

LACTICIFEROUS PLANTS OF THE
KARAPARANÁ-IGARAPARANÁ REGION OF
COLOMBIA

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(received September 27th, 1965)

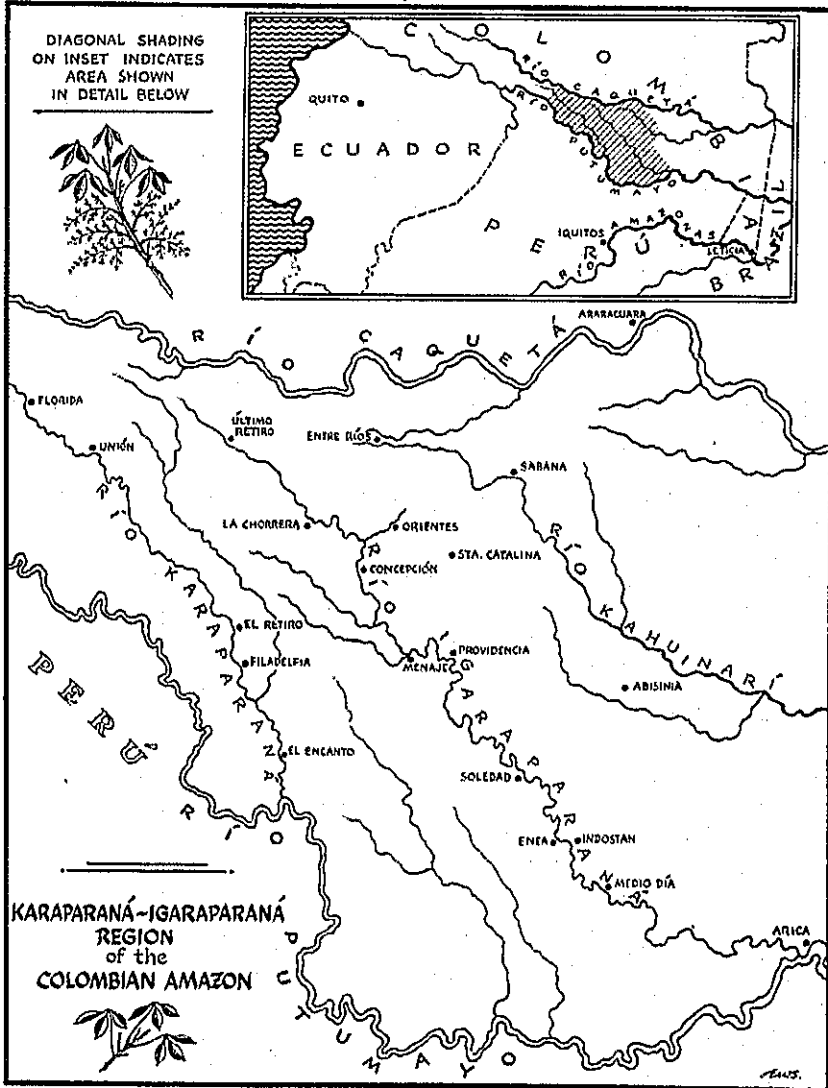
During the first fifteen years of the present century, the production of rubber from wild trees was a thriving, though nefarious, industry in the northwestern part of the Amazon Valley. The heaviest concentration of this primitive forest industry — and the most widely notorious — was centered in the area drained by the Ríos Karaparaná and Igaraparaná, northern tributaries of the Río Putumayo, lying between the Ríos Putumayo and Caquetá (Map 1).

In this hey day of rubber production, the area was claimed by both Colombia and Peru, but the Peruvians actually occupied and exploited it. As a result of the war between Colombia and Peru in the early 1930's, the boundaries have been set with the Río Putumayo as the frontier. Colombia is now in possession of the areas north of the Putumayo, which are incorporated into the Colombian political unit known as the Comisaría del Amazonas.

Historically, the "Putumayo", as this former rubber-producing area is known, holds great importance, if only because of the uncontrolled and inhuman atrocities committed on defenceless and peaceful Indian inhabitants by agents of the rubber company (Peruvian Amazon Company). As a result of mistreatment, disease and malnutrition, a decrease of the native population from an estimated 40 000 or 50 000 to about 10 000 during the first decade of the century took place. These troubled times and the region and its geography have been very thoroughly reported in W. E. HARDENBURG: "The Putumayo — the devil's paradise" (1912), T. WHIFFEN: "The north-west Amazons" (1915) and P. SINGLETON-GATES and M. GIRODIAS: "The black diaries of Roger Casement" (1959) 201-315.

Botanically, this region holds great importance, insofar as rubber is concerned, because of the kinds of trees that were exploited. The rubber produced here fell far short of being a product of high quality, but tons of it did enter world commerce, and specimens from the source trees have occupied, at times, the critical attention of taxonomists and economic botanists. Indeed, new species of *Hevea* have been based on several collections made in the area.

