TAXONOMY OF MAMMALS, BIRDS AND INSECTS IN BAJO CALIMA

By

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Within the overall responsability for the management of the Bajo Calima Concession, studies of the fauna of the region have been carried out by specialists on the region.

Birds were collected and identified in 1964 by Dr. José Ignacio Borrero and Dr. Humberto Alvarez, then with the National University at Medellín. Later identifications of birds were made by Dr. Alvarez and, in 1982, by Dr. Peter Jennings of the International Center for Tropical Agriculture (CIAT), Cali, along with William Thackaberry and John Crowell from the United States. Studies of insects were conducted by Dr. F. Luis Gallego, entomologist of the National University of Medellín between 1959 and 1964. Mammals were collected in 1964 by Borrero and Alvarez, and later collections and identifications were made in the eighties by Dr. Michael Alberico of the University of Valle in Cali.

Collections of specimens from the Bajo Calima area can be found in the following institutions:

Mammals	:	School of Agronomy, National University, Medellín Biology Department, University of Valle, Cali
Birds	:	School of Agronomy, National University, Medellin
Insects	:	Entomolgy Laboratory, School of Agronomy, National University, Medellin

Identifications have been made of 29 families and 97 species of mammals; 46 families and 165 species of birds; and 10 orders, 17 families and 112 species of insects. The following lists were developed from the above mentioned studies and collections.

MAMIFEROS DE LA REGION DEL BAJO CALIMA: SE INCLUYEN LAS ESPECIES DE EXISTENCIA COMPROBADA Y PROBABLE
(Mammals From the Bajo Calima Region, Including Species of Both Proven and Probable Ocurrence)

Familia (Family)	Especie (Species)	Common Name	Nombre Vulgar
Didelphidae		Opossums	Chuchas
	Caluromys derbianus	Wooly Opossum	Chucha lanosa
	Chironectes minimus	Water Opossum	Chucha de agua
	Didelphis marsupialis	Common Opossum	Chucha común
	Marmosa alstoni	Mouse Opossum	
	Marmosa phaea	Mouse Opossum	
	Marmosa robinsoni	Mouse Opossum	
	Metachirus nudicaudatus	Brown Four-eyed P.	Chucha mantequera
	Philander opossum	Gray Four-eyed P.	Chucha cuatro-ojos
Myrmecophagidae		Ant-eaters	Oso hormiguero
	Cyclopes didactylus	Silky anteater	Angelito
	Myrmecophaga tridactyla	Giant anteater	
	Tamandua mexicana	Lesser anteater	Tamandua
Bradypodidae			
	Bradypus variegatus	Three-toed sloth	Perezoso de 3 dedos
Megalonychidae			
	Choloepus hoffmanni	Two-toed sloth	Perezoso de 2 dedos
Dasypodidae		Armadillo	Armadillos
	Dasypus novemcinctus	Nine-banded Armadillo	Armadillo de nueve bandas
Emballonuridae		Sac-winged bats	Murciélagos
	Cormura brevirostris	Wagner's Sac-winged bat	
	Peropteryx macrotis	Doglike bat	
	Rhynchonycteris naso	Sharp-nosed bat	
	Saccopteryx bilineata	White-lined bat	
Noctilionidae			
	Noctilio leporinus	Fishing bat	
Phyllostomidae		Leaf-nosed bats	Murciélago de hoja nasal
(Subfamilia: Phyllostominae)		Insectivorous to frugivorous	
	Micronycteris megalotis	Little big-eared B.	
	Phyllostomus discolor	Spear-nosed bat	
	Phyllostomus hastatus	Spear-nosed bat	
	Tonatia silvicola	Round-eared bat	
	Trachops cirrhosus	Frog-eating bat	
	Vampyrum spectrum	False vampire	
(Subfamilia: Glossophaginae)		Nectarivorous	
	Choeroniscus periosus	Long-nosed bat	
	Glossophaga soricina	Long-tongued bat	
	Lichonycteris obscura		
	Lichonycteris spurrelli		
	Lonchophylla mordax		
	Lonchophylla robusta		
	Lonchophylla thomasi		
(Subfamilia: Carollinae)		Frugivorous bats	
	Carollia brevicauda		
	Carollia castanea		
	Carollia perspicillata		
	Rhinophylla alethina		

MAMIFEROS: Continuación
(Mammals: Continuaton)

Familia (Family)	Especie (Specie)	Common Name	Nombre Vulgar
(Subfamilia: Sturnirinae)		Frugivorous bats	Murciélagos
	Sturnira lilium		
	Sturnira luisi		
Stenodermatinae			
	Artibeus hartii	Neotropical fruit bat	Murciélagos
	Artibeus jamaicensis	Neotropical fuit bat	
	Artibeus lituratus	Neotropical fruit bat	
	Artibeus watsoni	Neotropical fruit bat	
	Ectophylla macconnelli	Neotropical fruit bat	
	Vampyressa nymphaea	Yellow-eared bat	
	Vampyressa pusilla	Yellow-eared bat	
	Chiroderma salvini		
	Chiroderma villosum		
	Chiroderma trinitortum		
	Vampyrodes caroccioli	Great Stripe-Faced bat	
	Vampyrops "chocoensis" (new species)		
	Vampyrops helleri	White-lined bat	
Desmodontidae			
	Desmodus rotundus	Common Vampire	Murciélagos
Thyropteridae			
	Thyroptera tricolor	Disk-winged bat	Murciélagos
Vespertilionoidae			
	Eptesicus brasiliensis		Murciélagos
	Myotis albescens		
	Myotis nigricans		
	Rhogeessa tumida		
Molossidae		Free-tailed bats	Murciélagos
	Molossus sp.		
Callithricidae			
	Saguinus geoffroyi	Geoffroy's marmoset (possible)	Tití
Cebidae			
	Alouatta palliata?	Black Howler Monkey	Mono aullero
	Aotus trivirgatus?	Night Monkey	
	Ateles fuscipes?	Spider Monkey	
Canidae			
	Dusicyon thous	Crab-eating fox	Zorra
	Speothos venaticus	Bush Dog	Zorra
Procyonidae			
	Bassaricyon gabbii	Olingo	
	Nasua nasua	Coati	Cuzumbo
	Potos flavus	Kinkajou	Perro de monte
	Procyon cancrivorus	Crab-eating raccoon	Mapache o Perro de Manglar

MAMIFEROS: Continuación
(Mammals: Continuation)

