

The Coyotillo



Karwinskia humboldtiana

"My main reason for bringing this study for your consideration is to call your attention to a new possibility in the use of this remedy for the treatment of poliomyelitis and similar affections, whenever we may find similar symptoms to those already recorded as produced by the drug. I also hope in so doing to arouse your interest for a more complete proving of the remedy in accordance with our precepts.

It is a very significant coincidence that this remedy would be of a neutral polarity, the same polarity of the polio's virus and that of *Lathyrus sativus*, according to Dr. A. H. Grimmer's classification for the treatment and prevention of infantile paralysis. In the last ten years I have used both, *Lathyrus sativus* and *Karwinskia Humboldtiana*, with equally good results."
(Eliud Garcia-Trevino, 1966)

"It is a neurotropic remedy, paralysing the motor nerves, producing a picture of flask, ascending paralysis ending in a quadriplegia."
(O. A. Julian, 1984)

"The neurologic symptoms are similar to those of poliomyelitis, Guillain-Barré syndrome, and other polyradiculoneuritis syndromes, for which it is often mistaken."
(L. Valeria Ocampo-Roosens et al, 2007)

"If an unsuspecting child accidentally ingests this toxic fruit, an acute symmetrical motor polyneuropathy mimicking Guillain-Barré syndrome may develop within 1 to 15 days. - The toxin targets the metabolic activity of the Schwann cell, with subsequent myelin disruption."
(D. Pleasure, 2015)

Inhalt / Content

Die Pflanze / The Plant

Namen / Names

The Coyotillo or Tullidora

- Description of the Plant
- Historical Review

Vergiftungen und Prüfungen / Poisonings and Provings

1966 - Eliud Garcia-Trevino

- Description
- History
- Clinical Observations
- Symptoms of acute Intoxication
- Chronic Intoxication
- Symptoms

Bibliographie / Bibliography

Die Pflanze / The Plant



Die Pflanze / The Plant

Namen / Names

Karwinskia Humboldtiana Zucc.

span.: Coyotillo, Humboldt Coyotillo, Tullidora, Capulincillo, Capulincillo Cimmaron, Capulin, Palo Negrito, Margarita, Cacachila, China, Frutillo Negrito, Cochila, Margarita del Cero.

The Coyotillo or Tullidora

Description of the Plant

Karwinskia: Shrubs or small trees; spineless; leaves opposite or nearly so, entire, thin, feather-veined, prominently nerved, dotted; flowers small in short-stemmed clusters in the axils of the leaves; calyx five-lobed, lobes acute; petals five, hooded, stamens five; style two or three lobed; drupe about three-eighths of an inch long. An American group of seven or eight species.

Karwinskia Humboldtiana Zucc. - Shrub or small tree, from 3 to 20 feet high. Twigs smooth or short-hairy; leaves oval to elliptical, 1 to 3 inches long, rounded or nearly heart-shaped at base, blunt or sharp at apex, smooth on both sides, green above, paler beneath, sometimes short-hairy beneath, edges somewhat rolled back, petioles short, slender; flower clusters smooth or sometimes short-hairy, short-stemmed, yellowish-green; drupe subglobose to ovoid brownish-black. This desert species is likely to be found in flower any month in the year, depending on weather conditions.

The plant is found on dry, gravelly hills, in Brazoria County, Tex. It is abundant from Corpus Christi and Brownsville along the Rio Grande River to the mouth of the Pecos River, Mexico, and in Lower California.

The plant is most generally known in Texas as coyotillo; other names are callotio, coyotio, cayote, rivendore, margarita, cacachila, and gallita bush. Sosa says it is known in Mexico as tullidora or capulincillo.

Historical Review

“The first mention of the poisonous properties of *Karwinskia humboldtiana* was made by Clavigero ^[1] in 1789 in the following statement (translation) regarding the plant in southern California: There is another shrub in some places on the peninsula whose fruit is large as a vetch, round and black when ripe. The Indians (Cochimi) refrain from eating it because they well know that it is very harmful; but sometimes the children do not know it, or at least they fear nothing, so sometimes they eat it, led on by hunger or their desire. The effect which does not take place for some days remains in the meantime unnoticed; and afterwards other accidents happen to them which finally end their lives. Therefore the missionaries caused the destruction of all such plants. Notwithstanding, the Pericui eat the fruit, without any bad results, first taking away the seed in which it is said is the whole trouble.

