

THE MACADAMIA OR QUEENSLAND NUT

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This nut is a native of Australia, the tree growing naturally in the coastal districts of southern Queensland and northern New South Wales. It occurs largely on alluvial situations bordering rivers and creeks where the fertile volcanic soils, rich in humus, and the subtropical climate provide conditions very favorable for it. The tree was probably first discovered in about 1870, although no doubt the nut had been known to the aborigines and appreciated by them from very early times. It was not until the beginning of the present century that it attracted serious attention as a nut-yielding tree and thoughts were directed to its cultivation.

The tree has now been introduced into various other countries where it has been found to grow well, such as parts of southern United States, the West Indies, South Africa, and Mediterranean countries, although it is only in Hawaii that the production of nuts from cultivated trees is of importance.

IN AUSTRALIA

The Queensland Nut (*Macadamia ternifolia*), one of the best of edible nuts, is indigenous to the coastal rain forests of southern Queensland and northern New South Wales. It is also known as bush nut and bopple nut. This native nut is highly nutritious and is one of the richest oil yielding nuts known, producing about 76 per cent oil, equal in quality to the best olive oil.

When growing naturally in rain forests, the tree attains a height of from 50 to 60 feet and branches out when above the surrounding jungle. Under cultivation, or when growing

out in the open, the tree is a robust handsome evergreen with rounded top and branches clothed closely with glossy light-green to dark-olive foliage.

A remarkable thing about the Queensland Nut tree is that, although growing naturally where there is abundant rainfall, when grown under cultivation it is fairly drought resistant after it has become well established. The tree is very adaptable and readily accommodates itself to a wide variety of soils; under natural conditions the tree is found growing well along water courses and where clay is but a few inches under the surface. Mild frosts do little harm except to young growth.

In recent years, a good deal more interest has been taken in the nut in Australia; and small plantations or orchards have been established in various districts. Certain enterprising firms of nursery men have also isolated superior thin-shelled forms of the nut from the forest and given special attention to the best methods of cultivation and propagation. The Nut Association of Australia, formed in 1932 with headquarters at Brisbane, has also done much to stimulate interest in and further production of this nut.

IN HAWAII

Macadamia was introduced into Hawaii about 1892 by E. W. and R. A. Jordan, the latter of whom secured seeds in Queensland and the former germinated them and grew the trees at his home on Wyllie Street, Honolulu, where six of the original trees are still to be found. These trees began to bear in 1908, and by 1910 considerable interest was aroused in the possibility of growing the nuts in commercial quantities.

The Macadamia grows here from sea level to an altitude of about 2,200 feet. While it is considered to be a drought resistant tree in Australia, it has done best in Hawaii where there is a rainfall of 30 inches or more or where irrigation is practiced during the drier part of the year. The tree does not appear to be limited to certain types of soil, although in its natural habitat it is found in rich alluvial soil along creeks and rivers. Strong winds injure the tree and it requires protection, especially while young.

Not until 1922 was a real attempt made to grow the nut for commercial use. A stock company was formed and sizable plantings were made on two islands, Oahu and Hawaii. With this impetus, other interests have made appreciable plantings in many locations on the several islands. By 1938, the acreage totalled some 800 and contained about 60,000 trees. In 1931 a factory was built and machinery, specially developed for processing the Macadamia as a roasted vacuum-packed article for the world trade, was installed.

About 1935, the University of Hawaii and Agricultural Experiment Station began extensive investigations of the commercial possibilities of the nut and of the characteristics necessary to meet the needs of consumer, processor, and producer. Selection of strains and methods of propagation were also studied. As a result of this study, five outstanding nut varieties were announced in 1946. These varieties stressed high yield, vigorous growth, strong branches, round or cone-shaped heads, heads neither too dense nor too open, nuts uniform in size and shape, resistance to disease and insects.

Until recent years the tree was usually grown from seed; however, new plantings are

largely of the new select, grafted varieties. Various methods of vegetative propagation have been accomplished successfully at the Experiment Station; i.e., rooted cuttings, air layerings, and grafting.

