

## Taxonomic Study of Palms in South Gujarat

Qureshimatva Umerfaruq M.<sup>1</sup>, Gamit Sandip B.<sup>1</sup>, Patel Sveta B.<sup>1</sup>, Solanki Hitesh A.<sup>2</sup> and Yadav Santosh L.<sup>3</sup>

[1]. Research Scholars, Department of Botany, Bioinformatics and Climate Change Impacts Management, University School of Science, Gujarat University, Ahmedabad 380009.

[2]. Professor, Department of Botany, Bioinformatics and Climate Change Impacts Management, University School of Science, Gujarat University, Ahmedabad 380009.

[3]. Botanical advisor, The Serenity Library and Botanical Garden, Bhat, Gandhinagar, 380005.

Email id: [ufmqureshi@yahoo.in](mailto:ufmqureshi@yahoo.in) and [husolanki@gmail.com](mailto:husolanki@gmail.com)

**Abstract**-The present paper deal with taxonomic study of palms (Arecaceae family) in South Gujarat. There are about 35 species and 5 cultivated varieties belonging to 26 genera's, out of which 12 species belongs to 10 indigenous genera's, or naturalized species in India and others are exotic. Four wild palms reported includes *Borassus flabellifer*, *Calamus rotang*, *Hyphaene dichotoma* and *Phoenix sylvestris*. Palms in cultivation are *Cocos nucifera* and *Elaeis guineensis*. Other palms are planted as an ornamental palm in gardens, private bungalows and parks.

**Keyword:** Taxonomic study, Arecaceae (Palms), South Gujarat, Indigenous, Exotic

### 1. INTRODUCTION

Palms are monocots, included in the section of Angiosperms characterized by bearing a single cotyledon. Scientifically, palms are classified as belonging to the family Palmae (the alternative name is Arecaceae), are perennial and distinguished by having woody stems. According to Dransfield et al (2005), the palm family consists of five subfamilies, representing a major line of evolution. The Calamoideae is the subfamily with the most specialized characters; followed by Nypoideae, Coryphoideae, Ceroxyloideae and Arecoideae. The foregoing names are based on the genus originally thought to be most characteristic of each subfamily, all of which have species of economic importance, such as the rattan palm (*Calamus*), mangrove palm (*Nypa*), talipot palm (*Corypha*), Andean wax palm (*Ceroxylon*) and betel nut palm (*Areca*).

About 183 palm genera are currently recognized all over the world. The number of palm species is much less precise because of conflicting concepts by palm taxonomists as to what constitutes a distinct species and the need to revise several genera. According to Govaerts and Dransfield (2005) there are about 2,450 palm species. India is represented by 22 genera and 105 species of palms distributed mainly in three geographical regions viz., the Peninsular India (Western Ghats, Eastern Ghats and Deccan Peninsula) forest areas of Northern India (Indo-Gangetic Plain, Himalayan Foothills and Assam ranges) and Andaman and Nicobar Islands (Renuka and Shree Kumar, 2015).

### 2. METHODOLOGY

Gujarat state is located between 20°0 1' North Latitude to 24°07' Latitude and 68°04' East Longitude to 74°04' East Longitude in the western part of India. South Gujarat region has costal and hilly regions with largest deciduous forest area, include districts Surat, Tapi, Valsad, Navsari, Bharuch, Dang and Narmada. Area also includes two wildlife sanctuaries and one largest botanical garden known as Waghai Botanical Garden.

The field survey was an important part of the study to collect the data for diversity of Palms in South Gujarat, frequent visits were conducted from year 2015 to 2018. Standard taxonomic techniques were followed to collect and preserve the specimens. The morphological characters which cannot be studied from the dried specimens like color, arrangements of plant parts, etc. were recorded in the field book. The collected specimens were identified studying related taxonomic books and booklets (Cooke 1907; Shah, 1978; Ellison, 2001, Riffle, 2008, Bhatt, 2012; Qureshimatva et al, 2016).

