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Flora of Outer Hills of Kashmir Himalayas (Jammu and Kashmir State) – Genus Euphorbia (*Euphorbiaceae*)

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I. INTRODUCTION

Euphorbia is the largest genus of family Euphorbiaceae comprises of over 2000 species. Members of this genus are found distributed in the diverse habitats of humid tropics, subtropics and temperate regions of the world. The vegetative and floral characters, inflorescence and latex facilitate the identity of species easy. Genus Euphorbia has been studied in the different district of Jammu and Kashmir but the complete enumeration of the genus is still wanting. Perusal of floristic literature indicates that Singh and Kachroo (1976), Sharma and Kachroo (1981), Swami and Gupta (1998) have studied the family Euphorbiaceae in their respective flora. Singh and Kachroo (1976) described five species from Srinagar, Kashmir. Sharma and Kachroo (1981) and Swami and Gupta (1998) described seven species from Jammu and Udhampur respectively. In the present communication the authors have described eight species from the outer hills of Kashmir Himalayas, of which Euphorbia orbiculata H. B. K. is new for the flora of Jammu and Kashmir State.

II. MATERIALS AND METHODS

Plant explorations were carried out in different seasons of the year at some selected sites in Jammu and Kashmir. This paper is based on the collection of angiosperm flora in general. The forays of two different types were undertaken round the year, the collection trips to distant places were of the duration of 3- 7 days. In between, brief trips of 1- 2 days durations were executed along or in the company of one or more helpers. In this way, it was possible to raise the collections from the different parts of the state. In the first year the collections were massive and in the subsequent years they reduced to solitary specimen. While collecting the plant specimens field numbers were allotted and relevant data about the plant was recorded in the field book. The specimens were carried to the Laboratory in the polythene bags, ruck-sacks or in plant press depending upon the length of trip and distance of the place of collection. The plants collected were pressed in the in wooden press wrapped in blotters. These specimens are changed frequently to reduce the discoloration of foliage and flowers and to avoid rotting. The dried specimens were mounted on the Herbarium sheets. Printed labels were pasted and relevant data was entered. These specimens were identified with the help of taxonomic literature.

III. KEY TO THE SPECIES OF EUPHORBIA L.

1. + Leaves opposite or whorled ---------- 2
 - Leaves alternate ---------- 7
2. + Upper leaves opposite or whorled ---------- 3
 - All leaves opposite ---------- 4
3. + Leaves obovate, spathulate, apex rounded; involucres with 4 yellow gland ---------- 5. *E. helioscopia*
 - Leaves elliptic, oblong-obovate; involucres with solitary greenish or coloured glands---------- 3. *E. geniculata*
4. + Ascending herbs; leaves more than 12 mm long ---------- 5
 - Prostrate herbs; leaves less than 12 mm long ---------- 6
5. + Hispidly hairy; glands reddish; limb very small to nearly obsolete ---------- 2. *E. hirta*
 - Glabrous to puberulous; glands greenish; limb conspicuous, white or pink---------- 4. *E. indica*
6. + Capsule pubescent at angles---------- 7. *E. prostrata*
 - Capsule glabrous all over ---------- 6. *E. obriculata*
7. + Capsule covered with conical worts ---------- 1. *E. cornigera*
 - Capsule not covered with conical warts -------- 8. *E. wallichii*

1. *Euphorbia cornigera* Boiss. in DC. Prodr. **15** (2) : 122. 1862; Stewart, *l.c.* 448. 1972; *E. pilosa* L. var. *cornigera* (Boiss.) Hooker f., FBI. **5** : 260-261. 1887.

Perennial, glabrous or pubescent herbs; stern several from woody base, 30-70 cm tall; leaves alternate, oblong, 3-10 x 0.5-1.8 cm, glabrous on both surfaces, margin entire, apex rounded, base cuneate; inflorescence umbellate; bracts ovate, lanceolate, rhomboid, suborbicular, apex rounded; involucre 5 toothed, glands yellow; margin rounded, entire; flowers of both the sexes present within an involucre; styles united half-way down, each 2-fid; fruits 3-lobed, covered with narrowlyconical processes; seeds ovoid, subglobose, smooth.

2. *E. hirta* L., Sp. Pl. 454. 1753; Stewart, Ann. Cata. Vasc. Pl. W. Pak. & Kashm. 449. 1972. *E. pilulifera* Sensu Boiss. in DC., Prodr. 15(2): 21. 1862; Hooker, f., FBI. 250. 1887 (non L. 1753).

