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RESEARCH ARTICLE

CHEKLIST OF PALMS IN AHMEDABAD, GUJARAT, INDIA

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ABSTRACT

Palms form a vital component of forest and agricultural ecosystem, providing a wide range of economic products necessary for daily life. Recently, there is a growing popularity for palm cultivation, both for indoor and outdoor decoration, and exotic palm species are being introduced at a steady stream. India has 20 genera and 96 species of palms. The city of Ahmedabad is situated on 23.01° N Latitude and 72.61° East Longitude in 8,086.81 sq. km area with 197 gardens, on the bank of river Sabarmati. In the present study, 71 species and 7 cultivated varieties belonging to 38 genera were recorded from Ahmedabad district. Among them 25 genera and 61 species are newly reported in Ahmedabad district. *Phoenix* was reported as the largest genus with 8 species followed by *Licuala* with 7 species, *Livistona* with 5 species and the rest with less than 3 species each.

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INTRODUCTION

The palms are highly variable and exhibit a tremendous morphological diversity. Palms have been supplying all the basic necessities of life to human civilizations since times immemorial; providing them with livelihood and sustenance, and, subtly entering their lives by becoming a part of socio-religious functions and rituals (Kolet *et al.*, 2013). In the world there are about 2400 species (Mabberley, 2008) belonging to 183 genera (Drensfield *et al.*, 2008) currently known, most of them are restricted to various climates like tropical, subtropical and warm temperate. India is represented by 20 genera and about 96 species among which 24 species belonging to 9 genera are endemic to India (Kulkarni and Mulani, 2004).

Palms may be solitary (single stemmed) or clustered multi stemmed, tall or dwarf, robust or slender or climbers. The palm stem is generally columnar and unbranched but branched in *Hyphaene indica* and *Dypsis sp.* with a crown of large fan-like or feather-like leaves at the top. Palms have large, evergreen leaves that are either palmately ('fan-leaved') or pinnately ('feather-leaved') compound and spirally arranged. A palm leaf consists of an axis and a blade. The inflorescence is a spadix or spike surrounded by bracts that become woody at maturity. Palms flowers may be unisexual or bisexual. The perianth is

composed of 2 alternating trimerous whorls, the outer whorl is calyx (3 sepals) and inner whorl is corolla (3 petals). The androecium consists of 6 or 3 stamens, or sometimes more; anthers are dorsifixed, medifixed or versatile. The gynoecium is generally tricarpeal, free or forms a syncarpous 1-3 locular ovary with one ovule in each locule, stigmas 3 and erect or recurved. Fruits are fleshy or fibrous covering forming a berry, or a drupe with a strong endocarp. The seeds are usually ovoid, ellipsoidal or globose in shape with homogeneous or ruminant endosperm (Almeida, 2009).

MATERIAL AND METHOD

Study Area

The city of Ahmedabad, is a leading industrial and commercial city of Gujarat, situated on 23.01° N Latitude and 72.61° East Longitude in 8,086.81 sq. km area, on the banks of the Sabarmati river. For this study palms which are commonly cultivated in the gardens were covered. There is a wide spectrum of gardens (approximately 198 gardens) in Ahmedabad that exhilarate the gleam and appeal of Ahmedabad.

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Umerfaruq M. Qureshimatva et al., Checklist Of Palms In Ahmedabad, Gujarat, India