In 1885 W. Havard wrote as follows: “The Coyotillo of the Mexicans on the Lower Rio Grande, common on the Pecos near its mouth and thence eastward to the coast. Shrub, with beautifully penninerved, ovate leaves, and brownish-black berries, said to be very poisonous. The virulent principle lies in the seed, the pulp being innocuous. The symptoms are those of paralysis of the spinal cord, primarily affecting locomotion.”

Writing of the plant in Mexico, in 1890 Sosa said that the fruit is eagerly eaten by boys and

produces a paralysis that is easily cured. The sickness does not come on immediately, but after continued eating for several days.

In Engler and Prantl, published in 1896, is the following sentence (translation): The seeds contain a paralyzing principle and are used in Mexico for convulsions.

Rose in 1899 said that the leaves of this plant are crushed and soaked in water and the cold infusion used in cases of fevers. It has a wide use in Mexico.

Pammel in his Manual of Poisonous Plants, published in 1910 and 1911, mentioned the plant as poisonous to goats, on the authority of Doctor Mitchell, of the United States Army.

Hernández said that the bark of the root is powdered by the natives of Mexico and used as a laxative.

Standley made the following statement: "The fruit is sweet and edible, but the stones are harmful if swallowed. In people, especially children, paralysis, particularly of the lower limbs, is caused by eating stones, and similar effects are said to be produced in pigs and chickens. Palmer states that in Tamaulipas children thus paralyzed are taken to a slaughter pen, and stomachs of freshly killed cattle are wrapped about the parts affected, an outer covering being employed to retain the warmth. There is a prevalent belief that this mode of treatment is quite successful. The seeds are oily, and they contain some principle which paralyzes the motor nerves. They are employed in Mexico as an anticonvulsive, particularly in the case of tetanus. An infusion or decoction of the leaves and roots is used locally for fevers, and Palmer states that the hot tea is held in the mouth as a remedy for toothache and neuralgia."

The same author said of another species, *K. calderoni*, found in Central America: Pigs are said to be paralyzed by eating the fruit, and similar properties are generally ascribed to the Mexican species.

A considerable volume of correspondence containing questions in regard to the toxicity of this plant has come to the Department of Agriculture. Among the notes which have been filed is the following statement made by Doctor Palmer in 1901: Affects lower limbs. A man was loosed with the black berries. Several children were brought to me at San Luis Potosi suffering from effects. One girl, aged about 15 years, lost use of limbs entirely. She was sent to Durango for treatment. Doctors said nothing could be done. They tried many remedies.

The investigations made by the Department of Agriculture were initiated as the result of correspondence in 1921 with H. Grafke, inspector in charge, at Fort Worth, Tex., who sent some letters from J. C. McGill, Alice, Tex., which were accompanied with material of this plant. Mr. McGill gave a somewhat detailed statement in regard to the plant itself and the symptoms which were produced by it in goats, cattle, sheep, and hogs. In order that a nearer acquaintance might be made with the plant, a trip was made to Alice, Texas, where some of the localities in which the plant is abundant were visited, and arrangements were made for a considerable collection of both the fruit and the plant itself. In 1923 letters were received from

Evaristo Treviño, of Randado, Texas, in which he gave many details of the symptoms produced by the plant. He also forwarded a very generous quantity of the fruit.

From these correspondents a fairly definite volume of information was obtained which indicated that the poison produced by *Karwinskia* was not produced by the leaves but by the seeds in the fruit. It appeared, too, that goats, cattle, sheep, hogs, and human beings were affected by this poison. All the informants agreed that the principal symptom produced was a form of paralysis which led to the common name of "limber leg" as applied to the disease, and that the plant was sometimes known as "tanglefoot." The information gathered indicated not only that the plant was of considerable importance because of its relation to the poisoning of livestock but also because the rather peculiar symptoms of poisoned animals give it an unusual

scientific interest.