Erect-ascending hispidly hairy herbs; stem herbaceous, branched, hairy, green, latex milky; leaves opposite, superposed, simple, subsessile, ovate, oblong or elliptic (Fig.104A), puberulous, base oblique or refuse, 10-35 x 5-15 mm, margin serrate; involucres subsessile, bearing appresscd hair without; cyathia aggregated into axillary clusters; each cyathium consists of 5 involucres, fused forming a cup, gland on inner side of bract (Fig. 1048), reddish; flowers of both sexes present within an involucre; single female flower in centre surrounded by many male flowers;

ovary tricarpellary syncarpous, superior, trilocular, styles 3, each bifid; fruit brown a capsule, transversely ribbed.

3. *E. geniculata* Orteg. Nov. Rar. Pl. Hort. Matr. Decad. 18. 1797; Sherff, Ann. Miss. Bot. Gardn. 25 : 72. 1937; Babu, Herb. Fl. DD. 459. 1977. *E. prunifolia Jacq*. Hort. Schoenbr. 3 : 15. 1798; Backer & Bakh. f., Fl. Java 2 : 502. 1965.

Erect, annual, glabrous or pubescent herbs, 30-80 cm tall; stem fistular, ribbed, branched towards the tip; leaves linear, lanceolate, elliptic-oblong, obovate, 2-10 x 0.5-7 cm, sparsely hairy on both surfaces, puberulous on margin; petiole 1-5 cm long; involucres upto 5 mm long, lobes 5, ovate, fimbriate; flowers of both sexes present within an involucre; fruits 3-lobed, smooth; seeds tuberculate.

4. *E. indica* Lam., Dict. Bot. 2: 423. 1786; Stewart, Ann. Cata. Vasc. Pl. W. Pak. & Kashm. 450/ 1972. *E. hypericifolia* Hooker f., FBI. 5: 259. 1887. p.p. (auct. non L.).

Annual herbs; stem weak, hollow, glabrous to puberulous, latex milky; leaves opposite, elliptic, upper surface glabrous, lower surface puberulous, margin entire or minutely dentate, 1.5-2.5 x 1-1.5 cm; cyathia terminal or axillary; involucres nearly glabrous, limb white or pink; glands 4-5; flowers of both sexes present within involucre; seeds reddish brown, transversely wrinkled.

5. *E. helioscopia* L., Sp. Pl. 459. 1753; Hooker f., FBI. 5; 262. 1887; Sharma & Kachroo, Fl. Jammu 1: 281. 1981.

Annual, erect glabrous herbs; stem 15-50 cm in height, latex milky, branched only towards tip, cauline leaves alternate, shortly stalked, obovate or oblong, spathulate, 1-5 cm, margin serrulate, green above, glaucous beneath; inflorescence umbellate; rays very short; involucres 4-toothed, glabrous; glands yellow, stiff, hairy towards top; flowers of both sexes present within an involucre; styles free; fruits depressed, globose, smooth; seeds 4-angled with coarsely reticulate surface.

6. *E. orbiculata* H.B.K. Nov. Gen. 2 ; 52. 1817; Raj & Panig in Taxon 17 : 547. 1968. *E. microphylla Heyne* in Roth. Nov. Pl. Sp. 227. 1821. non Lamk. 1786; Hooker f., FBI. 5 : 252. 1887. P.P.

Annual, prostrate, pubescent herb; stem several from base, upto 25 cm tall, hairy; leaves opposite, petiolate, glabrous above, sparsely hairy beneath in young leaves; stipule lanceolate subulate, hairy; inflorescence cyathium; involucre campanulate, glabrous, glands 4, minute, orbicular; flowers of both the sexes present within an involucre; capsule glabrous, quadrangular; seeds pinkish brown.

7. *E. prostrata* Ait., Hort. Kew ed. 1, 2: 139. 1779; Boiss. in DC. Prodr. 15(2): 47. 1862; Hooker f., FBI. 5: 266. 1887; Stewart, Ann. Cata. Vasc. Pl. W. Pak. & Kashm. 452. 1972.

Annual, prostrate herbs; stem weak, terete, puberulous or pubescent; leaves subsessile, ovate, oblong, apex rounded, base oblique, margin serrulate in upper half; stipule linear, lanceolate, rcmotely fimbriate; cyathia solitary, pedunculate; involucre campanulate or elongate, turbinate, glabrous or slightly puberulous; glands 4, red or purple, suborbicular; flowers of both the sexes present within an involucre; capsule subglobose, long stalked, trigonous, hairy on angles; seeds reddish-brown.

8. *E. wallichii* Hooker f., FBI. 5: 258. 1887; Stewart, Ann. Cata. Vasc. Pl. W. Pak. & Kashm. 453. 1972.

