

Some Historical Aspects of the Avocado in Australia

C. A. Schroeder and M. R. Schroeder

Department of Biology, University of California, Los Angeles.

The significant development of several horticultural industries in Australia has focused attention on the exotic crops of the area among which the avocado is most prominent and of great potentiality. Two species endemic in Australia have been made known to world horticulture. These are the macadamia nut (*Macadamia integrifolia* and *M. tetraphylla* L.) and to a lesser degree the quandong, *Santalum acuministrum*. The macadamia has developed into substantial horticultural industries in Australia, Hawaii, East and South Africa, and to a minor extent in California, Florida, and a few other subtropical areas of the world. The quandong is presently only of potential value as a commercial crop in desert areas of the world, but has not yet been fully exploited or proven.

Among the several plant species introduced comparatively recently in Australia, the avocado (*Persea americana*) appears to have reasonable climatic adaptation to some coastal areas which will allow its commercial exploitation. The avocado presently has provided the basis of small local industries in several areas, primarily in the southern Queensland and northern New South Wales areas on the east coast, the Sunraysia district of the Murray River Basin near Mildura in Victoria, and limited areas north of Perth in Western Australia which are presently under avocado trials.

While the avocado is virtually unknown in Australia and unrecognized by many Australians even today, nevertheless it has had a rather long history, some aspects of which warrant a careful recording for future understanding of the development of the industry in that country.

The avocado (*Persea americana* Mill.) originated in the highlands of southern Mexico and the mountains of Guatemala. These countries have provided the basic horticultural races, namely the Mexican, Guatemalan, and West Indian, which bear fruit that comprise the major varieties of commercial avocado production throughout the world. Hybrids of the Mexican and Guatemalan races, such as the variety Fuerte, also contribute much to the commercial production of some countries. The West Indian race of avocado and several of its hybrids probably originated in the lowlands near the Caribbean Sea and on some of its islands to provide the basis of avocado industries in the more humid tropics.

The avocado was known, utilized, and recorded in the history of Middle America long before the landing of Columbus in the New World. The avocado was introduced into Florida and California in the mid-1800s. In both of these states, the plant was exploited; and selections of better varieties were the major accomplishments of these early years. Slowly, a basic knowledge of the species and cultural techniques for the industries in

these areas were developed.

Several avocado varieties, either introduced or discovered and developed in California, have subsequently provided the standards for quality and production in many parts of the world. Considerable interest in the avocado as a potential fruit industry has been stimulated in many countries with subtropical climates such as Australia, South Africa, and Israel. As the result, importations of plants and specific varieties from California have been made into these new areas at various times for trial and exploitation.

Among the earliest of documented records of avocado in Australia are those referring to seedling trees growing in the botanic gardens in Brisbane and Sydney. The country of origin and the horticultural types of these early trees is not known. They could have been introduced from a number of areas such as Hawaii, Panama, or Central America, as ocean steamers carried on considerable commercial exchange of materials with Australia and other countries in the South Pacific.

Early reports of the Sydney Botanic Garden, 1849-58, indicate that the avocado pear apparently was introduced in the garden or had been distributed to local individuals in 1853-54 (3). "Avocada pears ... and others (species) which require protection are necessarily kept in small pots in the propagating pit" suggests the marginal conditions for avocado which prevailed in Sydney at that time.

Approximately in the same period, a list of plants and seed received during 1850 from Calcutta Botanic Gardens included *Persea gratissima*, *Mangifera indica*, *Phoenix dactylifera*, and other species (3). The following year, a shipment of plant materials from Royal Botanic Gardens, Pamplemousse, Mauritius, also listed *Persea gratissima* (16). Somewhat later, in 1856, *Persea foetens* was received from Lisbon, Portugal.

The Acclimatization Society of New South Wales in its 6th Annual Report - 1867 - points out the virtues of many tropical and subtropical species which had been tested over several years (1). Among those "which had been naturalized and were doing well" was the avocado pear. It is of interest to note the general accounting of early introductions and testing of exotic crop species in the east Australian area, with the focus especially on the Sydney area. There it was announced, "In no other part of the world can we point to a spot and say - Here is the site of the beginning of the horticulture and agriculture of a continent" (5).

While adaptation of the early introductions of avocado to the local climate in Sydney had failed (1870-71), the more favorable situation at Brisbane allowed the continued evaluation of avocado in the latter area. *Persea gratissima* was sent to Moreton Bay (1853-54) and to the Brisbane Botanic Garden somewhat later. According to J. F. Bailey (1), other avocado introductions were made directly from Mauritius by the Acclimatization Society in 1876.

Reports of the Brisbane Botanic Gardens, 1861-1895, indicate the beginning of the garden in 1855. The report of 1861 mentions among the exotic plants *Persea*, cherimoya, alligator pear, and the Chinese date (*Diospyros*) (6). Apparently, the first fruits were noted on *Persea* in 1867. In 1875, the reports indicate that "56 alligator pear plants were distributed." In the extensive list of holdings in 1890-91, there is no mention of *Persea*. Still another list of plants in the Queensland Botanic Garden of 1875

mentions several members of Lauraceae including *Persea gratissima*, *Endiandra* 6 spp., *Laurus* 5 spp., *Litsea* 3 spp., and *Cassytha* 5 spp. (12).