(C. Dwight Marsh, A. B. Clawson and G. C. Roe, Coyotillo (*Karwinskia Humboldtiana*) as a Poisonous Plant, Technical Bulletin No. 29, February 1928, United States Department of Agriculture Washington D.C., p. 1-4)
[1] Note: For the quoted references look at "Bibliography"

Vergiftungen und Prüfungen - Poisonings and Provings



Vergiftungen und Prüfungen / Poisonings and Proving

1966 - Eliud Garcia-Trevino

"A plant that belongs to the family of the Rhamnaceae, indigenous to many parts of Mexico, mainly to the northern States of Lower California, Sonora, Tamaulipas and my own home State of Nuevo León.

It is known by different names according to the different regions where it grows wild.

In the States of Tamaulipas and Nuevo León it is called either 'Tullidora' (which means crippler) or 'Coyotillo' (meaning a small coyote, in reference to the fact that the coyote seems to be the only animal that does not become paralyzed when eating berries of this plant).

In other places it is called 'Capulincillo cimarrón', 'Palo negro' and 'Cacachila'.

I personally gathered from my father's ranch the specimen brought to Chicago and from which Ehrhart & Carl prepared the first mother tincture and potencies.

Description

The Coyotillo or Tullidora (crippler) is a shrub, although in some locations may grow as a tree 9 mts. high; it is found in dry countries; the leaves are subopposite, oblong to oval, obtuse or rounded at the apex, glabrous; its flowers are small, greenish, axillary umbellate; the fruit is a blackish drupe 6-9 mm. long, containing four seeds, but only two fertile.

It is known for its poisonous properties, the seeds if eaten cause paralysis of the lower limbs and even death.

It is a well-established fact that the coyote eats the fruit, which has a sweet taste, but does not chew on the seeds which are found intact in its dejections, a reason to believe that the animal is immune to the toxic.

The seeds contain a fatty acid, a yellowish coloring matter, and a glucoside believed to be the agent producing the paralysis of the motor nerves.

History

The botanical name of *Karwinskia Humboldtiana* is in honor of the famous German scientist Baron von Humboldt, who first studied, classified and described this plant.

My first acquaintance with this plant, while practising in a small town of the State of Nuevo León some 40 years ago, was due to my attention being called by the natives who informed me that the seeds of the berries, if eaten, were known to produce paralysis in a few hours, both in animals and people, a paralysis that would first affect the lower limbs, but would travel up to become generalized and would even cause death if eaten in great amounts, unless the person or animal so afflicted would be given *immediately* a concoction made from the root of the same plant, acting as an antidote.

My 1955 paper on this subject was mainly based on the clinical observations of a case of mass intoxication of 106 soldiers who became more or less seriously paralyzed after eating handfuls of the berries of this plant. That was a most interesting study made by the late Dr. Francisco Castillo Nájera and presented to the V. Mexican National Congress at its meeting in Mexico City on January 14, 1918. Dr. Castillo Nájera was a distinguished Mexican physician, a General in the Medical Service of the Mexican Army, later the Director of Mexico City's Military Hospital and, after that, for many years Mexico's Ambassador to Washington. His paper was entitled 'A contribution to the study of toxic paralysis - a case of collective poisoning caused by the Tullidora.'

Dr. Luis G. de Legarreta of Mexico City has since made a proving of this drug, that will help us to complete this study, as presented here today. The crushed seeds is the source for our

homeopathic preparations.

Clinical Observations

A quotation from Dr. Castillo Nájera's paper: "During the latter part of January, 1916, a great number of patients were being admitted to the military hospitals in Guaymas, Sonora. In the course of a few days 106 were hospitalized, all of them with paralysis of the lower limbs, some totally paralyzed, except of the head and neck; some complaining of intense headache and frequent and large diarrhetic stools. Two of them died in the same day of their arrival, and eight more within the next ten days.

