



***Euphorbia clarkeana* Hook. f.: New Addition to the Flora of Allahabad District, Uttar Pradesh, India**

Satya Narain* and Renu**

*Professor, Duthie herbarium, Department of Botany, University of Allahabad, (Uttar Pradesh), INDIA.

**Ph. D. student, Duthie Herbarium, Department of Botany, University of Allahabad, (Uttar Pradesh), INDIA.

(Corresponding author: Renu)

(Received 14 September, 2017 accepted 07 October, 2017)

(Published by Research Trend, Website: www.researchtrend.net)

ABSTRACT: The present paper deals with addition of genus *Euphorbia clarkeana* Hook. f. to the flora of Allahabad district, Uttar Pradesh. A detailed description, updated citation, phenology, habit, distribution & photographs are provided.

Keywords: Euphorbiaceae, Flora, *Euphorbia clarkeana* Hook. f., Allahabad, Uttar Pradesh.

I. INTRODUCTION

Euphorbia L. is largest and diverse genera of the family Euphorbiaceae. It is predominantly cosmopolitan, mainly in tropical, subtropical and warm temperate regions of the world, comprises of about 2000 species. Flora of British India (Hook. f. 1887) [7] represented by 52 species while 82 species includes in Flora of India (Balakrishnan *et al.* 2012) [2]. Flora of Upper Gangetic Plain (Duthie 1903-192) [6] includes 17 species and 39 species in the checklist of Uttar Pradesh (Khanna, 1999) [10]. Flora of Allahabad district of Uttar Pradesh (Misra & Verma, 1992) [12] includes 11 species. On critical examination and perusal of relevant literature, it was reported by earlier workers like (Duthie, 1915; Cooke, 1958; Maheshwari, 1963; Stewart, 1972; Sharma & Tiagi 1979; Kashyap, 1980; Sharma & Kachroo, 1981; Radcliffe-Smith, 1986; Bhandari, 1990; Sharma & Dhakre, 1995; Balakrishnan & Chakrabarty, 2007; Binoj Kumar & Balakrishnan, 2010; Balakrishnan *et al.* 2012) [1-5, 11, 13-17]. During Floristic reinvestigation in Uttar Pradesh, *Euphorbia clarkeana* Hook. f. was collected from Shankergarh in Allahabad district & it was found new addition to flora of Allahabad (Misra & Verma, 1992). Allahabad district is located between 24°47' & 25°47' N latitude and 81°09' & 82°21' E longitude. Several field trips were organised during the year 2015-2017 for the study of family Euphorbiaceae in district Allahabad of Uttar Pradesh. Localities and other necessary field information were recorded in field diary. The specimens were identified with the help of various floras and online herbarium specimen of Royal Botanical Garden, Kew, England. Voucher specimens are recorded with their name, place, date and made herbarium by standard methodology (Jain & Rao, 1977)

[8]. These herbarium specimens were deposited at Duthie Herbarium, Department of Botany, University of Allahabad, Allahabad. The paper includes current valid name, up to date citation, detail description, habitat, phenology, ecology, distribution, and photographs.

II. KEY TO SPECIES

- 1a. Plants densely hispid-villous hairy - *E. granulata*
 - 1b. Plants glabrous or sparsely hairy- 2
 - 2a. Plants prostrate; limbs of glands of same size as the glands - *E. clarkeana*
 - 2b. Plants erect; limbs of glands larger than glands - *E. jodhpurensis*
- Euphorbia clarkeana* Hook. f.**, Fl. Brit. India 5: 253. 1887; *Chamaesyce clarkeana* (Hook. f.) Sojak in Cas. Nar. Muz. (Prague) 140: 169. 1972.
- Annual herbs, prostrate, up to 25 cm high; stems branched, sparsely hairy; nodes annular; internodes 1-2 cm long. Leaves sessile, oblong, entire or denticulate towards apex along margins, oblique at base, obtuse or subacute at apex, 3-13 × 1-5 mm; leaves on main stems larger; glabrous; petioles 1 mm long; stipules 2 or 3-clefted, each further lacinate. Cyathia terminal or axillary, solitary or 2-3 together on microphyllous shoots; peduncles 1 mm long; involucre campanulate, glabrous; lobes triangular, hairy; glands 4, pinkish; limbs of glands minute. Male flowers: few; pedicels very short; anthers subglobose. Female flowers: gynophores 1 mm long; ovary 2 mm in diam., sparsely hairy; styles free, each bifid; stigma capitate. Fruits subglobose, obtusely keeled, 3 mm in diam., glabrous; seeds obovoid, quadrangular, smooth, reddish brown.



Fig. 1. *Euphorbia clarkeana* Hook.f.

Flowering & Fruiting: August –November

Habitat: Common in Cultivated fields and roadsides, in open areas, on moist sandy soil.

