
Analysis on Integrating Hainan Regional Cultural Elements into Landscape Plant Configuration Design

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Abstract: Against the backdrop of ecological civilization construction and high-quality development in Hainan Free Trade Port, landscape plant configuration has evolved from simple scenic design to an integrated design model that synergizes ecological, regional, cultural, and functional aspects. As China's only tropical island province, Hainan boasts unique cultural elements including Li and Miao ethnic traditions, maritime heritage, Nanyang overseas Chinese communities, Su Dongpo cultural legacy, volcanic geology, and tropical ecosystems. Scientifically and artistically incorporating these regional cultural elements into landscape design serves dual purposes: enhancing Hainan's urban identity and preserving indigenous culture, while enriching landscape aesthetics and driving distinctive development. This study systematically examines the core cultural essence and botanical carriers of Hainan, identifies current challenges such as cultural gaps, homogenization, insufficient native plant utilization, and rigid cultural expression. Through multidimensional approaches encompassing cultural interpretation, plant selection, spatial design, artistic expression, and material coordination, the research explores design principles and implementation pathways for integrating regional culture into plant configuration. Practical case studies spanning urban parks, residential areas, waterfront landscapes, and rural scenery provide theoretical references and actionable insights for localized and distinctive landscape development in Hainan.

Keywords: Landscape plant configuration; Hainan regional culture; Native plants; Tropical gardens; Cultural heritage; Landscape design

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1. Introduction

Plants serve as the soul of landscape architecture and the most tangible and enduring material carrier of regional culture^[1,2]. With the rapid advancement of urban greening nationwide, the phenomenon of "uniformity across cities" in landscapes has become increasingly prominent: homogenized plant configuration patterns, rampant introduction of exotic tree species, lack of indigenous characteristics, and weak cultural connotations, all of which fail to reflect the unique historical heritage and regional identity of cities^[3,4].

Nestled in the tropics, Hainan boasts unparalleled tropical flora and multicultural resources. It is not only an ecological paradise, a health haven, and a longevity island, but also a fertile cultural ground where ethnic traditions, maritime heritage, and overseas Chinese culture converge^[5]. Plants like coconut trees, betel palms, banyan trees, and bougainvillea have transcended ecological significance to become iconic symbols of Hainan's culture. Scenes such as Li and Miao

villages, Nanyang-style arcade buildings, coastal coconut groves, ancient volcanic settlements, and Dongpo Academy all maintain profound cultural ties with their distinctive plant communities^[6].

However, current landscape plant configurations in Hainan generally suffer from blindly adopting mainland models, overemphasizing the accumulation of tropical plants while neglecting the creation of cultural ambiance^[7]. This results in plant landscapes that are “green but soulless, scenic yet rootless,” failing to genuinely convey Hainan’s cultural essence and regional character^[8]. Therefore, conducting in-depth research on integrating Hainan’s regional culture with plant configuration, and establishing a plant landscape system characterized by Hainan’s distinct identity, cultural belonging, and ecological sustainability, holds significant theoretical and practical value for enhancing urban and rural greening quality, preserving local culture, and shaping the distinctive character of the free trade port.

2. Definition of Relevant Concepts

2.1. Landscape Plant Configuration

Landscape plant configuration refers to the process of selecting, combining, arranging, and cultivating trees, shrubs, ground covers, vines, and aquatic plants based on site environment, functional requirements, aesthetic principles, and cultural themes. It not only pursues visual aesthetics but also emphasizes ecological adaptability, spatial rationality, seasonal variations, and long-term maintenance, serving as a core component of landscape design.

2.2. Hainan Regional Cultural Elements

Hainan’s regional culture is a composite cultural system shaped through prolonged historical development, characterized by distinct island features. It primarily encompasses: Li and Miao indigenous cultures—the most authentic and distinctive cultural markers of Hainan; maritime culture represented by coconut breezes, coastal rhythms, fishing-farming traditions, and coastal ecosystems; Nanyang overseas Chinese hometown culture featuring arcade buildings, overseas Chinese residences, and a fusion of Eastern and Western lifestyle aesthetics; Dongpo culture embodying refined elegance, poetic spirit, and the legacy of farming and scholarly pursuits; volcanic culture manifested through volcanic rock dwellings, drought-resistant plants, and rustic stone landscapes; and tropical ecological culture rooted in rainforests, native flora, and natural wilderness.