We found, upon investigation, that all their symptoms were due to the ingestion of the Tullidora berries, a plant growing in the neighboring section of Ortiz, where the armed forces of the First Brigade of the VI North-eastern Division, to which these patients belonged, were operating at the time. They all stated that they had been eating the berries in large amounts for several consecutive days, picking them by the handful, until they were informed by the Mayan Indians of other army units, of their dangerous properties. Four or five days later all began to experience some difficulty in walking, followed up by paraesthesia and paralysis phenomena. Most of them were natives of the states of Jalisco and Colima and were not aware of the intoxicating nature of the fruit, which they had mistaken for another edible berry known by the name of 'Capulín'.

It is worth noting that all these men concurred in the fact that the toxic manifestations did not begin to appear until four or six, and even eight days, after they had eaten the Tullidora berries. Only a few developed the intense cephalalgia, the vomiting and the diarrhea within the first 48 hours and they were those who had eaten the largest amounts of the pernicious fruit. Two of them were the men I mentioned above who first died from the symptoms climaxed with the deadly signs of asphyxia.

An extract made from the seeds paralyzes the voluntary movements in frogs, if injected under the skin. The cardiac action persists, but the respiratory movements are paralyzed; the muscles remain easily excitable. With the minimum dose of 0.2 cc. the animal recuperates in 24 hours; if 0.5 cc. is injected the animal dies within two hours, with 1 cc. the death is instantaneous. Large doses injected intravenously to dogs have not produced paralysis. Being of the same canine family, like the coyote, they may also be immune."

Symptoms of acute Intoxication

(For this I am using the data on the cases that died within the first 15 days.)

"The symptoms of acute intoxication appear 48 hours after the ingestion of the berries for several consecutive days; the paralysis of the lower extremities is suddenly established, soon to be followed by paralysis of the upper limbs; there is fever and a very intense headache and cramps in arms and legs; the pulse becomes slow, 65 to 70 per minute; diarrhea sets in with frequent and large stools. All of these symptoms prevail until the paralysis of the thoracic muscles begins to show and dyspnoea supervenes, after which the patient dies in two or three days as the paralysis of the respiratory muscles progresses. In some cases death does not come until 10 to 12 days."

Chronic Intoxication

"If the acute symptoms subside with the disappearance of the fever, the cramps and the diarrhea, the chronicity of the cases is established by the persistency of the paralysis, which in the absence of acute intoxication is only gradually produced. The paresis may remain limited to the lower limbs, or may invade the upper limbs as well, becoming more or less a complete general paralysis, traveling from the periphery to the root, or may become stationary or even cured, the lost motion being restored in a matter of from eight to 10 days, but sometimes

taking as long as six months. When the four extremities are paralyzed, the patients are absolutely motionless, with a flaccid type of paralysis, but with normal control of the bladder and bowels. The cutaneous and tendinous reflexes, which are normal at the beginning, gradually diminish until completely abolished in some cases. There are no abnormal phenomena of the sensibility, nor any alterations in the function of other systems nor of the organs of the senses; nutrition is normally accomplished. Muscular atrophy of variable intensity is produced, as above said, and may I add that in some cases sacral and trochanterian sores were observed. These cases may cure with a certain degree of atrophy that perhaps disappears once the function of the limbs is re-established. Death may be caused by an intercurrent disease, in most cases bronchopneumonia, or may come when the paralysis progresses so as to involve the respiratory muscles. We never observed paralysis of the muscles of the face, neck or larynx.

The symptomatic picture of the chronic intoxication resembles that of the saturnine polyneuritis, in both being only the motor nerves affected, with no involvement of the sensory and sympathetic; they resemble also in the form of their progressions from the extremities to the root of the limbs and by the preserved integrity of the sphincters. I believe that in those who recovered, the lesions must have been of the polyneuritis type, for I recall that in some paralysis due to alcohol, and in the simple ones attributed to exposure to cold, and even those which result from acute infectious diseases, when there is a complete paralysis of the four limbs and rather extensive amyotrophic lesions, some cases may recover without further signs of spinal involvement. Cases of asphyxia were due to lesions of the bulbopontine nerves, as it happens with other types of polyneuritis. It is also possible that in some of the cases there was probably an ascending myelitis, since we all know how difficult it is to make a differential diagnosis between poliomyelitis and polyneuritis by simply observing the progress of the disease.