During the course of taxonomic studies of *Hevea* and its close ally *Micrandra* and the preparation of a paper on minor rubber plants of Colombia, I have had to take into historical and botanical account specimens and information relating to the so-called "Putumayo" rub-



Map 1.

er boom of the early years of this century. I have tried to interpret some of the data in the light of field experience gained in this area in 1942. Supplementary to certain data in the literature, herbarium specimens and documents preserved at the Royal Botanic Gardens, Kew, have been most helpful. I wish to acknowledge the kindness of the authorities at Kew who, during my visits there in 1947 and 1950, and, most recently, in May, 1964, have placed their wealth of material at my disposition.

We have a rather complete collection of specimens from the region of the Karaparaná-Igaraparaná made by Mr. Walter Fox in 1910. Interesting notes on these collections were published in the Kew Bulletin of Miscellaneous Information for 1912 (1912) 74. Although the merciless exploitation and barbarous treatment of the natives were carried out by local employees of the Peruvian Amazon Company, much of the company's capital was British. As news of the atrocities, ever more alarming, leaked out and found its way to London, British representatives were sent over to these remote Amazon forests to investigate the working and living conditions of the native rubber tappers. Fox, former Superintendent of the Botanic Garden in Penang, Malaya, was one of these commissioners. He was not a taxonomic botanist, but he rendered science a unique service in collecting botanical material of the sundry laticiferous trees under exploitation in this part of the Amazon by the Company and in making significant botanical observations during his other official duties. There is at Kew an unpublished letter of Fox's which, since, in addition to a few notes on rubber, it indicates his breadth of interests, I am publishing in its entirety at the end of this article.

The material of laticiferous plants collected by Fox in the northwest Amazon and preserved at Kew represents an interesting survey of species and genera. Although we are concerned mainly with *Hevea* in this present article, I should point out that other genera are represented.

Castilla. *Castilla Ulei* reported as "probably *C. elastica*, though somewhat different from the type", was said to be the source of *caucho negro*, known by the Witoto name of *efacone*. It occurs in quantity only "near the Caquetá and Putumayo rivers". I met with a number of trees of *Castilla* rubber in the Igaraparaná in 1942, but I was not able to collect specimens of any.

Micrandra. According to Fox, the latex of *Micrandra minor*, known in the native tongues as *huemega* and *waketi erwichei*, was mixed with that of *Hevea*, but continued felling of the trees was making them rare. I was able, in 1942, to collect a specimen of *Micrandra minor* along the flood-bank of the lower Igaraparaná (Schultes 4035). Not far distant, in a light-forested sandy savannah, I found *Micrandra siphonioides* (Schultes 4049) (Fig. 1). Although both species were called by the same Witoto Indian name (*wer-meger*), the natives indicated that only *Micrandra minor* had formerly been used as a source of rubber (Plates I and II). In Fox's letter published below, the tree known by the natives as *hurmegea* is tentatively identified as a *Sapium*. Although *Sapium* is found in the area and can be exploited as an adulterant of *Hevea*, Fox apparently did not collect it on his trips.

Zschokkea. Fox reported that an endemic species of *Zschokkea* called *mingadotana* by the Witotos (Fox 31), *Z. Foxii* Stapf, likewise disappearing because of felling, gave a latex that was mixed with

