

**Research Article**

**LIVING CYCADS IN INDIA: PRELIMINARY REPORT**

**Masood Akhtar<sup>1</sup>, \*Praveen K. Agrawal<sup>1</sup> & R C Srivastava<sup>2</sup>**

*Department of Botany, Shibli National P.G. College, Azamgarh, Uttar Pradesh-276001*

<sup>2</sup>*Retd. Scientist, Botanical Survey of India, Kolkata (WB), India*

*\*Author for Correspondence: agrawalpk2015@gmail.com*

**ABSTRACT**

Present paper throws light on the present status of Indian Cycads (Cycadaceae *s s*). Present studies revealed that the family Cycadaceae (*s s*) is represented in India by 15 species which are enumerated in this paper. Accepted name followed by basionym / synonym with citation, distribution and notes on status of some taxa is given.

**Key words:** *Gymnosperm, Cycads, Cycadales, Cycadaceae (s s), Cycas, Taxonomic Status*

**INTRODUCTION**

The Genus *Cycas* L. is type genus of family Cycadaceae of Gymnosperms. It is native to the old world, with maximum species concentration around the equatorial region- eastern and southeastern Asia including Philippines, eastern Africa, northern Australia, Polynesia and Micronesia. The first species of *Cycas* described was *Cycas circinalis* L. from India (Linnaeus 1753).

Lindstrom and Hill (2000) recognized 8 species in India while Singh & Srivastava recognized 14 species (including *C. revoluta*) growing in India. Present study revealed the occurrence of 15 species distributed in the Southern Western Ghats, Karnataka, Eastern Ghats and North-eastern states of India extending up to Andaman and Nicobar Islands including 1 species (*C revoluta*), which is native to Japan is grown in gardens almost throughout the country. The cycads are dioecious and very slow-growing plants; as a result they are getting extremely rare in the natural habitat.

**MATERIALS AND METHODS**

During the course of studies on genus *Cycas* L. (Cycadaceae) in India, we have conducted survey and explorations in different area of the country. Specimens of *Cycas* in different Herbaria of country were examined and relevant literature (Laubenfels & Adema,1998; Hill, 1995; Lindstrom & Hill, 2002; Linnaeus,1753;Lindstrom& Hill 2007; Pant, Singh & Chauhan 1994; Pant ,2002; Prasad, Raman, Rao & Sanjappa, 2015; Reddy, Rao, Pattanaik, Reddy & Raju, 2007; Rao, Babu, Khadan & Ganeshaiyah,2009; Rao, Prasa, Babu, Prasad & Prasanna, 2016; Singh & Mishra, 2017; Singh & Srivastava, 2013; Srivastava & Chuhan, 2004; Srivastava & Chuhan 2006; Srivastava, 1993; Srivastava, 2014; Srivastava & Singh, 2015; Singh & Radha, 2006; Singh, Radha & Sharma, 2007; Singh, Rita & Radha, 2008; Singh, Radha & Khurajiam, 2015; Swamy, 1948; Schuster, 1932; Thiselton-Dyer,1885; Whitelock, 2002) were critically scrutinized.

**RESULTS**

From the present studies, it is concluded that 15 species of Genus *Cycas* L. occur in India. These are enlisted below:

**1. *Cycas annaikalensis*** Rita Singh & P.Radha, *Brittonia* 58(2): 119-123, figs. 1-2. 2006;

[https://cycadlist.org/taxon.php?Taxon\\_ID=56](https://cycadlist.org/taxon.php?Taxon_ID=56)

**Distribution:** Kerala

**Red List Category:** Critically Endangered (CR)

**2. *Cycas beddomei*** Dyer, *Trans. Linn. Soc. London, Bot.* 2(5): 85-86, pl. 17. 1883;

[https://cycadlist.org/taxon.php?Taxon\\_ID=67](https://cycadlist.org/taxon.php?Taxon_ID=67)

*Cycas circinalis* var. *beddomei* (Dyer) J.Schust.

**Distribution:** Andhra Pradesh

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**Red List Category:** Critically Endangered (CR)

**3. *Cycas circinalis*** L., *Sp. Pl.* 2: 1188. 1753; [https://cycadlist.org/taxon.php?Taxon\\_ID=87](https://cycadlist.org/taxon.php?Taxon_ID=87)

*Cycas circinalis* f. *undulata* (Hort. ex Gaudich.) J.Schust.

*Cycas circinalis* var. *angustifolia* Miq.

*Cycas rumphii* f. *undulata* (Desf. ex Gaudich.) Kaneh.

*Cycas undulata* Desf. ex Gaudich.

*Cycas undulata* Desf. ex Gaudich. *Cycas wallichii* Miq. *Cycas circinalis* f. *circinalis* *Cycas circinalis* subsp. *circinalis* *Cycas circinalis* var. *circinalis*

*Cycas circinalis* subsp. *vera* var. *vera*

*Cycas circinalis* subsp. *vera* J.Schust.

