

## AVOCADO AND OTHER SUBTROPICAL FRUITS OF NEW ZEALAND

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*This study was made while a recipient of a Fulbright Award to New Zealand in 1963-64.*

The beautiful islands of New Zealand are situated about 1,300 miles east of Australia at a latitude comparable to that of California but in the southern hemisphere. This geographical location provides a climate similar to that found in California. The general conditions are considered as warm temperate and the typical climate would approximate that experienced between the San Francisco Bay region and the Oregon Coast with cool ocean winds and moderate rainfall in most areas. Seasons in New Zealand are the opposite of those in California, hence the months of July and August are characterized by frequent frosts and cold weather and the month of December by typical summer heat. The generally mild climate provided by the ameliorating effects of the surrounding oceans allows both temperate and subtropical crops to be grown at least in some areas. The temperate climate has stimulated the development of a substantial apple industry as the major fruit crop. In recent decades, however, some attention has been given to more diverse crops which include the subtropical fruits, primarily citrus and avocado. Major citrus fruits grown are lemons and the so-called New Zealand grapefruit. Both are of high acidity because only moderate heat is available during the growing season. Some oranges and, recently, a few tangelo varieties have been tried and found acceptable when grown in the warmest areas. It may be possible to improve the quality of these fruits by use of appropriate rootstocks and selection of more suitable varieties.

A brief visit to several fruit growing areas in both the North and South Islands permitted a casual study of the fruit industries in general and of the avocado in particular. Only the avocado will be considered in detail in this report.

### PRINCIPAL PLANTING AT ORMOND

The largest and only commercial planting of avocado of any size in New Zealand is located at Ormond, some 10 miles from Gisborne on the Bay of Plenty. This area is on the eastern coast of the North Island, southeast of Auckland. The Gisborne Plain is a broad alluvial valley with deep, well-drained soil and a subtropical climate. Citrus and grapes are grown in the area as well as some apples in the cooler localities.

The avocado probably was introduced to the Gisborne area about 1920 when the late Mr. Charles Grey, father of Len Grey, the present leading grower, lived in the area pursuing general farming, especially with cereal crops. Tree crops of stone fruits and apples were among the first which were planted. Somewhat later, a shipment of

avocado seed from California was distributed to interested people by the Farmers Union and the Department of Agriculture. The late Mr. Grey germinated eight or nine of the seeds and planted them in his dooryard orchard. The seedlings flourished and eventually produced fruit. One of the original seedlings produced fruit of outstanding quality and has subsequently been propagated under the name of "Ormond." The Ormond was the first of the several seedlings to bear fruit in 1930, and was marketed in small quantity in 1939. Its parent tree eventually topworked to Fuerte and is still growing and in good health.

The Ormond variety is a medium-size fruit about eight to 10 ounces, short pyriform with medium-size seed and a clear flesh. The skin is tough and somewhat suggestive of Fuerte. The variety sets moderate crops nearly each year.

Fuerte was introduced to the Ormond area directly as a bare rooted tree by Mr. Len Grey. This tree, now 17 years old and with a forty foot spread, has a present crop estimated at 2,000 fruits. It tends toward the alternate bearing habit. The fruit quality is good. This variety has been propagated by Mr. Grey to provide several trees for this and other smaller orchards in New Zealand.

Nabal, which was propagated on Mexicola rootstock 14 years ago, has proved of satisfactory production with several good crops throughout the years. One tree about 15 feet high carried an estimated 1,500 fruit. The fruit are spherical in form and of good quality. A number on one tree and several scattered on other trees showed a serious breakdown and development of corks on the apical end. This was noted on fruit exposed to the sun and those in the shade. The trouble appeared to be a physiological development with a secondary infection which may have followed the original cracking.

### **OTHER VARIETIES TESTED**

Several other varieties have been tested as single trees at Ormond. Mary Martin has proved a shy bearer. The Hellen, Hazzard, Queen and Linda have proved unsatisfactory bearers. Zutano and Mexicola are still under observation. Queen has borne good crops but rather irregularly. Linda has had occasional good crops of very large fruits. Varieties which have been tried but discarded as unsatisfactory for one or more reasons are Puebla, Leucadia, Jalna, Ryan and Benick.

Hawkes Bay, on the southeast coast of the North Island, has several adjacent land areas where conditions are suitable for subtropical fruits such as citrus. The major crops are apples, pears and some cherries.



Figure 1. Commercial avocado pack, New Zealand.



Figure 2. Len Grey beside Hass avocado tree, Gisborne, New Zealand.

