

# Rooibos Tea, *Aspalathus linearis*, a Caffeineless, Low-Tannin Beverage<sup>1</sup>

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*Rooibos tea* (*Aspalathus linearis*, formerly *A. contaminatus*), is a leguminous shrub with needlelike leaves native to mountain slopes of western Cape Province, South Africa. Its beverage use by the Hottentots was first reported by the botanist Carl Thunberg in 1772. About 1900, it began to be marketed and then domesticated on a small scale. Seed selection and improved cultivation and processing started in the 1920s. Important advances were made in 1930. Demand for the product jumped during World War II because of the shortage of Oriental tea, then declined. The industry was stabilized in 1954 and continued to expand, with exports to Australia, New Zealand, Europe, the United Kingdom, Canada and, to a very limited extent, the United States. A fungus disease, then drought, followed by floods temporarily reduced the supply in 1980. The tea is gaining recognition for its freedom from caffeine, low tannin and high ascorbic acid content. It contains the antispasmodic principle, quercetin, and is said to have enough fluoride to inhibit caries. Consumer tests indicate that rooibos tea may be an acceptable alternative to tea, coffee, cocoa and high-caffeine soft drinks.

Rooibos tea (*Aspalathus linearis* R. Dahlgren; syns. *A. contaminatus* Druce; *A. corymbosus* E. Mey.; *Borbonia pinifolia* Marl.; *Psoralea linearis* Burm.) (Peterson and Dahlgren 702, G. P. and D. 1032, University of Lund; original spec. "*Psoralea linearis*" in Burman's herbarium, Geneva) (Dahlgren, 1964), a member of the Leguminosae, is increasingly recognized as one of the relatively few economic plants that have made the transition from a local wild resource to a cultivated crop in the 20th century.

In 1947, Ralph Holt Cheney considered rooibos tea too insignificant to mention in his report on "The biology and economics of the beverage industry." Sixteen years later, Cheney and Elizabeth Scholtz (1963) reviewed its botany, culture, harvesting and marketing in an article entitled "Rooibos tea, a South African contribution to world beverages." During the past 17 yr, this crop has suffered several setbacks but has become firmly established as a potential competitor for conventional tea and coffee.

The common name, meaning "red bush tea," is variously rendered rooibos tee, rooibosch tea (or tee), rooitea or rooitee, or, simply, red tea; and the plant is also called koopmans tea, naald tea, or speld tea. The product is sold in West Germany as roter busch-tee or massai-tee (Benk, 1961), and, in the United States, under the trade name, "Kaffree Tea".

## ORIGIN AND DESCRIPTION

The plant is of very limited distribution, occurring naturally only in the western districts of Cape Province, particularly the Cedarberg Mountains and higher areas

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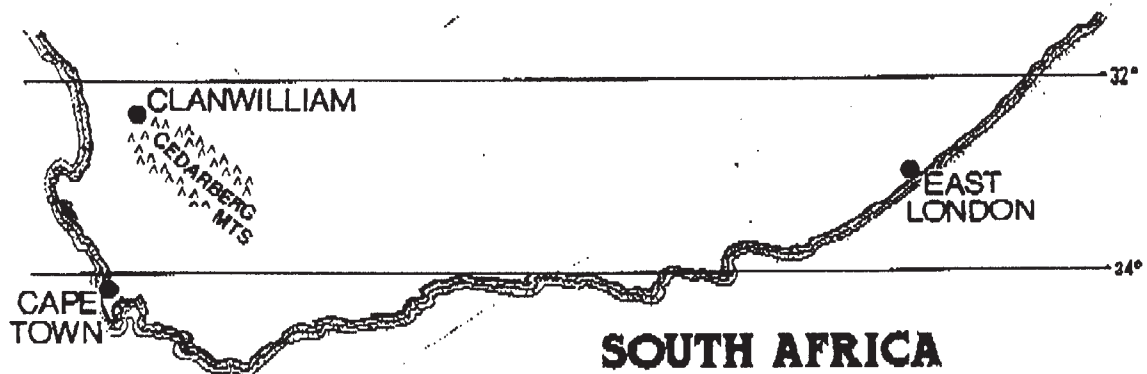


