

Short Communication

Diversity status of the family, Euphorbiaceae in about 30 km radius of Kudankulam Nuclear Power Project area, Southern India

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A detailed Euphorbiaceae flora study was carried out from 30 km radius of Kudankulam Nuclear Power Project area. The survey was conducted from September 2012 to August 2013. A total of 32 species under 12 genera belonging to the family Euphorbiaceae were collected and identified. For each species, botanical name, local name, life-form, habitat and flowering season were mentioned. A statistical summary is presented at the end of the checklist. The area shows a high diversity in its terrestrial flora and has an important role in the conservation of biodiversity of the region.

Key words: Euphorbiaceae, life-form, conservation, Nuclear Power Project, Kudankulam.

INTRODUCTION

Euphorbiaceae is composed of 334 genera (Webster, 1994) and over 8,000 species (Radcliffe Smith, 2001) as shown in some previous work worldwide (Govaerts et al., 2000; Balakrishnan and Chakrabarty, 2007). The earliest floristic exploration of the Tirunelveli and Kanyakumari region floras was undertaken in the last century (Beddome, 1877; Lawson, 1894). Most of the existing studies in the Agastyamalai region pertain to the floristic enumerations from the Kanniyakumari, Tirunelveli (Lawrence, 1959, 1960; Nayar, 1959; Sankaranarayanan, 1960; Subramanyam and Henry, 1973; Rao et al., 1974; Sharma et al., 1973). Vanila (2003) collected 793 species from 416 genera

belonging to 102 families. Uthayakumari Kalavathy (2004) recorded 412 species of monocotyledons belonging to 185 genera and 26 families from Tirunelveli hills and Jothi (2001) described the Euphorbiaceae floristic enumerations from the Tirunelveli hills. Biological diversity is now increasingly recognized as a vital parameter to assess global and local environmental changes and sustainability of developmental activities. Summarily, the study aims to provide the taxonomic diversity of Euphorbiaceae as part of the environment impact assessment studies undertaken on biodiversity around Kudankulam Nuclear Power Plant area in Radhapuram taluk of Tirunelveli

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Table 1. Diversity status of Euphorbiaceous plants in KKNPP site.

Genera and species	Local name	Habit	Flowering season	Status	Habitat
<i>Acalypha amentacea</i> Roxb.		S	Throughout the year	Rare	SJ
<i>Acalypha ciliata</i> Forssk.		H	September to January	Frequent	SJ
<i>Acalypha hispida</i> Burm.f.		S	Throughout the year	Common	O
<i>Acalypha indica</i> L.	Kuppaimeni	H	July to March	Common	P, W
<i>Acalypha paniculata</i> Miq.		H	Throughout the year	Common	W
<i>Acalypha wilkesiana</i> Müll.Arg.		S	Throughout the year	Common	O
<i>Breynia retusa</i> (Dennst.) Alston		S	Throughout the year	Common	SJ
<i>Codiaeum variegatum</i> (L.) Juss.		S	Throughout the year	Common	O
<i>Croton bonplandianus</i> Baill.	Mannannai chedi	H	Throughout the year	Common	P
<i>Euphorbia antiquorum</i> L.	Sadurakalli	S	January to April	Common	P, SJ
<i>Euphorbia heterophylla</i> L.	Paal perukki	H	October to March	Frequent	CF
<i>Euphorbia heyneana</i> subsp. <i>galioides</i> (Boiss.) Panigrahi		H	Throughout the year	Rare	SJ
<i>Euphorbia hirta</i> L.	Ammanpatchaiarisi	H	Throughout the year	Frequent	CF
<i>Euphorbia ingens</i> E.Mey. ex Boiss.		S	Throughout the year	Frequent	P, SJ
<i>Euphorbia rosea</i> Retz.		H	Throughout the year	Common	SJ
<i>Euphorbia thymifolia</i> L.	Sitrapaladai	H	Throughout the year	Common	SD
<i>Euphorbia tirucalli</i> L.	Thirukalli	S	Throughout the year	Common	SJ
<i>Euphorbia tithymaloides</i> L.		S	Throughout the year	Common	O
<i>Euphorbia tortilis</i> Rottler ex Ainslie	Thirukalli	S	January to February	Common	SJ
<i>Euphorbia umbellata</i> (Pax) Bruyn		S	August to March	Common	P, SJ
<i>Flueggea leucopyrus</i> Willd.	Pulachi	S	June to November	Common	P, SJ
<i>Hevea brasiliensis</i> (Willd. ex A.Juss.) Müll.Arg.	Rupper maram	T	Throughout the year	Common	C
<i>Jatropha curcas</i> L.	Kattuamanaku	S	Throughout the year	Common	P, SJ
<i>Jatropha glandulifera</i> Roxb.	Vellai kattuamanaku	S	Throughout the year	Common	W
<i>Jatropha gossypifolia</i> L.	Kattuamanaku	S	Throughout the year	Common	P, SJ
<i>Jatropha integerrima</i> Jacq.		S	Throughout the year	Rare	SJ
<i>Jatropha maheswaraii</i> Subram. & Nayar	Athalai	S	December to January	Endemic	S, P, SJ
<i>Jatropha multifida</i> L.		S	Throughout the year	Common	O
<i>Manihot esculenta</i> Crantz	Mara valli	S	Throughout the year	Common	C
<i>Microstachys chamaelea</i> (L.) Müll.Arg.		H	Throughout the year	Common	SJ, W
<i>Ricinus communis</i> L.	Amanakku	S	October to March	Common	C
<i>Tragia involucrata</i> L. var. <i>involucrate</i>	Senthatti	H	Throughout the year	Common	P, SJ

