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Palms in the Cloud Forest of the Henri Pittier National Park, Venezuela

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The coastal range is located in the northern part of Venezuela and is roughly 870 kilometers long and between 10 and 80 kilometers wide. It begins in the west in the depression of the Yaracuy River (at approximately 69°45′ west longitude and 10° north latitude), is interrupted in the Unare depression (at about 65° west longitude), then extends to the Paria Peninsula in the east (at approximately 61°15′ west longitude and 10°15′ north latitude). The range separates the maritime coastal zone from the plains and comprises two branches: the coastal branch and the interior branch, separated by the Tuy Valleys and the basin of the Lake of Valencia.

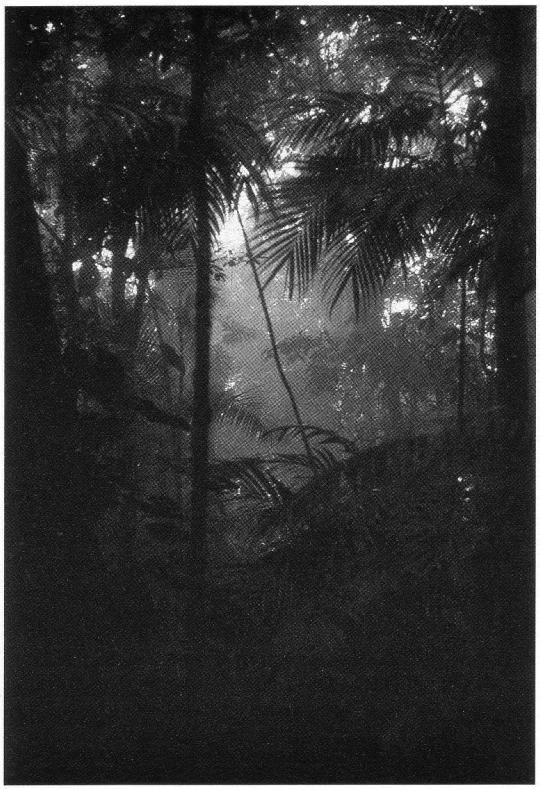
The Henri Pittier National Park is set in the central zone of the coastal branch, between Aragua and Carabobo States. Declared a National Park in 1937, it was the first of Venezuela's parks to obtain such a distinction. Altitudes vary from sea level up to 2,436 meters (7,992 feet) in Cenizo Peak, displaying a diversity of vegetation habitats, among which the cloud forest is one of the most conspicuous. It is understood that this type of forest must develop on a mountainous system since only the slope of a mountain or sierra enables the formation of clouds or orographic mist that is regular and frequent for most of the year at constant altitudes, playing a dominant ecological role in the ecosystem. Though broadly speaking, floristic composition is varied within cloud forests, the common environmental characteristic is the presence of clouds throughout the year, forming at altitudes ranging from 800 to 2,400 meters (2,625 to 7,875 feet) on both the southern and northern slopes, the latter being the side where clouds form at the highest altitude.

In the surroundings of the Rancho Grande Biological Station, located in the Henri Pittier National Park cloud forest, we observe a daily alternation in the prevailing wind regime that is undoubtedly one of the main factors in the formation, distribution, and duration of the clouds and mists in the mountainous zone. Prevailing local winds in the morning coming from the basin of the Lake of Valencia and the trade winds from the northeast that predominate in the afternoons both cause cloud formation on the mountains by forcing the air upward past its condensation altitude and temperature. This effect is called orographic cooling. The afternoon trade wind effect is somewhat less frequent in the dry season (December to March). Based on rainfall and temperature records, which are more or less continuous for the zone with altitudes ranging between 1,150 and 1,670 meters (3,773 to 5,479 feet), one observes an average annual rainfall of 1,170 mm (46.1 inches). February is the driest month with an average of 24 mm (0.9 inches) of rain, while August is the wettest with an average of 284 mm (11.2 inches). The annual mean temperature is 20°C (68° F). January is the coolest month with a monthly average of 18.4° C (65° F), and August, with an average of 21° C (70° F) is the warmest. Daily temperature oscillations vary between 1.5° and 8.2° C (2.7° and 14.8° F).