Familia (Family)	Especie (Species)	Common Name	Nombre Vulgar
Mustelidae			
	Eira barabara	Tayra	
	Galictis vittata?	Grison	
	Lutra longicaudis	River otter	Perro de agua, Nutria
	Mustela frenata	Long-tailed Weasel	Comadreja
Felidae			
	Felis concolor	Puma	
	Felis pardalis	Ocelot	Tigrillo
	Felis tigrina	Little Spotted Cat	Tigrillo
	Felis wiedii	Margay	Tigrillo
	Felis yagouaroundi	Jaguarundi	Gato pardo
	Pantera onca	Jaguar	Tigre
Tapiridae			
	Tapirus bairdii	Baird's Tapir	Danta, Tapir
Tayassuidae			
	Tayassu pecari	White-lipped pecari	Zaino
	Tayassu tajacu	Collared Pecari	Zaino
Cervidae			
	Mazama gouazoubira	Brocket deer	Venado
Sciuridae			
	Microsciurus mimulus	Dwarf Squirrel	Ardillita
	Sciurus granatensis	Tree Squirrel	Ardilla
Heteromyidae			
	Heteromys australis	Spiny Pocket Mouse	Ratón de bolsas
Cricetidae			
	Neacomys tenuipes	Bristly mouse	
	Oryzomys alfari	Rice rats	
	Oryzomys bombycinus	Rice rats	
	Oryzomys caliginosus	Rice rats	
	Tylomys mirae	Climbing Rat	
Erethizontidae			
	Coendou bicolor	Prehensile-tailed porcupine	Puerco espín
Dasyproctidae			
	Agouti paca	Paca	Guagua
	Dasyprocta punctata	Agouti	Gautín
Echyimyidae			
	Diplomys caniceps	Arboreal rat	
	Hoplomys gymnurus	Thick-spined rat	Rata espinosa
	Proechimys semispinosus	Spiny rat	Rata espinosa
Leporidae			
	Sylvilagus brasiliensis	Tapeti	Conejo

BIRDS OF BAJO CALIMA

Family	Species	Common Name
Tinamidae	Tinamus major	Great Tinamou
	Crypturellus soui	Little Tinamou
	Crypturellus cinereus	Cinerous Tinamou
Podicipedidae	Podilymbus podiceps	Pied-billed Grebe
Fregatidae	Fregata magnificens	Magnificent Frigatebird
Phalacrocoracidae	Phalacrocorax olivaceus	Neotropic Cormorant
Sulidae	Sula leucogaster	Brown Booby
Pelecanidae	Pelecanus occidentalis	Brown Pelican
Ardeidae	Bubulcus ibis	Cattle Egret
	Casmerodius albus	Great Egret
	Florida caerulea	Little Blue Heron
	Egretta thula	
	Butorides striatus	Striated Heron
Cathartidae	Cathartes aura	Turkey Vulture
Accipitridae	Buteo magnirostris	Roadside Hawk
	Buteo nitidus	Grey Hawk
	Elanoides forficatus	Swollow-tailed Kite
	Harpagus bidentatus	Double-tailed Kite
	Ictinia plumbea	Plumbeous Kite
	Leucopternis plumbea	Plumbeous Hawk
	Leucopternis semiplumbea	Semiplumbeous Hawk
Pandionidae	Pandion haliaetus	Osprey
Falconidae	Falco rufigularis	Bat Falcon
	Herpetotheres cachinnans	Laughnig Falcon
Cracidae	Penelope jacquacu	Spix's Guan
Phasianidae	Rhynchortyx cinctus	Tawny-faced Quail
Rallidae	Aramides cajanea	Gray-necked Wood Rail
	Laterallus melanophaius	Rufous-sided Crake
Charadriidae	Charadrius collris	
Scolopacidae	Actitis macularia	Spotted Sandpiper
	Catoptrophorus semipalmatus	Willet
Laridae	Larus atricilla	Laughing Gull
Columbidae	Columba speciosa	Sealed Pigeon
	Columba goodsoni	Dusky Pigeon
	Claravis pretiosa	Blue Ground-dove
Psittacidae	Pionopsitta pyrilia	Saffron-headed Parrot
	Pionopsitta haematotis	
	Pionus menstruus	Blue-headed Parrot
	Amazona farinosa	Mealy Parrot
	Pionopsitta pulchra	Beautiful Parrot

Family	Species	Common Name
Cuculidae	Piaya cayana	Squirrel Cuckoo
	Crotophaga ani	Smooth-billed Ani
	Crotophaga sulcirostris	Groove-billed Ani
Nyctibiidae	Nyctibius griseus	Common Potoo
Caprimulgidae	Chordeiles minor	Common Nighthawk
	Nyctidromus albicollis	Pauraque
Apodidae	Chaetura cinereiventris	Gray-rumped Swift
	Cypseloides rutilus	Chestnut-collared Swift
	Streptoprocne zonaris	White-collared Swift
	Chaetura spinicauda	Band-rumped Swift
Trochilidae	Amazilia tzacatl	Rufous-tailed Hummingbird
	Amazilia rosenbergi	Purple-chested Hummingbird
	Androdon aequatorialis	Tooth-billed Hummingbird
	Heliothryx barroti	Purple-crowned Fairy
	Thalurania furcata	Fork-tailed Wood Nymph
	Popelairia conversi	Green Thorntail
	Hylocharis grayi	Blue-headed Sapphire
	Phaethornis yaruqui	White-whiskered Hermit
	Phaethornis ruber	Reddish Hermit
	Threnetes ruckeri	Band-tailed Barbthroat
	Florisuga mellivora	White-necked Jacobin
Trogonidae	Trogon massena	Slaty-tailed Trogon
	Trogon comptus	Blue-tailed Trogon
	Trogon melanurus	Black-tailed Trogon
	Trogon violaceus	Violaceous Trogon
Alcedinidae	Ceryle torquata	Ringed Kingfisher
	Chloroceryle americana	Green Kingfisher
Momotidae	Baryphthengus ruficapillus	Rufous Motmot
Bucconidae	Notharchus pectoralis	Black-breasted Puffbird
	Notharchus tectus	Pied Puffbird
	Malacoptila panamensis	White-whiskered Puffbird
	Nonnula ruficapilla	Gray-cheeked Nunlet
Ramphastidae	Pteroglossus sanguineus	Stripe-billed Aracari
	Ramphastos ambiguus	Black-mandibled Toucan
	Ramphastos swainsonii	Chestnut-mandibled Toucan
Picidae	Campephilus melanocleucos	Crimson-crested Woodpecker
	Campephilus haematogaster	
	Melanerpes pucherani	Black-cheeked Woodpecker
	Celeus loricatus	Cinnamon Woodpecker
	Piculus leucolaemus	White-throated Woodpecker
	Veniliornis cassini	Golden-collared Woodpecker
Dendrocolaptidae	Dendrocincla fuliginosa	Plain-brown Woodcreeper
	Dendrocolaptes certhia	Barred Woodcreeper
	Xiphorhynchus erythropygius	Spotted Woodcreeper
	Xiphorhynchus lachrymosus	Black-striped Woodcreeper
	Glyphorhynchus spirurus	Wedge-billed Woodcreeper
Furnaridae	Hyloctistes subulatus	Striped Woodhaunter

