Native Plants of Palau

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Introduction

The Republic of Palau, an archipelago located in the western Pacific Ocean at the edge of Micronesia, is celebrated for its extraordinary biodiversity, both marine and terrestrial. Situated some 800 kilometers east of the Philippines and lying north of New Guinea, Palau comprises over 300 islands, most encircled by a vast barrier reef. Despite its relatively small total land area, between 415 and 460 square kilometers, Palau is home to the largest contiguous native forest in all of Micronesia. The islands' dramatic geological past—marked by volcanism, uplift, and erosion—has created a landscape of volcanic and limestone islands, as well as atolls, that support a remarkable array of habitats for plant life.

Palau's flora is unusually rich for such a compact island group, thanks in part to its proximity to the plant-rich regions of Southeast Asia. As a result, Palau has served as a crossroads for species dispersal, and flora surveys now estimate between 1,200 and 1,400 plant species inhabit its islands, with around 800 to 970 species considered native. Of particular importance is the high level of endemism: approximately 130 to 194 plant species are found nowhere else in the world, making up roughly 20% of Palau's entire flora. Despite this richness, a significant proportion of Palau's native and endemic species remain poorly studied, with many known only from their initial scientific collections—a testament to the need for ongoing botanical exploration and conservation.

Palau's diverse plant communities are shaped by the complex interplay between geological substrate and climate. Upland volcanic forests, found on islands like Babeldaob, exhibit the highest species diversity and host many of Palau's endemic plants. The uplifted limestone islands, including the spectacular Rock Islands, feature their own unique assemblages, with species adapting to shallow soils and karst formations. Mangrove forests fringe the coasts and river mouths, serving as crucial buffers for the land and nurseries for marine life, while specialized forests such as freshwater swamps, strand vegetation, and forested savannas demonstrate the adaptability and variety of Palau's native plants. Together, these ecosystems make Palau a vital biodiversity hotspot within the Indo-Pacific realm.

The people of Palau have relied on this abundance of plant life for millennia, drawing from native species for food, shelter, medicine, and cultural expression. Taro cultivation, for example, is at the heart of Palauan tradition and daily life, with agroforestry systems integrating native plants for both subsistence and cultural rituals. Many endemic species—such as the Bikkia palauensis, Palau's national flower, and rare native palms—are revered not only for their ecological roles but also their place in Palauan heritage.

Today, Palau’s unique plant communities face numerous challenges, including habitat loss, invasive species, and climate change. However, ongoing conservation efforts have begun to protect important habitats and raise awareness about the need to safeguard this irreplaceable natural legacy. Field research, protected areas, and community-driven conservation are helping to ensure that future generations of Palauans and visitors alike can continue to marvel at the islands’ botanical riches.

This book, “Native Plants of Palau: A Guide to the Native Plants of Palau,” seeks to provide a comprehensive introduction to the islands’ remarkable plant life. Drawing on both scientific knowledge and traditional wisdom, it presents detailed descriptions of Palau’s primary habitats, highlights key native and endemic species, and celebrates the deep connections between Palauans and their botanical environment. It is an invitation to explore, understand, and cherish the awe-inspiring native plants of Palau.

CHAPTER ONE: The Geography and Environment of Palau

The Republic of Palau is an island nation sculpted by powerful geological forces and situated in a vibrant corner of the western Pacific Ocean. It forms the westernmost archipelago of the Caroline Islands chain, a long string of islands stretching across Micronesia. Its location places it roughly 800 kilometers (about 500 miles) east of the Philippines, north of New Guinea, and southwest of Guam. This position has played a significant role in shaping its biodiversity, serving as a stepping stone for species arriving from the larger landmasses to the west and south.

Palau's geographic footprint is relatively small in terms of land area, totaling between 415 and 460 square kilometers (160 to 177 square miles), which is slightly more than 2.5 times the size of Washington, D.C. Despite this modest landmass, the country's influence extends far across the ocean. Palau boasts a considerable Exclusive Economic Zone covering over 600,000 square kilometers (230,000 square miles), highlighting the critical importance of its marine environment.

The archipelago itself is composed of more than 300 islands and islets, although only about nine are permanently inhabited. These islands are not uniform in character; their varied topography and structure are a direct result of a complex geological history involving volcanic activity, the growth and uplift of coral reefs, and relentless erosion by the elements over millions of years. This geological diversity is fundamental to understanding the varied plant communities found across Palau.

The islands can be broadly categorized into several types: larger volcanic islands, uplifted coralline limestone islands (which include the famous Rock Islands and larger platform islands), and low-lying atolls. This mix provides a mosaic of habitats, from steep, rain-drenched volcanic slopes to porous, sharply eroded limestone cliffs and low, sandy coral keys. Each type of island presents unique challenges and opportunities for plant life, leading to distinct vegetation patterns.

Babeldaob dominates Palau's geography, accounting for over three-quarters of the nation's total land area, approximately 363 to 396 square kilometers (140 to 153 square miles). It is the second-largest island in Micronesia after Guam. Babeldaob is primarily volcanic in origin, characterized by rolling uplands, dissected by streams and rivers, and featuring the archipelago's highest point.

The terrain on Babeldaob ranges from nearly level areas to very steep slopes, a result of extensive erosion of the volcanic material. The underlying geology consists of

volcanic breccias, tuffs, and some flow material, leading to the development of deeply weathered, fine-textured, and often strongly acidic lateritic clay soils in the uplands. These soils contrast sharply with those found on the limestone islands.