Fig. 1. Rooibos tea, *Aspalathus linearis*, is found wild and cultivated only in the western districts of the Cape Province of South Africa, particularly in the Cedarberg Mountains. (The spelling "Cedarberg" appears in most of the literature. Rooibos Tea Control Board has now adopted "Cederberg." Rand McNally's, *The International Atlas*, 1969, p. 148, shows "Sederberge." Of course, the word "mountains" is repetitious in view of the word-ending, "berg/berge.")

of the northwestern Cape (Fig. 1). Attempts to grow it elsewhere in South Africa have not been successful.

Rooibos tea (pictured by Cheney and Scholtz in their Fig. 2, 3, and 5) is an erect or straggling, slender-stemmed subshrub 1.35–2 m tall. It is fairly closely related to other South African low, bushy legumes of the genera *Lebeckia* and *Cyclopia*. Some species of the latter have been employed as "boertee" or "bosietee" (Adamson and Salter, 1950).

In *Aspalathus linearis*, there is a strong taproot descending to 2 m or more; the branches are red-brown, about 60 cm long, the leaves linear, needlelike, 2–6 cm long; the flowers, of typical "pea" form and borne in short clusters, are yellow, 6.5 mm long (Fig. 2). The seedpod, lanceolate, downy, 1.5 cm long, contains a single tiny, hard, yellow, kidney-shaped seed which is flung out when the pod splits open.

There are 4 naturally-occurring forms: 'Rooi Tea,' 'Vaal Tea,' 'Swart Tea' and 'Rooibruin Tea.' 'Rooi Tea' is subdivided into 2 types: 'Nortier,' which is the selected, improved type recommended and cultivated; and 'Cedarberg' which, while otherwise similar, has a broader and coarser leaf and grows wild in the Cedarberg Mountains around Clanwilliam. Buchu, *Agathosma* spp., the dried leaves of which are widely used for their diuretic effect and yield a commercial flavoring oil (Morton, 1976), abounds in the same region.

#### CLIMATIC AND SOIL REQUIREMENTS

Rooibos tea needs a Mediterranean-type climate. It is not found below 450 m above sea-level and flourishes only up to an altitude of about 900 m. It is sensitive to frost and snow when very young, but mature plants are adapted to cold winters and hot summers. The optimum annual precipitation of 380–635 mm takes place mainly in the winter, with occasional showers in early summer and again in late fall.

Deep, well-drained, sandy, acid soil (4.5–5.5 pH), rich in phosphate and potash, is essential. The plant has a well-nodulated root system, efficiently fixing its own nitrogen. Rooibos tea growing areas are highly favorable for orange production.

## CULTIVATION

Seed germination is ordinarily slow and may be delayed several years, but can be hastened and sprouting induced in a few days by scarifying or treating with acid. With 75% germination, 1/2 kg of seed should produce 40,000–50,000 plants. Seedlings are set out in midsummer when 3–4 mo old and 13–18 cm high (Fig. 3). The plants were close-set in the past but growers are now advised to space them 0.91 m apart in rows 2.7 m apart to reduce competition for moisture and allow room for mechanical operations. When 8–12 mo old, they are cut back to a height of about 30 cm to force branching. They are ready for harvesting 2 yr from planting and in full production after 3 yr. A mature bush yields 113–226 g dry tea per crop. Rooibos tea plants may live 20 yr but become filled with dead wood in the center, so that the feasible lifespan in plantations is 6–7 yr.