Distribution: Afghanistan and Pakistan. In India: Jammu & Kashmir, Himachal Pradesh, Punjab, Haryana, Delhi, Rajasthan, Andhra Pradesh and Uttar Pradesh.

Locality: Shankergarh (District Allahabad), Renu: 29138.

Specimen Examined: Online Herbarium Catalogue, Royal Botanical Garden, Kew, England. Barcode ID. K000246193, S. coll.: 23310 A, India.

III. DISCUSSION

Euphorbia clarkeana Hook. f. is morphologically closely related to the *Euphorbia granulata* Forssk. and *Euphorbia jodhpurensis* Blatt. & Hallb. The characteristic feature of identification of these plants is presence of leaves on main stems distinctly larger than those elsewhere. *Euphorbia granulata* Forssk. is different from other two species due to presence of hairs. *Euphorbia clarkeana* hook. f. is confused with *Euphorbia jodhpurensis* Blatt. & Hallb. due to its morphological similarities, however it can be distinguish by its habit and limbs of glands. *Euphorbia clarkeana* hook. f. is prostrate and limbs of glands of same size as the glands whereas *Euphorbia*

jodhpurensis Blatt. & Hallb. is erect in habit and limbs of glands larger than the glands.

ACKNOWLEDGEMENTS

The authors are thankful to the Head, Department of Botany, University of Allahabad, and University Grant Commission for financial assistance. The authors are also thankful to the Dr. G. P. Sinha, Scientist-E and Head of office, Botanical Survey of India, Central circle, Allahabad for providing access to library and herbarium facilities.

REFERENCES

- [1]. Balakrishnan, N. P. & T. Chakrabarty. (2007). *The Family Euphorbiaceae in India. A synopsis of its profile, taxonomy and bibliography*. Bishen Singh, Mahendra Pal Singh, Dehradun.
- [2]. Balakrishnan, N. P., T. Chakrabarty, M. Sanjappa, P. Lakshminarsimhan & P. Singh. (2012). *Flora of India- Vol. 23*. Botanical Survey of India, Kolkata.
- [3]. Bhandari, M. M. (1990). *Flora of Indian Desert*. MPS Reports, Jodhpur.
- [4]. Binojkumar, M. S. & N. P. Balakrishnan. (2010). *The Genus Euphorbia L. (Euphorbiaceae) in India: A taxonomic revision*. Bishen Singh, Mahendra Pal Singh, Dehradun.
- [5]. Cooke, T. (1958). *The Flora of the Presidency of Bombay*. Vol. 3. Botanical Survey of India, Calcutta.

- [6]. Duthie, J. F. (1915). *Flora of the Upper Gangetic Plain and of the Adjacent Siwalik and Sub-Himalayan tracts*. Vol. 3. Govt. of India, Central Publication Branch, Calcutta.
- [7]. Hooker, J. D. (1887). "Euphorbiaceae" In J.D. Hooker's *Flora of British India*-Vol. 5. London.
- [8]. Jain, S. K. and R. R. Rao. 1977. *A Handbook of Field and herbarium Methods*. Today & Tomorrow's Printer Publisher, New Delhi.
- [9]. Kashyap, S. R. (1980). *Lahore district flora*. The University of the Punjab, Lahore.
- [10]. Khanna. K. K., V. Mudgal, B. P. Uniyal, & J. R. Sharma. (1999). *Dicotyledonous plants of Uttar Pradesh (A checklist)*. Bishan Singh, Mahendra Pal Singh, Dehradun.
- [11]. Maheshwari, J. K. (1963). *The Flora of Delhi*. Council of Scientific & Industrial Research, New Delhi.
- [12]. Misra, B. K. & B. K. Verma. (1992). *Flora of Allahabad district, Uttar Pradesh, India*. Bishen Singh, Mahendra Pal Singh, India.
- [13]. Radcliffe-Smith, A. (1986). "Euphorbiaceae" E. Nasir & S. I. Ali's *Flora of Pakistan*-Vol. 172. Department of Botany, University of Karachi, Pakistan.
- [14]. Sharma, A. K. & J. S. Dhakre. (1995). *Flora of Agra district*. Botanical Survey of India, Calcutta.
- [15]. Sharma, B. M and P. Kachroo. (1981). *Flora of Jammu and Plants of neighborhood* -Vol. 1. Bishen Singh Mahendra Pal Singh, Dehra Dun.
- [16]. Sharma, S. and B. Tiagi. (1979). *Flora of north-east Rajasthan*. Kalyani Publishers, New Delhi.
- [17]. Stewart, R. (1972). *An Annotated Catalogue of Vascular Plants of West Pakistan and Kashmir*. Fakhri Printing Press, Karachi, Pakistan.