List Of Palms In Ahmedabad District				
Sr.No	Botanical Name	Common Name	Native to Country	Place in Ahmedabad
1	<i>Adonidia merrillii</i> (Becc) Becc	Veitchia palm	Palawan of the Philippines	Lalbhai Bungalow, Bhat, Gandhinagar.
2	<i>Aiphanes aculeata</i> (Jacq) Berret	Ruffle Palm	Bolivia, Brazil	Lalbhai Bungalow, Bhat, Gandhinagar
3	<i>Areca catechu</i> L	Areca Palm, Betel Nut Palm	Tropical Asia	Lalbhai Bungalow Bhat Gandhinagar, Botanical Garden, Dept. of Botany, Gujarat University; The Sarabhai Foundation, Botanical Garden, Shahibaug; Law Garden; Parimal Garden. Common in Ahmedabad.
4	<i>Areca catechu</i> L cv <i>alba</i>	Yellow Areca Palm	Tropical Asia	Lalbhai Bungalow, Bhat, Gandhinagar.
5	<i>Areca catechu</i> L cv <i>drafw</i>	Areca Palm	Tropical Asia	Lalbhai Bungalow, Bhat, Gandhinagar.
6	<i>Areca catechu</i> L cv <i>golden</i>	Golden Areca Palm	Tropical Asia	Lalbhai Bungalow, Bhat, Gandhinagar.
7	<i>Arenga engleri</i> Becc	Formosa Palm	Island of South Japan	Lalbhai Bungalow, Bhat, Gandhinagar
8	<i>Attelia cohune</i> Mart	American oil palm	Mexico and Central America	Lalbhai Bungalow, Bhat, Gandhinagar
9	<i>Bentinkia nicobarica</i> (Kurz) Becc	Nicobar Palm	India	Lalbhai Bungalow, Bhat, Gandhinagar.
10	<i>Bismarkia nobulis</i> Hildebrandt & H Wendl	Bismakia Palm, Greenish	Madagascar	Lalbhai Bungalow, Bhat, Gandhinagar and Serenity Library, Bhat, Gandhinagar.
11	<i>Bismarkia nobulis</i> Hildebrandt & H Wendl	Bismakia Palm, Bluish form	Madagascar	Lalbhai Bungalow Bhat Gandhinagar, Botanical Garden Dept. of Botany Gujarat University; The Sarabhai Foundation, Botanical Garden, Shahibaug; Law Garden; Parimal Garden and common in other gardens.
12	<i>Borassus flabellifer</i> L	Palmyra Palm	India, Sri Lanka and Myanmar	Mumbai express Highway, Narol; in a private garden near Astodia Darwaja.
13	<i>Brahea armata</i> S Watson	Blue Hesper Palm	Mexico	Lalbhai Bungalow, Bhat, Gandhinagar.
14	<i>Butia capitata</i> Beccari	Pindo Palm	Argentina, Brazil and Uruguay	Lalbhai Bungalow, Bhat, Gandhinagar.
15	<i>Calamus gamblei</i> Beccari	Hasirubetha	South-West India	Lalbhai Bungalow, Bhat, Gandhinagar.
16	<i>Calamus inermis</i> T Anders	Sikkim calamus palm	Northeast India	Lalbhai Bungalow, Bhat, Gandhinagar.
17	<i>Calamus rotang</i> L	Rattan Palm'	Sri Lanka	Lalbhai Bungalow Bhat Gandhinagar and The Sarabhai Foundation, Botanical Garden, Shahibaug.
18	<i>Carpentaria acuminata</i> H A Wendland	Carpentaria Palm	Australia	Lalbhai Bungalow, Bhat, Gandhinagar.
19	<i>Caryota mirtis</i> Lour	Fishtail Palm	Indochina, Myanmar, Thailand, India	Lalbhai Bungalow Bhat Gandhinagar and The Sarabhai Foundation, Botanical Garden, Shahibaug.
20	<i>Caryota obtusa</i> Griffith	Gaint Indian Palm	India, Laos and Thailand	Parimal Garden.
21	<i>Caryota urens</i> L	Toddy Palm, Fishtail Palm	India, Myanmar, Sri Lanka	Lalbhai Bungalow Bhat Gandhinagar, Botanical Garden, Dept. of Botany, Gujarat University; The Sarabhai Foundation Botanical Garden Shahibaug; Law Garden; Parimal Garden and common in other gardens.