During the summer and early fall, men with sickles cut the tops off at about 45 cm, tie them in bundles and convey them to yards where, after a wilting period, they are machine-cut into 5-mm lengths, spread out on concrete platforms, soaked with water (10 l per 35 kg of plant material), bruised by tractors and turned and wetted 3 times to stimulate enzyme activity, then spread in heaps 15–30 cm deep (depending on width) and covered with bags to ferment for 8–24 h while being frequently turned. All these processes are carefully controlled to achieve the desired results. Finally, the tea, now uniformly red-brown, is spread out in thin layers to sun-dry to 11% moisture content, sifted through 3-mm screens, bagged and delivered to the Rooibos Tea Control Board in Clanwilliam. There it is graded, mechanically screened of any foreign matter, stored according to grade, and kept in quarantine for 3 mo prior to release to packers. A quality certificate is supplied to shippers. The tea must travel 640 km by truck and then 2,400 km by train to reach Cape Town for shipment abroad (Cheney and Scholtz, 1963; Ginsberg, 1977; Nolte, 1968; Rooibos Tea Control Board, 1982; Theron, pers. comm.)

## HISTORY AND CURRENT STATUS

The Hottentots' use of this plant for beverage purposes was first reported by the botanist Carl Thunberg in 1772 (Thunberg, 1795–1796). Early settlers adopted the practice, lopping the bushes as needed, chopping the branches with axes, bruising with mallets, and letting them cure in heaps. Marketing began in 1902 and then domestication on a small scale, the leading pioneer being Barend Ginsberg, founder of B. Ginsberg (Pty.) Ltd., of Cape Town, today the largest packer and distributor of rooibos tea in South Africa. Important advances were made in the 1930s thanks to the zeal of Dr. P. le Fraais Nortier, a physician greatly impressed with the wholesomeness of the product as compared with prominent stimulating beverages.

The first plantations were established in the Pakhuis Mountains by Nortier's friends and supporters, Oloff Bergh and William Riordan. Local people were paid to collect seeds for planting and it is recorded that one Hottentot woman always

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Fig. 2–3. Fig. 2. *Aspalathus linearis* has needlelike leaves and yellow flowers in small clusters. Photo courtesy Rooibos Tea Control Board. Fig. 3. Rooibos tea seedlings 90 days old in experimental plot in a nursery. Photo courtesy Rooibos Tea Control Board.



brought in the most. She reluctantly admitted that she had followed a black ant carrying a seed to its hill where she found a large cache. Thereafter, ant hills were sought out and some have yielded as many as 25,000 seeds (Ginsberg, 1977; Heard and Faull, 1970).

Demand for rooibos tea jumped during the shortage of Oriental tea in World War II, then declined because the scarcity of high-grade seed led to the marketing of inferior grades. The industry was stabilized first by the forming of the Clanwilliam Tea Cooperative in 1948 and further by the creation of the Rooibos Tea Control Board in 1954. Trade continued to expand with exports to Australia, New Zealand, Europe, the United Kingdom, Canada, and, to a very limited extent, the United States. In the past 2 decades, South African consumption has increased from 848,512 to 3,363,245 kg/yr, and exports rose from 14,530 kg in 1968 to 139,720 kg in 1978 (Hanekom and Snyman, n.d.). A fungus disease, then severe drought, followed by disastrous floods temporarily reduced the supply in 1980–1981, but the industry has made full recovery with extensive new plantings (Theron, pers. comm.).

#### CHEMISTRY AND PHYSIOLOGICAL EFFECTS

Rooibos tea is caffeine-free and contains up to 15.7 mg/100 g ascorbic acid. Other constituents, according to an analysis supplied by the Rooibos Tea Control Board, are: tannin (as gallic acid), 4.4%—on the average after boiling 30 min (So. African Dept. Agric. Techn. Serv., 1976); protein, 6.9%; ash, 2.5%; soluble ash, 1.3%; petroleum ether extract, 1.7%; iron, 0.33%; alumina, 0.99%; calcium, 0.20%; magnesium, 0.33%; potash, 0.56%; manganese, 0.012%; phosphate, 0.12%; sulphate, 0.11% (Rooibos Tea Control Board, 1982).