Family	Species	Common Name
Formicariidae	Myrmotherula surinamensis	Streaked Antwren
	Myrmotherula axillaris	White-flanked Antwren
	Myrmotherula fulviventris	Checker-throated Antwren
	Myrmecisa exsul	Chestnut-backed Antbird
	Thamnophilus punctatus	Slaty Antshrike
	Cercomacra tyrannina	Dusky Antbird
	Sipia berlepschi	Stub-tailed Antbird
	Sipia rosenbergi	Esmeraldas Antbird
	Phaenostictus mcleannani	Ocellated Antbird
	Hylopezus fulviventris	Fulvous-bellied Antpitta
	Hylophylax naevioides	Spotted Antbird
	Gymnopithis leucaspis	Bicolored Antbird
	Dysithamnus pincticeps	Spot-crowned Antvireo
Cotingidae	Cotinga nattererii	Blue Cotinga
	Carpodectes hopkei	White Cotinga
	Lipaugus unirufus	Rufous Piha
	Pachyramphus cinnamomeus	Cinnamon Becard
	Tityra inquisitor	Black-crowned Tityra
	Tityra semifasciata	
	Querula purpurata	Purple-throated Fructicrow
Pipridae	Manacus vitellinus	Golden-collared Manakin
	Pipra coronata	Blue-crowned Manakin
	Pipra mentalis	Red-capped Manakin
Tyrannidae	Tyrannus tyrannus	Eastern Kingbird
	Tyrannus melancholicus	Tropical Kingbird
	Myiozetetes cayanensis	Rusty-margined Flycatcher
	Myiozetetes similis	Vermilion-crowned Flycatcher
	Ornithion semiflavum	
	Colonia colonus	Long-tailed Tyrant
	Empidonax virescens	Acadian Flycatcher
	Myiornis eucaudatus	Short-tailed Pygmy-tryant
	Myionectes striaticollis	Streak-throated Ground-tyrant
	Cnipodectes subbrunneus	
	Pitangus sulphuratus	Great Kiskadee
Hirundinidae	Progne chalybea	Gray-breasted Martin
	Progne subis	Purple Martin
	Stelgidopteryx ruficollis	Rough-winged Swallow
	Neochelidon tibialis	White-thighed Swallow
	Hirundo rustica	Barn Swallow
Corvidae	Cyanocorax affinis	Black-chested Jay
Troglodytidae	Henicorhina leucosticta	White-breasted Wood-wren
	Microceculus marginatus	Nightingale Wren
	Thryothorus nigricapillus	Bay Wren
	Troglodytes aedon	House Wren
Turdidae	Catharus ustulatus	Swainson's Thrush
Sylviidae	Polioptila schistaceigula	Slate-throated Gnatcatcher
	Microbates cinereiventris	Half-collared Gnatwren
Icteridae	Molothrus bonariensis	Shiny Cowbird
	Cacicus uropygialis	Scarlet-rumped Cacique
	Cassidix mexicanus	Great-tailed Grakle
Parulidae	Dendroica castanea	Bay-breasted Wrabler

Family	Species	Common Name
Coerebidae	Coreba flaveola	Bananaquit
	Chlorophanes spiza	Green Honeycreeper
	Dacnis cayana	Blue Dacnis
	Cyanerpes caeruleus	Purple Honeycreeper
	Cyanerpes cyaneus	Red-legged Honeycreeper
Thraupidae	Chlorothraupis olivacea	Lemon-browed Tanager
	Erythrothlypis salmoni	Scarlet-and-white Tanager
	Heterospingus xanthopygius	Scarlet-browed Tanager
	Piranga flava	Hepatic Tanager
	Piranga rubra	Summer Tanager
	Ramphocelus icteronotus	Lemon-rumped Tanager
	Tachyphonus delatrii	Tawny-crested Tanager
	Tachyphonus rufus	
	Thraupis palmarun	Palm Tanager
	Thraupis episcopus	Blue-gray Tanager
	Euphonia fulvicrissa	Fulvous-vented Euphonia
	Tangara gyrola	Bay-headed Tanager
	Tangara johannae	Blue-whiskered Tanager
	Tangara nigrocincta	Masked Tanager
	Tangara palmeri	Gray and Gold Tanager
	Tangara lavinia	Rufous-winged Tanager
	Bangsia aureocincta	Gold-ringed Tanager
Fringillidae	Pitylus grossus	Slate-colored Grosbeak
	Saltator maximus	Buff-throated Saltator
	Volatinia jacarina	Blue-black Grassquit
	Sporophila americana	Variable Seedeater
	Oryzoborus crassirostris	Large-billed Seedfinch

Del Orden: Coleoptera

Familia	Sub-familia	Genero y Especie
Bostrichidae		Bostrichopsis uncinata
"		Helipus sp.
"		(2)
Brentidae		Brentus sp.
Buprestidae		(1)
Carabidae		(1)
Casididae		(3)
Cerambicidae		Manilkara sp.
"		Platipodidus sp.
"		Platipus sp.
"		Acrocinus longimanus
"	Cerambicinae	Psyomatocerus sp.
"	"	Torneutini osimatocerus
"	"	(5)
"	Lamiinae	Eburodachius sp.
"	"	Trachideres interruptus
"	"	(1)
"	Prioninae	Bracilianus erythropus
"	"	Pteroplatini sp.
"	"	Chloridae sp.
Chrisomelidae	Alticinae	(1)
"	Hispinae	(1)
"		(4)
Curculionidae		Rhynabarbirrostris sp.
"		Helipus sp.
"	Calandrinae	Metamasius sp.
"	Chorinae	(1)
"	Criptorrhynchinae	(1)
"	Hilobinae	(1)
"	Otiorrhynchinae	(1)
"	Zigopinae	(1)
"		(1)
Coccinellidae		Cycloneda sp.
Elateridae		Noctilicus sp.
"		Semiotus intermedius
"		Chalcolepidius fabrieii
"		Pyrophorus sp. (2)
"		Semiotus imperialis
"		Pyrophorus noctilicus
"		(1)
Erotyllidae		Erotilus sp.
"	Dinastinae	Hemophileurus didimus
"		(1)
Elolidae		(1)
Histeridae		Histerus sp.
Licydae		Calopternon palpali
"		Lissonotus coltinus
Nilodidae		(1)
Passalidae		Pasalus sp.
Scarabeidae	Scarabeinae	(1)
"	Dinastinae	(1)
"	"	Megasoma sp.
"	"	Strataegus aloeus
"	Melolontinae	Phyllophaga sp.
"	Rulelinae	Platicoelia valida
"	"	Annomala caucana
"		Carabus sp.
"		Atractocerus brasiliensis
"		Platipus sp.
"		Metamasius sericeus
"		Lagochirus sp.
Tenebrionidae		Nyatobates gigas

Del Orden: Saltatoria

	Gryllinae	(1)

Del Orden: Diptera

Familia	Sub-familia	Genero y Especie
Asilidae		(1)
Mydaidae		(1)
Naididae		(1)
Tabanidae		(3)
Pigiodieranidae		(1)

Del Orden: Hemiptera

Aradidae		Dysodius lanatus
Reduviidae		(1)
"		Aplomerus gallegoi
"		Sirthenea atria
"		Aplomerus lanipes
"		Ronnius sp.
"		Montina nigripes
"		Micrauchelus lineda
"		Saliabata variegata
Scutelleridae		(1)
Triatomidae		(1)