22	<i>Chamaedorea elegans</i> Mart	Parlour Palm	Southern Mexico and Guatemala	The Serenity Library, Bhat, Gandhinagar.
23	<i>Chamaedorea seifrizii</i> Burret	Reed Palm	Mexico and Central America	Botanical Garden, Dept. of Botany, Gujarat University.
24	<i>Chamaerops humilis</i> L	European fan Palm	Mediterranean	Lalbhai Bungalow, Bhat, Gandhinagar.
25	<i>Cocos nucifera</i> L	Coconut Palm	Tropical Eastern Regions	Lalbhai Bungalow Bhat Gandhinagar, Botanical Garden, Dept. of Botany, Gujarat University; The Sarabhai Foundation, Botanical Garden, Shahibaug; Law Garden; Parimal Garden; Asavali garden Astodia and common in other gardens.
26	<i>Cocos nucifera</i> L cv <i>samoan dwarf</i>	Shigapuri Coconut	Tropical Eastern Regions	The Sarabhai Foundation, Botanical Garden, Shahibaug.
27	<i>Corypha umbraculifera</i> L	Talipot Palm	India, Sri Lanka	Lalbhai Bungalow, Bhat, Gandhinagar; behind Gujarat University Tower; Vastrapur Lake Garden.
28	<i>Corypha uten</i> Lam	Gebang Palm	India, Myanmar, Malaysia	The Sarabhai Foundation, Botanical Garden, Shahibaug.
29	<i>Cryostachys renda</i> Blume	Sealing-wax Palm	Malay Peninsula, Sumatra and Borneo	Lalbhai Bungalow, Bhat, Gandhinagar.
30	<i>Dypsis decaryi</i> (Hodel) Beentje & J Dransf	Triangular Palm	Madagascar	Lalbhai Bungalow, Bhat, Gandhinagar; near Dept of Climate Change, Gujarat University; The Sarabhai Foundation, Botanical Garden, Shahibaug.
31	<i>Dypsis lutescens</i> (H Wendle) Beentje & J Dransf	Bamboo Palm or Cane Palm	Madagascar	Lalbhai Bungalow Bhat Gandhinagar; Gujarat University, The Sarabhai Foundation, Botanical Garden, Shahibaug and common in Ahmedabad.
32	<i>Dypsis lutescens</i> (H Wendle) Beentje & J Dransfvar cv <i>pushy</i>	Bamboo Palm or Cane Palm	Madagascar	Lalbhai Bungalow, Bhat, Gandhinagar.
33	<i>Dypsis lutescens</i> (H Wendle) Beentje & J Dransfvar cv <i>variegata</i>	Bamboo Palm or Cane Palm	Madagascar	Lalbhai Bungalow Bhat Gandhinagar; Botanical Garden, Dept. of Botany, Gujarat University; The Sarabhai Foundation, Botanical Garden, Shahibaug.
34	<i>Dypsis lutescens</i> (H Wendle) Beentje & J Dransf cv <i>nana</i>	Bamboo Palm or Cane Palm	Madagascar	Lalbhai Bungalow, Bhat, Gandhinagar.
35	<i>Dypsis madagascariensis</i> Hor	Lucuba Palm	The forest of Lucuba	Lalbhai Bungalow, Bhat, Gandhinagar.
36	<i>Drymophloeus hentyi</i> (Essig) Zona	Unknown	The island of New Britain	Botanical Garden, Dept. of Botany, Gujarat University.
37	<i>Elaeis guineensis</i> Jacq	Oil Palm	Tropical West Africa	Lalbhai Bungalow Bhat Gandhinagar; Botanical Garden, Dept. of Botany, Gujarat University.
38	<i>Guihaia argyrata</i> S K Lee, F N Wei & J Dransfield	Silver Back Fan Palm	China	Lalbhai Bungalow, Bhat, Gandhinagar.
39	<i>Hyophorbe lagenicaulis</i> (L H Bailey) HE Moor	Shampin Palm	Mascarene Island	Lalbhai Bungalow Bhat, Gandhinagar and Serenity Library, Bhat, Gandhinagar.
40	<i>Hyophorbe verschaffeltii</i> H A Wendle	Spindle Palm	Mascarene Island	Lalbhai Bungalow, Bhat, Gandhinagar.