The Queensland Acclimatization Society was organized in 1862. Results of its activities began to appear about 1865. The fourth Annual Report of 1866 mentions the avocado pear, while distribution of seed and plants is noted in reports of 1868, 1873, and 1876. The avocado was on exhibit at the Sydney International Exhibit, according to the report of 1879-80, and was growing in North Queensland. It was noted that the avocado or Alligator pear (*Persea gratissima*) bore fruit for the first time that year in Bowen Park and had a "fair crop." A large number of fruit trees were distributed by 1886.

Nothing of importance is noted in journal literature again until 1914, when avocado trees were reported growing south of Sydney. These presumably were seedling trees (2).

Possibly the first introduction of selected named variety trees was made at Sunraysia in Central Southern Australia, where 25 trees were imported from Armstrong Nurseries in California (9). Shortly thereafter, the Fuerte variety is reported as established at the Wollongbar Experiment Station S.W.S. and the Lyon, Northrop, and Blakeman varieties at the Grafton Experiment Station (8). Somewhat later, in 1935, the Lyon variety was growing at Wollongbar. Without doubt, considerable interest had developed in the avocado as a potential commercial crop in New South Wales during that period, and methods for large scale production had been developed (13).

The first importation of avocado into the Carnarvon area of Western Australia is recorded in 1949 (11), following which many other introductions of seedling and variety trees have been made by several individuals. In the Perth area, a fine old seedling tree has been propagated under the variety name of Mrs. Judy Crook. The original tree was planted about 1959. Another fine seedling tree planted about 1944 from a seed obtained in Queensland is located on Mount Street near the freeway. The trunk is about 18 inches in diameter and approximately 50 feet tall. Unfortunately, a possible dieback, the result of *Verticillium* wilt, had caused the loss of most of the top of this specimen in 1979. A fine old tree of Fuerte now approximately 20 years old was imported from Langbeskers Nursery, Queensland, and grows in the backyard of Mr. Taplin in Perth.

The modern era of the Australian avocado industry probably can be dated from 1930, when the Fuerte and several other important varieties from California were established and propagated on a large scale. The continued expansion of plantings and varietal trials resulted in a long list of potentially and proven commercial varieties in the southern Queensland and northern New South Wales area (17). Now more than forty years later, this list of avocado varieties has been modified in part; but an increase in numbers of trees and acreages and production are clearly evident (10).

The parallel trends in evolution of the avocado industries in California and in Australia are exemplified by the early use of seedlings as major planting material in both areas. Later, this was followed by the selection of superior seedlings to become propagated and established as commercial local varieties and the importation of clonal selections. In both California and Australia, the use of seedling materials from local miscellaneous sources as rootstocks has given way to a very careful selection of rootstock seedling sources from very specific trees in order to produce good, standard orchard trees. The appearance of major virus and fungal diseases in both California and Australia has

resulted in special attention to the selection of these specific rootstock sources. These fungal and virus problems are not restricted to the two countries, but are world-wide wherever avocados are grown.

The avocado disease called "sun-blotch" was observed and described as a physiological disorder by J. E. Coit in 1928. The significance of this virus disease and its widespread distribution was not realized until 1955-60. The discovery of symptomless carriers and the spread of the virus through careless scion selection has resulted in many orchards in California and Australia with trees which exhibit poor health and low productivity. The development and practice of a series of hygienic precautions in plant propagation which, if followed, can result in orchard trees free of the virus, has provided the Australian industry with a new incentive. The essential developments of virus detection, indexing, and hygienic procedure in nursery propagation were first established in the California industry. The logical sequence of a program to produce "certified trees" was adopted quickly by the progressive avocado growers in Australia. The major objective of such activities is to promote quarantine programs which allow importation of clonal materials or the utilization of local seeds which have been established and proven "free of sun-blotch virus" according to specific criteria. Trees from which such propagating materials are obtained must be "indexed" and "registered" as free of the virus. The Australian regulations governing importation of avocado plant materials require certification of origin and freedom from the specific sunblotch and other viruses. This certification program was initiated in 1974 upon the urging of several progressive growers and knowledgeable investigators in the several state departments of agriculture concerned with avocado plant protection.

The first importation into Australia of certified avocado "seed material" was made in 1974, when Mexicola seed from registered trees in Santa Barbara County, California, were brought to the Alstonville area for the purpose of commercial propagation. This procedure was part of an industry-wide plan adopted by the Australian Avocado Growers Federation in 1974. Within the scheme, subsequent introduction of clonal materials of other specific rootstock sources such as Duke 7, G22, Lula, and Original Duke are presently in quarantine holding facilities pending clearance for release to the nursery multiplication block from which indexed, clean rootstock clones and fruit variety clones will be made available to registered nurserymen. Registered nurseries with appropriate equipment and practicing strict sanitary procedure are presently prepared to offer certified grafted trees to the industry. The superior value of certified trees to a progressive avocado industry requires no comment.