Del Orden: Himenoptera

		Camponatus sp.
Apidae	Meliponinae	(1)
Andrenidae		(1)
Bombidae		(1)
Braconidae		Ipobyacon sp.
Euglenidae		Euglenus sp.
Euglossidae		(1)
Formicidae		Menoponera clavata
Mombidae		(1)
Polistinae		(1)
Somnocharidae		(1)
Sphesidae		Sceliphron fistulare
Tabanidae		(1)
Vespidae		Polibia sp.
"	Psomnocharidae	(1)

Del Orden: Homoptera

Cicadidae		Proarna insignis
"		Trachideres sp.
Cicadellidae		Proarna sp.
Fulgoridae		(1)
Fasmatidae	Pseudofasmatidae	(1)
Membracidae		(1)
"		Rhodnius prolixius

Del Orden: Isoptera

Termitidae	(1)
Kalotermitidae	(1)

Del Orden: Lepidoptera

Artiidae	(1)
Acrididae	Lophacris latreillei
Cicadidae	(1)
Noctuidae	(1)
Erotilidae	(1)
Tettigonidae	(1)

Del Orden: Mantida

Epophoditinae	Aganthops sp.

Del Orden: Odonata

Agrionidae	(1)
Libellulidae	(1)

Del Orden: Coleoptera

Familia	Sub-familia	Genero y Especie
Bostrichidae		Scaptrichopsis unicinata
"		Heliptus sp.
"		(2)
Brentidae		Eremnus sp.
Bupprestidae		(1)
Carabidae		(1)
Cassidae		(3)
Cerambicidae		Mantilora sp.
"		Platipodinus sp.
"		Platipus sp.
"		Acrocinus longimanus
"	Cerambicinae	Peyomatocerus sp.
"	"	Tormentinl ostmastocerus
"	"	(5)
"	Lamiinae	Eburodacrinus sp.
"	"	Trachyderes infurruptus
"	"	(1)
"	Prioninae	Stenotilanus strytinopus
"	"	Pherophatini sp.
"	"	Chlorida sp.
Chrisomelidae	Alticinae	(1)
"	Hispinae	(1)
"		(4)
Curculionidae		Phymasbrlrrostrta sp.
"		Heliptus sp.
"	Calandrinae	Metamasius sp.
"	Cholrinae	(1)
"	Cryptorrhynchinae	(1)
"	Hilobiinae	(1)
"	Otiorrhynchinae	(1)
"	Ttypopinae	(1)
"		(1)
Coccinellidae		Cycloneda sp.
Elateridae		Hoplitlcus sp.
"		Semiotus intermedius
"		Chalcolepidius fabrlcii
"		Pyrophorus sp. (2)
"		Semiotus imperialis
"		Pyrophorus noctilicus
"		(1)
Erotylidae		Erotilus sp.
"	Dimastinae	Hemophilaurra didimus
"		(1)
Elaterldae		(1)
Histeridae		Hister sp.
Lagriidae		Chlorpterum pelpalli
"		Lissomatus nottinus
Nitidulidae		(1)
Passalidae		Passalus sp.
Scarabeidae	Scarabeinae	(1)
"	Dinastinae	(1)
"	"	Megasoma sp.
"	"	Strategus aloeus
"	Melolonthinae	Phyllophaga sp.
"	Rutelinae	Platiloella valida
"	"	Anomala cesonare
"		Canthon sp.
"		Aturtocerus brasilienais
"		Elaphus sp.
"		Metamasius sericeus
"		Isocoelus sp.
Tenebrionidae		Nyctoscles gigas

Del Orden: Diptera

Familia	Sub-familia	Genero y Especie
Asilidae		(1)
Hybatidae		(1)
Raldidae		(1)
Tabanidae		(2)
Phytotetranidae		(1)

Del Orden: Hemiptera

Familia	Sub-familia	Genero y Especie
Aradidae		Dysodius lunatus
Reduviidae		(1)
"		Apiomerus pallepes
"		Stirthrus atrls
"		Apiomerus lanipes
"		Rocmlus sp.
"		Montina nigrlpes
"		Micrauchenlus fitnedi
"		Saltaseta varlegata
Scutelleridae		(1)
Tristomidae		(1)

Del Orden: Mecanopteros

Familia	Sub-familia	Genero y Especie
		Camporeitus sp.
Apidae	Meliponinae	(1)
Andrenidae		(1)
Bombidae		(1)
Braconidae		Ioobracon sp.
Eugeniidae		Eugenia sp.
Eulophidae		(1)
Formicidae		Mesoponera elavata
Membidae		(1)
Pollistinae		(1)
Sphecidae		Sceliphron fistularis
Tabanidae		(1)
Vespidae		Polibia sp.
"	Pseudoscoliidae	(1)

Del Orden: Neuropteros

Familia	Sub-familia	Genero y Especie
Cicadidae		Proarna lineipnis
"		Tibicinidera sp.
Cicadellidae		Proarna sp.
Fulgoridae		(1)
Membracidae	Pseudofaeneatidae	(1)
"		Rhodnius prolixus

Del Orden: Isopteros

Familia	Sub-familia	Genero y Especie
Termitidae		(1)
Kalotermitidae		(1)

Del Orden: Lepidopteros

Familia	Sub-familia	Genero y Especie
Arctiidae		(1)
Acrildidae		Isobarria lateritiat
Cinetidae		(1)
Noctuidae		(1)
Erotilidae		(1)
Tettigonidae		(1)

Del Orden: Mantida

Familia	Sub-familia	Genero y Especie
Epipodottinae		Agamtbope sp.

Del Orden: Odonata

Familia	Sub-familia	Genero y Especie
Agrionidae		(2)
Libellulidae		(1)

COMPARATIVE ANALYSIS OF THE SOILS IN THE BAJO CALIMA CONCESSION IN THE PRIMARY FOREST AND AFTER CLEARCUTTING

Philip G. Cannon

SUMMARY

In the primary forest and in areas harvested from 2 months to 18 years previous to the study, soils were sampled to evaluate 18 physical and chemical paramenters on 13 sites. In general, all soils have deficiences in available P, Ca, K, Mg, Cu, B, Mn and Zn and have high aluminum saturation percentages. There was no important effect on the soil due to harvesting and wood extraction systems except that the quantity of surface litter diminished after cutting and Ca availability increased with harvesting.

RESUMEN

Se llevó a cabo un muestreo de suelos, en el cual se evaluaron 18 parámetros físicos y químicos en 13 sitios diferentes en el bosque primario y en áreas donde se habían llevado a efecto cosechas entre 2 meses y 18 años. En general, los suelos son deficientes en nutrientes disponibles de P, Ca, K, Mg, Cu, B, Mn, y Zn y existe un alto porcentaje de saturación de aluminio. No hubo efecto importante en el suelo debido al sistema de cosecha y extracción de la madera, con la excepción de la cantidad de hojarasca en la superficie la cual disminuyó después del corte y la disponibilidad de Ca, la cual se aumentó después del corte del bosque.