MICRANDRA siphonioides
Bentham

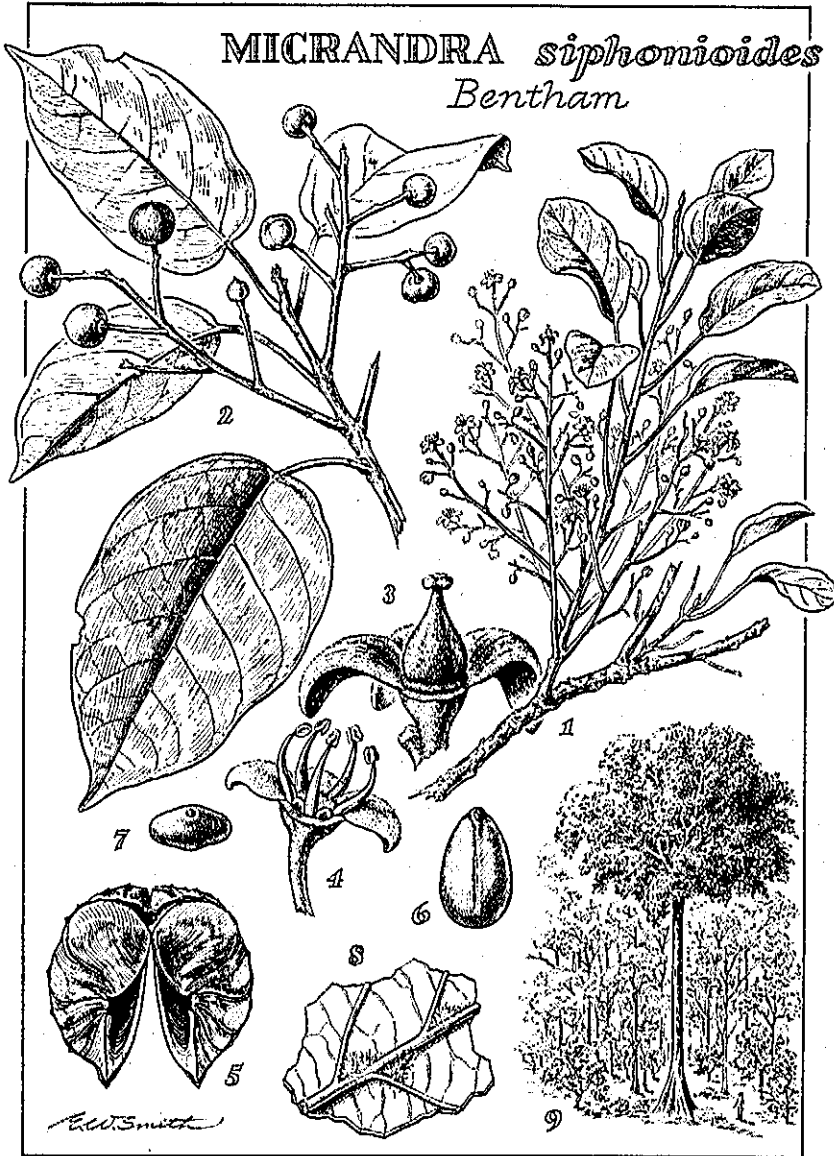


Fig. 1. *Micrandra siphonioides*

1) Flowering branch, x approximately one half natural size. 2) Branch in young fruit, x approximately one half natural size. 3) Pistillate flower, showing ovary, x approximately five times natural size. 4) Staminate flower, x approximately five times natural size. 5) Valves of capsule, x approximately natural size. 6-7) Seed, x approximately natural size. 8) Portion of nether surface of leaf, showing pilosity and nerve-axils, enlarged slightly from natural size. 9) Habitat sketch of tree, showing large buttresses.

(Drawn by Elmer W. Smith)

that of *Castilla* and *Hevea*. I failed to find any *Zschokkea* producing rubber along the Igaraparaná, but a species of this genus (*Schultes* 5459) was collected in the upper Apaporis basin in the Colombian Amazonia as the source of a kind of rubber known locally as *dinde*.

Sideroxylon. The rare *arorate*, probably *Sideroxylon cyrtobotryum* Mart., was said to yield a kind of gutta on the Río Putumayo, near the Igaraparaná, but again I did not find it in production in 1942.

Couma. In the early 1940's, the lacticiferous tree most widely exploited was *Couma macrocarpa* (*Schultes* 3878a). The latex of this corpulent tree is the source of a kind of chicle employed in making chewing gum; and, during the rubber boom of the Second World War, it enjoyed a high price and was produced from wild trees in many parts of the western Amazonia. The tree is exceedingly abundant in the Karaparaná-Igaraparaná region. It is curious that it was not mentioned in Fox's notes in the Kew Bulletin article, despite the fact that it undoubtedly was not exploited in the early part of this century. The Colombian name of *Couma macrocarpa* and its product is *juansoco*; the Peruvians call it *leche caspi*; in Brazil, it is *sorva*. The Witotos of the Igaraparaná know it as *do-ko* (Plate III).

Neocouma. Another abundant apocynaceous tree of this region is *Neocouma Duckei* Mgf. (*Ambelania Markgrafiana* Monachino). The copious thick white latex of this small to medium-sized tree (*Schultes* 3877; 3877a) is said to be the source of an inferior chicle; but, in the 1940's, it was being mixed with the latex of *Couma macrocarpa* in the production of commercial *juansoco*. *Neocouma Duckei* is called also *juansoco* or *juansoco de sabana* and *palo de leche*; the Witotos refer to it as *do-ka-gay*. I later found this species similarly used to adulterate *Couma macrocarpa* latex in the upper Apaporis basin (*Schultes* 5357) under the vernacular name *caimo morado*.

Hevea. Most of Fox's material of *Hevea* preserved at Kew was collected in the area that we are discussing in this paper. He did, however, provide specimens gathered on March 4, 1911, along the Río Amazonas itself, at Pebas, a Peruvian locality between Iquitos and the Colombian town of Leticia. One of these (*Fox* 115), reported as the source of *jébe fino* (the best quality of rubber), was identified by Jacques Huber as *Hevea brasiliensis*; I have examined the material at Kew and concur with this determination. The other (*Fox* 116), called *jébe débil* ("weak rubber") bears Huber's annotation as representing *Hevea nigra* Ule; it seems to me to be referable to what we now accept as *H. guianensis* Aubl.

In addition to the Kew Bulletin report to which reference has been made above, critical notes on Fox's collections of *Hevea* were published by HUBER (Novas contribuições para o genero *Hevea*, Bol. Mus. Goeldi 7 (1913) 227-236). Fox had sent a collection of his rubber plants to Huber, then the foremost authority on the classification of

Hevea. Huber reported being able to distinguish three species in the material: "two closely related to the group of *H. lutea*, and the third a species already previously described by me but upon incomplete material".

