

BOTANICAL RELATIVES OF THE AVOCADO IN AUSTRALIA

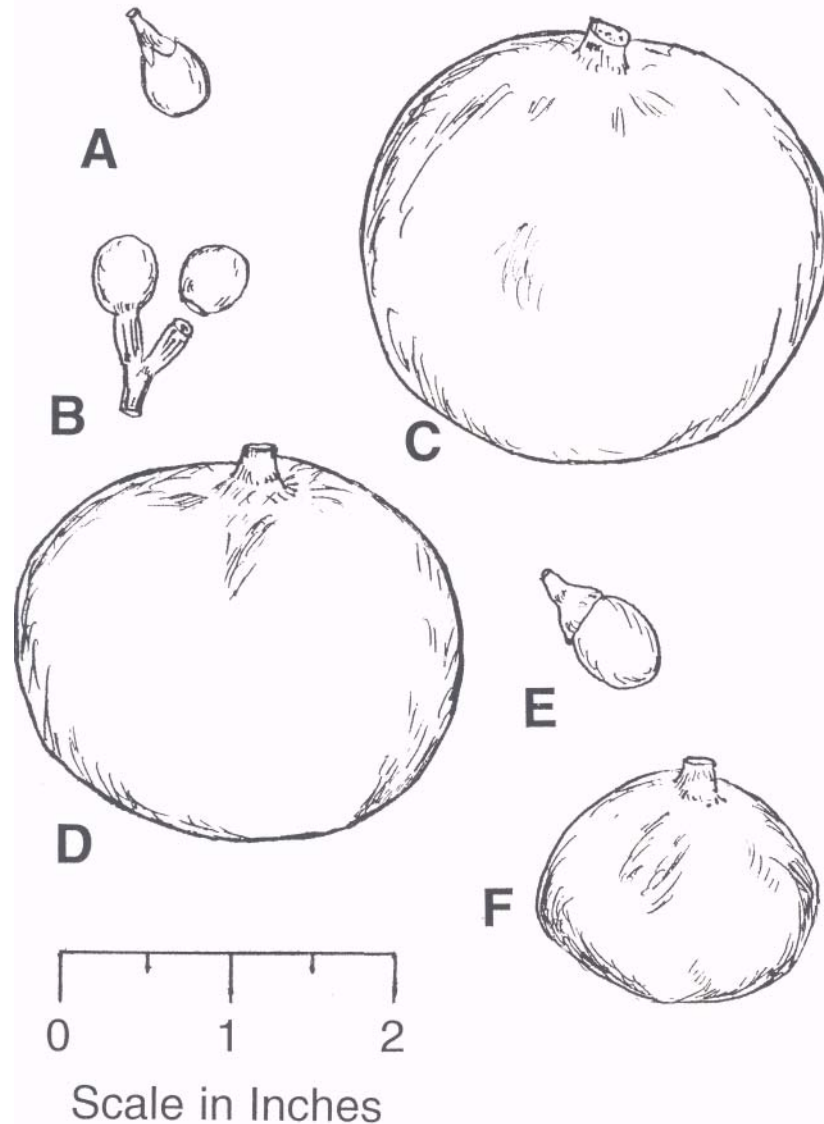
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The recent publication, "Fruits of the Rain Forest," has provided a beautifully illustrated account of a portion of the extensive native flora of the Queensland area of Australia<sup>2</sup>. Many of the species have been unknown until recently, except to the local people of the area. Only a few of these fascinating and attractive ornamental and possibly otherwise useful species have been introduced into California. Among the several plants bearing colorful and interesting fruits illustrated in this publication are several fleshy fruits which have been known to some extent for their potential value as crop plants. For example, the Burdekin plum (*Pleiogynium timorensis*-Anacardiaceae) and the Johnstone River Satinash (*Syzygium erythrocalyx*-Myrtaceae) and a few other species which are presently under trial for their attractive fruits. The edibility of the fruits of most of the rain forest species is not well known, and a few are listed as questionable or specifically poisonous. No mention is made concerning the potential value of any of the species for use in research and other investigations such as rootstocks for tree crop plants.

Among the Australian Lauraceae, the botanical family in which the avocado is classified, are three major genera which could be of potential value in research programs on the avocado. The genera *Endiandra*, *Beilschmedia*, and *Cryptocarya* are found in the rain forests of northeastern Australia generally as large trees, presently only utilized for some of their finer timber woods in the lumber trade<sup>1</sup>. Another large tree of possible value as rootstock are species of *Litsea*, the "laurel" of commerce which is also used primarily for its fine wood.

Some trees of *Endiandra* encountered in the native bush of Queensland can be easily and mistakenly identified as "feral" avocado. The tree itself is large, sometimes growing up to 90 feet or more in height. The leaf of this evergreen species is very similar to that of the ordinary avocado in size and shape and with a glossy surface. The fruit is often large, up to 2 or 2 1/2 inches in diameter, and green in color. The fruits of some species may develop a red, yellow, or russeted surface. At first glance and at a distance, one might identify some of the *Endiandra* trees as seedling forms of the well known Nabal avocado. A closer examination of the fruit indicates it has a comparatively thin pericarp of fleshy tissue and a very thick stony layer of tissue surrounding the large seed. Apparently the fruit is not eaten except by some animals, but it is not reported to be poisonous. The large seed is reported to have been roasted and eaten by some Aborigines. Some species such as *Endiandra palmerstonii* have been found to be drought and frost tender.