In a cup of normally brewed rooibos tea (see "Preparation and Uses") there have been found: protein, 300 mg; iron, 2.8 mg; calcium, 18 mg; magnesium, 28 mg; potash, 47 mg; phosphate, 10 mg (Rooibos Tea Control Board, 1982); quercetin (a flavonol), 1.5 mg (Snyckers and Salem, 1974). In addition, rooibos tea contains sufficient fluoride to have some anticarcinogenic value. In 5 samples, brewed 3 min, the fluoride content was found to be 1.42, 1.65, 1.53, 0.44 and 0.66 mg/l, the mean being 1.14 mg/l. Addition of milk tended to reduce the free fluoride ion concentration of the tea, the fluoride bound in milk being not completely diffusible (Hanekom and Snyman, n. d.). The low tannin content of rooibos tea makes the addition of milk unnecessary. The fluoride content of conventional black tea ranges from 0.92–1.56 mg/l, and the addition of milk is essential if one wishes to avoid the deleterious effects of the high tannin level (11.5–33%) (Morton, 1980).

Further advantages of rooibos tea are that its low tannin content presents little or no interference with the digestibility of protein, and it does not elevate a tendency toward constipation; nor does it cause hyperacidity. Rooibos tea does not inhibit iron absorption as does conventional tea. In one study utilizing young, healthy males, mean iron absorption after ingestion of water was 9.34%; after rooibos tea, 7.25%; after ordinary tea, 1.70% (Hesseling et al., 1979).

While rooibos tea is, first and foremost, a beverage, South African consumers and their physicians regard it as not only harmless—even to infants, and cardiac and kidney patients—but beneficial to the system, improving the appetite, calming digestive disorders, reducing nervous tension and promoting sound sleep. In 1968, the Rooibos Tea Control Board was attracted to its healthful aspects by the case

of an approximately 1-yr-old infant allergic to milk, able to tolerate only a soybean formula, and chronically suffering stomach cramps, vomiting and restlessness. The child had failed to respond to the usual medical treatment. She weighed only 8.5 kg. Then one day the mother, Mrs. Annetjie Theron, of Pretoria, intending only to hasten the warming of the fretful baby's bottle, added some hot rooibos tea from her teapot. The child relished the bottle, relaxed, and was thereafter given the same combination. She gained 2 kg in the next 10 days and her digestive trouble vanished. Mrs. Theron was so impressed with the results that she spread the news through the press and in person on lecture tours covering 40,000 km. Her book, *Babas, Allergie en Rooibostee*, was published in 1974 (Cape Times, 1974; Rooibos Tea Control Board, 1982).

The soothing effect is believed attributable to the quercetin which has well-known antispasmodic action. One average cup of rooibos tea, as stated, contains 1.5 mg of quercetin. The LD<sub>50</sub> (oral) is reportedly 160 mg/kg but repeated doses up to 3,000 mg/kg have shown no toxic effects (Snyckers and Salem, 1974). Apart from this factor, one might say that rooibos tea is healthful not so much for what it does but because of what it doesn't do! Therefore, it should not be classified as a medicinal infusion. It is, rather, a salubrious beverage.

#### NEED FOR WIDE RECOGNITION AND BETTER DISTRIBUTION IN THE UNITED STATES

Rooibos tea is shipped from South Africa to this country in 35-kg, double plastic-lined burlap bags at a total cost of \$2.40/kg (as of 1979) in shipments of over 10,000 kg (Theron, pers. comm.). At present it is imported in 11-ton quantities only by the firm of Erwin, Harrison and Whitney of Bronxville, NY, for packing and distributing by Worthington Foods, a subsidiary of Miles Laboratories, Inc. It is put in tea bags, packed 16 to the box, net weight 28.35 g (1 oz) and currently sold under the name "Kaffree Tea" at a price of \$1.15,<sup>2</sup> which would make the retail price \$40.56 per kg; \$18.40 per lb. At this rate, few could afford to drink it regularly. Rooibos tea in tea bags sells in South Africa for about \$6.60/kg (\$3.00/lb) (Rooibos Tea Control Board, 1982).

