

Ornamental Palm: Exquisite Beauty of Landscape with Immense Entrepreneurial Avenues

Palm is among nature's most handsome gifts, drawing the interest of landscapers, interior designers, amateurs, and plant lovers for their bold textures, symmetrical foliage, uniformity, diverse growth habits, and adaptability. These plants make dramatic statements in landscapes, whether as majestic specimens filling skylines or sculptural focal points in multitrunk clusters. Besides their aesthetic appeal, palms offer economic value for nurserymen and contribute to the scenic beauty of any setting. Ranging from miniature to tall robust varieties, palms are commonly grown in pot culture. Miniature and variegated palms are particularly favoured for landscaping and interiorscape. Their monetary value surpasses many other ornamental plants, as they require years of cultivation from seed to reach mature sizes suitable for residential and commercial landscapes. As popular containerized plants, palms enhance both indoor and outdoor environments and hold vast entrepreneurial potential. Specialized palmetums (singular: palmetum) are being established to supply these valuable plants, which also purify and soothe the environment.

PALM has significant ornamental value and are commonly used in landscaping due to their striking foliage and distinct columnar forms. Landscaping of any garden, educational institute, Government buildings, hospitals, hotels, etc. are not considered complete without having palms. The eminent botanist Linnaeus called palms the "*Princess of the Vegetable Kingdom*." Fossil records trace their origins to the late Mesozoic era, about 85 million years ago. Belonging to the family Palmae (Arecaceae), palms include approximately 212 genera and over 2,780 species. They are divided into five subfamilies based on morphological and molecular traits: Arecoideae, Calamoideae, Ceroxyloideae, Coryphoideae, and Nypoideae. Most ornamental palms cultivated today fall under Arecoideae and Coryphoideae.

Prominent genera in the Arecoideae include Archontophoenix (majestic palm, Alexander palm), Butia



(jelly palm), Chamaedorea (parlour palm), Dypsis (bamboo palm, areca palm), Howea (Kentia palm), Ptychosperma (solitaire palm), Roystonea (royal palm), Syagrus (queen palm), Veitchia (Christmas palm, manila palm), and Wodyetia (foxtail palm). Coryphoideae family include Brahea (Mexican blue palm), Bismarckia (silver palm), Caryota mitis (clustering fishtail palm), Chamaerops humilis (European fan palm), Livistona (Chinese fan palm), Phoenix (date palm), Pritchardia (Fiji fan palm), Rhapsis (lady palm), Sabal (cabbage palm), Trachycarpus (windmill palm), and Washingtonia (Mexican fan palm).

Most palm species are native to moist, tropical climates, with low temperatures being a limiting growth factor. However, about 10% are native to subtropical or temperate regions and adapt well to those conditions.

Palms are naturally characterized as woody monocots with a monopodial growth habit, straight unbranched

cylindrical or columnar trunks, and petiolate leaves that initially develop close to the ground and later split into segments emerging from a central midrib. Their inflorescences are enclosed in bracts and eventually develop into small drupaceous fruits. Palms are strikingly tall, long-lived, resilient, and hardy woody plants that exhibit primary growth derived solely from a single peripheral vascular cambium.

Importance of palms

With the rising concept of urban landscaping, landscapers, architects, and interior designers are increasingly interested in utilizing one of nature's jewels—palms—for their excellent aesthetics and minimal maintenance. Palms are highly suited for urban environments due to their diverse forms, varieties, foliage sizes, and textures. They are widely used in holistic landscaping for homes, parks, streets, and commercial buildings.

Their predictable growth habits and ability to create lush, refreshing environments make them ideal planting material. Palms are well-suited for beautifying various spaces and are available in many sizes, colours, and forms, ranging from majestic to miniature. While most palms have a tall, single, distinct trunk, species with multiple trunks add visual interest to landscapes. Symmetrical and uniform planting of tall palms in front of buildings enhances elegance by softening the hardscape.

Shrubby palms like *Rhapis*, with their elegant dark green foliage and multiple trunks, are used for naturalistic plantings, as well as for specimens, borders, hedges, patio trees, and street or avenue landscaping. Palms of varying statures can be planted under the canopy of large, spreading trees, and their grace can be enhanced by complementary plantings such as ferns, shade-loving foliage, and ground covers.

Many palms thrive in both indoor and outdoor landscapes. They are ideal for decorating conservatories, verandas, terraces, and shaded gardens. Palms are also well-suited to pot culture, with their beauty and charm lasting many years due to their slow growth in containers.

Palms are known to be among the most efficient air-purifying plants. Like other plants, they absorb carbon dioxide and release oxygen, while also removing significant amounts of volatile compounds such as



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benzene, xylene, formaldehyde, and trichloroethylene. Ornamental palms like the dwarf date palm, areca palm, bamboo palm, and broadleaf lady palm are excellent air purifiers for indoor environments. The areca palm, in particular, is effective at absorbing toxic gases such as formaldehyde, carbon dioxide, and carbon monoxide, while producing clean oxygen. It is recommended to place four areca palm plants in a medium-sized room to maintain a fresh and healthy indoor ambiance.