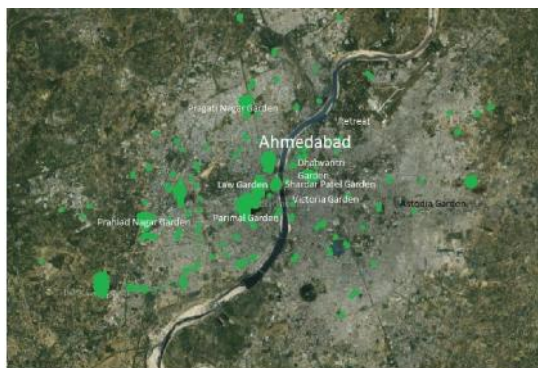
41	<i>Hyphoene indica</i> Beccari	Doum Palm	India	The Sarabhai Foundation, Botanical Garden, Shahibaug, Opp. Vejalpur Police Station Juhapura.
42	<i>Latania loddigesii</i> Mart	Blue Latan Palm	Mauritius to Mascarene Island	Lalbhai Bungalow, Bhat, Gandhinagar; near Dept. of Clinical Research, Gujarat University; Ahmedabad University Campus; The Sarabhai Foundation, Botanical Garden, Shahibaug.
43	<i>Latania lontaroides</i> (Gaertn) H E	Red Latan Palm	Mascarene Island	Lalbhai Bungalow, Bhat, Gandhinagar, Botanical Garden, Dept. of Botany, Gujarat University.
44	<i>Licuala bayana</i> Saw	Unknown	Unknown	Lalbhai Bungalow, Bhat, Gandhinagar
45	<i>Licuala grandis</i> H Wendl	Raffled Palm	New Hebrides	Lalbhai Bungalow, Bhat, Gandhinagar; Botanical Garden, Dept. of Botany, Gujarat University and St. Xavier's College.
46	<i>Licuala kunstleri</i> Beccari	Unknown	Malay Peninsula	Lalbhai Bungalow, Bhat, Gandhinagar.
47	<i>Licuala paludosa</i> Griff	Golden Licuala	Southern Pakistan	Botanical Garden, Dept. of Botany, Gujarat University.
48	<i>Licuala peltata</i> Roxb ex Buch-Ham	Unknown	Thailand and Malaysia	Botanical Garden, Dept. of Botany, Gujarat University.
49	<i>Licuala rumphii</i> Blume	Celebes Fan Palm	Fiji	Lalbhai Bungalow, Bhat, Gandhinagar.
50	<i>Licuala spinosa</i> Tumb	Swamp Palm	Malaya Peninsula	Lalbhai Bungalow Bhat Gandhinagar, Serenity Library.
51	<i>Livistona chinensis</i> R. Br.	Chinise Fan Palm	China	Near Gujarat University Tower; Lok Maniya Tilak Baug.
52	<i>Livistona decora</i> (W Bull) Dowe	Ribbon Fan Palm'	Central Queensland	The Sarabhai Foundation, Botanical Garden, Shahibaug.
53	<i>Livistona jenkinsiana</i> Griffith	Jenkeins Palm'	Asia	The Sarabhai Foundation, Botanical Garden, Shahibaug; Gujarat College; in a private Bungalow near British Library.
54	<i>Livistona regida</i> Beccari	Mataranka Palm'	Oceania	The Sarabhai Foundation, Botanical Garden, Shahibaug.
55	<i>Livistona rotundifolia</i> (Lam) Mart	Footstool Palm	Java, Philippines, Celebes	Lalbhai Bungalow Bhat Gandhinagar; Botanical Garden, Dept. of Botany, Gujarat University; Ahmedabad University Campus; The Sarabhai Foundation Botanical Garden Shahibaug; Parimal Garden and common in Ahmedabad.
56	<i>Lodociea makdivica</i> Pers	Double coconut palm	America	The Sarabhai Foundation, Botanical Garden, Shahibaug.
57	<i>Phoenix acaulis</i> Buch-Ham ex Roxb	Stemless Date Palm	India	Gujarat University.
58	<i>Phoenix canareiensis</i> Chabaud	Canary Island Date Palm	Canary Island	Lalbhai Bungalow, Bhat, Gandhinagar.
59	<i>Phoenix dactylifera</i> L	Date Palm, Khajura	Arabia	Lalbhai Bungalow, Bhat, Gandhinagar; near entrance Gujarat University; The Sarabhai Foundation, Botanical Garden, Shahibaug; Parimal Garden; Vastrapur Lake Garden and common in Ahmedabad.