INTRODUCTION

The Bajo Calima Concession, which is located on the Pacific Coast near Buenaventura, is characterized by an annual precipitation of 7,500 mm. and by poorly drained and undifferentiated soils resulting from alluvial deposits which have been disected into a low hills geologic formation. According to Holdridge's classification it is a humid-tropical to pluvial-tropical forest.

The wood from the concession is used mainly for making pulp and paper and is harvested by clearcutting all commercial trees of all species and forwarding the wood to the road by means of a skyline cable system. Due to the high rainfall, the imperfect drainage of the clayey soils and the low, hilly land formation, there exists a concern as to the effect the clearcutting of the forest has on the soil conditions after harvesting.

As a means of studying soil differences before and after harvesting, in 1983 a preliminary soil sampling was carried out in the primary forest and on sites harvested recently and also those harvested several years ago.

PURPOSE

To compare the results of analyses of 18 soil properties on 11 sites harvested previously with 2 sites having standing primary forest.

METHODS

The following plot types were selected in the Bajo Calima Concession for soil sampling:

Primary forest, intact,
Two months after cutting,
Six months after cutting,
Two years after cutting,
Seven years after cutting,
Eighteen years after cutting.

On those sites harvested two months prior to sampling, soil samples were taken in the area between cable lines and also under the cable line. On the site cut six months before sampling, there was a small lot recently burned by local colonists and a sample was taken in this burned lot as well.

The litter on the soil surface was sampled by collecting the organic material on top of the soil in a 1/10 square meter plot and drying this in the laboratory to determine its oven dry weight. Bulk density was measured from samples taken in the A horizon.

For the soil chemical analyses, twenty sub-samples were collected from between 5 and 10 cm. depth and then mixed to provide the sample for

each site (Figure 1). Chemical and textural analyses were done in the soils laboratory of the Colombian Agricultural Institute (ICA) in Tibaitatá, near Bogotá.

RESULTS

No important differences were found between the soil analyses in the primary forest and on the sites cut before sampling for the following parameters. texture, acidity, percent organic matter, available phosphorus, aluminum saturation, available Al, Mg, K, Na, Fe, B, Cu, Mn, Zn, nor in the cation exchange capacity (Table I).

The quantity of litter was generally less 6 months after clearcutting than in the primary forest or on the sites recently harvested. It was very low on the burned lot as would be expected. Nonetheless, the quantity of organic matter in the soil did not vary more than a percentage point between all samples.

Available calcium increased between 2 months and 7 years, but in the 18 year sample it was at a level similar to that of the primary forest. The bulk density of the soil showed no tendency to vary according to the type of site sampled, but sample 5, taken under the path of the slyline cable where the wood had dragged over the top of a small hill, had a higher bulk density than the average of the other samples (Table I).

In all of the samples, the quantity of available phosphorus is very low and the aluminum saturation level is high, indicating aluminum toxicity. The quantities of available Ca, K, Mn, Cu, B, Mg and Zn are also marginal to low in nearly all cases (Cannon, 1983).

DISCUSSION

In inventories of forest development after harvesting it has been found that the forest of the concession regenerates itself naturally and abundantly on all areas that were clearcut (Mazuera, 1979). This phenomenon is due in large part to the fact that the wood in the Bajo Calima Concession is transferred to the roadway by means of skyline cable systems which do not make major soil disturbances. As a result, the litter on the soil surface remains intact after harvesting. The litterfall was less in the plots where the forest had been cut more than six months prior to sampling, but this is an expected condition due to the lesser litterfall under the young new forest which results from the natural regeneration.

The bulk density of the soil did not vary after harvesting because the wood was removed by skyline cable. Even in the path under the cable, which is a very narrow zone, one sample (4) was no different from the others and the other (5), taken where the wood scraped the top of a hill, had a bulk density only slightly higher.

Although the soil samples were taken on sites that in cases were more than five kilometers distant from each other, the physical and chemical analyses were very similar, indicating a high degree of uniformity of the soils over a large part of the low hills forest type. On all sites, the quantity of available elements essential for tree growth, and especially that of phosphorus, was very low. Additionally, the high aluminum saturation percent undoubtedly affects the availability of certain elements. As a result, the soils are so poor in nutrients and have such a poor drainage that the primary forest just reaches an average height of 20 meters and an average D.B.H. of 27 cms. (Mazuera, 1979).

CONCLUSIONS

1. In this sampling of soils in the low hills of the Bajo Calima Concession, there is a similarity of texture and chemical composition between samples.

2. The majority of the soils are deficient in available nutrients, principally those of P, Ca, K, Mg, Cu, B, Mn and Zn.

3. The aluminum saturation percent is very high in nearly all cases, indicating toxic aluminum levels in the soils.

4. There was no detectable effect of harvesting of the primary forest by clearcutting and wood removal by skyline cable on the principle characteristics of the soil, with the exception of a reduction of the soil litter after harvesting and an increase in available calcium during the first few years, which reverted to ! vels similar to those of the primary forest afterwards.

5. In the paths of the skyline cable there is some displacement of the litter on the surfaces where the wood was dragged over the soil, as on the tops of the hills and near to the recollection points, but this is a very small area compared with the total area harvested.

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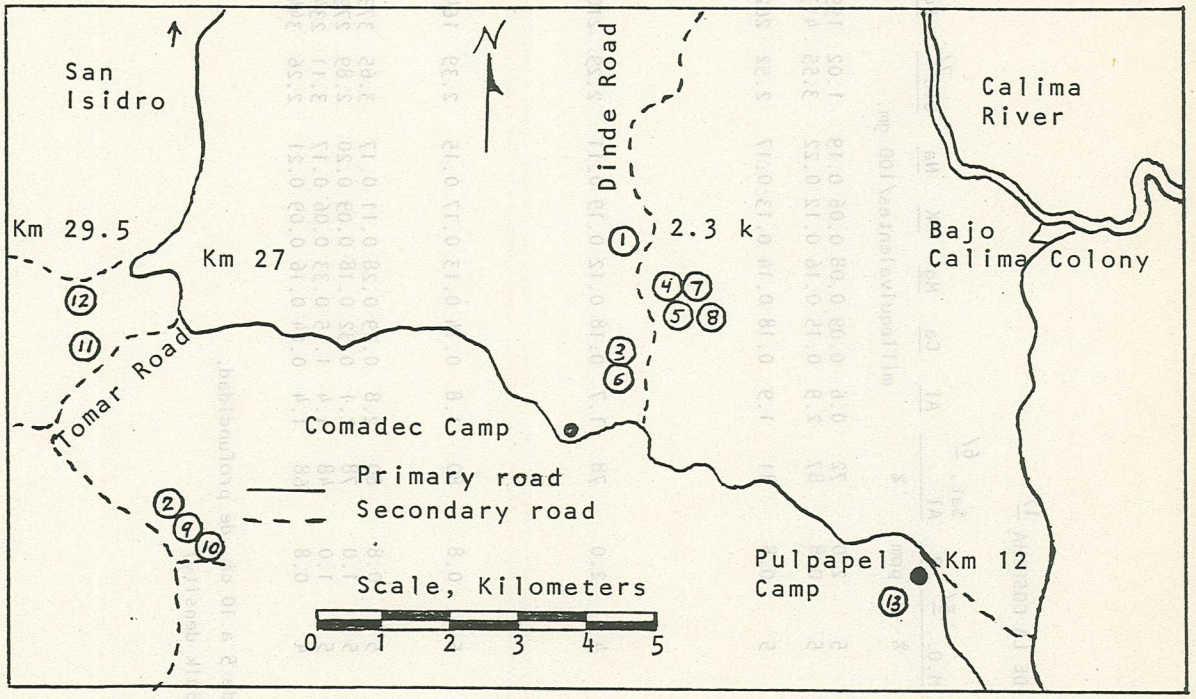
FIGURE 1. LOCATION OF THE SITES SAMPLED IN THE BAJO CALIMA CONCESSION