Furthermore, palms are divided into two main classes:

(i) **Feather or pinnate-leaved palms:** The foliage is divided into leaflets that are attached to a central rachis, resembling a feather. Common examples include the areca palm, seaforthia palm, chamaedorea palm, pygmy date palm, rhaps palm, bottle palm, and royal palm.

(ii) **Fan or flabelliform-leaved palms:** The foliage consists of an extended lamina divided into segments that radiate out from the point where they are attached to the petiole. Common examples include the palmyra palm, doum palm, Chinese fan palm, licuala palm, latania palm, corypha palm, *Sabal adansonii* palm, and Bismarckia palm. These fan-shaped leaves are commonly used for thatching and roofing.

Economic utility of palms

- **Palms for culinary purposes:** Coconut, date palm, arecanut, oil palm, palmyrah palm, etc.
- **Commercial landscaping:** *Chamaedorea* palm, areca palm, phoenix palm, bottle palm, royal palm, foxtail palm, fishtail palm, *Ptychosperma macarthurii* (Macarthur palm).
- **Avenue plantation:** Cuban royal palm, cabbage palm, Chinese fan palm, bottle palm, licuala palm, spindle palm, sugar palm, phoenix palm, Washingtonia palm, foxtail palm, fishtail palm.
- **Indoor landscaping:** *Rhapis* palm, Chinese fan palm, areca palm, seaforthia palm, *Chamaedorea* palm, windmill palm (cold hardy), *Kentia* palm, lipstick palm, parlour palm.
- **Palms suited for waterlogged areas:** *Cyrtostachys renda* (lipstick palm), licuala palm, nipa palm, ribbon fan palm.
- **Palms suited for saline areas:** Saw palmetto (*Serenoa repens*), *Chamaerops humilis*, *Sabal palmetto*, *Phoenix dactylifera*.
- **Palms suited for colder areas:** Windmill palm, needle palm, dwarf palmetto palm, European fan palm.

Propagation

Most palms are propagated from seeds, which are typically sown during the spring or rainy season. Germination is generally slow, with some species requiring anywhere from one month to two years to sprout.

Commercially, palm seeds are sown in 5 × 8 cm polythene bags and placed in shaded areas. Alternatively, they can be sown in pro-trays, tree cones, root trainers, wide and shallow pots, small nursery containers, or raised ground beds—provided that proper drainage is ensured to



facilitate seed development.

Some palm species, such as *Borassus* and *Bismarckia*, exhibit remote germination. Before sprouting their initial leaf, their seeds first push an inner stem as far as 30 cm into the soil. Therefore, these seeds are often planted singly and close to the surface in long, deep containers to prevent damage to the emerging seedlings.

The slow germination observed in many palm species is largely due to their thick, impermeable endocarp and sarcotesta. To improve germination, seeds are often pre-soaked in water for seven days or treated with 1000 ppm GA₃ (gibberellic acid) for 48 hours to soften the seed coat before sowing.

Although not as common, vegetative propagation is also effective for certain palm species. Many species—such as *Acrocomia* sp., *Areca* sp., *Bactris* sp., *Calamus* sp., *Geonoma* sp., *Metroxylon* sp., *Oenocarpus* sp., and *Rhapis* sp.—can be propagated from suckers or by dividing clumps.

Cultural operations

Palms are very sensitive to extreme heat and frost. Temperature requirements vary by species; some prefer hot climates, while others can tolerate cooler conditions. During winter, the optimal temperature is around 22°C during the day and 12.8°C at night.

Palms grow well in loamy soils enriched with humus and sand. Adequate fertilizer and soil moisture are essential for healthy growth. A well-decomposed bio-compost mixed with equal parts of loamy soil, leaf mould, and sand, along with a small quantity of bone meal, is ideal for palm cultivation.

Transplanting

After germination or separation from mother palms, young palms are transplanted into small polybags or pots and maintained under shade nets throughout the year. The rainy summer months are ideal for transplanting, as weather conditions favour root establishment.

Palms generally transplant well as mature, rooted plants. Transplanting is best done during the rainy summer season when the weather begins to warm, allowing several months of suitable growing conditions. Ideally, newly transplanted seedlings or suckers should first be kept under light shade (30–50%)—preferably beneath large trees—for 8 to 12 weeks, or until new growth appears. This helps prevent sunburn or stress in the young plants.

Steps for transplanting/planting palms

- Plant palms at the same depth as before, or carefully transfer the root ball into a new pot or large polybag.
- Insert the palm straight into the hole, pot, or polybag, and fill the space around the root ball with soil.
- Use plenty of water to eliminate any air pockets.
- Dig planting holes at designated spots based on the landscape layout plan. Hole size may vary according to the age and size of the plant. Fill the pit with an ideal soil mix to ensure proper growth.
- Create a soil basin around the root ball to retain water during irrigation.
- Add a 2- to 3-inch layer of organic mulch to stabilize soil temperature, retain moisture, and suppress weeds.
- Use bracing to stabilize large palms for the first 6–8 months. Avoid driving nails directly into the palm trunk.
- Water daily for the first few weeks until the palms become established.
- Apply a light dose of slow-release fertilizer around the root ball margin 3–4 months after transplanting.





infested, and nutrient-deficient leaves should be removed. While older leaves are often pruned for aesthetic reasons, excessive removal should be avoided, as palms naturally translocate nutrients from aging fronds to newer foliage. Premature removal of such leaves can deprive the plant of essential nutrients.