The third of these three species was referred by Huber to *Hevea viridis*, a species which he had described in 1902 on the basis of sterile specimens from the lower Ucayali in Peru. The Fox material, since it was in flower, gave Huber opportunity to complete the description and to assign the species to series *Obtusiflorae* in his classification of the genus. *Hevea viridis* has now been placed in synonymy under *H. nitida* Martius, and there is general agreement on this disposition of Huber's binomial (SEIBERT, Ann. Mo. Bot. Gard. 34 (1947) 298; SCHULTES, Bot. Mus. Leaf. Harvard Univ. 13 (1947) 9). Noting, in topotypical cultivated material grown in the Jardim Botânico of the Museu Goeldi in Belem, a minute lepidote condition on the nether surface with scales so small and sparse that the typical concolourous character of the leaflets was not altered, Seibert suggested that Huber's type material of *Hevea viridis* had "some admixture of *H. brasiliensis* germ-plasm". My study of very ample material of *Hevea* from its entire range convinces me that small variations, especially in respect to scales and pilosity, may and should be expected without our necessarily resorting to introgression or other complex phenomena to explain their occurrence. This instance of *Hevea nitida* is a case in point: five or six of the numerous collections that I made of this species in the Colombian Vaupés, hundreds of miles from the nearest *H. brasiliensis*, show a similar minutely lepidote condition.

The two species described by Huber as "closely related to the group of *H. lutea*" are *Hevea Foxii* and *H. glabrescens*. Most of the rubber from the region between the Ríos Karaparaná and Igaraparaná was produced by the tree that Huber described as *Hevea Foxii*. "Of the rubber exported from this region, 75 per cent is derived from *Hevea Foxii*, and these trees are the only ones which are properly tapped. All the other rubber plants are cut down for the extraction of their latex." This *Hevea* was slashed with a machete. The latex was allowed to run down the trunk to the ground, coagulating as it went, and the strips were collected, washed and pressed into sausage-shaped lumps known in commerce as "Putumayo tails" or *rabos del Putumayo*.

Huber distinguished *Hevea Foxii* from what was then called *H. lutea* (*H. guianensis* var. *lutea*) by its having leaflets glabrous beneath in the adult stage; while what he interpreted as "*H. lutea*" had leaflets glabrous from the start. Furthermore, he reported an indistinct disk in the staminate flower of "*Hevea lutea*" and *H. Foxii* as compared with a short, thin annular disk in *H. glabrescens*. In both of these characters, we have come now, with much wider experience, to expect appreciable variation, and neither this vagary in leaf pilosity nor the slight fluctuation in the disk can be taken as critical — unless combined with at least one more stable and more important difference. This additional difference is not found. Huber likewise stated that *Hevea Foxii* appeared to be allied to *H. apiculata* Spr. ex Baill.,

collected by Spruce on the Río Negro and now considered to be *H. guianensis* var. *lutea*.

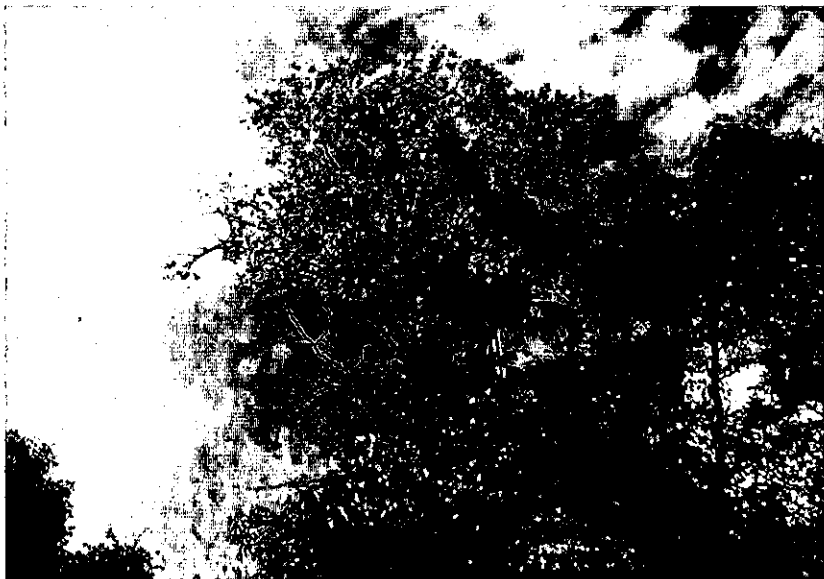
Ducke and Seibert are the only recent botanists to have discussed *Hevea Foxii* and *H. glabrescens*. In 1929, DUCKE (Rev. Bot. Appl. 9 (1929) 627) considered both to represent varieties and made the nomenclatural transfers *Hevea lutea* var. *Foxii* and var. *glabrescens*. In 1935, he (in Arch. Inst. Biol. Veg. 2 (1935) 231-232) listed *Hevea Foxii* and *H. glabrescens* as good species, pointing out, nonetheless, that they were known from sparse material. In 1946, he (in Bol. Tecn. Inst. Agron. Norte no. 10 (1946) 10, 23) suggested that both might be varieties of *H. guianensis* related to *H. guianensis* var. *lutea*; that *H. Foxii* (together with *H. apiculata* Baill., described from the upper Río Negro basin) represented possibly a geographical variety peculiar to the northwest Amazon and characterized by strong leaflet pubescence; that *H. glabrescens* might be considered a transition from *H. Foxii* to *H. guianensis* var. *lutea*; but that more material would be necessary before resolving the problem.

