BOTANICAL MUSEUM LEAFLETS

HARVARD UNIVERSITY

CAMBRIDGE, MASSACHUSETTS, MAY 27, 1955

VOL. 17, No. 1

A NEW NARCOTIC GENUS FROM THE AMAZON SLOPE OF THE COLOMBIAN ANDES

BY
RICHARD EVANS SCHULTES

RECENT ethnobotanical investigations in Colombia have greatly advanced our understanding of the narcotic and stimulant plants which are used in divination, witchcraft and medicine by the Indians of the region. The discovery, in the high and geographically isolated Indian village of Sibundoy, of a dangerously active narcotic tree, representing a new genus belonging apparently to the *Solanaceae*, may have significant consequences in several different fields of study.

In early 1942, whilst I was engaged in ethnobotanical studies in the Putumayo of Colombia, my attention was drawn to a most extraordinary tree which the Kamsá and Inga Indians of the Valley of Sibundoy cultivate for use as a narcotic. Flowering material was collected, an examination of which seemed to indicate that a new genus close to the *Brugmansia* group of *Datura* had been found. In the following years, I made several trips to Sibundoy and was able to gather additional material from the original and several adjacent trees; and colleagues, who have travelled in the area, have been kind enough to prepare specimens from still other trees both in the village of Sibundoy and the neighboring town of Santiago. In

1953, we were able finally to introduce the tree into cultivation in easily accessible gardens. Now, with plentiful material and after more than a decade of cautious consideration, I still hold that we have at hand an undescribed genus, the diagnosis of which is presented herewith.

Methysticodendron *R. E. Schultes gen. nov. Solanacearum.*

Arbor. Folia ligulata. Flores solitarii, maximi, penduli. Calyx longe tubulosus, herbaceus, spathaceus. Corolla profundissime quinquedivisa, lobis spathulatis, acuminatis. Stamina tubi apicem versus affixa, filamentis robustioribus, apicem versus attenuatis et valde contortis; antherae lineares, loculis parallelis introrsum longitudinaliter dehiscentibus. Ovula in quoque loculo numerosa, in placentis axillaria. Styli tres, liberi (sed aspectu singulares, mucilagine (?) cohaerentes, valde tortiles), crassiore filiformi-ligulati sed in sectione concavo-complanati, stigmatе indiviso, clavellato-tumescenti; ex ovarii parte centrali duo vel tres appendices, una filiformis, stylo subsimilis sed multo brevior atque una vel duae ad subulas brevissimas vel bullas reductae. Fructus non est praesto.

Genus apparenter *Datura* sectione *Brugmansia* satis affine est.

Generis nomen Graece “arbor somnifica,” inter indigenas usum perstringens, significat.

Generis species typica: *Methysticodendron Amesianum*.

Methysticodendron Amesianum *R. E. Schultes spec. nov.*

Arbor usque ad viginti quinque pedes alta, ramulis brevibus, dense foliatis. Folia membranacea, atroviridia, anguste lineari-ligulata, apice acuminata, basi sensim attenuata (saepissime sine petiolo distincto), margine vulgo