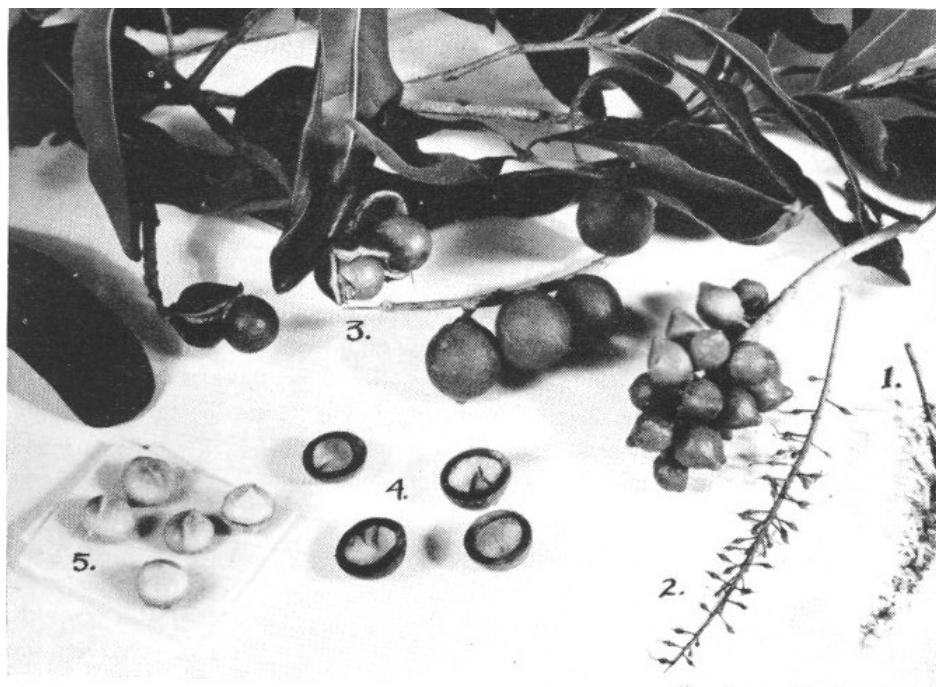
IN THE UNITED STATES

The Macadamia Nut is grown in this country largely in Florida and California. It appears that there are more trees and more interest in the tree in the latter state.

Since the close of World War II, considerable and growing interest has been awakened in Southern California in the Macadamia as a potential new crop. The University of California at Los Angeles (subtropical horticulture division) is making extensive study of the plant, and Dr. C. A. Schroeder has written several articles on the subject. The Agricultural Experiment Station at Riverside has studied certain phases under the leadership of Dr. George A. Zentmyer, who has demonstrated Macadamia's apparent immunity to the soil fungus which is rapidly killing out many acres of avocado trees.

Investigations now in progress indicate there are about 150 to 200 mature bearing trees in California, scattered between Santa Barbara and the Mexican border. Practically all of these trees are growing singly at widely separated locations as ornamentals with little or no care. It is the exceptional case when they are irrigated or fertilized, yet in most instances they are bearing edible nuts.

In California, the Macadamia tree is a beautiful evergreen subtropical, growing moderately erect, 25 to 40 feet high, with long shiny leaves, somewhat leathery. Some varieties have spiny, holly-like edges, others have smooth edges. It is considered a clean tree entirely suitable for home or parkway planting. The nut is nearly round, about one inch in diameter, sometimes mottled with light brown specks.



Macadamia: 1—Bloom. 2—Fruit set. 3—Immature nuts, in husks. 4—Nuts cut to show shell and meat. 5—Kernels.

BOTANY

The Macadamia is a member of the Protea family, which includes such relatives as the Grevillea (silk oak), Hakea, Leucadendron, and other ornamental plants. The flowers are small, numerous and borne in clusters or inflorescences, consisting of spine-like racemes of 200-300 flowers, produced in the axils of the leaves on new or recent growth or at nodes on older branches where the leaves have fallen. The small creamy white or pinkish flowers about ½" long each consist of a floral tube in the throat of which are attached four anthers. This tube splits along one side to release the curled and elongated club-shaped style and stigma. The bulbous pistil is highly pubescent in the floral stage and is mounted on a glabrous disc. The flower is perfect and contains both pistil and stamens. It appears to be pollinated by bees and offers a good source of honey. As no indications of self-sterility have been noted, interplanting of varieties or provision of pollinators to insure fruit appear to be unnecessary.