Only a few avocado trees are reported from this area. Two of the known specimens deserve special mention because of potential value in future trial in the area. A particularly fine and robust specimen tree was planted on the estate of Mrs. A. E. Fernie, Chester-Hope near Hastings. Mrs. Fernie had been in California in 1936, when she became acquainted with the avocado as a fruit while at the home of Mr. G. L. Hamilton, then living near Santa Barbara. Mrs. Fernie brought some of the seed to New Zealand and planted these as seedling trees in 1937. One of the two trees now has attained a height of 60 feet with a trunk diameter of 18 inches. It is in excellent health and bears a good crop of good quality fruit. The tree probably is a Guatemalan or Mexican-Guatemalan hybrid type as there is little evidence of anise in the crushed leaf. Its fruit appears to be mature in September-October, simultaneously with the Fuerte. The fruit is a much lighter green color than the Fuerte and the flesh is free from discoloration when mature and has an attractive yellow cast. The fruit is rather long, pyriform in shape, about five inches in length by three inches in diameter and with a medium size seed.



Figure 3. Fernie avocado tree, Chester-place, Hawkes Bay, New Zealand.



Figure 4. Peter Kent beside Hopkins avocado, Tauranga, New Zealand.

A second tree on the Fernie place is a Fuerte which was grafted in place by Mr. Len Grey of Gisborne. This specimen is about 30 feet tall with a trunk diameter of 12 inches. The bud union is quite evident. The tree bears a good crop of typical Fuerte fruit, but

somewhat small in size.

Another grafted tree in the collection was of an unknown variety. The leaves had distinct anise odor and the trunk was some three inches in diameter. No fruits were available from this specimen. Mrs. Fernie, a horticulturist in her own right and a knowledgeable observer, has also introduced the white sapote, *Casimiroa edulis*, to the area. Two fine seedling specimens with trunks 15 and 18 inches in diameter respectively reached a height of about 30 feet. The fruits were reported to be numerous and of good quality, free of turpentine flavor. Nearby was a large pecan tree, grown from seed to a height of 35 feet. Although several nuts had been produced last year, they were apparently without kernels and hence worthless. The locality was a cool climate probably with insufficient summer heat to develop the kernel of the nut. The tree itself is in excellent vegetative condition.

Another fine fruiting specimen of Fuerte was seen at the home of Miss A. J. Twentyman in Havelock North, nearby Hastings. The rootstock for this tree was obtained from Mr. Len Grey in 1954. The seedling had been grafted rather high on one limb with Fuerte wood furnished by Mr. Webb of Hastings. Many of the fruiting branches of the original Mexican-type rootstock surround the grafted limb and are crowding it. The entire tree is about 15 feet tall with trunk diameter of approximately eight inches. The Fuerte fruits were rather small in size and some appeared to have a slight malformation as a raised, roughened area at the stylar end.

The major commercial production of avocado in New Zealand is presently from Nabal, Fuerte and Ormond varieties. These have furnished some 53,000 fruits from the 10-acre orchard of Mr. Len Grey for the 1963-64 season. His fruit is sent by rail or boat consignment to the markets in the larger cities of Auckland, Wellington and Christchurch.

The standard box used for avocado shipment is made of local Monterrey pine which is a California species but comprises the major man-planted timber of the country. The box, which is 7x5x19 inches, will hold six to 12 fruit nestled in excelsior. A brochure indicating how to determine maturity of the fruit, and its proper preparation and suggested uses, is put in each box. Present limited packing operations are performed in a shed where the field boxes of fruit are brought for sorting and grading. Fruits are separated, selected and packed directly by hand by a crew of one to three persons. The shipping crates are assembled by hand from stock obtained from a local sawmill.

The avocado is comparatively little known in New Zealand. Very few persons who know of it actually have seen or tasted the fruit. A few of the larger fruit markets display the local fruit or, on occasion, some of the West Indian seedling avocados which are imported from the Cook Islands. Local fruit usually command a premium price because of their higher quality. One of the major factors which confronts the potential but embryonic industry is that of public education concerning maturity criteria and the proper use of the fruit. The limited supply also will restrict the development of the industry probably for several years.