subundulata vel undulata, statu adulto 20–26 cm. longa, 1.3–2.0 cm. lata, nervo centrali robusto, subtus valde elevato, nervis secundariis subparallelis, subconspicuis, marginem versus arcuato-anastomasantibus, utrinque minute et irregulariter (venas versus densiore) pilosa. Flores usque ad 28 (plerumque plusminusve 23) cm. longi, apice in anthesi 10–13 cm. in diametro, solis occasu atque noctu fortissime et dulcissime fragrant. Calyx spathaceus, viridis, papyraceus vel membranaceus, duo- ad quinque-fissus, dentibus acutis, per dimidium tubiformis, $\frac{3}{5}$ corollae longitudine (usque ad 13 cm. longus), utrinque minutissime et irregulariter pilosiusculus. Corolla $\frac{3}{5}$ – $\frac{4}{5}$ pro parte divisa, lobis saepissime quinque (sed abnormaliter quattuor vel sex), membranaceis, albis, patentibus, spathulatis vel subspathulate rhombiformibus, apice longe acuminatis, cincinnalibus, margine integris, dimidio superiore valde inflexis, 14–16 cm. longis, tubi apicem versus plerumque 6 mm. sed in parte latiore 2.5–3.3 cm. latis, basim versus utrinque remotissime et irregulariter pilosiusculis, tribus cum venis conspicuis, valde parallelis; tubus intus densiore albido-pilosus. Stamina saepissime quinque, corollae lobis breviora, filamentis teretibus, plusminusve 5 cm. longis, basi 2 mm. in diametro, apice valde contortis atque leviter tortilibus, apice excepto pilosiusculis, antheris flavis, 2.7–3 cm. longis, 3–4 mm. in diametro. Ovarium subcylindricum, conspicue trisulcatum, glabrum, usque ad 1.5 cm. longum, 0.5 cm. in diametro, in stylos sensim productum. Styli glabri, usque ad plusminusve 9 cm. longi, 2.5 mm. in diametro, apice paulo clavellati et valde complanati, stigmatibus textu in apice ipso et in marginibus usque ad 1–1.5 cm. decurrenti, nigro (siccitate) et papilloso. Appendix (stylus incohatus ?) ex ovarii parte centrali stylis similis, usque ad 5.5 cm. longa, ab una vel duabus appendicibus subclavellatis carnosius, 2–5 mm. longis comitata.

EXPLANATION OF THE ILLUSTRATION

PLATE I. METHYSTICODENDRON AMESIANUM *R. E. Schultes*. Habit drawing of a flowering branch, about one half natural size.

Drawn by ELMER W. SMITH

PLATE I

EXPLANATION OF THE ILLUSTRATION

PLATE II. METHYSTICODENDRON AMESIANUM *R. E. Schultes*. 1, partly dissected flower, about one half natural size, showing the relative sizes of stamens, styles and other floral segments. 2, a stamen and its attachment, slightly more than natural size. 3, the styles and the style-like appendage, about three quarters natural size. 4, the tip of a style showing the stigmatic surface, about three times natural size. 5, cross section of the ovary, about six times natural size. 6, sagittal section of the apical part of the ovary showing (a) styles, (b) the large appendage homologous with the styles and (c) one of the minute appendages arising from the central tissue of the ovary, about three times natural size. 7, pollen grains, about four hundred and fifty times natural size.

Drawn by ELMER W. SMITH

EXPLANATION OF THE ILLUSTRATION

PLATE III. Habit photograph of the plant from which the type of *Methysticodendron Amesianum* was taken. Sibundoy, Colombia.

Photograph by RICHARD EVANS SCHULTES

PLATE III

EXPLANATION OF THE ILLUSTRATION

PLATE IV. Kamsá Indian boy holding a flower of
Methysticodendron Amesianum. Sibundoy, Colombia.

Photograph by RICHARD EVANS SCHULTES

PLATE IV

Specei nomen professorem rerum herbarum demortuum Oakes Ames Universitatis Harvardianae, quis studia mea plantarum somnificarum inter indigenas americanos excitavit, honorat.

Methysticodendron is here described as a genus of the *Solanaceae* with some hesitation, for the concept shows several characters which are not easily accommodated in that family.

In habit, *Methysticodendron Amesianum* is a small tree quite suggestive of some of the larger tree-species of *Datura*, i.e., *D. arborea* L., *D. suaveolens* HBK. and *D. Rosei* Safford. Like these members of the *Brugmansia* section of *Datura*, the new concept is characterized by large, pendulous flowers. The intoxication which a decoction of the leaves of *Methysticodendron Amesianum* induces bespeaks the presence of similar alkaloids: hyoscyamine and scopolamine. There are also strong similarities in the branching, as well as in the structure of the calyx and stamens.

