden tree, although young trees always have narrow, pyramidal tree heads. The yield in an "on year" is over 3800 pounds.

Very interesting is the question of rootstocks in Chinese apple orchards. All apple trees are grown on seedlings, about 40 percent on *M. baccata*, 40 percent on *M. prunifolia*, the remaining on *M. micromalus*, *M. asiatica* and others. In the Liaoning Province where most European apples are cultivated, they are all grown on *M. baccata*. The trees are of medium vigor. 25-30 year old trees are grown 23 x 23 feet and do not seem to be very crowded. No case of incompatibility is known either in the nursery or in the orchard.

It is interesting that apple trees in the Northwest are not grafted on *M. baccata*. Most of the apple trees are grafted here on the seedlings of cultivated forms of local *M. prunifolia*.

There is, however, a problem. These forms of *prunifolia* usually have very few seeds in their fruits; three to four in some of them, and in the others as little as one or two. It is not easy to collect enough seeds for them.

With pears the situation is different from that with apples. About 99 percent of them are the indigenous Chinese varieties. Very few European pears such as Bartlett, Clapps Favorite, Flemish Beauty are grown. There is no tendency to increase their production as with apples.

Chinese pears do not suit our taste. The Chinese like them because of their great productiveness, juiciness and



Figure 2. Pingo-li pear, a hardy Chinese hybrid, of good eating quality and long storage life.

incomparable storage qualities.

They come mostly from three species—*Pyrus ussuriensis* in the North-east, *P. Bretschneider* in the central section, and *P. serotina* in the South. One character they have in common is that they are hard, with many stone cells; and they do not ripen as do the European pears. In all these species many winter varieties are known with excellent keeping qualities. I was presented in Liaoning with fruits of the Pingo-li variety from the 1956 harvest, and those of this year's harvest (1957). They were almost equally hard. Pingo-li, a hybrid between *P. ussuriensis* and *P. serotina* is the best of them. (See Fig. 2) Its fruits weigh over six ounces. The flesh is juicy with only few stone cells, and storage quality is extremely good.

On an island near Lanchow, in Kansu Province, near Mongolia, I



Figure 3. Apple fruits wrapped in paper for protection from insects, near Talién, China.

was shown the oldest Chinese pear trees in this country. There were at least 50 of them, each over 200 years, and as big as very large poplars. This was an "on year" and each of these giants yielded about 5000 pounds of fruit under irrigation and stone mulch.

As far as rootstocks for pears are concerned, *P. ussuriensis* is used in the Northeast, *P. betulaefolia* in the central area and *P. calleryana* in the South.

Stone Fruits

Of the stone fruits, peach is most important. It is grown from Harbin in the North to Canton in the South. Fruit-boring insects are the greatest obstacle in further development of its production.

Apricots are grown mostly in the Northwest and in the West. They are cultivated both for their pericarps and for the seeds, sweet or bitter.

Prunus Mume is a southern species common from the Yang-tse-kiang down to Canton. Plums are of little significance. They can be found also from Harbin to Canton. Sour cherries are virtually unknown and sweet cherries are now being introduced, especially in the Liaoning Province.

Among the more interesting fruits collected locally in the Northeast, my attention was called to the peach, Kenda, a winter peach. It is harvested at the beginning of November and can be stored until February.

Some apricots and peaches are also grown in Kirin, in the Northeast. They are very interesting to us in northern countries because of their extreme winter resistance. These two species are grown by farmers in the home gardens, propagated by seeds.

Horticulturists have selected an apricot variety named Wan-sun-pi-sin. It ripens late, toward the end of August. It has a tough skin and can be stored until the end of September. It blooms at the end of May, two weeks later than all other apricots, and escapes spring frosts.

Two winter resistant types were found in peach-Yen-pion-mae-tae and Wan-tsun-tae. Both have withstood temperatures of -30°C without any injuries. Their fruits are medium sized. The peasants maintain that some seedlings of the latter type bear fruit weighing up to 10 ounces. However, such fruits have never been found by trained horticulturists.

Some plums can be grown in the Harbin area—Hanson's American hybrids and local selections of *Prunus ussuriensis* and *P. salicina*.

It is interesting that in a climate too severe for Antonovka, some peaches and apricots are grown. However, they have to be covered with soil or straw for the winter. These include

the Yuan-ho-tao, Pei-tao or Hung-tao varieties of peach and the Hwang-sin apricot.

Climate on the Liaotung Peninsula in Liaoning Province is mild and winter freeze is not a problem. They have, however, called my attention to an apricot variety Pei-ko-sin being grown that was obtained from the coldest region of the province. This variety is said to be very resistant to winter cold and spring frost.

There is a Horticultural Experiment Station in Lanchow in the Northwest. I have noted the following varieties in its collection that should be of the greatest interest to Western fruit breeders:

Peaches: Ping-ting-tao, Chi-sui-tao, Huan-kan-tao, Ta-yeh-huang-kon-tao. These last two varieties are very resistant to frosts and can stand even the temperature of -28°C .

The Northwest College of Agriculture in Shensi Province has the best collection of local fruit varieties from the three northwest provinces. A winter peach, Tung-tao, deserves special attention. It was discovered in the Tsingling, and has been cultivated there by peasants for centuries, propagated by seeds. The fruits are rather small and freestone. They are harvested at the beginning of November and can be stored until February.

This peach was crossed at the College with the best local summer variety, Si-nung-shu-mi, which ripens at the end of July. Several hybrids gave fruits this year for the second time. I sampled the fruits and they tasted quite good. They ripen at the end of September and can be stored for two to three weeks.

Small Fruits

Grapes are grown widely in China and many new plantations are being

established both for dessert fruits and for wine. Southern Manchuria, the Northwest and the West are the best regions for grape growing.

At Lanchow in Kansu, in the northwest loess lands I saw some very old grape vines of the *vinifera* species. There were 13 plants about 200 years old, trained in a most peculiar way. Each one consisted of a very short trunk and well-branched arms 15 to 20 feet long. The arms were raised to form a cup of about 80 feet in diameter. The edges of the cup are raised 16 to 19 feet above the ground and rested on a scaffold made of wood. No wonder that each "bush" like that yields about 3800 pounds of grapes a year!

Small fruits other than grapes are of no consequence. For hygienic reasons, Chinese eat fruit fresh only when it has been peeled or washed in hot water. Small fruits do not lend themselves to such treatment. On the other hand, jam has no place in the Chinese diet. Some interest is now being shown in strawberries because of export possibilities.

In the Pomological Experiment Station collection at Harbin, I noticed a raspberry of unknown origin. It had plenty of fruits and flowers at the same time—the date of my visit there, September 6. I was told that this raspberry blooms and fruits abundantly all summer until autumn. It is very resistant to cold and needs no cover for winter.

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