The only three post-mortems that I was able to perform do not give me sufficient ground to formulate any definite opinion on the cases involved, particularly because of lack of competent and proper means for pathological tissue examinations at that time; and with no visible lesions in the spinal cord, the meninges of the brain, but only slight diminution in the volume of the peripheral nerves, it would have been necessary to investigate whether besides the evidence of the signs of polyneuritis that were observed clinically, there had also been other alterations in the central nervous system.

SYMPTOMS

By following Hahnemann's scheme, I have arranged the symptoms of this remedy so as to include both, those observed in the cases of the intoxication as well as those registered in the provings. An (L) in parentheses after the symptom will identify the ones resulting from the provings of Dr. Legarreta, and a (C), also in parentheses, the ones observed by Dr. Castillo.

Head

Intense headache. (C)

Sensation of heaviness with constant headache. (L)

Ears

Noise in both ears. (L)

Stomach and Intestines

Vomiting and diarrhea within the first 48 hours. (C)

Nausea with vomiting. (L)

Intestinal paralysis with inability to move the bowels. (L)

Respiratory Organs

Paralysis of lungs threatening asphyxia. (L)

Paralysis of the respiratory muscles causing dyspnoea, and even death in two or three days. (C)

Broncho-pneumonia as a common complication, and in some cases even the cause of death. (C)

Extremities

Cramps in arms and legs. (C)

Paralysis of the lower limbs, without pain, but progressive, causing muscular atrophy. (C)

Lack of muscular contractions. (L)

Lack of power to move legs which are dragged with no control (polymyelitis). (C)

The paresis may remain limited to the lower limbs, or may invade the upper limbs as well, becoming more or less a complete paralysis, traveling from the periphery to the root. (C)

Paralysis and muscular atrophy may persist after all other symptoms have subsided. (C)

Paralysis more marked on left side. (C)

Fever and Pulse

High fever in the acute stage, 38°-39° C, but with a slow pulse, 65-70 per minute. (C)

Generalities

When the four extremities are paralysed the patients are absolutely motionless, with a flaccid type of paralysis, but with normal control of the bladder and bowels. The cutaneous and tendinous reflexes, normally at the beginning, gradually diminish until completely abolished.

There are no abnormal phenomena of the sensibility, nor any alterations in the function of the other systems, or the organs of the senses. Muscular atrophy of variable intensity is produced, and in some cases sacral and trochantherian sores develop. (C)

A tincture from the leaves of the plant has been used, empirically, as an anticonvulsive in cases of tetanus, in the dose of 1 gm. every two hours until the muscles completely relax.

It also has been claimed that a tincture from the root has an antimalarial effect.

It is a very significant coincidence that this remedy would be of a neutral polarity, the same polarity of the polio's virus and that of *Lathyrus sativus*, according to Dr. A. H. Grimmer's classification for the treatment and prevention of infantile paralysis. In the last ten years I have used both, *Lathyrus sativus* and *Karwinskia Humboldtiana*, with equally good results.

Allow me now to end up this presentation by transcribing a few lines from my 1955 paper: "My main reason for bringing this study for your consideration is to call your attention to a new possibility in the use of this remedy for the treatment of poliomyelitis and similar affections, whenever we may find similar symptoms to those already recorded as produced by the drug. I also hope in so doing to arouse your interest for a more complete proving of the remedy in accordance with our precepts. I will be more than satisfied if this presentation of the new remedy *Karwinskia Humboldtiana* would stir up your minds to the extent of using some of your homeopathic proving of this drug. May the American Institute of Homeopathy and the rest of our organisations take notice of this appeal and help to bring it to a full realization."