Plot No.	Sample Description
1, 2	Primary forest, intact
3, 4, 5	2 months after harvesting, samples between cable lines.
6, 7, 8	2 months after harvesting, samples under cable lines.
9, 10	6 months after harvesting
11	2 years after harvesting
12	7 years after harvesting
13	18 years after harvesting

TABLA I. PROPIEDADES DEL SUELO EN LA CONCESION DEL BAJO CALIMA, ANTES Y DESPUES DE LA COSECHA [1/]
(Soil Properties Before and After Harvesting)

Número	Estado	Dens. [2/] Apr.	Hoja-rasca [3/]	Textura [4/]	pH	M.O. [5/]	P	Sat. [6/] Al	Al	Ca	Mg	K	Na	CIC [7/]	Fe	B	Cu	Mn	Zn
			Kg/m^2			%	ppm	%	miliequivalentes/100 gm.						partes por millón				
1	Bosque primario, sin intervención	1.06	3.02	FArA	4.9	5	2.0	72	0.6	0.09	0.08	0.06	0.19	1.02	199	0.4	0.6	0.9	0.1
2	Bosque primario, sin intervención	0.81	1.25	FArA	4.4	5	0.8	87	2.9	0.15	0.16	0.12	0.22	3.55	413	0.4	1.5	2.8	3.4
3	2 meses después de cosechar, muestreo en líneas del cable aéreo	—	1.84	FArA	4.6	5	0.8	81	1.9	0.18	0.14	0.13	0.17	2.52	262	0.3	1.2	1.5	1.0
4	2 meses después de cosechar, muestreo en líneas del cable aéreo	0.94																	
5	2 meses después de cosechar, muestreo en líneas del cable aéreo	1.20																	
6	2 meses después de cosechar, muestreo entre líneas del cable aéreo	0.93	1.75	FArA	4.8	4	2.0	78	1.7	0.18	0.12	0.19	0.11	2.29	210	0.3	0.7	0.9	1.1
7	2 meses después de cosechar, muestreo entre líneas de cable aéreo	0.90																	
8	2 meses después de cosechar, muestreo entre líneas de cable aéreo	0.96																	
9	6 meses después de cosechar	0.93	0.60	FArA	4.7	5	0.8	80	1.8	0.14	0.13	0.17	0.15	2.39	164	0.3	0.4	1.8	0.1
10	6 meses después de cosechar, lote quemado por colonos	0.83	0.05	FAr	4.5	5	0.8	80	2.8	0.29	0.28	0.11	0.17	3.65	379	0.4	1.2	3.4	3.0
11	2 años después de cosechar	0.81	0.30	Ar	4.6	5	1.0	78	2.1	0.32	0.18	0.09	0.20	2.89	279	0.4	0.9	2.6	0.3
12	7 años después de cosechar	1.00	1.65	Ar	4.8	5	1.0	48	1.4	1.15	0.33	0.06	0.17	3.11	234	0.5	0.8	3.5	0.1
13	18 años después de cosechar	0.81	0.47	FAr	4.7	4	0.8	68	1.4	0.04	0.16	0.09	0.21	2.26	344	0.4	1.2	3.0	0.7

1/ Análisis químico por el Instituto Colombiano Agropecuario, Bogotá, muestras de 5 a 10 cm. de profundidad.

2/ Densidad aparente del suelo en gramos/cc., análisis por Cartón de Colombia (Bulk density)

3/ Peso seco de hojarasca y humus encima del suelo (Dryweight of litter)

4/ Textura: F = franco, Ar = arcilla, A = arena (F = loam, Ar = clay, A = sand)

5/ Materia Orgánica

6/ Saturación de aluminio = meq. de Al/meq. de Al + Ca + Mg + K

7/ Capacidad de Intercambio de cationes

NURSERY TRIALS IN THE CONCESSION, BAJO CALIMA, DURING 1975-1976

By

Miguel Heraclio García A.

ABSTRACT

This report describes the functions of the nursery in the Concession, Bajo Calima. Results of tests made during 1975 and 1976 are shown. These studies were conducted in order to determine germination percent and survival as well as behavior and adaptation to nursery handling and to field planting. The species tested were: Belotia spp. (aliso), Pouteria caimito (caimito), Inga spp. (guabo), Izertia pittieri (jaboncillo), Miconia spp. (mora), Vismia spp. (sangregallina), Vochysia spp. (soroga), Cecropia spp. (yarumo), Cordia alliodora (canalete) and Pouruma aspera (uva). In addition there are tables of results, design and construction of the nursery, and design of the nursery beds.

RESUMEN

En este informe se describe el funcionamiento del vivero en la Concesión del Bajo Calima. Se muestran algunos resultados obtenidos en pruebas realizadas en los años 1975 y 1976. Estos ensayos se efectuaron con el objeto de conocer porcentajes de germinación y supervivencia, comportamiento y adaptación, tanto en el vivero como en el campo. Las especies probadas en la Concesión fueron: Aliso (Belotia sp.), caimito (Pouteria caimito), guabo (Inga sp.) jaboncillo (Izertia pittieri), mora (Miconia sp.), sangregallina (Vismia sp.), yarumo (Cecropia sp.), canalete (Cordia alliodora) y uva (Pouruma aspera). Se anexan además, cuadros con resultados obtenidos, diseños de la construcción del vivero, diseño de conformación de eras y cobertizos empleados en la zona y cuadro descriptivo de las especies que se encuentran actualmente en el vivero.

INTRODUCTION

The first nursery in the Concession Bajo Calima, was established in May, 1961. The object of this nursery was to initiate germination tests of native species such as mora, sangregallina, jaboncillo, soroga and yarumo (Pulpapel 1972). With the construction of the present camp in 1964, a second nursery was established in order to continue research on these species and make tests of other native and exotic species such as P. caribaea, Artocarpus comunis (bredfruit tree) and Bixa spp. (achiote). Due to the construction of the new Calima-Juanchaco road in 1967, the nursery was moved behind the camp to its present site.

Thirty exotic species and twelve native species had been studied to date without promising results (Gutierrez, 1976). In the past three years, 1974-1976, studies have continued with germination and behavior of native species.