VARIETIES

There are two distinct types of Macadamias in Hawaii and in the United States; the Rough Shell type (*Macadamia Ternifolia*) and the Smooth Shell type (*M. Ternifolia* Var. *integrifolia*). They differ both in vegetative and nut characteristics. While considerable differences exist within each type, both as to tree and nut characteristics, there is no difficulty differentiating between the two. The *Ternifolia* is distinguished by slender, upright growth habit; spiny-edged leaves (pink new growth); deep rooting system; knobby to pebbled ovoid nut; annual bearing. The *integrifolia* inclines to rounded,

spreading growth habit; smooth edged leaves (green new growth); shallow, spreading root system; spherical, smooth nut. The *Ternifolia* nut is sweeter, raw; but does not roast well; the *Integrifolia* nut is rather flat and mealy, raw; but is outstanding when roasted.

Macadamia has demonstrated that it has real value in Southern California as an ornamental and a family orchard tree. It appears to have definite potentialities as a commercial-crop tree. These potentialities will have to be developed by hard and persistent work, especially in the selection of varieties and the pioneering of acreage plantings. The problems of processing and marketing appear to be readily soluble, since there is already an avid acceptance of the nut for its outstanding eating quality, and as the processing machinery has been in use many years.

There are several nursery men who are experimenting actively in the propagation of Macadamias, both from seed and asexually with imported and local varieties. These efforts, along with the assistance of university specialists, should lead to a real commercial venture, in time. At present, there are several small plantings ranging from 20 to 150 trees; and more are being initiated steadily. These are being planted on various soil types and under differing frost conditions. The answers to many questions regarding the economic possibilities of the Macadamia Nut in California should develop rapidly.

The following are notes on cultural practices and marketing in California as observed by an orchardist-nurseryman in San Diego County during the last five years:

In general, Macadamias appear to do very well under the type of care, soil, water, and climate suitable to avocados. The following more definite recommendations are made:

1. WATER: The Macadamia does well with about 24" total water annually, including rain; i.e., monthly totals of 2" to 2½" during the irrigation season. However, the tree will exist and appear fairly thrifty with much less water. Macadamia appears to be somewhat sensitive to salts—about like avocado.

2. SOIL: The Macadamia does best in well drained, slightly acid soil. It has been observed locally flourishing in soils which vary considerably—from fairly heavy to quite sandy.

3. FERTILIZER: The newly planted Macadamia does well with a mulch basin and frequent very light applications of commercial fertilizer. Mild manure in the basin seems helpful. Mature trees thrive with the equivalent of 3 lbs. of nitrogen per tree, per year, applied in three or four increments; younger trees require proportionately less.

4. CLIMATE: The Macadamia, on the average, has about the same frost resistance as Fuerte avocado. Individual seedlings vary from this considerably. These trees should not be planted in areas known to be too frosty for avocados, lemons, or Sumac.

5. HARVESTING: The Macadamia is found in two general varieties: *Ternifolia*, which bears an annual crop in the fall, and *Integrifolia*, which is everbearing (like lime or lemon) but bears the heaviest crop in winter. The nuts fall to the ground when mature, and the thick green husks crack open; the husks are removed and the shells cracked. For the home, a steel vise or a hammer and wood block are satisfactory. It is worthwhile to oven-heat the nuts in shell before cracking (about ½ hour at 250°), to separate meat

from shell and make the shell more brittle.

6. PEST CONTROL: It appears that where ants are controlled (chlordane or lindane) insect pests are no problem. Macadamia has demonstrated resistance or immunity to root-rot fungus (*P. Cinnamomi*).

7. PRUNING: Modified central leader should be developed. Lateral branching should be induced by pinching out terminal buds when the young tree has attained the desired height — that is, about two to four feet. Avoid permitting young main limbs to develop opposite each other.

8. MARKETING: Hawaii-grown Macadamia nuts are vacuum packed and shipped to this country in glass jars, and are sold in specialty shops, delicatessens, liquor stores, and department store food departments at high prices. California-grown Macadamia nuts have little market at present, largely due to lack of production and organization. Most trees here are ornamentals; the largest planting known to the writer consists of about 100 five-year-old trees. If all local production were pooled and marketed through one processor, there might be sufficient tonnage to initiate a market. There is little market for the nut in shell, due to toughness of the shell; there is a very wide market for the shelled, roasted nut to the salted nut trade, confectioners, and bakers.

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