The historical development of the Avocado Growers Federation Avocado Scheme for certified trees was initiated in the Alstonville-Wollongbar area in co-operation with plant scientists at the N.S.W. Agricultural Research Centre, Wollongbar, and the Tropical Fruit Research Station, Alstonville. The quarantine holding glasshouse is on the Wollongbar Station. Propagation of initial newly introduced materials has been handled through facilities on the Cookie and John Leon properties, Alstonville, under contract with the Federation. An isolated rootstock seed source orchard is maintained as one clonal source of trees of specific varieties.

A program of importation of certified clonal avocado materials from California also has been undertaken by the South Australian Department of Agriculture through the offices

of Rip Van Vilsen and Don Alexander.

Other recent importations by Allan Campbell of Sydney have included the varieties Pinkerton, Santaro, MacArthur, Susan, and Bacon, which will eventually be certified for distribution under the sanitation and certification program.

The interest in and production of avocado in various parts of Australia have fluctuated throughout the past years, partially as the result of severe climatic conditions and irregular economic returns within the industry. Within the last decade, a reassessment of the avocado as a crop has been made by a number of progressive growers throughout the country. They have come to realize the value of a cooperative country-wide approach to the many problems of commercial production. The objectives of standardization of product within the potentially great industry and an exchange of information and cooperation on all aspects of the industry could achieve this goal. The climatically suitable areas for avocado in Australia are widely separated along the periphery of the continent, particularly in the states of Queensland and New South Wales, with lesser developed regions in Victoria, South Australia, and Western Australia.

On October 18, 1974, the avocado growers of Queensland and New South Wales met and formed the Australian Avocado Growers Federation (A.A.G.F.) A constitution provides the growers with equal rights for voting and sharing the costs of organization. Growers in the other areas have organized and have become members of A.A.G.F. through their state organizations. Membership is by states, and not by individual members. Voting is on the basis of four votes per state, but delegate numbers are not limited to four from each state. The A.A.G.F. has formed a Variety Committee. They also have a tree registration program to certify trees and from which healthy rootstock sources and virus-free scions are available to qualified nurserymen who produce "certified trees." They have a "promotional committee" with the objective of developing new markets and extending sales.

A strong effort is underway to seek uniform maturity and quality standards and to consider matters of quarantine regulations as related to marketing, containers, storage, pest, and disease control.

The A.A.G.F. meets twice a year with a subcommittee meeting as is necessary. This organization is supported by a great number of growers, as its influence is becoming more widely felt, and as the industry expands. The promotion of the "certified tree" as the basis for a sound avocado industry appears to be influential in the development of many new orchards, particularly in the Queensland and New South Wales areas.

Literature Cited

1. Acclimatization Society of New South Wales. 1867. 6th Annual Report 1867.
2. Anderson, K. 1977. Brief Review of avocado growing in Subtropical Australia. Proc. Austral. Avocado Res. Workshop, p. 4-6.
3. Anon. 1850. Papers Relative to the Botanic Gardens, Sydney.
4. Anon. 1891. (Reference to avocado). Agric. Gaz. NSW. 2: 176, 446.
5. Anon. 1928. Journal and Proceedings of Royal Australian Historical Society. Vol.

XIV. Part I.

6. Anon. 1861-95. Report of Brisbane Botanic Gardens.
7. Bailey, J.F. 1910. Introduction of economic plants into Queensland. Presidential Address - Royal Society of Queensland, Feb. 26, 1910.
8. Barnett, G. B. 1932. The Avocado. Agric. Gaz. NSW. 43:59.
9. Codman, R. and B. M. El Zeflawi. 1977. Avocado plantings in Sunraysia, Australia. Calif. Avocado Soc. Yearbook 61: 29-35.
10. Debney, H. 1977. The Australian Avocado Industry. Calif. Avocado Soc. Yearbook 61: 64-70.
11. Hawson, M. B. 1965. Avocado Industry in Western Australia. Calif. Avocado Soc. Yearbook 49: 35-36.
12. Hill, W. 1875. Catalogue of the plants in the Queensland Botanic Garden. Government Printer.
13. Kebby, R.G. 1937. The avocado, its propagation and establishment. Agric. Gaz. NSW 48: 260-262, 329-332, 346, 443-446, 456.
14. Sharpe, F.V. 1950. The Avocado in Australia. Calif. Avocado Soc. Yearbook 35: 124 -125.
15. Storey, W. B. 1960, The Avocado in Australia. Calif. Avocado Soc. Yearbook 44: 61-71.
16. Thompson, J. V. 1822. Catalogue of Exotic Plants Cultivated on the Island of Mauritius at Royal Botanic Garden, Pamplemousse.
17. Zentmyer, G.A. 1965. Avocado Culture and Avocado Diseases in Australia and the South Pacific. Calif. Avocado Soc. Yearbook 41: 19-26.