Sandy (S), wetland (W), scrub jungle (SJ), cultivated field (CF), cultivated (C), sand dune (SD), plains (P) and ornamental (O).

district, Tamil Nadu.

MATERIALS AND METHODS

Study area

The site for Kudankulam Nuclear Power Project (KKNPP) is situated in Kudankulam Village, Tirunelveli district, Tamil Nadu, India. The site is on the shore of the Gulf of Mannar and is located near the South eastern tip of India. The study area covered is 30 km radius of KKNPP. The study area lies between latitudes 8° 5' to 8° 28' of North and longitudes 77° 28' to 77° 57' of East in the terrestrial region including fresh water and wetlands. The nearest village to the site is Kudankulam and Idinthakarai. The study area covered Radhapuram in Tirunelveli district, Agasteeswaram and

Thovalai taluks in Kanyakumari district, Tamil Nadu. The east of the KKNPP is lined up by the seashore of Gulf of Mannar and the north, west and south are bound by land (Tirunelveli district) (Table 1).

The Plant Site Boundary Wall Layout of the site area is presented in Figure 1. The common habitats of terrestrial, hydrophytes and marshy vegetation are in the plains, coastal dune, shrub jungle, dry deciduous forest, ponds, tanks, rivers, canal banks, ditches, rice fields and low-lying waterlogged areas are ideal habitats for many terrestrial, aquatic, semi aquatic wetland and marsh plants.

Method

Frequent field surveys were carried out in about 30 radius of Kudankulam Nuclear Power Project during September 2012 to August 2013. Diversity of each species and their distribution in Gulf