PURPOSE

To present results of the native species tested in 1975 and 1976 in the nursery of the Forest Concession, Bajo Calima.

PORCEDURE

The Present Nursery

The nursery consists of 18 beds 5 by 1.2 meters, constructed in two blocks and separated by a lane one mete wide. Space between the beds is half a meter. The walls of the beds are of brick, with drain holes to avoid excesive humidity (figure 1). The beds themselv are formed in three layers: One of gravel, another of sand on top and finally a mix of soil and sand (figure 2). Due to the high pricipitation of the zone (8,000 mm. per year) a covering was constructed of slats and plastic film, to keep out rain.

Species Tested in 1975 and 1976

Germination tests and nursery and field adaptation studies were conducted with the following species: Aliso, caimito, guabo, jaboncillo, mora, sangregallina soroga, yarumo and uva. The species Cordia alliodora (canalete) was also tested, the seed coming from plant tions in Tumaco.

The species tested for germination were: canalete, cai mito, guabo and uva. With canalete, 600 grams of seed was broadcast sown on top of three beds. Before seeding 600 seeds of caimito, three beds, prepared wit sand and soil were treated with 5 percent formol and the beds were covered two days with plastic film. The

third day the seed was sown and the beds covered with palm leaves. Two weeks later the germination began.

Five hundred uva seeds were sown in individual plastic bags, after removing the pulp from the seed, but without washing the seed. One hundred and fifty guabo seeds were sown in plastic bags also. The bags were left exposed to the sun and after 30 days the seeds germinated.

Trials With Seedling Stumps (Pseudoestacas)

This system consists of cutting the top of a wild seedling, leaving a stump 5 to 10 centimeters long and pruning the roots, leaving a taproot 10 to 15 centimeters long. These pruned stumps were tested in the case of 150 aliso and 100 jaboncillo seedlings. The stumps were planted in plastic bags 12 centimeters in diameter, filled with dirt.

Tests With Volunteer Seedlings

These seedlings were brought directly form the woods either with a little soil or bare root, having heights of 5 to 8 centimeters. The species tested by this method were sangregallina, yarumo, mora, soroga, jaboncillo and uva. The seedlings leaves were pruned, leaving only the two top leaflets and the seedlings were planted in polyethylene bags 12 centimeters in diameter. The bags were left in the shade.

Transplanting

The seedlings germinated in the nursery beds were transplanted to plastic bags. Of the canalete, 1,654 seedlings were transplanted, with heights ranging from 4 to 6 centimeters. They were left in semi-shade and two month later were treated with a fertilizer solution, Bayfolan, using 3 cubic centimeters per liter of water. When the seedlings reached 12 centimeters in height the leaves were pruned to maintain them at optimum size in the nursery. At nine months, height and survival data was recorded.

Likewise, 930 seedlings of canalete were transplanted at a later date, into other beds in order to give them better spacing. Six beds were treated with 5 percent formol as a disinfectant and 155 seedling were planted per bed, at a distance of 20 centimeters square. A shade of slats was kept over the transplanted seedlings for a few days and the fertilizer solution was applied in the same proportions as before. At nine months the height and survival were recorded, as a comparison to those planted in bags.

RESULTS AND DISCUSSION

In tables 1 and 2 are the nursery trial results of the Concession, Bajo Calima, during 1975 and 1976. The aliso, tested as pruned stumps, had 90 percent survival and 120 of the sprouted stumps were planted in the field at a height of 20 centimeters, in March of 1976. The behavior of this species in the field as in the nursery is very promising.

Jaboncillo (Izertia pittieri)

The survival using pruned stumps, "pseudoestacas", was 60 percent with an average height of 30 centimeters at 9 months of age. The volunteers had a transplant survival of 85 percent and an average height of 30 centimeters, at the same age. The nursery growth was slow and the root formation was poor in plastic bags; this method is not recommended. The bare root seedlings did not plant well in the field either, but once established, the growth was satisfactory.

Yarumo (Cecropia spp.)

Thes tests with volunteer seedlings gave survival of 45 percent at nine months. The behavior of this tree in the nursery as in the field is variable and it cannot be easily managed for planting. One species of the genus seemed to respond better than the rest.

Sangregallina (Vismia spp.)

Percent survival in the two trials made with volunteer seedlings was 57 and 33 percent. In the field there was a high mortality and the growtn was not ideal, compared with the natural regeneration of the same group of species. Nursery growth was good in the plastic bags, in spite of spiraling of the roots.

Mora (Miconia spp.)

Survival of volunteer seedlings in the nursery after nine months was 57 and 38 percent in the two tests. The average height was 15 centimeters. The trees planted in the field had poor survival.

Uva (Pouruma aspera)

Several trials were made with uva. In one, the germination was 30 percent, using 500 seeds. Of 400 volunteers brought to the nursery from the woods, 38 percent survived. This is one of the most difficult species to handle in the nursery; growth is slow, the seedlings grow deformed and chlorisis is common in new leaves. The seedlings grow best in the shade. Underneath a patch of mature tres, at the camp the natural regeneration is abundant and growth is good. In this clump, which is ten years old, the average heights is 7 meters and average D.B.H is 20 centimeters.

Guabo (Inga spp.)

In two trails containing a total of 400 seed sown in plastic bags, the germination was 96 and 75 percent, respectively. Average height of these seedlings at nine months of age was 100 centimeters. Eighty trees were planted in the field when they had an average height of 15 centimeters and none prospered. Later, 50 seedlings were outplanted at 50 centimeters height and had 100 percent survival after six months and an average height of one meter at that time.

Sorogá (Vochysia spp.)

This group of species is difficult to handle in the nursery. The survival of 400 volunteer seedlings, transplanted to plastic bags was only 40 percent. The behavior of the seedlings in the field as in the nursery in full light is undesirable. The seedling needs shade for its first few years of development. The natural regeneration under mature trees of the same species is good in the forest.

Caimito (Pouteria caimito)

Of the 600 seed sown in the nursery bed, 510 or 85 percent germinated. This species developed well in the nursery but its growth in the field leaves much to be desired.

Canalete (Cordia alliodora)

After nine months, the trials gave the following results:

	In plastic bags	In nursery beds
Survival	82%	82%
Height	20 cmts.	80 cmts.

This species requires sandy loam soils with good drainage. This species in not recommended for the Concession. The majority presents chlorosis and drying of the leaves. Afterwards, some die. Field growth is not good either. In both the field and in the nursery the seedlings suffered from insect attack.

CONCLUSIONS

1) The size of the nursery is ideal for research purposes.

2) Control of sunlight is important for these species. Of the species tested, some developed well in full sunlight, for example, caimito, jaboncillo, aliso and guabo. Others need slight shade: Sangregallina, mora and yarumo. And finally, others require a complete shade for their development: soroga and uva.