The pollen grains of the type plant of *Methysticodendron* have been studied by Dr. Thomas van der Hamen, palynologist to the Servicio Geológico Nacional of Colombia and by Professor Elso S. Barghoorn of the Botanical Museum of Harvard University. Dr. Barghoorn's description of the grains follows:

Pollen grains spherical, chiefly inaperturate, occasionally tricolpate or triporate with very weakly developed short furrows. Size ranging from 45μ to 63μ , averaging about 53μ (after acetylation). Sculpturing of the exine striate, and of the "finger print" pattern of striation. Striae converging at the poles and commonly anastomosing between the poles. Polar areas reticulate-foveolate. A feeble punctate or reticulate texture may be detected between the striae or along their sides. Equatorial costae conspicuous.

In basic morphology the grains are a modified bipolar, tricolpate type, in which both pores and furrows have been greatly reduced.

The pollen grains of *Methysticodendron* are of the same type and are, indeed, very similar to the grains of other species of *Datura*, section *Brugmansia*.

Notwithstanding these similarities, *Methysticodendron* can be distinguished at once from the tree-species of *Datura* by its very deeply lobose corolla which is divided for three-fifths to four-fifths of its length. The tubular portion of the corolla is wholly enclosed within the tubular, spathaceous calyx, so that it bears a superficial resemblance to a polypetalous flower, the gamopetalous condition not being evident as the blossoms hang on the tree. The narrowly ligulate leaves are also strikingly unlike those of the tree-species of *Datura*.

The major and perhaps fundamental departure from the solanaceous condition, however, lies in the morphology of the ovary and styles. *Methysticodendron* has three conduplicate carpels with three free styles (with undivided stigmatic areas) which retain the conduplicate condition. The concave structure of the styles leaves the ovule cavity somewhat open at the apex, exposing the apical ovules, until, about one third of the way down, the carpel walls fuse to form a trilocular syncarp. All members of the *Solanaceae* have a simple style with a two-lobed stigma. All members of the tribe *Datureae* have a four-celled ovary. Indeed, the only tribe of the family possessing a three- to five-celled ovary is the *Nicandreae*, but even *Nicandra* has a simple style.

The structures most difficult of interpretation are the several appendages arising from the central tissue of the ovary. One of these is an elongated appendage usually entirely homologous with the styles (even to the presence of what appears to be stigmatic tissue), but much shorter. Accompanying this appendage are usually one or two anomalous knob-shaped, clavate or even subulate projections. These do not appear to arise consistently

from any definite part of the ovary. They resemble adventitious style-like outgrowths.

Several fruits of *Methysticodendron Amesianum* were collected in 1947. These were preserved in alcohol and sent to Bogotá, but, unfortunately, they were lost in shipment. Consequently, a detailed description of them cannot be given here. We may record, however, that they were unarmed, smooth, indehiscent and fusiform, about six inches in length and in shape very like the fruit of *Datura suaveolens*.

The evidence for retaining *Methysticodendron* in the *Solanaceae* seems to me to be overwhelming. Nevertheless, the several fundamental characters in which this concept diverges from the conditions now embraced by the family must be borne in mind. It would seem entirely probable that a new tribe should be set up within the *Solanaceae* to accommodate *Methysticodendron*.

Would we not be warranted in suspecting that we have at hand perhaps a primitive representative of the *Solanaceae*, possibly a prototype of what has today developed into the tree-species of *Datura*? The apparent primitiveness in the union of floral parts might conceivably be interpreted in this light. In any consideration that *Methysticodendron* may represent a prototype of the modern representatives of the brugmansiid *Datura*-species, it would be advisable to take into account the interesting fact that the Valley of Sibundoy, a locality which we know to be a repository of many curious endemics, is a high Andean region, and the center of origin of some tree-species of *Datura* is thought to be the northern Andean area.

Because of the extreme rarity of this plant, even in the Valley of Sibundoy, and because of its extraordinary beauty, several attempts were made to introduce *Methysticodendron Amesianum* into cultivation. In 1953, efforts

to establish it by planting short sticks cut from the upper branches met with success. The species is now in cultivation in the Capuchin Mission Station at Sibundoy; in the gardens of the Ciudad Universitaria in Bogotá, Colombia; in the Universidad del Cauca, Popayán, Colombia; at the Royal Botanic Gardens, Kew; in the greenhouses of the Department of Biology, Harvard University; and at the Division of Plant Exploration and Introduction, Bureau of Plant Industry, Beltsville, Maryland.