### 3. RESULT AND DISCUSSION

The present paper deals with the taxonomic study of the members of the family Arecaceae (Palmae) of South Gujarat. The present study shows present of 35 species and 5 cultivated varieties belonging to 26 Genera's (see table no. 1). Analysis shows that out of 35 species, 12 species belongs to 10 indigenous or naturalized genera's in India whereas rest of the species are cultivated in gardens or parks for their ornamental value. The maximum species diversity found in Surat 33 species and 5 cultivated varieties followed by Bharuch and Valsad 27 species

with 3 cultivated varieties, Tapi 25 species with 3 cultivated varieties, Navsari and Narmada 24 species and Dang 23 species with 3 cultivated varieties (see graph no. 1).

During the study, all the palms including ornamental, cultivated and wild palms were reported. Wild species include *Borassus flabellifer*, *Calamus rotang*, *Hyphaene dichotoma* and *Phoenix sylvestris*. Cultivated palms are *Cocos nucifera* and *Elaeis guineensis*. Other palms are planted as ornamental in gardens, private bungalow and parks.

*Borassus flabellifer* L., is indigenous to India occurring in Gujarat, Maharashtra, Goa, Kerala, Karnataka, Chennai, Bangalore, Andhra Pradesh, West Bengal, Odisha and Punjab. A sugary sap, called toddy, can be obtained from the young inflorescence, both male and female, and this is fermented to make a beverage called arrack. It is planted as a windbreak on the plains. In South Gujarat toddy palm naturally occurs at fallow land, plain area, gardens. It is abundantly found near the coastal region of Surat, Bharuch and Valsad but in Narmada, Navsari and Tapi district less found. *Calamus rotang* L., distributed in India and Sri-Lanka. It is found in moist deciduous and riverine ecosystem of Western Ghats including Dang forest (Shah, 1978). In the present study the species is not found in Dang forest but reported as plantation in Waghai Botanical Garden. *Phoenix sylvestris* Roxb., common throughout India in the dry areas. It is rarely cultivated in gardens as ornamental plant. In south Gujarat, the sweet juice which is tapped by means of deep notches made in the upper parts of the stem below the crown. The sap is either fermented into toddy. *Hyphaene dichotoma* (White) Furtado (Indian Doum Palm) is indigenous, distributed along the watercourses, coastal sand dunes and flat area of Gujarat, Union territories of Dadra, Diu and Daman,

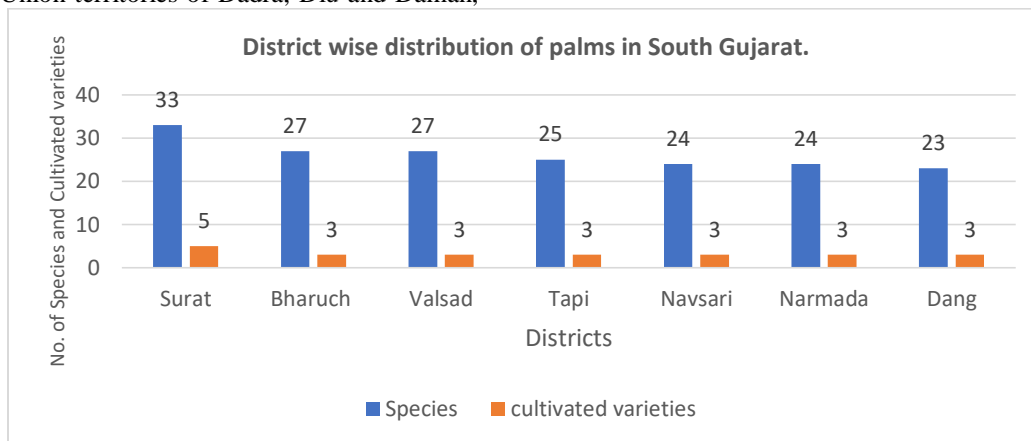
Goa and Maharashtra and some part of Sri-Lanka. It is near threatened palm categorized by IUCN in 2014. South Gujarat few individuals recorded in areas including Kalgam in Valsad district (Umergam Road), Udvarda and one planted in a private bungalow near Atul village on national highways and BMK Science College.