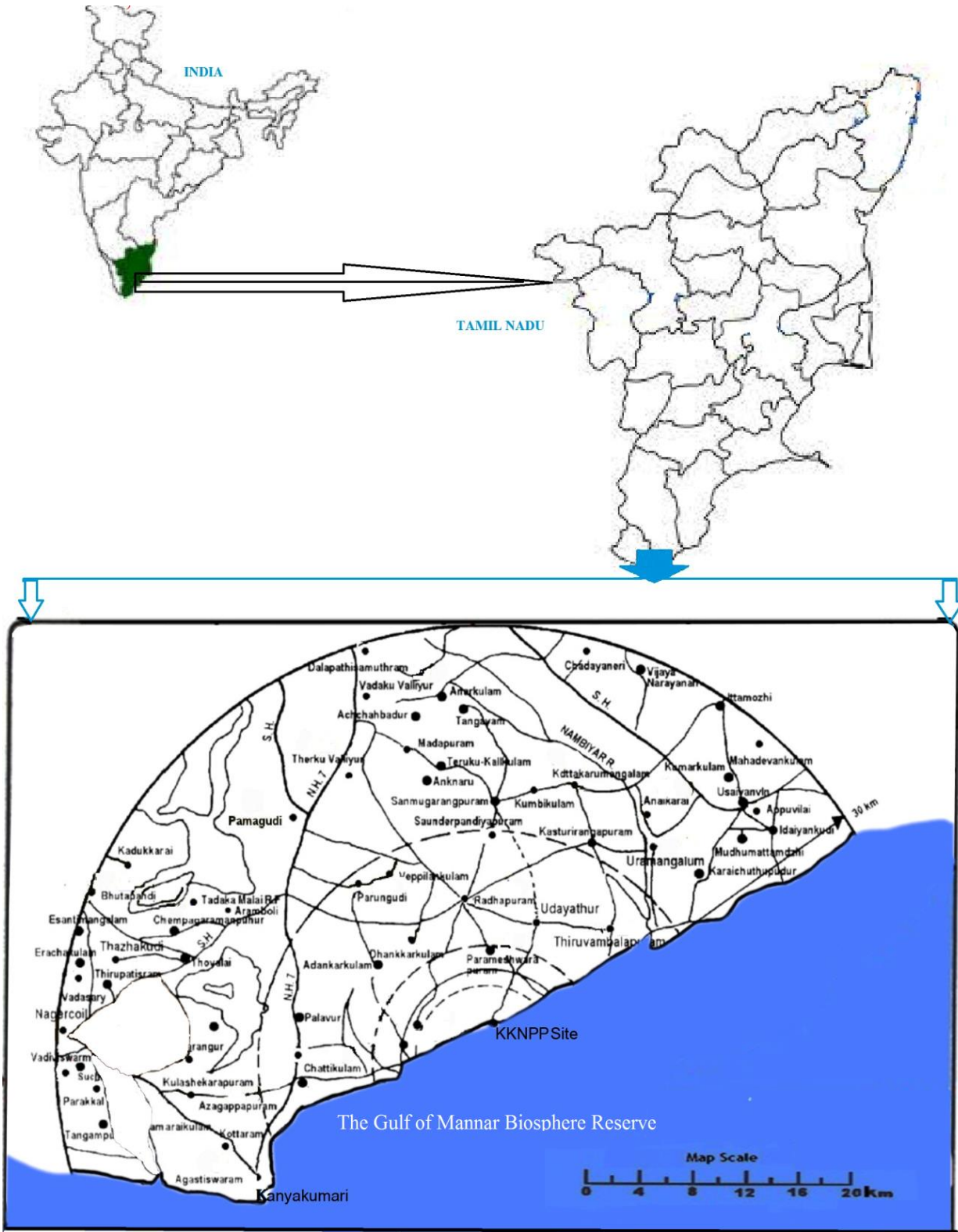


Figure 1. Location map of about 30 km radius of Kudankulam Nuclear Power Project area in Tamil Nadu, southern India.

of Mannar Biosphere Reserve was determined by the Flora of Gulf of Mannar Biosphere Reserve (Daniel and Umamaeswari, 2001).

The endemic and rare status of plant was determined using the published flora of Daniel and Umamaeswari (2001). The entire

specimen was cross checked from Sri Paramakalyani Centre for Excellence in Environmental Science herbarium, Alwarkuruchi, Tamil Nadu (India).

RESULTS AND DISCUSSION

Euphorbiaceae is the third largest family with 32 species of plants belonging to 12 genera and considered as one of the best represented families of about 30 km radius of Kudankulam Nuclear Power Project area.

The earliest floristic exploration of the Tirunelveli and Kanyakumari region floras was undertaken in the last century (Beddome, 1877; Lawson, 1894). Most of the existing studies in the Agasthyamalai region pertain to the floristic enumerations from the Kanniyakumari, Tirunelveli (Lawrence, 1959; 1960; Nayar, 1959; Sankaranarayanan, 1960; Subramanyam and Henry, 1973; Sharma et al., 1973; Rao et al., 1975). Vanila (2003) collected 793 species from 416 genera belonging to 102 families. Uthayakumari Kalavathy (2004) recorded 412 species of monocotyledons belonging to 185 genera and 26 families from Tirunelveli hills. But, Jothi (2001) described the Euphorbiaceae floristic enumerations from the Tirunelveli hills and also intraspecific variation in some species of Euphorbiaceae from Tirunelveli hills (Jothi and Manickam, 2005). Ayyanar and Ignacimuthu (2010) studied diversity, conservation status and medicinal plants of the family euphorbiaceae in Tirunelveli Hills. *Jatropha maheswarii* Subr. & Nayar is found in Gulf of Mannar Biosphere Reserve and identified as strict endemic plants (Daniel and Umamaeswari, 2001).