**Distribution:** Andhra Pradesh, Karnataka, Kerala, Maharashtra, Tamilnadu.

**Red List Category:** Endangered (E)

**4. *Cycas darshii*** R.C.Srivast.&B.Jana, *Ind. Journal of Plant Sciences* 3(2):151-153.2014

**Distribution:** Andaman & Nicobar Islands, AJC Bose Indian Botanical Garden, Howrah.

**Red List Category:** Data Deficient (DD)

**5. *Cycas indica*** D D Pant ex A.Lindstr. &K.D.Hill, *Telopea* 11(4): 481-483, fig. 3. 2007;

[https://cycadlist.org/taxon.php?Taxon\\_ID=140](https://cycadlist.org/taxon.php?Taxon_ID=140)

*Cycasswamyi* Rita Singh & P.Radha *Cycas swamyi* D D Pant, *nom.nud*

**Distribution:** Karnataka

**Red List Category:** Data Deficient (DD)

**6. *Cycas nathorstii*** J.Schust., Engler, *Pflanzenr.* 99: 76, fig. 10e. 1932.

[https://cycadlist.org/taxon.php?Taxon\\_ID=172](https://cycadlist.org/taxon.php?Taxon_ID=172)

**Distribution:** Tamil nadu

**Red List Category:** Vulnerable (VU)

**7. *Cycas nayagarhensis*** Rita Singh, P.Radha & Khurajam, *Asian J. Conserv. Biol.* 4(1): 3-14, figs. 4-6.

2015; [https://cycadlist.org/taxon.php?Taxon\\_ID=674](https://cycadlist.org/taxon.php?Taxon_ID=674)

**Distribution:** Odisha

**Red List Category:** Data Deficient (DD)

**8. *Cycas orixensis*** (Haines) Rita Singh & Khurajam, *Asian J. Conserv. Biol.* 4(1): 3-14, figs. 1-

3. 2015; [https://cycadlist.org/taxon.php?Taxon\\_ID=673](https://cycadlist.org/taxon.php?Taxon_ID=673)

**Distribution:** Odisha

**Red List Category:** Data Deficient (DD)

**9. *Cycas pectinata*** Buch.-Ham., Mem. Wern. *Nat. Hist. Soc.* 5(2): 322-323. 1826;

[https://cycadlist.org/taxon.php?Taxon\\_ID=183](https://cycadlist.org/taxon.php?Taxon_ID=183)

*Cycas circinalis* subsp. *vera* var. *pectinata* (Griff.) J.Schust.

*Cycas jenkinsiana* Griff.

*Cycas pectinata* var. *pectinata*

**Distribution:** Assam, Manipur, Meghalaya, Sikkim, West Bengal.

**Red List Category:** Vulnerable (VU)

**10. *Cycas pschannae*** R. C.Srivast. & L. J. Singh, *Int. J. Curr. Res. Biosci. Plant Biol.* 2 (8): 35-37.

2015,

**Distribution:** Andaman & Nicobar Islands. Planted in AJCB IBG, Shibpur, Howrah (WB).

**Red List Category:** Data Deficient (DD)

*Cycas andaemanica* K. Prasad, M.V. Ramana, Sanjappa & B.R.P. Rao

*Cycas dharmrajii* L.J. Singh

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**Figure:** *Cycas annaikalensis* Singh & Radha (1a, 1b); *Cycas beddomei* Dyer (2a, 2b); *Cycas circinalis* L. (3a, 3b); *Cycas darshii* R.C. Srivast. & B.Jana (4a, 4b); *Cycas indica* Lindstr. & Hill (5a); *Cycas nathorstii* J. Schust. (6a, 6b); *Cycas nayagarhensis* Singh, Radha & Khuraijam (7a, 7b, 7c); *Cycas orixensis* (Haines) Singh & Khuraijam (8a, 8b); *Cycas pectinata* Buch.-Ham. (9a, 9b); *Cycas revoluta* Thunb. (10a, 10b); *Cycas seshachalamensis* Rao et. al. (11a, 11b); *Cycas sainathii* R.C. Srivast. (12a, 12b); *Cycas sphaerica* Roxb. (13a, 13b); *Cycas zeylanica* (J. Schust.) Lindstr. & Hill (14a, 14b); *Cycas pschannae* Srivast. & Singh (15a). (Figure Source: <http://www.bsienvs.nic.in>; Calonje et al. (2013-2018); University of Hawaii Botany Department (No date); <https://www.flowersofindia.net>; Authors cited in text and under reference)



**Figure 16: A Gaint *Cycas sainathii* tree at Saharanpur Botanical Garden, Saharanpur**



**Figure 17: Adventitious (Coralloid?) Roots on the horizontally lying trunk of *Cycas sainathii* at Saharanpur Botanical Garden, Saharanpur**