60	<i>Phoenix paludosa</i> Roxb	Mangrove Date Palm	India, Bangladesh, Myanmar	Lalbhai Bungalow, Bhat, Gandhinagar.
61	<i>Phoenix pusilla</i> Gaertn	Ceylon Date Palm	Southern India & Ceylon	Lalbhai Bungalow Bhat Gandhinagar, front of Agora Mall.
62	<i>Phoenix reclinata</i> Jacq	Senegal Date Palm	Tropical Africa	Lalbhai Bungalow, Bhat, Gandhinagar.
63	<i>Phoenix roebelenii</i> O'Brien	Dwarf Date Palm	Southeast Asia	Lalbhai Bungalow Bhat Gandhinagar; behind tower Gujarat University; The Sarabhai Foundation, Botanical Garden, Shahibaug and common in Ahmedabad.
64	<i>Phoenix sylvestris</i> Roxb	Wild Date Palm	India	Laxminagar Narol, Vatva Crossing and common in Ahmedabad.
65	<i>Phoenicophorium borsigianum</i> (K Koch) Stuntz	Stevenson Palm	Seychelles Island	Lalbhai Bungalow, Bhat, Gandhinagar.
66	<i>Prithcherdia pacifera</i> L	Fiji Fan Palm	Fiji	Lalbhai Bungalow, Bhat, Gandhinagar, Botanical Garden, Dept. of Botany, Gujarat University; The Sarabhai Foundation, Botanical Garden, Shahibaug and common in Ahmedabad.
67	<i>Ptychosperma caryotoides</i> Ridley	Unknown	New Guinea	Parimal Garden; behind post office Gujarat University.
68	<i>Ptychosperma macarthurii</i> H A Wendle	Mac Arthur Palm	New Guinea	In a private garden Mithakhali cross road.
69	<i>Raphis humilis</i> Blume	Slender Lady Palm	Japan	Lalbhai Bungalow, Bhat, Gandhinagar.
70	<i>Rhapis excelsa</i> (Thunb) A Henry ex Rehder	Lady Palm	China and Japan	Lalbhai Bungalow Bhat Gandhinagar; Botanical Garden, Dept. of Botany, Gujarat University; The Sarabhai Foundation Botanical Garden Shahibaug and common in Ahmedabad.
71	<i>Roystonea olacea</i> Mart	Caribbean Royal Palm	West Indies	The Sarabhai Foundation, Botanical Garden, Shahibaug and Gujarat University.
72	<i>Roystonea regia</i> (Kunth) O F Cook	Cuban Royal Palm'	Cuba	Common in Ahmedabad.
73	<i>Sabal causiarum</i> (O F Cook) Beccari	Puerto Rican hat palm'	Puerto Rico	Parimal Garden.
74	<i>Sabal domingensis</i> Beccari	Puerto Rican hat palm	Hispeniola, Puerto Rico	Lalbhai Bungalow, Bhat, Gandhinagar.
75	<i>Sabal palmetto</i> (Walter) Lodd ex Schult & Schultf	Blackburn Palmetto	Tropical America	Lalbhai Bungalow, Bhat, Gandhinagar.
76	<i>Thrinax parviflora</i> Sw	Mountain thatch palm	Jamaica	Lalbhai Bungalow Bhat Gandhinagar; Botanical Garden, Dept. of Botany, Gujarat University and common in Ahmedabad.
77	<i>Washingtonia filifera</i> (Linden ex Andre) H Wendl	Desert fan Palm	Arizona to California	Gujarat College; in a private bungalow, opp. Reliance Mall, Iscon.
78	<i>Wodyetia bifurcata</i> A K Irvine	Foxtail Palm	Australia	Lalbhai Bungalow Bhat Gandhinagar; Botanical Garden, Dept. of Botany, Gujarat University; Serenity Library and common in Ahmedabad.