Conclusion

KKNPP area has great diversity of plants with varied economic importance and most of the species are locally threatened (Table 1). Sand quarrying in major parts of the coastal dune area has resulted in geomorphological changes only to the disadvantage of the people around there. This has become a social problem leading to clash between communities in the mainland coast where there is sand mining for quartz. Some of the threats like heavy influence of plain land converted for housing development, construction activities adversely affected the existing ecosystem. *J. maheswarii* Subr. & Nayar is one of the important medicinal floras. This species should be conservation need.

Conflict of Interest

The authors did not declare any conflict of interest.

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REFERENCES

- Ayyanar M, Ignacimuthu S (2010). Diversity, Conservation Status and Medicinal Plants of the Family Euphorbiaceae in Tirunelveli Hills, Southern India. *J. Exp. Sci.* 1(6):12-16.
- Beddome RH (1877). The forest and flora of Tinnevely district. *The Indian Forester* 3:19-25.
- Daniel P, Umamaheswari P (2001). *The Flora of Gulf of Mannar. Southern India*. Botanical Survey of India.
- Jothi J (2001). Floristic diversity of Euphorbiaceae in Tirunelveli hills, Ph.D thesis, St. Xaviers College, Palayamkottai, Tirunelveli, Tamil Nadu, India.
- Jothi GJ, Manickam VS (2005). Intraspecific variation in some species of Euphorbiaceae from Tirunelveli hills of southern western ghats, Tamil Nadu. *Trop. Ecol.* 46(2):145-150.
- Lawrence CA (1959). Observations on the flora of Marunduvamalai, Cape Comorin. *J. Bombay Nat. Hist. Soc.* 56:95-100.
- Lawrence CA (1960). The vegetation of Kanyakumari district, Cape Comorin. *J. Bombay Nat. Hist. Soc.* 57:184-195.
- Lawson MA (1894). Notes of a tour in Travancore etc. *Records Bot. Surv. India* 1:58-60.
- Nayar MP (1959). The vegetation of Kanyakumari, Kanyakumari district. *Bulletin of the Botanical Survey of India* 1:122-126.
- Radcliffe-Smith A (2001). Genera Euphorbiacearum. *Royal Botanic Gardens, Kew.* 464.
- Rao TA, Sastry ARK, Basu P, Mandal NR (1975). A contribution to the coastal flora and vegetation of Tamil Nadu (India). *Indian For.* 101(8):460-475.
- Sankaranarayanan KA (1960). The vegetation of Tirunelveli district, *J. Indian Bot. Soc.* 39:474-479.
- Sharma BD, Shetty BV, Karthikeyan S, Chandrabose M (1973). Studies on the vascular flora of Mahendragiri hill and the surrounding regions, Kanyakumari and Tirunelveli districts, Tamil Nadu. *Bull. Bot. Surv. India* 15:45-70.
- Subramanyam K, Henry AN (1973). The vegetation of Agasthyamalai hills and surrounding regions in Tirunelveli district, Tamil Nadu. *Proceedings of 22th Indian Science Congress III*, 340p.
- Uthayakumari Kalavathy (2004). Taxonomic studies of the monocots of Tirunelveli hills, Ph.D thesis. St. Xaviers College, Palayamkottai, Tirunelveli, Tamil Nadu, India.
- Vanila D (2003). Floristic diversity of Tirunelveli plains, Tamil Nadu, Ph.D thesis. St. Xaviers college, Palayamkottai, Tirunelveli, Tamil Nadu, India.
- Webster GL (1994). Synopsis of the genera and suprageneric taxa of Euphorbiaceae. *Ann. Missouri Bot. Gard.* 81:33-144.
- Balakrishnan NP, Chakrabarty T (2007). The Family Euphorbiaceae in India: A Synopsis of its Profile, Taxonomy and Bibliography. Bishen Singh Mahendra Pal Singh, Dehradun.
- Govaerts R, Frodin DG, Radcliffe-Smith A (2000). World Checklist and Bibliography of Euphorbiaceae (and Pandaceae). Vol. 1-4. Royal Botanic Gardens, Kew. pp. 1-1622.