SEIBERT (loc. cit. 295), in discussing *Hevea Foxii*, stated: "It appears that this variable pubescence character has at least twice accounted for the description of separate entities, namely *H. lutea* var. *pilosula* Ducke and *H. Foxii*. Such variations, where *lutea* and *Benthamiana* grow close together, may result from further hybridization between the two entities. In other instances, these variations may be natural tendencies toward recombination. The range of variation and distribution as known from specimens at hand appear to be too intergrading for any decisive subspecific naming at the present time." Seibert referred *Hevea Foxii* to *H. guianensis* var. *lutea* x *H. Benthamiana*, because (loc. cit. 319) "leaflet pubescence, long reddish floral pubescence, and the bud and calyx lobe acumination" (shown in Fox's specimens from Liberia) are "definitely characters of *H. Benthamiana*". Unfortunately for this hypothesis, similar conditions of pubescence exist in a number of my collections of *Hevea guianensis* var. *lutea* (e.g. Schultes 5649, Upper Río Apaporis Basin; Schultes & Cabrera 14329, Río Vaupés Basin; and others) hundreds of miles from the nearest *H. Benthamiana*. In fact, the presence of reddish or golden leaflet and floral pubescence appears, in the Colombian Amazonia in general, to be the more usual condition.

Insofar as *Hevea glabrescens* is concerned, Seibert believes that Huber was confused in the several collections that he cited in the original description. Fox 7, the type, collected in the headwaters of the Río Igaraparaná, he determined as *Hevea guianensis* var. *lutea* x *H. Benthamiana*, thus equating it with *H. Foxii*. But Huber cited also two other Fox collections (from Sombra on the Río Putumayo and Pebas on the Amazon itself) in the original description; Seibert thought these "better placed in *H. guianensis* var. *lutea* x *H. pauciflora*."

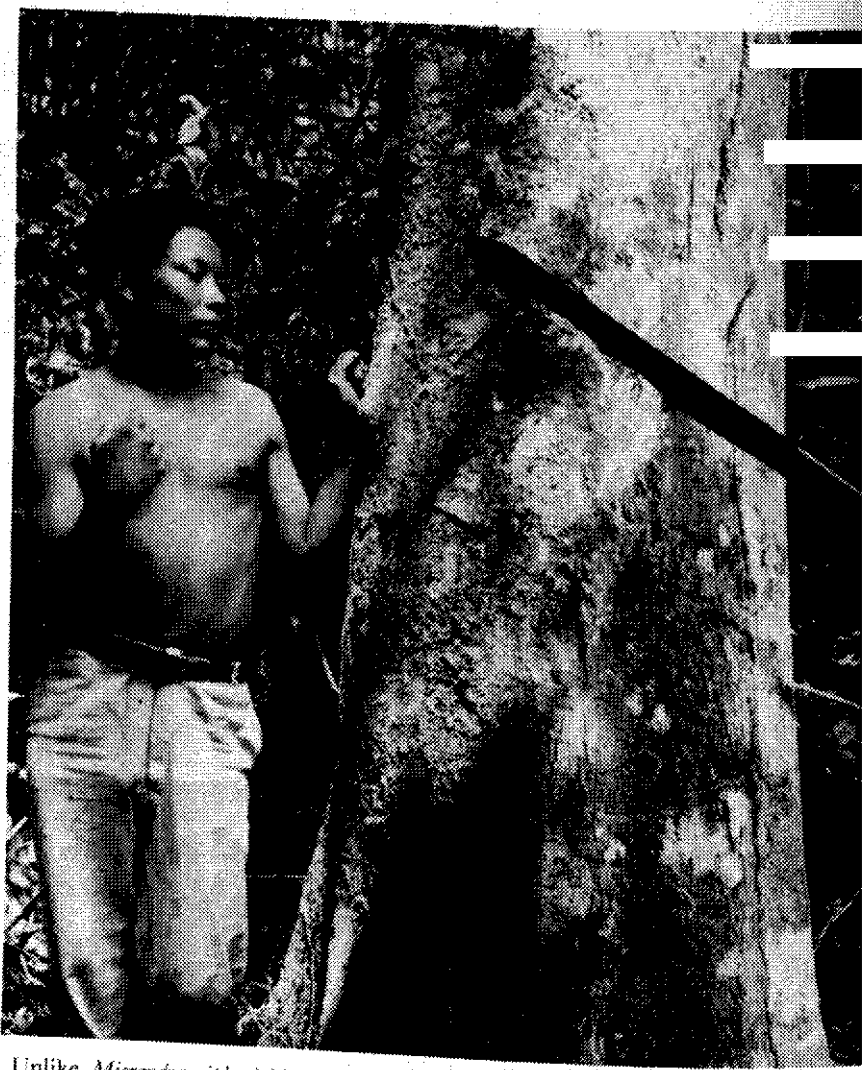
It is now clear from collections and studies of many trees of *Hevea guianensis* var. *lutea* in the northwesternmost part of the Amazon, especially in the basins of the Ríos Vaupés, Apaporis and Caquetá in Colombia, that this is the area where the variety manifests its greatest