(Eliud Garcia-Trevino, Pathogenesis of some new Mexican Drugs, Journal of the American Institute of Homeopathy, 1966, p. 333-337)

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[The authors made extensive experiments on animals. - Summary: "Karwinskia humboldtiana is a plant growing in southwestern Texas and in Mexico which, previous to the experiments of this study, was reported to produce paralysis in some domestic animals. Experimental work has shown that it affects cattle, sheep, goats, guinea pigs, and chickens, producing a more or less complete paralysis, the effects being especially pronounced in the posterior limbs. There are reliable reports to the effect that Karwinskia poisons swine and horses also. The effect of the plant is peculiar in that the symptoms do not ordinarily appear until a considerable time after the feeding and continue for an indefinite period. In severe cases recovery seldom takes place. The reported cases of poisoning are from eating the fruit. It has been found that the leaves are also poisonous but that the resulting symptoms are different from those produced by the fruit."]
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[“An anatomo-clinical study has been done by Dr. Santos, of the University of Nuevo Leon, during her training as a medical student in a small agglomeration near Monterrey.” - Julian 1984]

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[“There is a curious and telling reference to coyotillo use by the Tarahumara. It was actually eaten as starvation food in June, but over-consumption caused a serious stomach ache. Children exhibiting symptoms of coyotillo poisoning, including shakes or "palsies" were seen by outside observers. The Tarahumara crushed coyotillo bark to prepare a tea that was ingested for fevers. As an external headache remedy, the leaves were wrapped in a cloth which was in turn tied around the head. The Tepehuan also report using the fruit as a starvation food. Indeed, the Tepehuan boil the bark for several hours and ingest the resultant tea for fevers, identical uses to the Tarahumara that the ethnographer duly noted.”]

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[“In a classic work on Mexican medicinal plants, Maximino Martínez devotes more space to describing the poisonous effects of coyotillo than he does to its healing applications. However, he does note that a tincture of the leaves was used as an anticonvulsive for treating paralysis from tetanus, until the muscles relax. Additionally, a cooked potion of the leaves was applied externally to infected wounds.”]

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••• *Frecuencia da intoxicación con Karwinskia humboldtiana en México [The Incidence of Poisoning by Karwinskia Humboldtiana in Mexico]*, M. V. Bermúdez-de Rocha, F. E. Lozano-Meléndez, V. A. Tamez-Rodríguez, G. Díaz-Cuello, A. Piñeyro-López, *Salud Publica de Mexico* Jan-Feb 1995;37(1) p. 57-62.

[Abstract: “Intoxication produced by *Karwinskia humboldtiana* presents a neurological picture similar to that of poliomyelitis, Guillain-Barré syndrome or other polyradiculoneuritis with which it is frequently confused. The purpose of this paper is to report the frequency of this intoxication, by means of the antecedent of ingestion of the fruit and the detection of toxins in blood using a thin layer chromatography method. One hundred fifty four samples of cases with acute flaccid paralysis from 18 states of the country were received. The antecedent of ingestion in 56 of them was corroborated and the detection was positive in 50 of these. In 98 patients there was not antecedent of ingestion and detection was negative in 95 of them. We estimated that the sensibility and specificity of detection method are 89% and 96.9% respectively.”]

•• *Intoxicación de una familia por Karwinskia Humboldtiana [Familial Poisoning With Karwinskia Humboldtiana]*, M. V. Bermúdez de Rocha, F. E. Lozano Meléndez, M. E. Salazar Leal, N. Waksman de Torres, A. Piñeyro López. *Gaceta Medica de Mexico* Jan-Feb 1995;131(1), p. 100-106.

[Abstract: “The ingestion of ripe fruit of the *Karwinskia humboldtiana*, a shrub commonly known as tullidora or coyotillo, produces an intoxication described in the literature as a symmetric flaccid paralysis of the hind limbs, progressive and ascendent, that in severe cases may cause bulbar paralysis and death. The cause of an acute accidental intoxication of an entire family is presented here, wherein ten out of thirteen members ingested the ripe fruit of the tullidora. Three died, the father and two daughters. For the first time the toxins determination in blood by thin layer chromatography method is described. This method supports the diagnosis with other polyradiculoneuritis such as poliomyelitis and the Guillain Barre's syndrome.”]

•• *Clinical Diagnosis in Karwinskia Humboldtiana Polyneuropathy*. H. R. Martínez, M. V. Bermudez, R. A. Rangel-Guerra, L. de Leon Flores. *Journal of the Neurological Sciences* 1998 Jan 21;154(1), p. 49-54.