These cultural elements can be integrated into plant configuration design through plant selection, community structure, spatial atmosphere, matching forms and artistic conception creation.

2.3. Intrinsic Relationship Between Cultural Elements and Plant Configuration

Plant configuration serves as a crucial approach to “visualize, experience, and perceive” regional culture. Culture endows plants with spiritual connotations, while plants imbue culture with life forms. The integration of these two elements elevates landscape architecture from “visual beauty” to “aesthetic conception and cultural beauty,” achieving the objectives of “conveying culture through greenery, shaping scenery with culture, and educating people through scenery.”

3. Correspondence Between Hainan Regional Culture and Representative Plants

The expression of Hainan’s regional culture must rely on native plants, cultural plants, and iconic plants. The following represents the most representative cultural plant system in Hainan:

3.1. Plants Related to Li and Miao Cultures

The Li and Miao ethnic groups have developed a cultural system deeply intertwined with plants through centuries of daily life and agriculture: Betel nut – the iconic plant of Li and Miao villages, symbolizing good fortune, ceremonial practices,

and hospitality; banana plant – commonly found around boat-shaped dwellings, renowned for its graceful form and distinctive ethnic character; mountain orchid rice – a hallmark of Li agricultural culture that enhances pastoral landscapes; bamboo – utilized in construction and utensils, with bamboo groves creating the distinctive ambiance of Li and Miao villages; banyan tree – the sacred tree of villages, serving as a focal point for community gatherings, shade provision, and religious worship^[9].

3.2. Plants Related to Marine Culture

Hainan, surrounded by the sea on all sides, boasts marine cultural plants with distinct coastal characteristics^[10]: Coconut trees—the “provincial tree” of Hainan and the foremost symbol of maritime culture; Casuarina trees—the mainstay of coastal defense forests, embodying resilience and protection; Yellow hibiscus—a native coastal species with elegant flowers and leaves, resistant to salt, alkaline conditions, and wind; Sea lemon fruits, bitter orange trees, and saddle vine: typical coastal plants reflecting marine ecosystems. Mangrove plants such as tung trees, white-rooted plants, and autumn eggplants represent marine ecological culture^[11].

3.3. Plants Related to the Culture of Nanyang Overseas Chinese Hometowns

The cultural plants of overseas Chinese communities embody an open, elegant, and leisurely tropical lifestyle: Indian rosewood – commonly planted in front of residences as a prized timber symbolizing nobility; flamewood with vibrant floral patterns exuding distinct Southeast Asian charm; fox-tail coconut trees with graceful forms frequently used in local landscapes; scattered-tail and fish-tail palms creating tropical courtyard ambiance; bougainvillea, Hainan’s official flower with bold colors, perfectly suited for arcade street greenery.

3.4. Plants Related to Dongpo Culture

During his three-year residence in Hainan, Su Dongpo left behind a wealth of poetic imagery related to plants: Lychee—his celebrated works have been widely recited, making it a distinct cultural symbol; Betel nut—frequently mentioned in his poems; Bamboo, banyan trees, and camphor trees: these elements create an elegant, rustic, and tranquil atmosphere characteristic of literati gardens; Banana plant: a poetic symbol embodying refined aesthetics.

3.5. Plants Related to Volcanic Culture

In volcanic rock regions, drought-resistant, tolerant of poor soil, and ancient yet vigorous plants thrive: small-leaved fig trees and high-altitude fig trees grow attached to rocks, exhibiting an ancient morphology; jackfruit and star fruit are common fruit trees in volcanic villages; volcanic chrysanthemums and drought-resistant herbs reflect the ecological characteristics of volcanic landforms. The stone mountain cycad is a rare and endangered plant endemic to China, found exclusively in volcanic rock areas, with its ancient form serving as a “living fossil” of volcanic landscapes; the ludo tree features tough leaves, often growing in volcanic rock crevices, and produces distinctive fruits that demonstrate the remarkable resilience of volcanic plants; the yellowwood has rough bark and deep-rooted systems in volcanic soils, showcasing strong adaptability as a common native species in volcanic regions; the thick-barked tree boasts a sturdy trunk and thick bark, capable of withstanding drought and temperature fluctuations in volcanic environments, embodying the indomitable spirit of volcanoes.