RICHARD EVANS SCHULTES: Lactiferous plants of the Karaparaná-Igaraparaná region of Colombia



Above: *Micrandra minor* is a conspicuous element along flood-banks of the lower Río Igaraparaná. The crown in the centre of the picture represents this species.
Photographed by R. E. Schultes.

Below: Flowering branches of *Micrandra minor*.
Photographed by R. E. Schultes, Río Caquetá, Colombia.



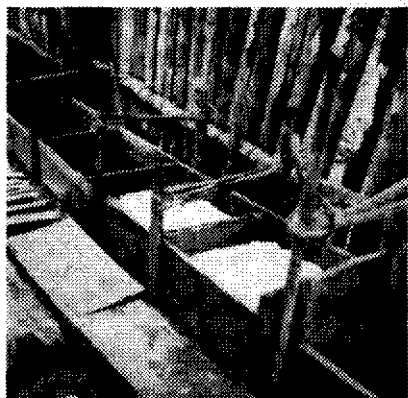
Unlike *Micrandra siphonoides*, with a buttressed trunk and very sparse latex, *M. minor*, pictured above, is unbuttressed and has a copious flow of thick, white milk. Photographed by R. E. Schultes. Rio Apporis, Colombia.



a



b

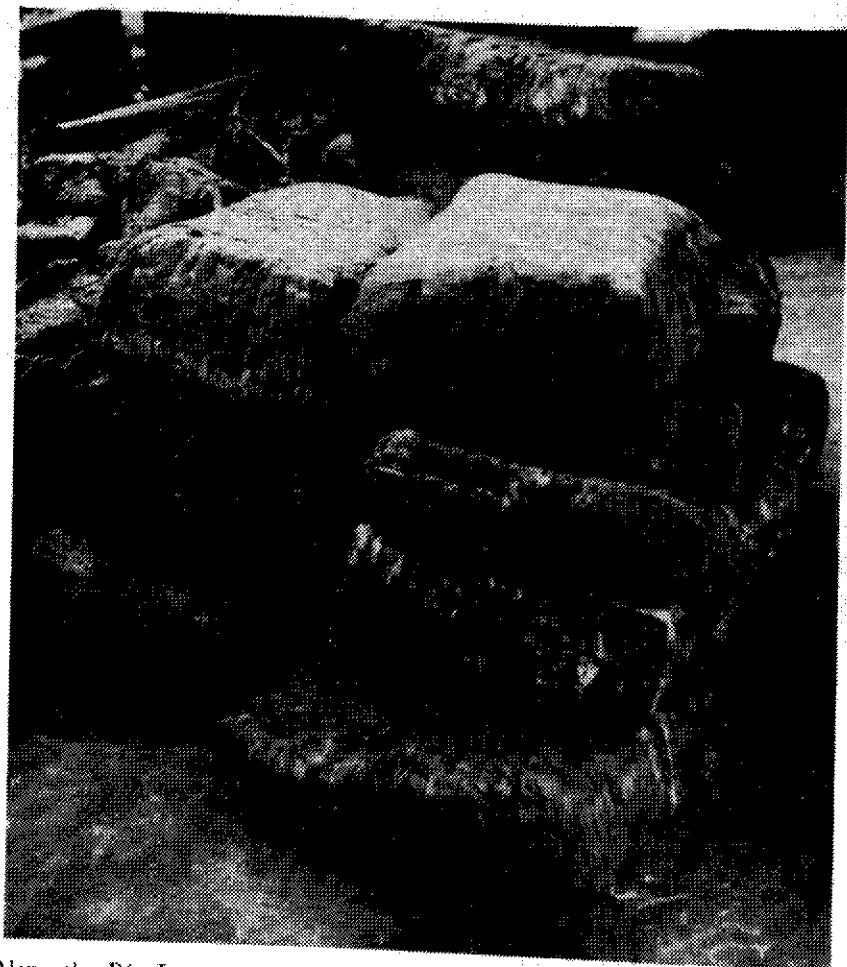


c



d

Couma macrocarpa is the source of *juansoco*, a kind of chicle employed commercially in making chewing gum. It is exploited actively in the Karaparaná-Igaraparaná region at the present time. The tree is usually felled and ringed and the copious latex collected in cups made of palm leaves (a); boiled in large pots; (b) poured into crude wooden moulds (c); and allowed to coagulate into large blocks (d) which are then sold for shipment to commercial centres. Photographed by R. E. Schultes. Río Karaparaná, Colombia.



