

The Carnauba Wax Palm (*Copernicia prunifera*).

IV. Economic Uses

DENNIS JOHNSON

Department of Geography, University of California, Los Angeles 90024

The carnauba palm has served as the source of a number of products in north-east Brazil. In fact, it has been used in such a variety of ways that there is a saying that a man can live entirely on its products. It was given the sobriquet "tree of life" by Denis (1837), and while this is descriptive it is a designation used to refer to many palms.

Surprisingly little is known about the economic uses of this palm prior to the description by Marcgravius and Piso (1648). They mentioned that the leaves were used as thatch for huts and for basketmaking, and that the wood of the trunk was used to make corrals for livestock. The latter is clearly a result of the Portuguese colonizers, while the former may be as old as the Indian tribes themselves. Nearly a century and one-half later, in a document dated 1783 quoted by Lins and Andrade (1960), the reported uses of carnauba were about the same. The only additional information included was that the fruit and starch from the tree were used as food by the poor people.

Medicinal Use

The roots of the carnauba, especially those of the white variety, have traditionally been used to make home remedies for the treatment of skin diseases, rheumatism, arthritis, etc. (Braga, 1960). The roots can be harvested in small quantities without destroying the tree,

which is important considering the rarity of the white carnauba.

Food Source

The fruit of the carnauba is utilized as food during times of crop failure, often associated with the recurring periods of drought. When green, the fruit may be cooked with milk to eliminate the tannin; when ripe it may be eaten raw (Valverde, 1964). If it is not used as food, the fruit is commonly used to supplement the diets of hogs, goats, and cattle.

The single seed within the fruit is reported to contain about 14 percent oil (Jamieson, 1943), and can be crushed to produce a satisfactory cooking oil. This oil content, however, is insufficient for oil extraction to be commercially feasible. In addition to providing an edible oil, the seed can be ground and roasted and mixed with coffee.

From the pith of the upper part of the tree, a starchy, floury meal can be prepared. The tree can also be tapped for its sap which can be used in cooking, drunk fresh, or allowed to ferment into a palm toddy.

The terminal shoot or heart of palm is edible and is generally extracted when a tree is felled for some other purpose. Heart of palm is part of the traditional diet of the region and is one of the rare green vegetables eaten.

As a substitute for salt, the roots of the common variety of carnauba are utilized.

Pieces of root are gathered and burned in a clay pot or metal pan and the ashes used directly on food.

Young carnauba plants can be browsed by domestic animals. In times of drought when other animal feed is lacking or in short supply, these plants will often be sacrificed. Leaves of the mature palms can also be harvested and chopped into small pieces for animal feed.

Wood Source

The settlement of the semiarid portions of northeast Brazil by cattle ranchers brought with it a demand for general purpose construction wood which could not be satisfied by the dicotyledonous trees of the thorn forest. The straight trunks of the carnauba, therefore, became important in building corrals, as already mentioned, and for ceiling beams in houses and other structures.

The most desirable qualities of carnauba wood are resistance to termites, of major importance in the tropics, and to dry rot. In salt water it is also rot-resistant and this has prompted its use in bridge construction in tidewater areas and as a piling for docks (Souza Pinto, 1928).

The wood has also been used in cabinet work and for making canes. It is hard, yellowish-red in color, lined with black veins, and is said to take a fine polish. It appears, from a reference by Seeman (1863), that carnauba wood was prized enough to be exported and was occasionally found in the timber yards of London.

Despite increased protection of carnauba stands because of wax harvesting, the tree still serves as a wood source for such things as ceiling beams. Specialized uses such as for cabinet work, however, appear to have completely disappeared.

The petiole of the carnauba leaf serves in a number of ways as a wood substitute. It is used in the building of the

simple mud-and-stick houses, for making lightweight fences to keep animals out of household gardens, and for domestic items such as broom handles and corks for bottles.

Fiber Source

Carnauba leaves have long been used to make hats, baskets, brooms, mats, hammocks, and other similar items. The new leaves yield a fine fiber which is used for quality baskets and hats, while older leaves have a coarser fiber better suited to heavier items. Under the old method of extracting wax from leaves by sun-drying and shaking them to dislodge the wax particles, the spent leaves could be used for fiber.

In the late nineteenth century it is reported that fiber was exported to Europe and used as stuffing in mattresses and furniture, as well as for making hats, baskets, etc. (Howes, 1936). Fiber use in Brazil expanded early in the present century and by the 1920s hat making had increased in Ceará to the extent that hats were being shipped to other parts of the country.

The adoption of the Guarany-Ciclone machine for wax harvesting had major consequences, for by chopping up the leaves to liberate the wax, the raw material for the fiber industries was destroyed. Fortunately some carnauba leaves continue to be harvested by the old manual method, thereby providing fiber for small-scale manufacture of the items mentioned.

Wax

In chronological terms wax is the most recent economic item derived from the carnauba. Its initial use was for making candles in Brazil, first reported about the turn of the nineteenth century (Arruda da Câmara, 1810). A few decades later the wax became known in Europe and the

first exports took place in 1845 from Ceará. In addition to its use in candle-making, there was interest in Europe in using the wax as a protective coating for parquet floors (Macedo, 1867). This application only became important, however, in the 1890s when the S. C. Johnson & Son, Inc., of Racine, Wisconsin adopted it as a prime ingredient in their floor polishes.

