Native Plants of Tuvalu

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Introduction

Tuvalu, a small yet resilient nation nestled in the Central Pacific, consists of nine scattered atolls and reef islands surrounded by vast expanses of ocean. Covering only about 26 square kilometers, it stands as the fourth smallest country in the world. The islands are known for their extreme environmental conditions: shallow and nutrient-poor soils, intense ultraviolet light, salty winds, periodic droughts, and frequent

flooding. These challenges have played a defining role in shaping the country’s botanical landscape, resulting in a flora that reflects both the limitations and the adaptability required for survival in a true atoll environment.

Despite its modest size, Tuvalu's native plant life has been the subject of scientific curiosity since the late nineteenth and early twentieth centuries. Early botanical surveys laid the foundation for our understanding, but recent comprehensive works, such as “Plants of Tuvalu: Lākau mo mouku o Tuvalu,” have provided invaluable insights into the current flora of these islands. In the Tuvaluan language, *lakau* refers broadly to vascular plants, which are then further identified as trees (*lakau*) or grasses and herbs (*mouku*), highlighting the importance of plants within daily life and traditional knowledge.

The composition of Tuvalu’s flora is overwhelmingly influenced by introduced species. Of the approximately 362 recorded vascular plant species or varieties, perhaps only 59 to 64 are considered possibly indigenous, with the rest arriving through human activity, both ancient and modern. Remarkably, Tuvalu lacks endemic plant species; nearly all of its native species are found throughout the Pacific or in pantropical zones. These plants share critical adaptations: they are able to disperse across great distances by sea, tolerate high levels of salt, and thrive in tough, wind-exposed environments. The absence of diverse habitats and the difficulty of plant dispersal have deeply constrained Tuvalu’s native floral diversity.

Nonetheless, the country’s native plants serve as the ecological and cultural backbone of island life. Dominant indigenous trees like *Pandanus tectorius* and *Tournefortia argentea*, hardy coastal shrubs such as *Scaevola sericea*, as well as mangroves and unique ground covers, play vital roles in both the environment and the daily lives of Tuvaluans. These plants stabilize shorelines, shelter native fauna, and provide crucial resources for food, shelter, tools, medicine, and cultural practices. The integration of these species into traditional knowledge systems underscores their significance for Tuvaluan identity and resilience.

Today, the survival of Tuvalu’s native flora faces mounting threats: habitat loss, competition with aggressive invasive species, the ongoing impacts of climate change—especially sea level rise and saltwater intrusion—and the erosion of traditional plant knowledge. Conservation efforts are increasingly urgent and are finding strength in blending scientific research with community-led stewardship and traditional wisdom. Tuvalu’s conservation initiatives, from the establishment of protected areas to mangrove restoration projects, are vital steps towards safeguarding its botanical heritage.

This book, “Native Plants of Tuvalu: A Guide to the Native Plants of Tuvalu,” provides a comprehensive exploration of the nation’s indigenous flora. It serves not only as a scientific and cultural reference but also as a call to action to appreciate, protect, and

sustain the unique plant life that has enabled Tuvaluans to survive and thrive on their fragile islands—a legacy that deserves to endure for generations to come.

CHAPTER ONE: The Geography and Climate of Tuvalu

Tuvalu is less a single landmass and more a scattering of tiny specks in the vast expanse of the Central Pacific Ocean. Imagine tossing nine small pebbles onto a very large blue tablecloth – that gives you a sense of the scale and distribution of this island nation. Located roughly halfway between Australia and Hawaii, Tuvalu lies within the Polynesian Triangle, a cultural and geographical region spanning millions of square kilometers. Its total land area is remarkably small, approximately 26 square kilometers, making it one of the world's smallest independent countries. This limited land is spread across an exclusive economic zone covering around 900,000 square kilometers of ocean, highlighting the intrinsic connection between the islands and the surrounding marine environment.

The country is composed of nine islands, which lend the nation its name, meaning "eight standing together" in Tuvaluan, though the ninth island, Niulakita, was traditionally uninhabited. These islands are not all the same; they fall into two main geological categories: reef islands and true atolls. Three are classified as reef islands: Nanumanga, Niutao, and Niulakita. These are typically more compact landforms with a fringing reef. The other six are true atolls: Funafuti, Nanumea, Nui, Nukufetau, Nukulaelae, and Vaitupu. Atolls are characterized by a ring of low-lying islets, often called motu, that encircle a central lagoon. The formation of these atolls is a story of ancient volcanoes that erupted, built up, and then slowly subsided, leaving behind the coral reefs that continued to grow upwards, forming the basis of the islands we see today.