Mount Ngerchelchuus, located on Babeldaob, stands as the highest elevation in Palau, reaching 242 meters (794 feet) above sea level. This relatively modest peak is part of the hilly spine of the island, influencing local weather patterns and providing diverse microhabitats from its summit down to the coastal plains. The volcanic composition of Babeldaob also means it is the source of most of Palau's surface freshwater.

Rivers are a notable feature of Babeldaob's landscape, carving valleys and supporting riparian ecosystems. There are several major river systems on the island, including the Ngeremeduu, Diongradid, Ngerikiil, Ngerbekuu, and Ngerdorch rivers. These rivers are vital water sources for the island's residents and their flow contributes significantly to the coastal environment, particularly the mangrove forests.

In contrast to the volcanic landscapes of Babeldaob and parts of Koror, the uplifted limestone islands present a dramatically different environment. These islands, including the iconic Rock Islands, Peleliu, and Angaur, were formed from ancient coral reefs that were tectonically uplifted. Over eons, rain, waves, and biological activity have sculpted the porous limestone into unique, often dramatic shapes.

The Rock Islands, situated south of Babeldaob and Koror within the protective barrier reef lagoon, are perhaps the most visually striking example of these limestone formations. They number over 300 and are characterized by their steep, undercut cliffs, often resembling green mushrooms rising from the turquoise waters. Some of these islands reach elevations of up to 180-200 meters (about 600 feet).

The terrain on the limestone islands is rugged and karst-like, with sharp edges, sinkholes, and limited soil depth. Despite the lack of extensive soil, these islands support dense vegetation adapted to the challenging conditions. The porous nature of the limestone allows water to drain rapidly, creating environments distinct from the wetter volcanic soils. Phosphate deposits are also found on some of the more accessible limestone islands like Peleliu and Angaur, a legacy of past geological processes.

A unique feature of the uplifted limestone islands, particularly within the Rock Islands, is the presence of marine lakes. These are saltwater lakes isolated from the surrounding lagoon by land barriers, often connected only by subterranean tunnels and fissures. These lakes, numbering around 70, are isolated ecosystems with unique biological communities, including endemic jellyfish subspecies, showcasing the specialized habitats created by Palau's geography.

Atolls represent another island type found in Palau, though they are less numerous in

the main island cluster. Kayangel Atoll, located north of Babeldaob, is an example of this formation. Atolls are ring-shaped coral reefs, often with associated islets, that enclose a lagoon. They form as coral reefs grow upwards around a volcanic island that is slowly subsiding.

Surrounding the main island cluster is an extensive barrier reef system. This reef is largely continuous on the western side and more broken on the eastern side, enclosing a vast lagoon. This lagoon, stretching for miles, is a critical component of Palau's environment, providing sheltered waters, diverse marine habitats, and influencing coastal conditions on the islands. The barrier reef acts as a natural buffer, protecting the inner lagoon and islands from the full force of the open ocean.

The relationship between the islands and the surrounding marine environment is incredibly close. The geology of the islands extends underwater, forming the foundation for the coral reefs that define much of Palau's natural beauty and ecological richness. The steep drop-off just outside the barrier reef on the western side descends rapidly into the deep Palau Trench.

While Babeldaob is the largest island, Koror is the most populous, historically serving as the economic center. Koror is linked to Babeldaob by a bridge, and further connected by causeways to nearby Malakal and Arakabesan islands. These linked islands, though developed, also contain remnants of Palau's natural vegetation. Peleliu and Angaur lie to the south of the main cluster and are also geologically significant uplifted limestone islands, although their landscapes bear the scars of historical events.

Further to the southwest lie the more remote Southwest Islands, a scattering of smaller islands including Sonsorol, Pulo Anna, and Tobi. These islands are geographically distinct from the main archipelago and add another layer of diversity to Palau's overall environment, though they are less frequently visited. Their isolation also influences the plant life found there.

Freshwater resources are primarily concentrated on Babeldaob due to its volcanic composition and higher elevation, which capture rainfall. Lake Ngardok, located on Babeldaob, is the largest freshwater lake in Micronesia and an important ecological site. Beyond the rivers and Lake Ngardok, smaller streams and wetlands contribute to the freshwater ecosystems on Babeldaob. The limestone islands, with their rapid drainage, have very few surface freshwater sources.

The soils across Palau reflect the varied geology. On Babeldaob and other volcanic islands, soils are typically lateritic clays, ranging in depth and drainage depending on the terrain. These soils can be fertile but are also prone to erosion, particularly in areas where vegetation cover has been removed. The limestone islands have much shallower, often excessively drained soils, frequently mixed with rock outcrops. This

diverse soil profile contributes to the range of plant adaptations seen across the archipelago.

Considering the extremes of Palau's geography, the archipelago stretches from Ngaruangel Reef or Velasco Reef in the north to Round Rock in Helen Reef in the south. The easternmost point is Kayangel islet, while the westernmost is Tobi Island. This geographical spread, combined with the varied island types and surrounding marine environment, creates a complex and fascinating setting for the study of native plants.

Understanding the physical geography of Palau – the distribution and characteristics of its volcanic, limestone, and atoll islands, the presence of its barrier reef and lagoon system, and the flow of its rivers and unique marine lakes – provides the essential foundation for appreciating the diversity and distribution of its native flora. The interplay of landform, water, and geological history has shaped the very habitats that the plants described in this guide call home.

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