Methysticodendron Amesianum, known only from the Valley of Sibundoy, is there employed by the Inga and Kamsá Indians in their witchcraft. Its use in each tribe is restricted to several witch-doctors, and these practitioners grow the plant with special care in the neighborhood of their huts. The wild habitat of the species is said to be the forested slopes of the mountains to the south of the Valley of Sibundoy, especially the slopes of the botanically almost completely unknown Cerro Patascoy. When in cultivation, the plant is apparently the hereditary property of certain families, forasmuch as the sorcerers pass it on to the eldest son together with the secrets attending its use.

Little could be learned about the use of the narcotic, partly because of the proximity of influential Christian missionaries. It would appear from what information I have been able to glean that *Methysticodendron Amesianum*, which the Indians classify together with other intoxicating solanaceous plants similarly used, is by far the strongest of all the narcotics of the region, surpassing in danger and potency even *Datura arborea*. A description of the intoxication leaves no doubt that the active principles are solanaceous alkaloids of the tropane series. This intoxication, resorted to by the witch-doctors only for very important or difficult cases of divination, prophecy

or therapy, usually lasts for two full days and sometimes may persist for four—with a long period of complete lack of consciousness. Missionaries who have been at work in the Valley of Sibundoy for more than a quarter of a century suspect that the death of one aged witch-doctor may have been due to an overdraught of this narcotic.

Smaller doses of the drug are administered to boys who are studying witchcraft. Certain of the medicine-men's secrets apparently are imparted only when the novitiate is "under the protection" of this narcotic.

According to the sparse information available, only the leaves of *Methysticodendron Amesianum* can be employed in the preparation of the narcotic infusion. The leaves, which must be gathered not more than one hour before the narcotic drink is to be taken, are stripped from the plant, crushed and allowed to remain in cold water for perhaps one half hour. Just before the draught is to be taken, the leaves and the infusion are slightly heated and agitated. Then the liquid is strained. It is, apparently, never allowed to boil.

Witch-doctors never take the whole draught at one time, it is said; but they may drink as much as a large cup-full over a period of two or three hours. If, by then, the desired frenzy and initial narcosis have not been induced, an assistant prepares additional drink from fresh leaves.

According to the Indian tradition, this narcotic must be taken only during the wane of the moon.

In addition to its use in divination and prophecy, *Methysticodendron Amesianum* is employed by its "owners" in the treatment of certain diseases. The leaves and flowers are heated in water and applied in the form of a plaster for the reduction of tumors and swellings, especially of the joints. For persistent chills and fevers (advanced tuberculosis (?)), which are not uncom-

mon at this high, damp altitude, the witch-doctor will sometimes first bathe the whole body of a patient with a warm decoction of the leaves and flowers, then smear lamb-fat on the chest, back and abdomen.

The Kamsá name of *Methysticodendron*, *mets-kwai borrachero* or *mits-kway borrachero*, means "intoxicant of the jaguar." The term *borrachero* is a loan-word from Spanish, for in southern Colombia and Ecuador a large number of solanaceous narcotics are referred to popularly as *borrachero* (*borracho* = drunken). Notwithstanding the meaning of the Kamsá *mets-kwai*, these Indians refer to the plant in Spanish as *culebra-borrachero* ("intoxicant of the snake") and not as *tigre-borrachero*. Another name which the Kamsá people apply to the plant is *goon'-ssi-an borrachero*, the meaning of which I could never ascertain. The Inga Indians of the Valley of Sibundoy call the plant *kin-de-borrachero*.

I wish to acknowledge gratefully the helpful suggestions of many of my colleagues at Harvard University and elsewhere during my study of the material of *Methysticodendron Amesianum*. My special appreciation to Professor Irving W. Bailey and to Professor Ivan M. Johnston is here expressed. The plates which Mr. Elmer W. Smith has so painstakingly prepared were made possible by a grant from the American Academy of Arts and Sciences.