*Cocos nucifera* L., widely cultivated throughout the tropics and warmer subtropics. The fibrous mesocarp of the fruit yields the coir fibers used for cord, ropes, nets, etc. The sap of the peduncle yields toddy. Coconut generally cultivated in all the districts of south Gujarat with three cultivated varieties include chowghat orange dwarf, chowghat green dwarf and west coast tall. *Elaeis guineensis* Jacq native to tropical West Africa, widely planted in tropics and in South-east Asia. It is cultivated in Valsad district of south Gujarat for the extraction of oil, popularly called palm oil and planted for ornament in gardens and parks.

*Phoenix dactylifera* L., distributed and widely cultivated in Arabia and North Africa for the edible fruits. Commercial cultivation occurs in Kutchh; however, sporadic trees are seen in some places without flowering and fruiting in South Gujarat.

#### 4. CONCLUSION

Palms are third largest economically important family providing essential goods to mankind. In south Gujarat palms are most widely used as ornamental plant in major cities including Surat, Vyara, Navsari, Bardoly, Mandvi, Rajipla, etc. Wild palms like *Hyphaene dichotoma* and *Calamus rotang* is found very rare in south Gujarat. Some conservation strategy for above wild palms need to be adopted such as commercial cultivation at large scale as they have wide commercial uses.



Graph No. 1: District wise distribution of palms in South Gujarat.



Figure No. 1: Photographs of Palms in South Gujarat.

		
<i>Areca catechu</i> L	<i>Borassus flabellifer</i> L	<i>Elaeis guineensis</i> Jacq
		
<i>Calamus thwaitesii</i> Becc. & Hook. f.	<i>Calamus rotang</i> Linn	<i>Caryota mirtis</i> Lour
		
<i>Dypsis decaryi</i> (Hodel) Beentje &	<i>Hyphaene dichotoma</i> (White)	<i>Hyophorbe lagenicaulis</i>



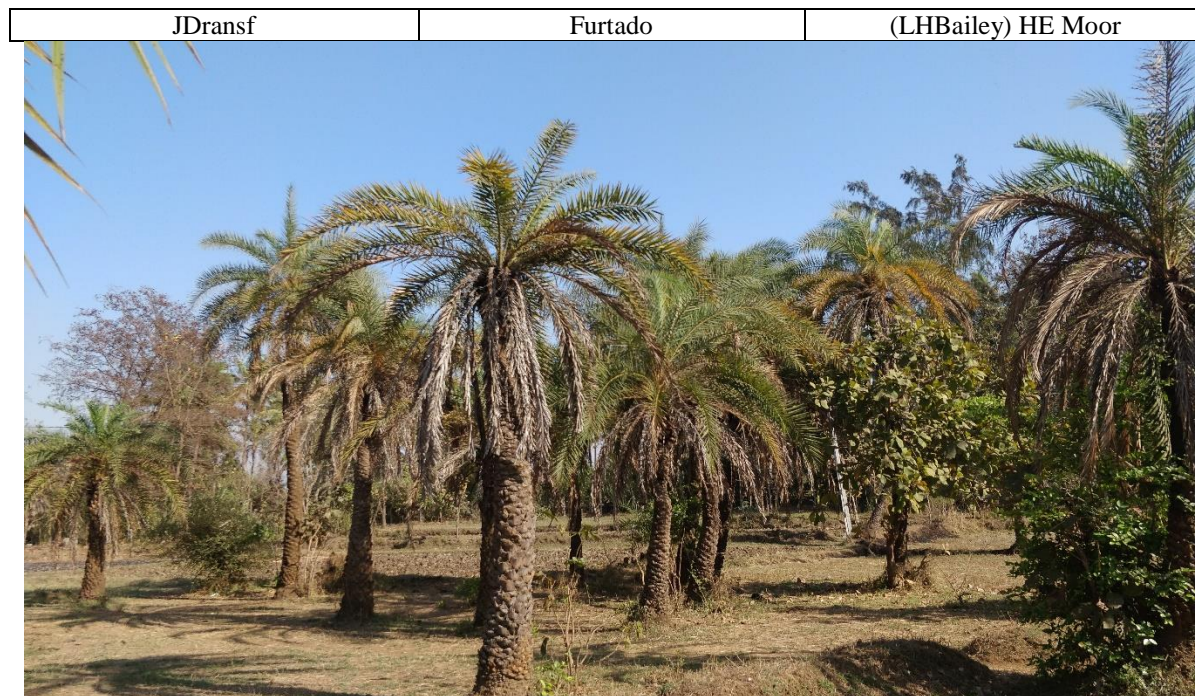


Figure No. 2: Habitat of *Phoenix sylvestris* Roxb near Valsad district.