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**11. *Cycas revoluta*** Thunb., Verh. Holl. MaatschWeetensch. *Haarlem* 20(2): 424, 426-427.1782. [https://cycadlist.org/taxon.php?Taxon\\_ID=191](https://cycadlist.org/taxon.php?Taxon_ID=191)

*Cycas revoluta* var. *planifolia* Miq. *Cycas revoluta* var. *prolifera* Siebold & Zucc. *Cycas revoluta* var. *robusta* Messeri *Epicycasmiquelii* (Warb.) de Laub. *Cycas revoluta* var. *revoluta*

**Distribution:** A native of Japan. Introduced in India as ornamental plant but still restricted to gardens; No wild population recorded so far from India.

**Red List Category:** Data Deficient (DD)

**12. *Cycas seshachalamensis*** P.V.C.Rao, N.V.S.Prasad, P.M.Babu, K.Prasad & Prasanna, *Asian J. Conservation Biol.* 5(1): 55-58, figs. 1-2. 2016; [https://cycadlist.org/taxon.php?Taxon\\_ID=815](https://cycadlist.org/taxon.php?Taxon_ID=815)

**Distribution:** Andhra Pradesh (Tirupati Circle).

**Red List Category:** Data Deficient (DD)

**13. *Cycas sainathii*** R.C.Srivast. *Indian J. Pl. Sci.* [Jaipur] 3(1): 109-110, pl. 1. 2014; [https://cycadlist.org/taxon.php?Taxon\\_ID=595](https://cycadlist.org/taxon.php?Taxon_ID=595)

**Distribution:** Andaman & Nicobar Islands. Planted in AJCB IBG, Shibpur, Howrah (WB) and Saharanpur Botanical Garden (UP)

**Red List Category:** Data Deficient (DD)

**14. *Cycas sphaerica*** Roxb., *Fl. Ind.* (Roxburgh) 3: 747. 1832; [https://cycadlist.org/taxon.php?Taxon\\_ID=217](https://cycadlist.org/taxon.php?Taxon_ID=217)

**Distribution:** Andhra Pradesh, Karnataka, Odisha, Tamilnadu.

**Red List Category:** Data Deficient (DD)

**15. *Cycas zeylanica*** (J.Schust.) A.Lindstr. & K.D.Hill, *Novon* 12(2): 238. 2002; [https://cycadlist.org/taxon.php?Taxon\\_ID=241](https://cycadlist.org/taxon.php?Taxon_ID=241)

*Cycas rumphii* subsp. *zeylanica* J. Schust.

**Distribution:** Sri Lanka, India (Andaman & Nicobar Islands)

**Red List Category:** Vulnerable (VU)

### DISCUSSION

*Cycas swamyi* was actually discovered and described in his book (Pant, 2002) by the world famous Cycadologist Prof. DD. Pant. Later on Srivastava and Chauhan (2004) also published notes on *Cycas swamyi* but no one published it as per ICBN (now ICN) rules. However, Lindstrom & Hill(2007) examined 3 specimens deposited in K, BM & E herbaria giving it a new name *Cycas indica* Lindstrom and Hill (Lindstrom and Hill, 2007), which as per extant rules, is the accepted name. We feel that it should have been published as *Cycas swamyi* Pant ex Lindstrom and Hill.

Confusion exist around *Cycas nayagarhensis* Rita et al. and *Cycas orixensis* Rita et al. The world lists of cycads treat the *Cycas nayagarhensis* Rita et al. and *Cycas orixensis* Rita et al. separately, (Calonje M, Stevenson DW, Stanberg L. The World List of Cycads, Online edition [Internet] 2013-2018. [Cited 2018 Oct 11]. Available from: <http://www.cycadlist.org>), while as per IUCN database *Cycas orixensis* (*Cycas circinalis* L. ssp. *orixensis* Haines) has been kept under synonyms of *Cycas sphaerica* Roxb., but at the same time *Cycascircinalis* var. *orixensis* Haines has been kept under synonymy of *Cycas nayagarhensis*. The voucher specimens collected by the authors of *Cycas nayagarhensis* are not available for study. This needs a comprehensive comparative study of all the type specimens of *C. sphaerica*, *C. orixensis* and *C. nayagarhensis*. Further, it cannot be claimed authentically that plant having male cone with forked apices of microsporophyll, belong to the same species, whose female plants and megasporophyll are different. Present authors tried to work out molecular aspects of the species under this complex under joint collaboration with Prof. Raout of Utkal University; but there is no response from him till date about the fate of samples taken by him.

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Ramana *et al.* (2018m) tried to discuss name confusions in Indian Cycads but did not include their own species viz., *C. andamanica* Ramana *et al.*

However, with the specimens available in different herbaria of the country, available literature and field observations across the country, the present checklist is being presented.

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