The present century has witnessed a slow but steady expansion of markets for carnauba wax. While floor polishes and carbon paper were initially the largest consumers, they have in recent decades reduced sharply their usages. Fortunately at the same time other applications have been developed in a variety of products from lipstick and candy to coating for electric cable, and this has helped maintain demand for the wax.

The future of carnauba wax as an industrial raw material might be termed cautiously favorable. Most detrimental to expanding the international market is the high price of the wax, which has sold for as much as \$2.25 per pound. Variability of wax quality is another factor which complicates its use in carefully controlled product formulas. Ironically, the development of mechanized wax extraction which brought about higher yields per leaf, also added impurities which are difficult to remove.

Price and variable quality were the two main reasons why carnauba wax users looked for substitutes wherever possible. In a number of instances other vegetable waxes were tried, but they too had similar drawbacks.

The stiffest competition has come from nonvegetable waxes. Montan wax, obtained from lignite, was one early replacement. More recently the synthetically derived polymers have cut deeply into carnauba wax usage for floor polishes. Their advantages are threefold:

one, a reasonable, steady price; two, complete lack of impurities; three, simple composition and qualities which can be varied to suit specific formulas.

The use of carnauba wax as a raw material in Brazil is one of the keys to its continued significance, and recent data are encouraging. In the early 1960s, for example, an average of 1,400 metric tons per year was being used by Brazilian industries. This level of usage represents about 12 percent of the total production (SUDENE, 1967).

Conclusion

This series of papers has dealt briefly with various aspects of the carnauba palm and its utilization by man. The palm has been the source of a number of different products in northeast Brazil, culminating with its exploitation as a wax source. Despite measures and proposals to standardize quality and reduce production costs, the carnauba's future as an international wax supplier is uncertain due to increased competition from substitutes. Whatever its eventual role as a wax producer, secondary uses of this palm will always be of some local importance, and the association between man and the carnauba palm will continue.

LITERATURE CITED

- ARRUDA DA CÂMARA, M. DE. 1810. Discurso sôbre a utilidade da instituição de jardins nas principaes provincias do Brasil. Rio de Janeiro. Quoted in translation in Koster, H. 1816. Travels in Brazil.
- BRAGA, R. 1960. Plantas do nordeste, especialmente do Ceará. 2nd ed., Fortaleza, Brazil.
- DENIS, F. 1837. Brésil. Paris.
- HOWES, F. N. 1936. Sources of vegetable wax. Bulletin of Miscellaneous Information 10. Royal Botanic Gardens, Kew, U.K.
- JAMIESON, G. S. 1943. Vegetable fats and oils. 2nd ed. New York.

LINS, R. C. & G. C. DE ANDRADE. 1960. Os rios-da-carnaúba. Instituto Joaquim Nabuco de Pesquisas Sociais, Recife, Brazil.
 MACEDO, M. A. DE. 1867. Notice sur le palmier carnauba. Paris.
 MARCGRAVIUS, G. & G. PISO. 1648. *História naturalis Brasiliae*. Pt. 2. Amsterdam.
 SEEMAN, B. 1863. *Die Palmen*. Leipzig.

SOUZA PINTO, G. DE. 1928. *A carnaubeira*. Fortaleza, Brazil (pamphlet).
 SUDENE (Superintendência para o Desenvolvimento do Nordeste). 1967. *Estudo dos principais extrativos vegetais do nordeste*. Recife, Brazil.
 VALVERDE, O. 1964. *Geografia agrária do Brasil*. Rio de Janeiro.

Palmologue Letters and Excerpts

One might question the authenticity of "Palmologue." Whence sprang its etymology? This new feature might just as well be called "Palmology," for both "ology" and "logue" are combining forms signifying discourse and either one would fit without too much strain. Straws were drawn to resolve a choice, and there it is up there as a title or sort of buoy to mark the course.

Not long ago I remarked to the editor of this journal that a good many letters about palms, or at least referring to them, come my way and had the temerity to suggest that a fair number of readers of PRINCIPES might welcome a regular feature consisting of such letters or excerpts from them. I said they would go a long way towards mollifying the feelings of honest dirt-gardeners who are dismayed by technical matter and yearn for articles the literary faculty would term of the earth earthy, the phrase

they snitch from I. Corinthians. The editor, Professor Moore, knew that this meant palm culture, and the dirtier the better. He tossed the ball to me with alacrity and told me to run with it.

The matter quoted may be thoroughly unscientific, or learned, or sprightly, or inaccurate, or novel, depending on the propensities, knowledge, whimsy and sphere of interest of each correspondent. But even more than on any of all that, it will have to depend on whatever comes to hand. Some of it may be several months old, for PRINCIPES appears but quarterly and there is a further lag caused by the time that elapses in preparation of the typescript and its travels first to the editor and then to the printer and finally when printed to the readers.

The quoted letters and excerpts are in roman type. My added comments, if any, appear in italics.

—Dent Smith

From Mr. Kyle E. Brown, Raleigh, N. C., May, 1972.

It was with considerable interest that I read your article on *Serenoa repens* in the most recent issue of PRINCIPES. You and I share a love for this most maligned and little appreciated plant.

Since visiting with you last, just before the Society meetings in Melbourne two years ago, I have ranged far and wide in the south Atlantic coastal states doing research on *Sabal Palmetto* for my doctoral thesis at North Carolina State University. On these various trips I have been continually on the look-out