4. The Practical Challenges in Integrating Regional Culture into Hainan’s Landscape Plant Design

Hainan’s cultural awareness remains weak, with a tendency to prioritize greenery over cultural heritage. Most projects focus solely on plant coverage and visual appeal, simplistically interpreting Hainan’s culture as “planting coconut trees” while neglecting deeper cultural explorations of Li and Miao ethnic groups, Nanyang traditions, Dongpo philosophy,

and volcanic heritage. The use of native plants is insufficient, while invasive species proliferate. Excessive reliance on exotic tropical ornamental plants at the expense of indigenous flora and native tree species results in landscapes that appear “tropical but not authentically Hainanese,” characterized by low survival rates, high maintenance costs, and poor ecological sustainability.

Cultural expression has become superficial and overly symbolic. Some projects merely showcase cultural elements through sculptures, landscape walls, and patterns, while plant arrangements remain disconnected from cultural themes, resulting in a disconnect where “culture exists in culture and plants exist in plants.” The homogenization of plant configuration patterns is severe, with direct replication of urban park and residential greening models from inland cities—large lawns, expansive color blocks, and dense shrubbery—leading to a loss of Hainan’s natural, rustic, comfortable, and ventilated tropical garden ambiance.

The neglect of cultural heritage in landscape design has resulted in uniformity across urban parks. Cities like Haikou, Sanya, Qionghai, Baoting, and Danzhou exhibit repetitive plant configuration styles that fail to reflect their unique urban identities: Baoting’s Li and Miao ethnic influences, Danzhou’s Dongpo literary legacy, Wenchang’s overseas Chinese heritage, and Haikou’s historical ambiance remain underdeveloped. The absence of artistic conception and spatial storytelling leads to plant arrangements focused solely on form, color, and hierarchy, while overlooking cultural narratives, daily life scenarios, and folk traditions. Consequently, these landscapes possess visual appeal but lack depth, resembling mere facades devoid of soul.

5. Design Principles for Integrating Hainan Regional Culture into Plant Configuration

The Regional Principle: Centered on Hainan’s native plants, it adheres to the principles of selecting appropriate trees for specific locations, prioritizing indigenous species, and emphasizing cultural significance. By utilizing iconic, culturally significant, and native plants as the foundation, the landscape ensures distinctive Hainan identity.

Cultural Principle: With cultural connotation as the soul. Transitioning from symbolic implantation to artistic conception creation, making plant landscapes readable, understandable, and resonant, thereby conveying regional history, folklore, lifestyle, and spirit.

Ecological Principle: Aligned with the tropical climate and environment. Designed to adapt to Hainan’s high temperatures, high humidity, intense typhoons, and heavy rainfall, it emphasizes wind resistance, moisture tolerance, drought tolerance, and low maintenance requirements, fostering stable, healthy, and nearly natural plant communities.

Aesthetic Principle: Reflecting tropical aesthetics and natural wild charm. It highlights the characteristics of Hainan plants—large leaves, tall stems, dense green foliage, and vibrant floral colors—to create a natural, expansive, open, and wild-themed tropical garden atmosphere.

Functional Principle: Centered on human needs, serving daily life, it integrates functions such as shading, leisure, recreation, disaster prevention, and wellness to meet the requirements of residents and visitors, achieving harmony between cultural value and practical utility. **Holistic Principle:** Plants and their environment are designed in synergy, with vegetation arrangements coordinated with architecture, topography, water features, paving surfaces, decorative elements, and lighting to form a cohesive regional cultural landscape system.