Field Work & Identification

Field work was carried out on study area from August 2012 to April 2013. The visits were conducted across various gardens in Ahmedabad.

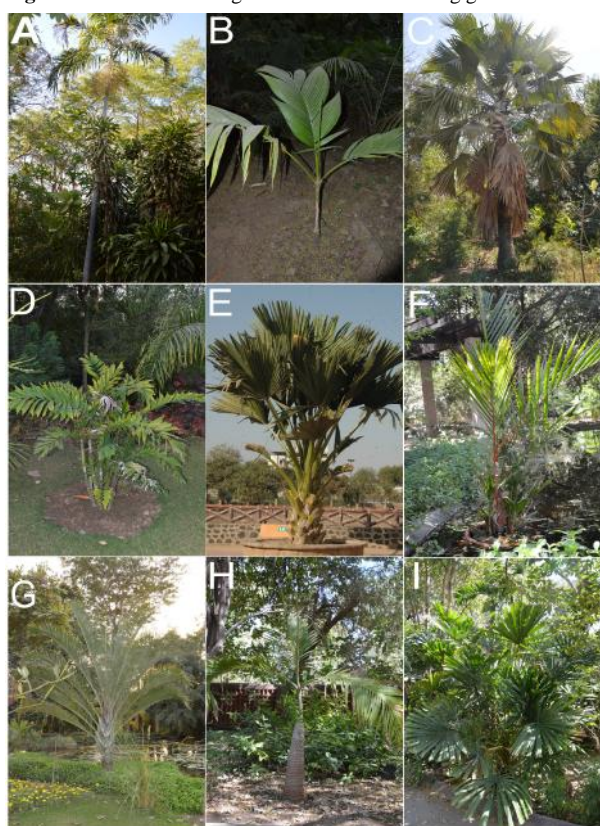
The major gardens were visited as first preference, above all those which have large number of palms in gardens. During field work the photograph of each palm was taken to illustrate the habit, stem, leaves and other floral parts. Inflorescences and fruits were also collected. Field notes were taken to have

information on habit, habitat, characteristics of palms and photo number for identification.



Satellite image of Ahmedabad showing gardens visited. (Source: Google Map)

Figure No. 1 Satellite image of Ahmedabad showing gardens visited.



A. *Adonidia merrillii* (Becc) Becc; B. *Bentinkia nicobarica* (Kurz) Becc; C. *Bismarkia nobilis* Hildebrandt and H Wendt; D. *Caryota mitis* Lour; E. *Corypha umbraculifera* L; F. *Crytostachys renda* Blume; G. *Dypsis decaryi* (Hodel) Beentje & J Dransf; H. *Hyophorbe verschaffeltii* H A Wendt; I. *Licuala kunstleri* Beccari

Figure No. 2 Photographs of some unique palms found in Ahmedabad.

Identification

The photographs of palms were identified with the help of documented literature (Cooke 1907, McCurrach, 1960; Shah, 1978; D. & E. Ellison, 2001 and Riffle, 2008) available in the library of Department of Botany, Gujarat University and Serenity Library in Ahmedabad. The identification was also confirmed by matching with authentically identified photographs of palms from online websites (<http://www.MBPalms.org>; <http://www.identifiedcommonlycultivatedpalms.com>). Photograph of palms were captured with digital camera (Nikon D70s, lens Nikon AF NIKOL/70/ 300mm).

RESULT

During the study 71 species listed in Table No. 1 which are cultivated and wild in Ahmedabad.

DISCUSSION

In the present study 71 species of palms were noted belonging to 38 genera and 7 cultivated varieties. 25 genera and 61 species were not reported earlier from Ahmedabad District which bold marked in Table 1 and selected ones are shown in Plate 1. In the present study 12 palms were reported as indigenous and endemic to India, which are which are speared over the Eastern Himalaya, Western Ghats and Andaman and Nicobar Islands. Other palms were introduced from the Madagascar, Philippines, Mexico, Indochina, Myanmar, Thailand, etc. Most of palms found in Ahmedabad were introduced from Madagascar. Now all these palms were introduced for indoor and outdoor gardening in malls, hospitals, industries, institutes and other private gardens.

CONCLUSION

Palms “Princess of Plants” called by (Carl Linnaeus) are the most beautiful forms used for gardening, landscaping and ornamental display all around the world. Limited work has been carried out on palms of Ahmedabad and hence less species are reported, because of limited exploration. In the present study, 71 species and 7 cultivated varieties belonging to 38 genera were documented with photographs. Among them 25 genera, 54 species and 7 varieties were introduced from various part of India and other countries.

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