In late 1978, feeling deeply the public need for a safe beverage, I asked a colleague, Dr. Elizabeth Rose, National Research Institute for Nutritional Diseases, East London, South Africa, to send me a sample of rooibos tea. She sent 3 different brands, 'Freshpak,' 'Laager,' and 'Oude Kaap,' each box containing 100 g loose tea in a waxed paper sack. I drank the tea, hot or cold, for several weeks and was so favorably impressed that I asked the South African Embassy in New York to recommend a source of supply. They mistakenly referred me to the A. R. Wagner Organization in Philadelphia which directed me to V. Laing Theron (Pty.) Ltd. in Worcester, South Africa. This exporter, eager to cooperate with my desire to popularize rooibos tea in this country, has furnished the bulk tea in generous quantities for me to serve at horticultural, botanical and other meetings and social gatherings. I have shared the tea with certain institutions and individuals expressing a particular need. It was unknown at Dr. Nathan Pritikin's Longevity Research Institute when I sent a sample in February 1979. Trials there

<sup>2</sup> In some specialty shops, the price may be higher, as much as \$4.00 (Dr. A. D. Krikorian, State University of New York, Stony Brook, NY).

were so satisfactory that they adopted this tea for regular service to patients. It is now consumed in quantity by the staff of the Pritikin Research Foundation in Santa Barbara and accepted as a standard beverage by the recently formed Pritikin Foods Division of Thompson Medical Co., New York.

I have recently received from B. Ginsberg (Pty.) Ltd., some very attractive 100-g packages of their "Eleven O'Clock" brand, loose, together with 100-g packages of the same in tea bags—40 to the box (Fig. 4). Information also supplied by Mr. G. Du Plessis, Managing Director, has contributed substantially to this updating of the rooibos tea "story."

Dried rooibos tea has a most agreeable aroma and the beverage has a pleasant, nonastringent taste. A few persons have remarked on an initial "hay-like" tone but most quickly acquire a fondness for it. Most individuals to whom I have given supplies soon ask where they can obtain more at a reasonable price because they want to drink it every day. My goal is to persuade some public-spirited packer to import, pack it and distribute it to grocery stores and supermarkets under its own name and on a basis competitive with conventional tea and coffee. Boxed as "Kaffree Tea" (Fig. 5), it is easily confused with "Caffeinefree tea" (Golden Harvest Brand) which, while nonstimulating, still possesses its full complement of condensed catechin tannin.

It is claimed in South Africa, and I have found it true, that a portion of rooibos tea will yield twice as much full-flavored brew as the same amount of ordinary tea. Therefore, even if the price were equal, rooibos tea would be far more economical.

#### PREPARATION AND USES

Rooibos tea is chopped very fine and a fine-mesh strainer is needed for bulk tea to avoid particles in the brew. A perforated aluminum tea ball serves very well. Dealers suggest that one use 1 level teaspoon of rooibos tea per cup, pour boiling water over it, and let it steep for a few minutes (to attain whatever strength desired) and strain. If brewed in quantity—most easily and crudely by boiling a handful in 2 l (2.1134 qt) of water—excess tea can be kept on hand and reheated when needed. It will not become cloudy, become bitter, nor lose any of its flavor or color.

To serve iced rooibos tea, the directions say to use 2 teaspoons per cup of boiling water, steep, strain, and add ice. If one wishes to retain as much as possible of the ascorbic acid, one can make cold rooibos tea simply by filling a tea ball, hooking the chain over the edge of a glass of water and letting it stand in the refrigerator until wanted. The infusion can be drunk as is or diluted to suit one's taste. For the young, it is much more suitable than high-caffeine soft drinks.