COLOMBIA: Comisaría del Putumayo, Valle de Sibundoy, Sibundoy, alt. 2225 m. "Treelet 25 feet tall. Cultivated in Indian garden. Used as divinatory narcotic. Flowers white, anthers yellow. *Culebra borrachera*. Kamsá = *mits-kway borrachera*." June 30, 1953, *Richard Evans Schultes & Isidoro Cabrera 20079* (TYPE in Herb. Gray).—Comisaría del Putumayo, Sibundoy, alt. about 6700 feet. "Treelet 25 feet tall. Flowers pendulous, white. Leaves used to prepare a narcotic drink for use of witch-doctors in divination. Spanish: *culebra borrachera*. Ingano = *kin-de borrachero*. Kamsá = *goon-ssi-an borrachero*." February 16, 1942, *Richard Evans Schultes 3256*.—Comisaría del Putumayo, Sibundoy, Valle de Sibundoy. "In garden near house of an Indian

herb doctor. Erect shrub 3-4 m. tall. Flowers white, somewhat irregular. Plant apparently sterile, as old flowers seem to drop off, and the people say it never sets fruit. *Culebra borrachero* planted here not seen wild." March 30, 1943. *F. R. Fosberg 20406*.—Comisaría del Putumayo, al norte de Sibundoy, alt. 2250 m. "Arbusto de 3 m. Flores blancas. Estambres color gris, anteras amarillas." February 21, 1951, *Mardoqueo Villarreal 68*.—Comisaría del Putumayo, al sur de Sibundoy, alt. 2250 m. "Inga=*boracero*. Kamsá=*nitwaí-boracero*. Arbusto 2 a 3 m. Flores muy juvenes, color verde-claro; adultas blancas." February 22, 1951, *Mardoqueo Villarreal 71*.—Comisaría del Putumayo, al sur de Sibundoy, alt. 2250 m. "Arbusto de 3 m. Flores blancas." February 22, 1951, *Mardoqueo Villarreal 72*.—Comisaría del Putumayo, al sur de Sibundoy, alt. 2250 m. "Arbusto de 3 m. Flores juvenes, color verde-claro; adultas blanco-pálidas." February 22, 1951, *Mardoqueo Villarreal 73*.—Comisaría del Putumayo, al sur de Sibundoy, alt. 2250 m. "Arbusto de 3 m. Flores muy juvenes, color verde-claro; adultas blanco-palidas. Ingano=*culebra borrachero*; Kamsá=*nitkwai boracero*." February 22, 1951, *Mardoqueo Villarreal 74*.—Comisaría del Putumayo, camino de Santiago a San Andrés, cerca al Río Quinchoa, alt. 2270 m. "Ingano=*culebra borrachera*. Árbol de 3 m. Corolo blanco-pálida. Estambres blanco-verdosos; anteras carmelitas." February 24, 1951, *Mardoqueo Villarreal 94*.—Comisaría del Putumayo, camino de Santiago a San Andrés, cerca al Río Quinchoa, La Misión, alt. 2270 m. "Kamsá=*quinchora borrachero*. Arbusto de 2 a 3 m. Flores blancas. Estambres ligamente blanco-violáceas; anteras semi-violáceas." February 24, 1951, *Mardoqueo Villarreal 95*.—Comisaría del Putumayo, Valle de Sibundoy, Santiago, alt. ca. 2250 m. "*Culebra borrachero*. Arbolito ramoso 2-3 m. de alto. Flores blancas. El líquido resultante por la decocción de las hojas lo toman los indígenas para alucinarse." September 22, 1953, *A. Fernández 2641*.

Schultes, Richard Evans. 1955. "A New Narcotic Genus from the Amazon Slope of the Colombian Andes." *Botanical Museum leaflets, Harvard University* 17(1), 1–11. <https://doi.org/10.5962/p.168494>.

View This Item Online: <https://www.biodiversitylibrary.org/item/31863>

DOI: <https://doi.org/10.5962/p.168494>

Permalink: <https://www.biodiversitylibrary.org/partpdf/168494>

Holding Institution

Missouri Botanical Garden, Peter H. Raven Library

Sponsored by

Missouri Botanical Garden

Copyright & Reuse

Copyright Status: Public domain. The BHL considers that this work is no longer under copyright protection.

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.