Following are brief descriptions of the palms which to date have been identified in the Henri Pittier National Park cloud forest; their main vegetative characteristics, by which they may be easily identified, are pointed out. Scientific descriptive terms have been used where necessary to keep the descriptions concise. A glossary of such terms is included at the end of the article.

Bactris setulosa Karsten

Monoecious palm, armed, clustered, rarely solitary, 8 to 10 m; adventitious roots occasionally present; leaves 4 to 5, pinnate, leaflets regularly



1. *Hyospathe pittieri* growing in the Henri Pittier National Park cloud forest.

2. Well-developed roots of *Dictyocaryum fuscum.*

distributed on the rachis, linear-lanceolate with acuminate apex, intensely green; inflorescence yellow; fruit globe-shaped, 1.5 to 2 cm in diameter, scarlet-red; prefers well-shaded locations.

Catoblastus praemorsus (Willd.) Wendl.

Monoecious palm (Fig. 3), unarmed, solitary or clustered, 10 to 15 m; roots well developed, 1 to 1.5 meters long with sharp superficial protuberances; leaves 4 to 5, pinnate, leaflets regularly distributed on the rachis, lacerated on the edges; the last pair joined in the form of a semi-open fan; bracts 3 to 6; fruit (Fig. 4) globe-shaped, 2 to 2.5 cm in diameter, brown to yellow; prefers well-shaped locations.

Ceroxylon klopstockia Mart.

Dioecious palm, unarmed, solitary, 15 to 20 m; wax secretions along the entire stem; leaves, 10 to 15, pinnate, leaflets regularly distributed on the rachis, linear-lanceolate, long acuminate apex, green on the upper surface, grayish white on the reverse side; fruit globe-shaped, 2.5 to 3 cm in diameter, purple-red; generally prefers well-shaded conditions, but occasionally found in sunny locations.

Chamaedorea pinnatifrons (Jacq.) Oerst.

Dioecious palm, unarmed, solitary, 1.5 to 2 meters; adventitious roots, 10 to 15 cm long, smooth, orange red; leaf-scar rings well developed; leaves 3 to 5, pinnate, leaflets regularly distributed on the rachis, rhomboid, alternate or opposite each other; fruit elliptic, 1.5 cm long, 1 cm wide; orange then black when ripe; prefers well-shaded locations.

Dictyocaryum fuscum (Karst.) Wendl.

Monoecious palm, unarmed, solitary, 15 to 20 meters; roots well-developed (Fig. 2), 1 to 1.5 m long with sharp superficial protuberances; leaves 5 to 7, pinnate, leaflets regularly distributed on the rachis, lacerated at the apex; bracts curved,

3. *Catoblastus praemorsus* is one of the most frequent palms in the cloud forests of the coastal range of Venezuela.

4. *Catoblastus praemorsus* with fruit.

joined together forming a horn; fruits globe-shaped, 2 to 2.5 cm in diameter, light brown; surface of seed reticulate; generally prefers well-shaded conditions, but occasionally found in sunny locations.

Euterpe microcarpa Burret and
E. stenophylla Trail

Monoecious palms, unarmed, clustered, 15 to 20 meters; leaf-scar rings inconspicuous on adult plants; leaves 5 to 7, pinnate, sheath light purple, leaflets regularly distributed on the rachis, linear-lanceolate, long acuminate, lax; fruit globe-shaped, 0.5 to 1 cm in diameter, brown to black; prefers well-shaded locations.

Geonoma pinnatifrons Willd.

Monoecious palm, unarmed, clustered or rarely solitary, 3 to 4 meters; leaves 5 to 7, pinnate, leaflets irregularly distributed on the rachis, broad at the base and narrow towards the apex; fruit ovoid, 1 cm long and 0.8 cm in diameter, black; prefers well-shaded locations.

Geonoma simplicifrons Willd.