## **OTHER SUBTROPICAL FRUITS**

The Bay of Plenty, which Captain Cook named upon replenishing his supplies during

the historical visit to the then little-known lands east of Australia, lies some 100 miles southeast of Auckland. The city of Tauranga is a center of sport fishing and other summer attractions along the Pacific Ocean and is the focus of the horticultural activity in that area. Nearby, in Te Puke, some 20 miles to the south, are important plantings of Chinese gooseberries (*Actinidia chinensis*), a unique fruit produced on a vine, and being exploited to furnish an attractive, excellent and exotic fruit for export markets including Canada, England and the United States. Here too is found the passion fruit (*Passiflora edulis*) and the tree tomato (*Cyphomandra balacea*), providing both fresh fruits and preserved products of high quality and of unique nature. Citrus, primarily lemons, comprises the major horticultural crop of volume in this area. The climate here is subtropical, hence it can be tolerated by the avocado—which has been introduced less than two decades ago. One of the more prominent growers and nurserymen who has attempted to introduce the avocado into the area is Peter Kent of Tauranga. He has been a producer of citrus nursery stock and other subtropical species for many years and has one of the largest collections of fruit varieties in that part of New Zealand. Among the species in his nursery are the cherimoya (*Annon cherimola*), including the Chaffey, Ott, and Deliciosa varieties from California and the Pink Mammoth and Douglas Morton Special from Australia. The litchi (*Litchi chinensis*), longan (*Euphoria longans*), jaboticaba (*Myrciaria jaboticaba*), Surinam cherry (*Eugenia uniflora*), white sapote (*Casimiroa edulis*), and several varieties and forms of citrus including tangelos, navel oranges, grapefruit and several varieties of avocado have been established for trial.

Most of Peter Ken's original avocado introductions were obtained from Armstrong Nurseries in California. One of the oldest and largest specimens in the collection is a tree of Mexicola about 14 years old and 25 feet high, with a trunk 18 inches in diameter. Among the other varieties which are well established and bearing are Fuerte, Hazzard, Nabal, Mary Martin, Jalna, Zutano, Ryan, Hellen and a local selection named Hopkins. The Fuerte has produced quite satisfactorily here, as have the Nabal and Mexicola. Other varieties have been less productive. The Hopkins avocado was selected as a seedling from Katikati where the mother of Mr. Iwan Hopkins planted a seed purchased locally. This variety probably is Guatemalan in type, having no anise in the leaf, with a rather large fruit and a short thick stem. Young trees of this clone have borne very good crops.

The present production of Chinese gooseberry, tree tomato and passion fruit provides a substantial income for many growers on the North Island. These fruits are well known locally and are extensively utilized throughout New Zealand. The export of Chinese gooseberry under the name of Kiwi fruit to the United States, Canada and United Kingdom has stimulated considerable interest among many growers to improve their production and handling methods. The production of avocado, however, is practically limited to one 10-acre commercial orchard plus several experimental and dooryard trees. This could develop into a modest industry upon public acceptance of the fruit which is practically unknown there by the average person at the present time. Indeed the situation in New Zealand is somewhat comparable to that which existed in California around 1915.



Figure 5. Chinese gooseberry trained on pergola, New Zealand.

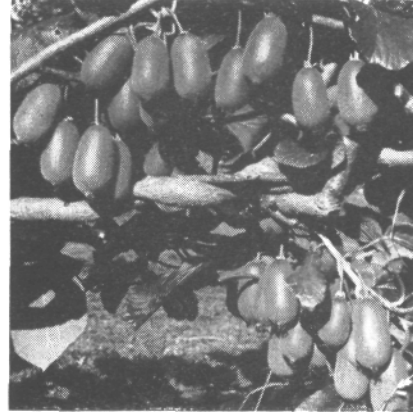


Figure 6. Fruit of Chinese gooseberry (Kiwi fruit) — (*Actinidia chinensis*), New Zealand.



Figure 7. Fruit of tree tomato (*Cyphomandra batesca*), New Zealand.



Figure 8. Commercial export pack of Chinese gooseberry, New Zealand.

## LIMITING FACTOR

It has been demonstrated that the avocado tree will grow and yield well in several localities with favorable natural environmental conditions. A limiting factor is that of public acceptance and education, which can be achieved through appropriate and persistent publicity. It would appear a reasonable assumption that local market outlets will comprise the chief objectives of the embryonic industry of New Zealand for several years to come. Export markets, except under the most unusual circumstances, appear to be a remote possibility for the industry.

The avocado has been tested for adaptability in New Zealand in only a few of the several potential regions. The generally temperate type of climate with its marginal subtropical areas will limit the extensive development of new plantings. Use of adaptative practice such as windbreak protection, the development of irrigation facilities for use during periods of deficient rainfall and the selection of suitable varieties adaptable to the marginal environmental conditions could result in a more extensive trial of the avocado than is presently contemplated by the average grower. It is quite likely that the avocado may achieve in the near future a more prominent position in the economy of New Zealand.