3) Seedlings taken to outplant in the field should have optimum heights for good development and to resist the competition from the natural regeneration. The ideal heights for field planting are: 50 to 80 centimeters for jaboncillo, guabo and aliso (approximately 15 to 20 months old), 40 to 60 centimeters for sangregallina, mora, uva, soroga and yarumo (approximately 8 to 12 months of age).

4) The species of guabo respond well when sowing the seed in polyethylene bags 12 centimeters in diameter. The caimito developed well in the nursery beds. The transplanting of Cordia alliodora at a wider spacing in the nursery gave better results than those in bags. The method of pruned stumps (pseudoestacas) worked better with aliso than the transplanting to bags. Of the volunteers brought in from the woods, the species that gave the best results was jaboncillo and it developed better when left in bags in the nursery to develop than when it was planted bare root directly in the field.

5) The ideal size for seedlings to be collected for handling as pruned stumps is 2 meters in height and 1½ to 2 centimeters in diameter (about two years old).

6) The height of volunteers brought in from the field should be 2 to 3 centimeters for soroga and uva and 5 to 7 centimeters for mora, sangregallina and yarumo. These species should be lifted from the woods with a little earth and planted in the plastic bags.

DEVELOPED BY

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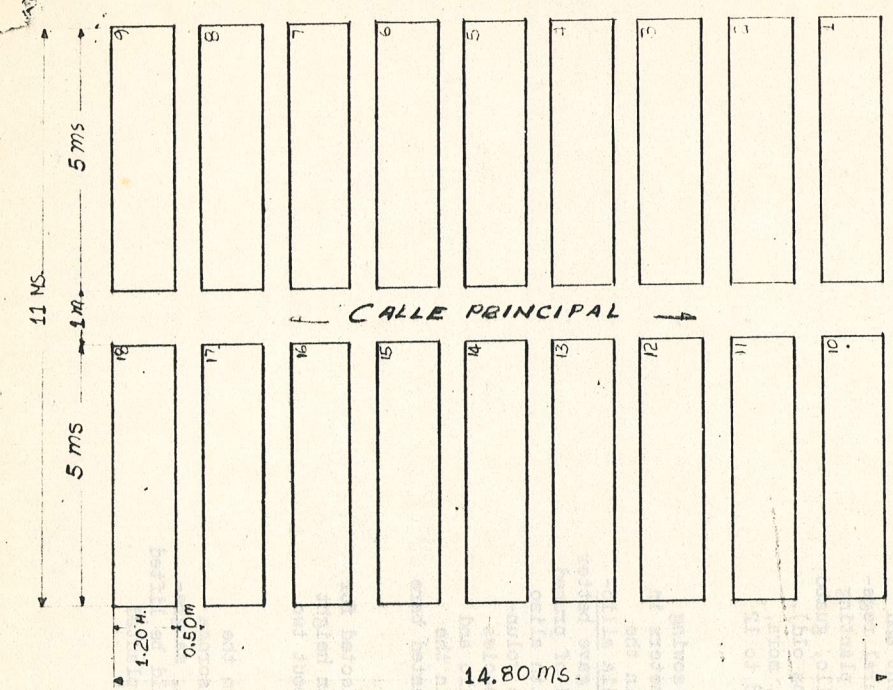
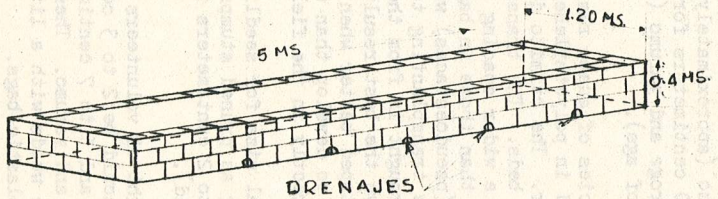


VIVERO EN CONCESION

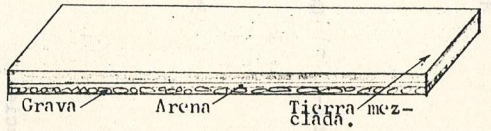


ERA CONSTRUIDA EN LADRILLO

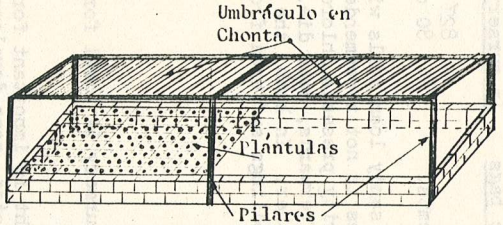
Figura 1.

Figura 2.

CONSTRUCCION DE ERAS



FORMACION DE UNA ERA



SISTEMA DE COBERTIZO DE UNA ERA.

F.T/F.S...Fechas de Siembra y Trasplante.

SP..... Especie.
M ..... Método de Siembra.

Cuadro 1. Resultados obtenidos en 1975

EDAD Meses Age Months	ESPECIES Species	N° Total de árboles No. of Trees	Supervivencia % Survival	**Altura Inicial cms.	Altura Total cms.	OBSERVACIONES
*24	Canalete	600 gr.	-	Semilla Seed	-	3 eras de 200gr/cra. (3 beds of 200gr each)
20	Caimito	600	85%	"	40	Siembra en eras (Sown in beds)
20	Guabo	150	96%	"	-	Murieron (Died)
20	Mora	250	48%	6	70	Voluntarios (Volunteers)
20	Sangregallo	300	57%	6	80	Voluntarios
20	Yarumo	395	46%	7	100	Voluntarios
20	Sorogá	400	50%	4	30	Voluntarios
20	Aliso	150	90%	Tocones	200	Tocones en bolsas (Stumps planted)

+ Siembra de 600 gramos de semilla de Canalete. (600 grams of seed were sown)

++ Columna altura inicial, indica el sistema de siembra: Por semillas, trasplante, voluntarios, tocones.

CUADRO II. Resultados Obtenidos en 1976

EDAD Meses Age Months	ESPECIES Species	N° Total de árboles No. of Trees	Supervivencia % Survival	Altura Inicial cms.	Altura Total cms.	OBSERVACIONES
8.5	Canalete	1654	82	5	20	Trasplante en bolsas (Transplant to bags)
8.5	Canalete	930	83	5	80	Raíz desnuda en eras (Bare root in beds)
6	Caimito	146	69	Semilla	40	Siembra en bolsas (Sown in bags)
9	Guabo	270	74	"	100	Siembra en bolsas
10	Guabo	50	96	"	40	Siembra en bolsas
9	Jaboncillo	100	60	Tocones	20	Siembra en bolsas
9	Jaboncillo	100	85	8	30	Voluntarios (Volunteers)
9	Mora	130	39	5	12	Voluntarios
9	Palma A.	222	96	8	35	Voluntarios
9	Sangregallina	300	67	6	15	Voluntarios
9	Uva	400	38	6	12	Voluntarios
9	Yarumo	383	44	7	25	Voluntarios

The forest tree nursery at the Bajo Calima Concession headquarters where indigenous species are tested for germination and initial development. Trees planted in field studies and in the Bajo Calima arboretum were produced here. Nursery seedlings are also given to neighbors in Bajo Calima and in the city of Buenaventura.