Monoecious palm, unarmed, solitary, 1.5 to 2 meters; leaves pinnate, 4 to 5, leaflets irregularly distributed on the rachis, broad at the base and narrow towards the apex; fruit globe-shaped, 1 cm in diameter, green; prefers well-shaded locations.

Geonoma solitaria (Engler) Jahn

We have never observed this palm, but Jahn (1908) and Badillor et al. (1984) report it as existing in the Henri Pittier National Park, describing it as a monoecious palm, unarmed, solitary, 4 to 6 meters; leaves, 5 to 7, entire, bifid, with reddish central vein; fruit ovoid, 1 cm long and 0.5 cm in diameter, green; prefers well-shaded locations.

Geonoma tenuis Burret

Monoecious palm, unarmed, solitary, 0.5 to 1 m; leaves 7 to 10, entire, bifid, intensely green; bracts completely deciduous; fruits globe-shaped,

0.5 to 1.1 cm in diameter, black; prefers well-shaded locations.

Geonoma undata Klotzch

Monoecious palm, unarmed, solitary, 4 to 8 m; leaves 4 to 7, pinnate, sheath with fibrous edges; leaflets irregularly distributed on the rachis, broad at the base and narrow towards the apex; fruit ovoid, 1 cm long and 0.8 cm in diameter; chestnut brown to black; prefers well-shaded locations.

Hyospathe pittieri Burret

Monoecious palm (Fig.1), unarmed, clustered, 8 to 10 meters; leaves 10 to 12, pinnate, sheath light green, leaflets regularly distributed on the rachis, linear-lanceolate with an acuminate apex, the last pair joined to almost half of the length; inflorescence red; fruit globe-shaped, 0.5 to 1 cm in diameter, dark purple; prefers well-shaded locations.

Table 1. Distribution of palm species in the cloud forests of the Henri Pittier National Park, Venezuela.

Palm species	T.C.F.	C.F.	S.C.F.
Bactris setulosa	+	−	0
Catoblastus praemorsus	−	+	−
Ceroxylon klopstockia	0	0	−
Chamaedorea pinnatifrons	+	−	−
Dictyocaryum fuscum	−	+	−
Euterpe microcarpa	−	−	0
Euterpe stenophylla	−	−	0
Geonoma pinnatifrons	+	−	−
Geonoma simplicifrons	+	−	0
Geonoma solitaria	0	0	−
Geonoma tenuis	0	+	−
Geonoma undata	0	0	+
Hyospathe pittieri	−	+	−

T.C.F. = Transition cloud forest (900–1,400 meters or 2,950–4,595 feet elevation). C.F. = Cloud forest (1,400–1,600 meters or 4,595–5,250 feet elevation). S.C.F. = Superior cloud forest (greater than 1,600 meters or 5,250 feet in elevation). + = frequent; − = occasional; 0 = absent.

Glossary of Descriptive Terms Used

acuminate—tapering to a point
adventitious—arising or occurring spontaneously in other than the normal location
armed—spines of some type present
bifid—divided in two, usually equal, parts
bract—modified leaf associated with the inflorescence
deciduous—shed periodically, falling
dioecious—when male (staminate) and female (pistillate) flowers are borne on different plants
elliptic—oblong, with regularly rounded ends
inflorescence—the branch that bears the flowers, including all its bracts and branches
lanceolate—narrow, tapering at both ends, the basal end often broader
lax—loose or non-rigid
linear—several times longer than wide, usually narrow
monoecious—both sexes present on a single plant, i.e., describing a plant bearing both staminate and pistillate flowers
petiole—the stalk of a leaf
rachis—the axis of a leaf beyond the petiole
reticulate—having veins, fibers or lines in a netlike pattern
rhomboid—shaped like a parallelogram with oblique angles
sheath—the basal part of a leaf, usually tubular or enrolled

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The Rancho Grande Biological Station in the Henri Pittier National Park is a scheduled side trip at the **IPS Biennial** to be held in June in Caracas. Several of the post-biennial tour options also include more in-depth visits to this cloud forest environment. Perhaps you can be the one to find the elusive *Geonoma solitaria*.