Hot or cold, the brew can be sweetened with sugar, sugar substitutes or non-

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Fig. 4-5. Fig. 4. Rooibos tea is a popular beverage among South Africans. It is packed under various commercial brands, loose or in tea bags. "Eleven O'clock" is the product of R. Ginsberg (Pty.) Ltd., of Cape Town. Fig. 5. Rooibos tea is imported and distributed in the United States only by Worthington Foods under the label "Kaffree Tea." On the back of the box it is identified as "leaves of the rooibos tea plant (*Borbonia pinifolia*)."



ey—though it really needs no sweetening—diluted with milk, or flavored with cinnamon or other spices, with lemon juice or any other fruit juice or juice concentrate as preferred. Rooibos tea makes an excellent base for punch.

A glamorous book, *80 Rooitea Wonders*, produced for the Rooibos Tea Control Board, provides recipes not only for rooibos tea beverages, but for using rooibos tea in gelatin desserts, puddings, custards, tarts, cakes, nut loaf, muffins, breads, cookies, aspics, jellied salads, stews, meat casseroles, and in meat sauces. The possibilities are endless, thus greatly enlarging the potential role of rooibos tea in the diet of infants, children and adults.

#### CEDARBERG SERENITY

by Margaret Lawder

Journey from the lovely little town of Clanwilliam over the Pakhuis Pass into the heart of the Cedarberg, and history unfolds its own story

... Here, in this wondrous mountain region of the Western Cape, the majestic protea, *Protea arborea*, blooms. It is commonly called *waboom* tree (wagon tree), for way back in the time of the early settlers its wood was used to make brake blocks for the wagons in which they travelled.

... work is still worship. Tending gardens is still a vital part of mission life—the still long-skirted, sun-bonneted women hang the mealie cobs from their plots to dry in the sun with the peaches, apricots and grapes.

The women, too, gather and dry *rooibos* (red bush) tea, famous for its refreshing and medicinal qualities . . . .

Here, too, the gentle art of relaxation is still part of life's even flow . . . . [A caffeine-free society? JFM]

Excerpt from *South African Digest*, 25 June 1971.

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## Book Review

**The Piñon Pine. A Natural and Cultural History.** Ronald M. Lanner. 208 pp. Illus. University of Nevada Press, Reno, 1981. \$13.50 (hardcover); \$8.50 (paperback).

While Lanner's book is basically technical, it is written in a readable and entertaining style that will appeal to a wide public beyond the botanically trained audience.

It is often believed that pinyon pine "nuts" are relatively unimportant as foods, but locally they constitute a valuable adjunct to Indian diet. Growing where the flora is extremely sparse because of desert conditions and producing ample supplies of nutritious seeds, these pines have usually not been accorded the botanical and ethnobotanical attention they deserve.

Lanner, professor of forestry at Utah State University, has devoted many years to taxonomic, paleobotanical, genetic, dendrological, and physiological research on the pinyon pine. This book considers many aspects of the tree: evolution, ecology, its relationship to man and the inter-relationships between the pine and animals, land management policies affecting the tree, and many others. A section on harvesting and cookery of pinyon nuts by his wife, Harriette Lanner, completes the book.

Throughout the treatise the author's deep love of the tree is evident. "Man, impressed by power, judges trees by their size. We name our grand sequoias after generals and praise our redwood, firs and tall pines . . . . Trees that live more modestly . . . are thought poor and humble, objects of pity. The piñon pine . . . is regarded as lowly, a pygmy, a dwarf, a scrub conifer . . . . But a tree is what you make of it, and once, much was made of the piñon. This little tree produced the fuel, building materials, food and medicines that enabled pre-historic Indians to establish their cultures . . . and to survive into the present . . . ."

Would that more of our minor economic plants had such absorbing and inclusive volumes dedicated to their understanding. This little volume is a big contribution to economic botany.

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