6. Implementation Approaches for Integrating Hainan’s Regional Culture into Garden Plant Arrangements

6.1. Extraction of Cultural Genes and Establishment of Plant Themes

During the initial design phase, we conducted a thorough analysis of the site’s cultural context to identify core cultural elements and determine thematic plants: The Li-Miao theme features betel nut, bamboo, banana plants, banyan trees, and mountain orchid rice; the marine theme showcases coconut palms, casuarina trees, yellow hibiscus, mangroves, and

horsehair vine; the Nanyang theme includes rosewood, pomegranate trees, flamewood, bougainvillea, and fox-tail coconut palms; the Dongpo theme highlights lychee, bamboo, camphor trees, banyan trees, and banana plants; while the volcanic theme incorporates small-leaf banyan, jackfruit, volcanic chrysanthemums, and drought-resistant flowering shrubs. These thematic plants serve as the central elements guiding the overall landscape design, creating a distinct cultural ambiance.

6.2. Construction of Cultural Plant Community Structure

The design adopts Hainan's traditional natural multi-layer structure: "upper canopy of shade-providing trees, middle layer of palm trees, lower layer of flowering shrubs, and ground cover herbs." Upper layer: shade trees including coconut palms, areca palms, banyan trees, camphor trees, and rosewood trees. Middle layer: species such as scattered-leaf sunflowers, fishtail sunflowers, banana plants, hibiscus, and dragon boat flowers. Ground cover: tropical ferns, three-leafed horsetail, volcanic ground covers, and horsehair vine. Aquatic plants include water hyacinths, calamus, and mangrove species. The community layers are naturally layered, avoiding dense planting patterns that create enclosed or oppressive inland-style landscapes.

6.3. Creating Cultural Scenes and Spatial Ambience

Through strategic plant arrangements, we recreate Hainan's iconic daily life scenes, embodying the concept of "a new view at every step, each view telling a unique story":

Liemiao Village landscape: rows of betel palms, bamboo groves, banana plants, and large banyan trees create a gathering area at the village entrance and a shaded leisure space beneath the trees.

Nanyang Courtyard Scene: A mix of Banyan trees, bougainvillea, eggplants, and rosewood creates an arcade-style alleyway reminiscent of overseas Chinese residences. **Coastal Coconut Grove Scene:** Rows of coconut palms, casuarina forest belts, and coastal ground covers evoke the ambiance of sea breezes, sunlight, and coconut shade. **Dongpo Poetic Scene:** Bamboo clusters, lychee trees, camphor trees, and banana plants evoke a refined, tranquil, and scholarly atmosphere. **Volcanic Rock Village Scene:** Rock-adorned banyan trees, fruit trees, and volcanic ground covers showcase an ancient, rugged, and pristine landscape.

6.4. Utilizing Plant Colors, Morphology, and Seasonal Characteristics to Enhance Cultural Expression

Li Miao Culture: Dominated by green, characterized by simplicity, naturalness, and tranquility; **Ocean Culture:** Featuring blue and green tones, conveying freshness, openness, and expansiveness; **Nanyang Culture:** With vibrant red, yellow, and orange hues, exuding warmth and elegance; **Dongpo Culture:** Subtle, light green, and rustic, emphasizing artistic conception; **Tropical Ecology:** Rich in colors, showcasing symbiosis of flowers and leaves, and wild, natural charm. The cultural ambiance is enhanced through the varied heights of plant forms, contrasting leaf shapes, and the seasonal succession of flowers and fruits.

For instance, in the Li and Miao cultural setting, the pairing of banana plants with broad, sprawling leaves and tall betel palms creates a striking contrast between the former's soft contours and the latter's upright form. This is further enhanced by the feather-like divided leaves of the scattered-tailed palm, where the interplay of forms vividly captures the indigenous people's harmonious coexistence with nature. The maritime cultural scene utilizes coconut trees' towering trunks and umbrella-like canopies to evoke a sense of boundless openness reaching skyward, complemented by silk-like casuarina leaves that sway like ocean waves. The creeping saddle vine and fleshy leaves echo the gentle embrace of coastal sands through their low-growing posture. Seasonal dynamics are showcased in the Dongpo cultural setting: spring's white blossoms of lychees bring refined elegance; summer's dense camphor tree shade creates a tranquil retreat; autumn's evergreen foliage sustains the enduring vitality cherished by scholars; winter bamboo groves remain verdant, embodying the resilient spirit of "no bamboo, no home." The Nanyang cultural setting features bougainvillea's year-round vibrant purple-red blooms, paired with eggplant flowers' pure white and yellow centers in summer, forming a passionate

yet graceful color rhythm. Deep-brown sandalwood branches and pinnate leaves collectively create visual focal points blending overseas Chinese heritage with tropical charm, allowing cultural essence to be concretely expressed through botanical color variations, morphological traits, and seasonal transitions.