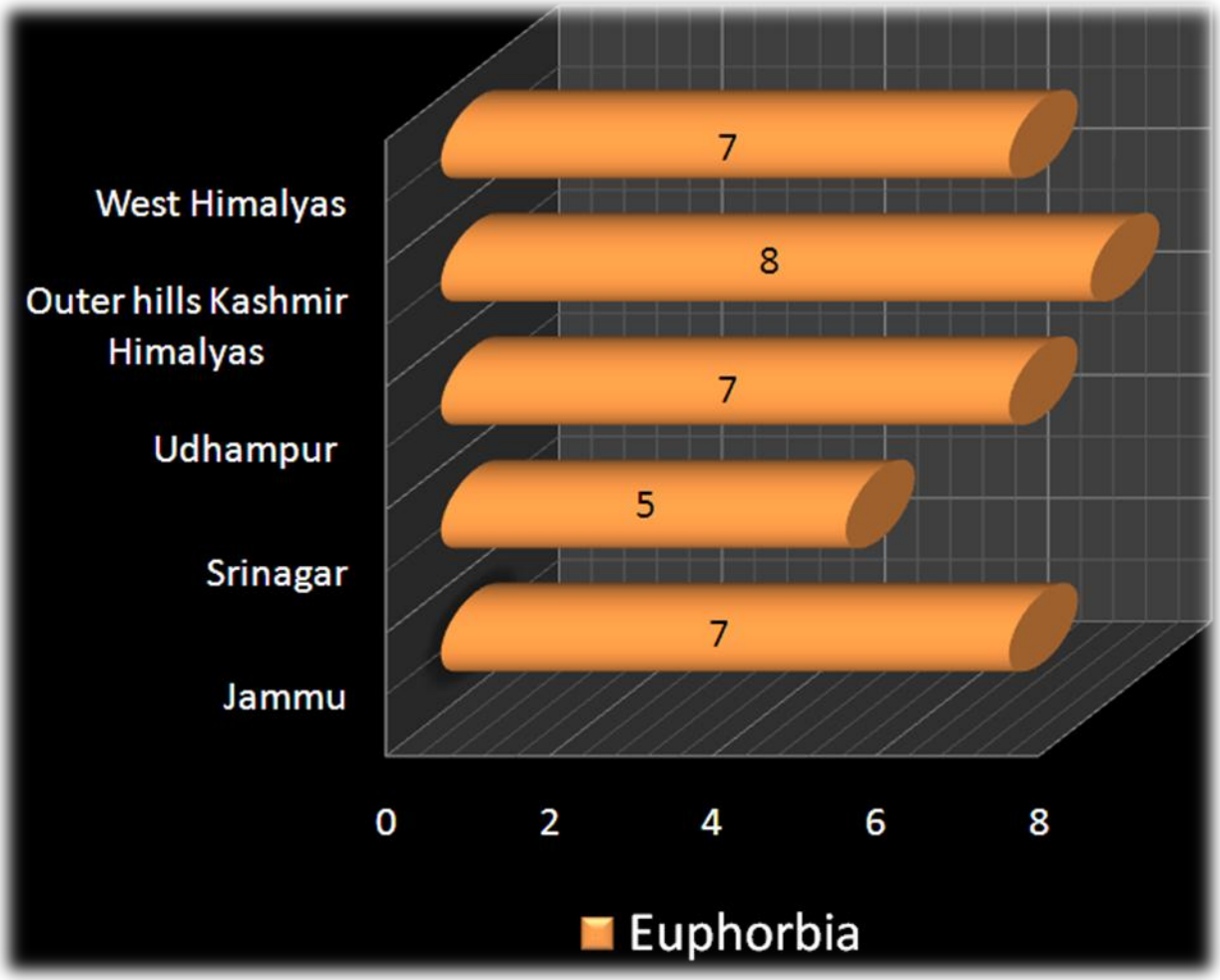
Annual or perennial erect herbs; root-stock woody; stem 30-70 cm in height, glabrous or pubescent; stem leaves alternate, sessile or subsessile, ovate, lanceolate, 3-10 x 1-3 cm, bright green or pale yellow beneath; cyathia pseudoumbellate, ray S-7; leaves of pseudoumbels 5-7, whorled, ovate, lanceolate, pale-yellow; ray leaves 3, yellow or greenish-yellow; cyathia sessile; glands transversely ovate, rounded or undulate; flowers of both the sexes present within an involucre; capsule 3-lobed, bearing crauncle not covered with conical warts.

IV. DISCUSSION

Species **of** *Euphorbia* have been studied by the different authors of regional floras of the State of Jammu and Kashmir. These include Singh and Kachroo (1976), Sharma and Kachroo (1981), Swami and Gupta (1998). As many as 7 species of *Euphorbia* have been described by Sharma and Kachroo (1981) in the flora of Jammu and plants of its neighbourhood and Swami and Gupta (1998) described 7 species from Udhampur district of Jammu and Kashmir State. Sigh and Kachroo reported reported 5 species from Srinagar, Kashmir.

V. CONCLUSION

The present author have reported 8 species from Outer hills of Kashmir Himalayas. Of these species *E. orbiculata* H. B. K. is new for the flora of Jammu And Kashmir State.



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