[Abstract: “Intoxication by *Karwinskia humboldtiana* presents a neurological picture similar to that for Guillain-Barré syndrome or other polyradiculoneuropathies. Clinical diagnosis in poisoned humans may be difficult if no

evidence of previous fruit ingestion is available. We present our experience in the clinical diagnosis of *Karwinskia humboldtiana* polyneuropathy, as confirmed by toxin detection in blood. We designed an open trial at the Pediatric Neurology service and included all cases with acute ascending paralysis that were admitted to our hospital in the last two years. In all cases, we performed hematological, immunological and biochemical profiles, CSF analysis including immunological studies, oligoclonal bands and myelin basic protein determinations. Electrodiagnostic studies were performed, including motor conduction velocities, distal latencies, F-wave latency and compound muscle action potential (CAMP) amplitude. The presence of *Karwinskia humboldtiana* toxins in blood were determined by thin layer chromatography. In six cases, T-514 *Karwinskia humboldtiana* toxin was detected. These cases had a symmetric motor polyneuropathy with the absence of tendon reflexes and no sensory signs or cranial nerve involvement. Only one patient required assisted ventilation due to bulbar paralysis. In two of these cases, a sural nerve biopsy revealed a segmental demyelination with swelling and phagocytic chambers in Schwann cells and without lymphocytic infiltration. All six cases survived, with complete recovery in five. We conclude that this intoxication is common in Mexico. The availability of toxin detection in blood samples allows the clinician to establish an accurate diagnosis and should be included in the study of children with polyradiculoneuropathy, especially in countries where this poisonous plant grows.”]

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- Intoxication With Buckthorn (*Karwinskia Humboldtiana*): Report of Three Siblings, L. Valeria Ocampo-Roosens, Patricia G. Ontiveros-Nevarés, Obed. Fernández-Lucio, *Pediatric and Developmental Pathology* . Jan-Feb 2007, 10(1), p. 66-68.

[Abstract: “A variety of plants and seeds, some of which are used for therapeutic and nutritional purposes, can cause neurotoxic symptoms. The ingestion of the green or ripe fruit of the *Karwinskia humboldtiana* (buckthorn), a bush known in Mexico as coyotillo or tullidora, causes a flaccid, symmetric, progressive, and ascending palsy of the lower limbs, which, in severe cases, can cause bulbar palsy and death. The neurologic symptoms are similar to those of poliomyelitis, Guillain-Barré syndrome, and other polyradiculoneuritis syndromes, for which it is often mistaken. The clinical diagnosis of intoxicated patients can be difficult without a history of the fruit ingestion. We present a report of three siblings with buckthorn intoxication.”]

- David Pleasure, *Neuromuscular Disorders of Infancy, Childhood, and Adolescence, A Clinician’s Approach*, Academic Press 2015, Chapter 23 - Toxic Neuropathies

[“If an unsuspecting child accidentally ingests this toxic fruit, an acute symmetrical motor polyneuropathy mimicking Guillain-Barré syndrome may develop within 1 to 15 days. The cerebrospinal fluid protein is usually normal. If the intoxication is severe, a bulbar paralysis and a potentially fatal outcome are possible. Some of the most severely affected children also have diarrhea and vomiting. (...) Buckthorn toxin targets the metabolic activity of the Schwann cell, with subsequent myelin disruption.”]

II. Homöopathie / Homoeopathy

- M. D. De Legarreta, *Pathogenesis de cinco medicinas introducidas en la Materia Medica Homeopatica para la curacion del tifo y otras pirexidas*, Editas en “La Verdad”, Mexico 1911

- E. G. Trevino, *Karwinskia Humboldtiana, un nouveau médicament homéopathique qui peut être efficace dans le traitement de la poliomyélite antérieure aiguë*, XXVI^e Congrès D’Hom. Pan-Américain, 1955

- De Legarreta, Dr. Luis G., *Materia Medica Homeopatica de Plantas Homeopaticas*, Mexico City, 1961

- E. G. Trevino, *Patogenesis de Alganos Nuevos Medicamentos, La Homoeopathia en el Mundo*, 16 (1968), (2), p. 77-91

- O. A. Julian, *Dictionary of Homoeopathic Materia Medica*, B. Jain Publishers, New Delhi 1984, *Karwinskia Humboldtiana*, p. 167-168