Figure No.3: Cultivation of *Elaeis guineensis* Jacq in Valsad district.

**Table No.1:** List of ornamentals, cultivated and wild palms in South Gujarat.

List of Ornamentals, Cultivated and Wild Palms in South Gujarat					
Sr. NO	Botanical Name	Common name	Native	Distribution	Habitat
1	<i>Adonidia merrillii</i> (Becc) Becc	Veitchia palm	Palawan of the Philippines	Surat	Ornamental
2	<i>Adonidia merrillii</i> (Becc) Becc cv green	Mirchi Palm	Tropical Asia	Surat	Cultivated
3	<i>Areca catechu</i> L cv <i>alba</i> Blume	Areca Palm, Bete Nut Palm	Tropical Asia	Surat, Tapi, Valsad, Navsari, Bharuch, Dang, Narmada	Ornamental
4	<i>Bismarkia nobulis</i> Hildebrandt & HWendl	Bismakia Palm, Greenish	Madagascar	Surat, Tapi, Valsad, Navsari, Bharuch, Dang, Narmada	Ornamental
5	<i>Borassus flabellifer</i> L	Palmyra Palm	India, Sri Lanka and Myanmar	Surat, Tapi, Valsad, Navsari, Bharuch, Dang, Narmada	Wild
6	<i>Calamus rotang</i> Linn	Rattan Palm'	Sri Lanka	Navsari	Wild
7	<i>Calamus thwaitesii</i> Becc. & Hook. f.	Rattan cane	India	Navsari	Wild
8	<i>Caryota mirtis</i> Lour	Fishtail Palm	Indochina, Myanmar, Thailand, India	Surat, Valsad, Tapi	Ornamental
9	<i>Caryota urens</i> L	Toddy Palm, Fishtail Palm	India, Myanmar, Sri Lanka	Surat, Tapi, Valsad, Navsari, Bharuch, Dang, Narmada	Ornamental
10	<i>Chamaedorea elegans</i> Mart	Parlour Palm	Southern Mexico and Guatemala	Surat	Ornamental
11	<i>Cocos nucifera</i> L	Coconut Palm	Throughout the world	Surat, Tapi, Valsad, Navsari, Bharuch, Dang, Narmada	Cultivated
12	<i>Cocos nucifera</i> L cv <i>chowghat orange dwarf</i>	Coconut Palm	-	Surat, Tapi, Valsad, Navsari, Dang	Cultivated
13	<i>Cocos nucifera</i> L cv <i>chowghat green dwarf</i>	Coconut Palm	-	Surat, Tapi, Valsad, Navsari, Bharuch, Dang, Narmada	Cultivated
14	<i>Cocos nucifera</i> L cv <i>west coast tall</i>	Coconut Palm	-	Surat, Tapi, Valsad, Navsari, Bharuch, Dang, Narmada	Cultivated
15	<i>Corypha umbraculifera</i> L	Talipot Palm	India, Sri Lanka	Surat	Ornamental
16	<i>Dypsis decaryi</i> (Hodel) Beentje & JDransf	Triangular Palm	Madagascar	Surat, Tapi, Valsad, Navsari, Bharuch, Dang, Narmada	Ornamental
17	<i>Dypsis lutescens</i> (H Wendle) Beentje & J. Dransf	Bamboo Palm or Cane Palm	Madagascar	Surat, Tapi, Valsad, Navsari, Bharuch, Dang, Narmada	Ornamental
18	<i>Dypsis lutescens</i> (HWendle) Beentje & J. dransf cv <i>variegata</i>	Bamboo Palm or Cane Palm	Madagascar	Surat	
19	<i>Elaeis guineensis</i> Jacq	Oil Palm	Tropical West Africa	Surat, Tapi, Valsad, Navsari, Bharuch, Dang, Narmada	Cultivated