Along the Río Igarapará and adjacent rivers, rubber is prepared principally from *Hevea guianensis* var. *lutea* in the form of *rabos del Putumayo* ("Putumayo tails") and *Putumayo blocks*. In both cases, scrap rubber or *sernambi*, strips allowed to dry on the tree, are pressed together; in the former, in shapes simulating tails; in the latter, into large blocks, pictured above, made with crude presses. Photographed by R. E. Schultes, Río Igarapará, Colombia.

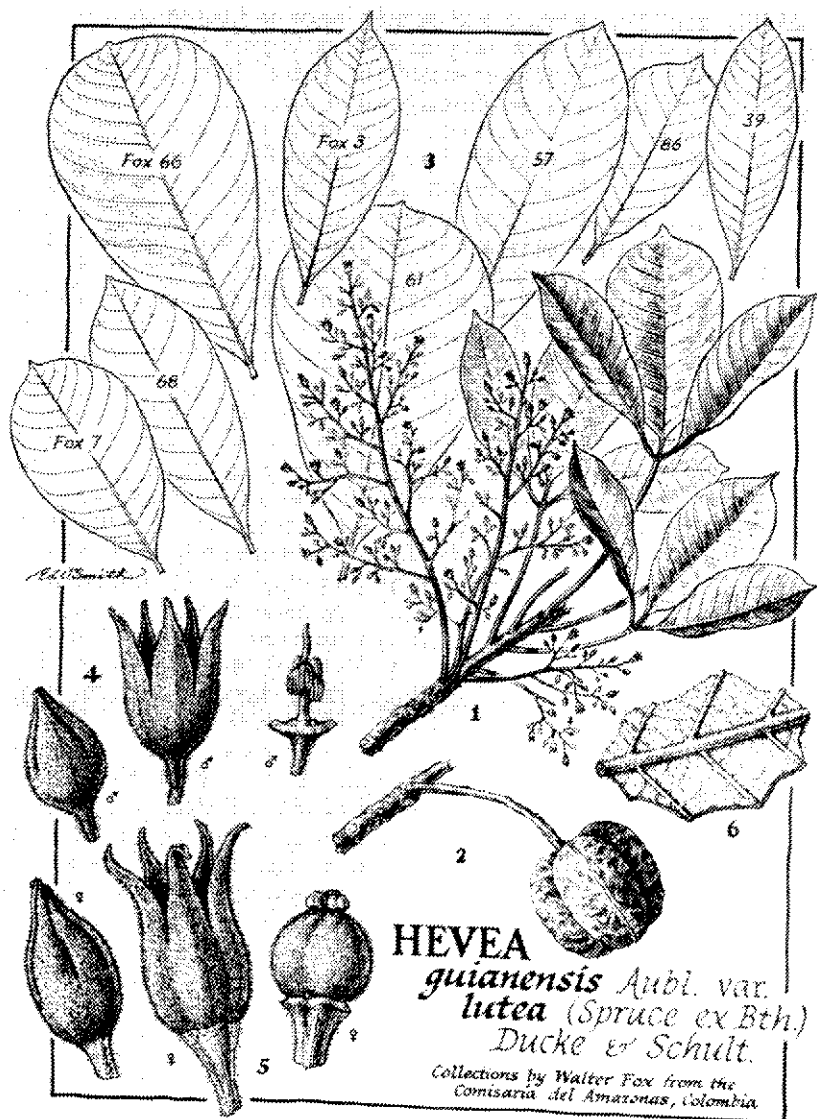


Fig. 2.

region of Colombia's Amazonas. The following list has been drawn up from my own observations (S) and those of Fox (F).

caucho negro (S)		<i>Castilla elastica</i>
do-ko (S)	Witoto Indians	<i>Couma macrocarpa</i>
do-ko-gay (S)	Witoto	<i>Neocouma Duckei</i>
efacone (F)	Witoto	<i>Micrandra minor</i>
ee-te-ree (S)	Witoto	<i>Hevea guianensis</i> var. <i>lutea</i>
e-serie (F)	Witoto (?)	<i>Hevea guianensis</i> var. <i>lutea</i>
huermega (F)	Witoto	<i>Micrandra minor</i>
wer-me-ger (S)	Witoto	<i>Micrandra minor</i> and <i>M. siphonioides</i>
ituri (F)	Witoto	<i>Hevea guianensis</i> and <i>H. guianensis</i> var. <i>l</i>
juansoco (S)		<i>Couma macrocarpa</i> and <i>Neocouma Duckei</i>
juansoco de sabana (S)		<i>Hevea guianensis</i> and <i>H. guianensis</i> var. <i>l</i>
ohimeca (F)	Bora Indians	<i>Hevea guianensis</i>
palo de leche (S)		<i>Neocouma Duckei</i>
seringa de rebalse (S)		<i>Hevea Benthamiana</i>
seringa fina (S)		<i>Hevea Benthamiana</i>
ucu-shiringa (F)		<i>Hevea guianensis</i>
wakati crwickeri (F)	Bora (?)	<i>Micrandra minor</i>