Repeated trimming can result in a “pencil top” appearance—a narrowing of the trunk just below the fronds—which weakens the palm and may lead to its premature death. It is therefore advised to remove only dead leaves and avoid pruning fronds that are held above the horizontal.

Diseases and insect pests

With proper care and maintenance, palms can be kept free from most infestations. However, several insect pests and diseases can cause significant damage if not managed.

Diseases such as pink rot, bacterial wilt, fusarium wilt, false smut, leaf scab, leaf blight, petiole and rachis blight, leaf spot, stem and root rot, bud rot and wilt, black scorch, and heart rot are known to affect palms. In cases of false smut, leaf scab, bud rot, black scorch, or heart rot, all infected fronds, leaves, and flower parts should be pruned and burned, followed by spraying with a copper-based fungicide (e.g., carbendazim or metalaxyl at 2 g/L). Leaf blight can also be controlled with copper fungicide sprays. Bud rot can be managed by soil drenching with metalaxyl or by foliar spraying with Ridomil Gold.

Common pests include scale insects, red spider mites, aphids, thrips, and moth larvae. Aphids and mealybugs can be controlled by spraying imidacloprid at 3 ml per 10 L of water. Thrips can be controlled with a spinosad spray at 3.2 ml per 10 L of water.

Cold protection

Palms grown in heated greenhouses are often protected from freeze damage. In open shade houses or container nurseries with full sun exposure, special precautions are needed. Anti-transparent chemicals can be applied to the foliage to prevent cold injury. Thermal blankets, specifically designed to cover container plants, are also effective during brief periods of freezing temperatures.

In extreme conditions, overhead irrigation can be used to ice the plants and protect them from sub-zero temperatures. However, irrigation must begin before temperatures drop below freezing to avoid frost formation.

Potting and repotting

Palms prefer a confined root system and generally thrive when slightly pot-bound. Repotting should only be done when the roots become crowded or start breaking

Management practices

Both the quality and quantity of irrigation water are of prime importance for the healthy production of elite palms. It is essential to plan irrigation so that the potting medium remains consistently moist and well-aerated. Sub-irrigation, drip or trickle irrigation, and overhead irrigation are commonly used methods to grow high-quality container palms. The irrigation frequency depends on factors such as species, current temperature, relative humidity, growing media type, and the size of the polybag, grow bag, or pot.

Palm seedlings typically do not require fertilization during the first 2–3 months after germination.

For faster growth of palm species, nutrient application through foliar spray or fertigation is recommended using 150–200 ppm of nitrogen (N) and potassium (K), and 50–75 ppm of magnesium (Mg). If containers are not exposed to rain, they should be leached once a month with irrigation water to prevent salt build-up.

Pruning

Judicious pruning of old, oversized, senescing, and dead leaves is recommended. Diseased, insect-

the pot. When repotting, the root ball should remain undisturbed, and the base of the plant (collar) should sit just at the soil surface. Deep planting can be detrimental.

During transplantation, care must be taken not to damage any roots. Once repotted, palms usually do not require repotting for at least two years. If repotting is unnecessary, top-dressing with rich compost once or twice a year can help rejuvenate the plant.

A suitable potting mix consists of two parts good garden soil, two parts leaf mould, one part well-rotted cow dung manure, and half to one part sand. Proper drainage material should be placed at the bottom of the pot. Transplanting is ideally done during the wet season.

Palms retain their lush green foliage when fed with liquid manure made by fermenting oil cake and diluting it to tea-like colour, applied once every 15 days. Alternatively, a solution of approximately 30 grams of ammonium sulphate in one liter of water may be used. The quantity varies depending on plant size.

Availability of Plants

Garden lovers, amateurs, landscapers, and nurserymen can obtain a wide range of palm species from reputable

sources such as the CPWD Government Sunder Nursery in Nizamuddin, New Delhi; Government Mehrauli Nursery in Delhi; nurseries in 24 Parganas (West Bengal); and Kadiam, Rajahmundry (Andhra Pradesh), among others.

Ornamental palms are highly valued for their aesthetic appeal and bring a tropical beauty to landscapes and gardens. They also contribute to improving indoor air quality. Today, they are among the most sought-after garden plants across all types of landscapes. Several dedicated palm nurseries ensure their availability, and the cultivation of palms offers substantial economic opportunities.

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Development of economically efficient and environmentally robust Integrated Farming System model

An IFS model (1-acre area) comprises polyhouse cultivation of vegetables (600 m² area for cultivation of tomato, capsicum, and cucumbers), mushroom production (50 m² area), agri-horti system (1,200 m² area), apiculture and open field cultivation of vegetables, flowers, cereals, oilseeds and pulses on 2,200 m² area was for small and marginal farmers developed. The IFS model is economically efficient and environmentally robust and has the potential to generate a net income of ₹ 1,75,650 per year.



Integrated farming system model

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