Sketches of fruits of Lauraceae From Australian rain forest (after Cooper):

A - *Neolitsea delbata*. B - *Lindera queenslandia*. C - *Endiandra anthropophagorum*. D - *Beilschmedia castrisinensis*. E - *Litsea leefeana*. F - *Cryptocarya oblata*.

Cooper's book lists 19 species of *Endiandra* which occur in the Queensland rain forest. These are generally known locally as "walnuts," with an associated descriptive character such as "brown walnut," "gully walnut," "hairy walnut," etc. Other walnuts have such commonly associated names as Northern rose, candle, coach, ball-fruited, buff, Noah's, rose, and Sankey's. The derivation of the use of "walnut" as a common name for this fruit is suggested by the hard and thick endocarp tissue which surrounds the seed and the non-edible fleshy outer portion of the fruit. The fruits of several species of *Endiandra* illustrated by Cooper are quite large. The fruits of *Endiandra anthropophagorum* and *E. insignis* are 2 1/2 inches in diameter and spherical in form. The fruit of *E. microneura* is long-oval in shape and about 2 1/4 inches in length. None of the fruits are said to be edible. Nearly all of the trees of these species are tall

reaching heights up to 30 meters or more under rain forest environment.

Some species of *Beilschmedia* also become large trees and bear large size fruit. *Beilschmedia castrisinensis* produces a large, spherical black fruit about 3 inches in diameter. The seven species of *Beilschmedia* are described as large trees and with various sized fruits none of which are said to be edible. The 12 species of *Cryptocarya* are commonly known as "laurels." Some of these trees are very large, up to 70 or more feet tall. They provide woods of excellent quality which are used in furniture and interior finishing. The black fruits are small,  $\frac{1}{2}$  to  $\frac{3}{4}$  inches long, and are eaten only by animals. One species of *Litsea* is described as a tree reaching 80 feet. The fruits of *Litsea leefeana* commonly known as "Bollywood," are inedible, small oval, and purple black, about one inch long and seated in a cup. Still another large tree in the rain forest is *Neolitsea* which produces a small red fruit about  $\frac{1}{2}$  inch in diameter, borne in clusters. Among the other member of Lauraceae found in the rain forest is the woe-vine, *Cassytha filiformis* a semi-parasitic vine which climbs over other vegetation much as common dodders (*Cuscuta* spp.-Convolvulaceae) which are found throughout many parts of the world.

The above brief descriptions of some of the more prominent botanical relatives of avocado found in the Australian rain forest are given to call attention to investigators and others of some comparatively newly described species of Lauraceae which could be of potential value in research programs on the avocado. Some of the materials could prove of use as attractive ornamental specimens. The use of such species could be of especial value in investigations on rootstocks and possibly for some of the breeding programs in avocado research. Some reports have indicated that *Endriandra* has been tried as a rootstock for avocado, but has not been successful<sup>4,5</sup>. Perhaps other species of *Endriandra* should be included in grafting or budding trials, using a wider range of materials or repeating the trials under various conditions. An example of drawing false conclusions from limited experiences is that noted when *Persea scheideana* was first tried as a rootstock for avocado. Wilson Popenoe reported in a personal letter that the coyo (*Persea scheideana*) tested as a rootstock in Honduras, "lacked compatibility" and that "eventually the trees failed to develop satisfactorily." Later, this same species was found to make excellent rootstock for several cultivars of avocado when tested in South Africa<sup>3,6</sup>. Examples of the utilization of species of fairly distant botanical relatives for rootstock in fruit cultivars is found in the citrus group. A major and important rootstock for cultivars of the evergreen species of sweet orange (*Citrus sinensis*), grapefruit (*C. paradisi*), mandarins (*C. reticulata*) and other edible citrus selections, is the deciduous species *Poncirus trifoliata*, which itself produces fruits which are generally considered as inedible. One might not expect this combination of an evergreen species grafted on a deciduous form to be successful or of particular advantage to the citrus grower. The highly beneficial effects of the dwarfing effects of the trifoliolate rootstock in this case is definitely of value. Another example of graft compatibility between species apparently widely separated in respect to botanical characters is the family Rosaceae. It is a common practice to propagate cultivars of the evergreen loquat (*Eriobotrya japonica*) on rootstocks of the deciduous species the quince (*Cydonia oblonga*). This combination results in a comparatively dwarfed, yet very fruitful and valuable tree for the grower. Thus, one should not reach conclusions on problems of grafting compatibility between any two species of woody plants without considering trials using a wide range of

materials and a sufficient number of trials under various environmental conditions. The constant challenge of seeking new avocado rootstocks which exhibit disease resistance; adaptability to adverse soil conditions such as high salinity, poor drainage; or other soil limitations, requires that all possible botanical relatives of the avocado be explored in respect to their budding and grafting affinity and long time compatibility. Some of the recently described rain forest species of Lauraceae must be considered for such trials.

## References

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