Fox's letter, written from the rubber-gathering centre of the Peruvian Amazonas Corporation (Casa Arana) at La Chorrera on the Rio Igaraparaná, is reproduced because of its botanical and historical interest. The original letter is preserved at Kew. I have inserted within brackets several botanical identifications or critical notes.

La Chorrera, Pa
13 Nov., 1910

Dear Col. Prain:

I have never thanked you for sending on board for me the collecting outfit you had so kindly promised me. It has been most useful. Indeed, if I could have done always what I should have liked, it would have been to have stayed in suitable spots and collected. Largely, as it is, I can only gather any striking thing and that must be fairly easily get-attable [sic]. Well this is an immense country, a magnificent country, and for the equator a lovely climate. In the hands of an enterprising people, what could not have been done with it? As it is, however, to say that it backward is to state a fact that is well known to most people in Europe. I think you know that part of our enquiries is to look into the alleged atrocities said to have been and are being carried on in the Company's territory against the Indians. I wish not to anticipate our reply to that further than that I should like to examine 5/6 of the employees here who are placed over unfortunate aborigines. The whole system of management is wrong from top to bottom. The method of working the rubber is of the most primitive and crudest imaginable in the way of a better system simply because those placed over them know no better. One chief of sections went so far as to say that he only knew a rubber tree when he saw it exuding latex. I was much surprised with the magnitude of the Amazon, the monotony was only relieved by its vastness—going along day after day, with much the same general scenery confined, of course, to the immediate shores, as the whole Amazon basin is so flat that the vision is shut in by the two shores. Perhaps the commonest trees along the bank were the Cecropias—and on the innumerable sandbanks called "playas" the arrow grass, a *Saccharum* I think [*Cyperium sagittatum*]. I was asked my impressions of the American forests as compared with the Malay jungles, I should give the palm to the latter—that is, vegetation is denser, trees bigger—but, of course, I have not yet been in the Brazilian forests except for a little bit of the forest near Pará—so that the comparison is of no value. If you look at a map of America, you will see the river Putumayo—or Iça as it is called at its mouth where it empties into the Amazon. About 3 days steaming up the

Putumayo brings one to the 2 tributaries—the Igaraparaná and the Caraparaná, and it is practically the basins of these two tributaries that the Company claims as its sphere of operations—roughly some 14 or 15 000 square miles. This territory has been divided up into sections. Over each section, a chief assisted by several so-called white men is appointed, and owing in a great measure to the pernicious system of paying the chief by results, it is his policy to get as much rubber as he can in the shortest space of time. And here is where the exploitation of the poor wretches of Indians comes in. I will tell you more of this when I see you—in the course of our enquiry we are visiting these sections—using the two rivers as far as possible, but most of our journeys are on foot through the worst jungle tracks I have yet seen. Distances here are reckoned by time instead of miles, i.e. such and such a place is so many hours or days away. I have never done so much jungle walking in the same time before. So far I have found that the rubber from this region is mainly produced by *Hevea*—probably *H. Spruceana* [see discussion above], but of this I am not quite sure. I have collected specimens, but have no fruits so far. Then there is another tree called by natives “Hurmega”, which is probably a *Sapium* [see discussion above], and thirdly another tree that I am not sure what it is, but as I am bringing home specimens I hope to clear it up. So far I have not come across a single *Castilleja*. Orchids so far have been almost completely absent. I collected one small plant with orchid pseudobulbs and monophyllous leaves with a pendant inflorescence—of a distinctly bluish colour [*Aganisia cyanea*], common along the Río Karaparaná. [See Schultes in *Lloydia* 21 (1958) 88 and in *Am. Orch. Soc. Bull.* 30 (1961) 558.] I have dried the flowers and hope to bring the plant alive. I have one or two other things but, on the whole, I am disappointed as regards Orchids. On the other hand, I have a few seedlings in a box of a lovely slender bamboo rivalling asparagus plumes in feathery grace—also some palm seeds of several sp. *Melastomaceae* is very common—so is *Bignoniaceae*—some of the latter are truly giant. There is also a beautiful thing in the forest here with large white bracts and small lilac flowers, probably a *Mussenda*. I have specimens but alas no seeds. Before I get back I hope to have quite a nice little collection of seeds. As far as I can see, we ought to drive home about May. This is, however, so subject to circumstance that it is only an indication I want to be back a little before the Rubber Exhibition.

With kindest regards,
Yours sincerely,
Walter Fox