A defining characteristic of all Tuvalu's islands, regardless of type, is their extremely low elevation. Most of the land sits only a few meters above sea level. The highest point in the entire country is a mere 4.6 meters (about 15 feet) above sea level, found on the island of Niulakita. This lack of height means the islands are incredibly vulnerable to the ocean that surrounds them. Unlike larger, volcanic islands with mountainous interiors and distinct watersheds, Tuvalu's islands have no rivers or streams. The porous coral and sand structure means that rainwater quickly percolates down. Freshwater resources are therefore limited, primarily relying on rainwater catchment and a fragile freshwater lens that floats atop the denser saltwater underground. This lens is highly susceptible to contamination and depletion.

Geographically, the islands are spread out across a considerable distance, running in a chain from the northwest to the southeast over approximately 676 kilometers (420

miles). This scattering means that conditions can vary slightly between the islands, particularly in terms of rainfall and exposure to weather systems. The isolation of these islands from larger landmasses has historically meant that the plant life arriving and establishing itself had to be capable of long-distance oceanic dispersal, a key factor shaping the native flora.

Moving from the landforms to the air above and the water around, Tuvalu experiences a tropical marine climate. It's generally hot and humid throughout the year, a typical characteristic of being situated close to the equator. The average temperature doesn't fluctuate dramatically, hovering around 27°C to 30°C (81°F to 86°F). Nighttime temperatures rarely drop below 20°C (68°F), and even on the warmest days, they seldom exceed 34°C (93°F). The heat and humidity are somewhat moderated by the prevailing easterly trade winds, which blow consistently for much of the year, particularly from March to November.

Tuvalu has two main seasons: a wet season and a dry season. The wet season typically runs from November to April, and the dry season from May to October. However, labelling the latter as truly "dry" might be a bit misleading, as rainfall is still abundant throughout the year compared to many other parts of the world. The wet season is characterized by heavier rainfall, blustery westerly gales, and an increased chance of storms. This period is strongly influenced by the movement and intensity of the South Pacific Convergence Zone (SPCZ), a band of low pressure and convergence where air rises and produces significant rainfall.

Rainfall amounts can vary across the archipelago, with the southern islands generally receiving more rain than the northern ones. For instance, Funafuti, located in the south-central area, averages around 3,400 mm (about 134 inches) of rain annually, while northern atolls like Nanumea receive slightly less, closer to 2,500-2,900 mm (98-114 inches). Even in the so-called dry season, monthly rainfall in Funafuti usually stays above 200 mm (around 8 inches). The rain often comes in intense, but relatively short-lived, downpours and thunderstorms.

Adding another layer of complexity to the climate is the significant influence of the El Niño-Southern Oscillation, or ENSO. This natural climate pattern, which involves fluctuations in sea surface temperatures in the tropical Pacific, has a dramatic effect on weather patterns across the region, including Tuvalu. El Niño events tend to bring warmer, wetter conditions and increase the likelihood of tropical storms and cyclones in the vicinity. Conversely, La Niña events can lead to drier, cooler conditions and increase the chance of drought in Tuvalu. This interannual variability in rainfall, particularly the risk of drought during La Niña, poses significant challenges, especially for freshwater availability.

Beyond the regular seasonal cycles, Tuvalu is also subject to extreme weather events. Tropical cyclones, while perhaps not hitting directly every year, are a significant

hazard, particularly during the wet season from November to April. These powerful storms bring destructive winds, torrential rain, and crucially, storm surges. Given the islands' low elevation, storm surges can be devastating, inundating coastal areas, damaging infrastructure, and causing saltwater flooding far inland. Historical accounts and recent events, such as Cyclone Bebe in 1972 or Cyclone Pam in 2015, demonstrate the immense destructive power of these events on the fragile atoll environment. Even distant cyclones can generate damaging storm surges that impact the islands.

Another regular occurrence that stresses the islands is the perigean spring tide, often referred to as a "king tide." These exceptionally high tides can cause significant coastal inundation, especially when combined with other factors like sea level rise. The low-lying nature of the islands means that even a slight increase in sea level or a strong tide can lead to saltwater covering parts of the land.

This challenging geographical and climatic setting – low elevation, limited freshwater, high salinity, exposure to wind and waves, variable rainfall, and the threat of tropical cyclones and storm surges – forms the environmental backdrop against which the native plants of Tuvalu must survive and thrive. It's a demanding environment that only the most resilient and well-adapted species can call home. The plants that have successfully colonized and persisted on these islands possess remarkable traits that allow them to cope with these formidable conditions. This constant interplay between the environment and the flora has shaped the unique, albeit limited, botanical character of Tuvalu.