20	<i>Hyophorbe lagenicaulis</i> (LH Bailey) HE Moor	Shampin Palm	Mascarene Island	Surat, Tapi, Valsad, Navsari, Bharuch, Dang, Narmada	Ornamental
21	<i>Hyphaene dichotoma</i> (White) Furtado	Doum Palm	India	Valsad	Wild
22	<i>Latania lontaroides</i> (Gaertn) HE	Red Latan Palm	Mascarene Island	Surat, Tapi, Valsad, Bharuch, Narmada	Ornamental
23	<i>Licuala grandis</i> H Wendl	Raffled Palm	New Hebrides	Surat, Tapi, Valsad, Navsari, Bharuch, Dang, Narmada	Ornamental
24	<i>Licuala spinosa</i> Tumb	Swamp Palm	Malaya Peninsula	Surat	Ornamental
25	<i>Livistona chinensis</i> R Br	Chinise Fan Palm	China	Surat, Tapi, Valsad, Navsari, Bharuch, Dang, Narmada	Ornamental
26	<i>Livistona rotundifolia</i> (Lam) Mart	Footstool Palm	Java, Philippines, Celebes	Surat, Tapi, Valsad, Navsari, Bharuch, Dang, Narmada	Ornamental
27	<i>Phoenix canareiensis</i> Chabaud	Canary Island Date Palm	Canary Island	Surat	Ornamental
28	<i>Phoenix dactylifera</i> L	Date Palm, Khajura	Arabia	Surat, Tapi, Valsad, Navsari, Bharuch, Dang, Narmada	Wild
29	<i>Phoenix pusilla</i> Gaertn	Ceylon Date Palm	Southern India & Ceylon	Surat, Navsari, Bharuch	Ornamental
30	<i>Phoenix roebelenii</i> O'Brien	Dwarf Date Palm	Southeast Asia	Surat, Tapi, Valsad, Navsari, Bharuch, Dang, Narmada	Ornamental
31	<i>Phoenix sylvestris</i> Roxb	Wild Date Palm	India	Surat, Tapi, Valsad, Navsari, Bharuch, Dang, Narmada	Wild
32	<i>Prithchardia pacifera</i> L	Fiji Fan Palm	Fiji	Surat, Tapi, Valsad, Navsari, Bharuch, Dang, Narmada	Wild
33	<i>Ptychosperma microcarpum</i> (Burret) Burret	New Guinea Cluster Palm	New Guinea	Surat	Ornamental
34	<i>Ravenea rivularis</i> Jum. & H. Perrier	Majesty palm	Madagascar	Surat, Valsad, Navsari, Bharuch,	Ornamental
35	<i>Rhapis excelsa</i> (Thunb) A Henry ex Rehder	Lady Palm	China and Japan	Surat, Tapi, Valsad, Navsari, Bharuch, Dang, Narmada	Ornamental
36	<i>Roystonea regia</i> (Kunth) O F Cook	Cuban Royal Palm'	Cuba	Surat, Tapi, Valsad, Navsari, Bharuch, Dang, Narmada	Ornamental
37	<i>Sabal palmetto</i> (Walter) Lodd ex Schult & Schultf	Blackburn Palmetto	Tropical America	Surat	Ornamental
38	<i>Thrinax parviflora</i> Sw	Mountain thatch palm	Jamaica	Surat, Valsad, Bharuch,	Ornamental
39	<i>Washingtonia filifera</i> (Linden ex Andre) H Wendl	Desert fan Palm	Arizona to California	Surat	Ornamental
40	<i>Wodyetia bifurcata</i> AK Irvine	Foxtail Palm	Australia	Surat, Tapi, Valsad, Navsari, Bharuch, Dang, Narmada	Ornamental

## **5. ACKNOWLEDGMENT**

**Qureshimatva Umerfrauq M.** is thankful to University Grant Commission, Government of India for financial support in terms of Maulana Azad Nation Fellowship for Minorities (MANF) scheme. \

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