6.5. Synergistic Use of Plants and Native Materials to Create a Cultural Atmosphere

The plant configuration should integrate volcanic rocks, bamboo, thatch, logs, coconut shells, and Li brocade pattern ornaments: volcanic rock flower beds paired with banyan trees and ferns; bamboo fences combined with banana plants and betel palms; coconut shell ornaments alongside coconut trees; and Li brocade-patterned ground covers with tropical floral borders. This approach achieves a harmonious integration of plants, materials, and cultural elements into a cohesive whole. Emphasize the landscape prominence of culturally significant plants, utilizing Hainan's iconic species—coconut trees, betel palms, banyans, and bougainvillea—as focal features, accent elements, street trees, and backdrop forests to enhance visual memorability and cultural identity. Avoid excessive use of exotic species that may dilute local characteristics.

7. Practical Strategies for Cultural Integration in Different Garden Spaces

The urban park's plant configuration centers around a cultural theme garden, featuring the Li and Miao Culture Zone, the Nanyang Style Zone, the Coastal Plant Zone, the Dongpo Culture Zone, and the Volcanic Plant Zone, creating a multicultural plant landscape that balances recreational and cultural experiences for residents. The plant arrangement in residential areas fosters an atmosphere reminiscent of Hainan's homeland and a tropical living environment: coconuts, banyan trees, and camphor trees provide shade; banyan trees, bougainvillea, and eggplant flowers enhance courtyard aesthetics; while betel nuts and bamboo evoke a sense of local belonging, collectively forming a livable, healthy, and nostalgic living environment.

The road greening system features coconut palms, kapok trees, yellow hibiscus, camphor trees, and Hainan bean trees as street trees, creating distinctive Hainanese road aesthetics. Cultural plant clusters are integrated into key green spaces to enhance the city's gateway image. Waterfront and wetland vegetation prioritizes mangroves, tung trees, yellow hibiscus, and aquatic plants, reflecting marine ecology and coastal culture while establishing ecological embankments and coconut-themed waterfronts. Rural revitalization initiatives and pastoral complexes highlight Li-Miao ethnic heritage, volcanic landscapes, and overseas Chinese communities through betel nut trees, coconut palms, fruit trees, bamboo, and mountain orchid rice fields, achieving harmony between native flora, agricultural traditions, and rural scenery. Campus and cultural architecture incorporate Dongpo philosophy, Li-Miao culture, and Nanyang traditions, selecting poetic and culturally significant plants to cultivate scholarly ambiance and regional identity, ultimately fostering environmental education.

8. Conclusion

Landscape plant configuration serves as the most natural, enduring, and accessible medium for preserving Hainan's regional cultural heritage. By integrating Li and Miao ethnic cultures, maritime traditions, Nanyang overseas Chinese communities, Su Dongpo philosophy, volcanic geology, and tropical ecosystems into botanical designs, we can not only address urban landscape homogenization challenges and create distinctive free trade port landscapes, but also enable local cultures to thrive dynamically within green spaces, fostering deep cultural resonance among communities.

Future landscape development in Hainan must embrace four fundamental principles: indigenous roots, cultural essence, ecological foundations, and aesthetic forms. Centered on iconic cultural plants, structured around near-natural communities, narrated through regional contexts, and designed to evoke poetic imagery, this approach will authentically realize the vision where “every blade of grass and tree embodies Hainan, and every landscape element carries nostalgic resonance.” Only by allowing plants to take root in Hainan's soil, bear its historical legacy, and tell its stories can we create

distinctive garden landscapes that harmonize tropical charm with cultural depth, combine ecological sustainability with unique appeal, and inject enduring cultural vitality into the high-quality development of Hainan Free Trade Port.

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