

A CONSPECTUS OF THE FAMILY ONAGRACEAE IN INDIA

T. K. PAUL

Botanical Survey of India, Howrah

ABSTRACT

The paper presents a concise account of Onagraceous plants in India. They are represented by 4 genera and 46 species. Five species of the genus *OENOTHERA*, an American genus, became naturalised, other 8 species are occasionally cultivated. The genus *CLARKIA* with 3 species and *FUCHSIA* with 8 species are cultivated. Of the hitherto known taxa of *EPILOBIUM* one species is relegated to synonymy, one new species has been added. Original citations, synonymy, reference to taxonomic revisions and Indian floras, types, distribution, ecological notes, phenology etc. have been provided. A key to the genera and species is given. A list of cultivated species has been added.

INTRODUCTION

C. B. Clarke in Hook.f., Flora British India (1889) first gave an account of the family Onagraceae of British India. In his treatment there were 5 genera viz., *EPILOBIUM* (12 species), *JUSSIAEA* (2 species), *LUDWIGIA* (2 species), *CIRCAEA* (3 species) and *TRAPA* (2 species). In the present political boundary of India a number of additions and deletions of several species in the family have taken place. The genus *TRAPA* is now under the family Trapaceae. Some exotic species became naturalised and are now part of the Indian flora. So, a systematic study of the family Onagraceae of India is needed. Here in this paper an account of this family with respect

to enumeration, synonymy and distribution is given. A key to genera, species and subspecies has been given for field identification. Specimens extant in the herbaria like CAL, BSIS, BSD, ASSAM, MH, DD have been studied as well as a number of fresh collections have been examined. Type specimens/photos have also been examined. Current nomenclature has been given. Indian distributions are worked out on the basis of authentic records of occurrence, phenology as well as ecological notes of each species. Genera and species are arranged in alphabetical order. Citation of specimens is kept restricted for economy of space.

KEY TO THE GENERA

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|-----|---|-----|---------------------|
| 1a. | Sepals 2 ; capsule covered with stiff hooked hairs, 1 - 2 seeded | ... | 1. <i>CIRCAEA</i> |
| b. | Sepals 4-5 ; capsule without any hooked hair, many-seeded | ... | 2 |
| 2a. | Sepals persistent in fruit, petals yellow, floral tube absent | ... | 3. <i>LUDWIGIA</i> |
| b. | Sepals deciduous after anthesis, petals pink, white or yellow ; floral tube present or if absent then petals pink | ... | 3 |
| 3a. | Seeds with a chalazal tuft of hairs, capsule not conspicuously ribbed | ... | 2. <i>EPILOBIUM</i> |
| b. | Seeds without chalazal tuft of hairs, capsule conspicuously ribbed | ... | 4. <i>OENOTHERA</i> |

Date of receipt : 25.08.97. Date of acceptance : 17.08.99.

CIRCAEA Linn. Sp. Pl. 8. 1753.

Lectotype : *Circaea lutetiana* Linn. (Britton and Brown, Ill. Fl. N. U. S. ed. 2. 2:610. 1913).

Distrib. : Throughout northern hemisphere

in subarctic and temperate regions extending southwards to the tropics on mountains up to 5000 m above m.s.l.

7 species in the world ; 4 species in India.

KEY TO THE SPECIES

- 1a. Ovaries and fruits unilocular ; rhizomes terminated by tubers, fruits obovoid to slenderly clavate ... 3
- b. Ovaries and fruits bilocular ; rhizomes not terminated by tubers, fruits thickened lenticular to flattened pyriform, globose ... 2
- 2a. Leaves cuneate at base, rarely rounded ; petals 0.8 - 1.8 mm long ; fruits with prominent ribs and deep sulci ... 3. *C. mollis*
- b. Leaves cordate or rounded at base ; petals 3-4 mm long ; fruits without prominent sulci ... 2. *C. cordata*
- 3a. Petals notched more than half of their length, 'V' shaped ; pedicels glandular pubescent ; leaves with 9-15 secondary veins ... 4. *C. repens*
- b. Petals notched one half or less their length, obovate to obtriangular ; pedicels glabrous or rarely with glandular hairs ; leaves with 4-10 secondary veins ... 1. *C. alpina*

1. *Circaea alpina* Linn. Sp. Pl. 9. 1753 ; C.B. Clarke in Fl. Brit. India 2 : 589. 1879, *p.p.* ; Collett, Fl. Simlensis 196. 1900 ; Boufford in Ann. Missouri Bot. Gard. 69 : 900. 1982. *C. alpina* Linn., is comprised of 6

subspecies in the world and distributed at high altitude throughout the northern hemisphere to 79°N Lat., extending into the subtropics and tropics at high elevations in Southern Asia. 2 subspecies in India.

KEY TO THE SUBSPECIES

- 1a. Leaves thick, opaque, denticulate to subentire, base rounded to sub-cordate ; ovaries pubescent at anthesis ... 1.1. subsp. *imaicola*
- b. Leaves thin, translucent, pale green, sharply denticulate to serrate, base cordate ; ovaries glabrous at anthesis ... 1.2. subsp. *micrantha*

1.1. subsp. ***imaicola*** (Aschers. & Magnus) Kitamura, Fl. Afghanistan 279. 1960 ; Singh & Kachroo, For. Fl. Srinagar 177. 1976 ; Naithani, Fl. Chamoli 1 : 238. 1984 ; Boufford in Ann. Missouri Bot. Gard. 69 : 915. 1982. *C. alpina* var. *imaicola* Aschers. & Magnus in Bot. Zeit. 28 : 749. 1870. *p.p.*

C. pricei Hayata, Ic. Pl. Formosa 5 : 72. 1915. *C. imaicola* (Asch. & Magnus) Hand.-Mazz., Symb. Sin. 7 : 603. 1933. *C. minutula* Ohwi in Acta Phytotax & Geobot. 2 : 151. 1933.

Type : India, Eastern Peninsula, Wight 989 (*Lectotype* : K, Photo, CAL !).

Fl. & Fr. : July - Oct.

Distrib. : INDIA : Throughout the Himalayas, forest edges, slopes, nearby streams between 2000-4000 m, above m.s.l. Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh, West Bengal, Sikkim, Nagaland, Manipur, Mizoram, Meghalaya and a disjunct distribution at Tamil Nadu (Nilgiri and Palni hills). Afghanistan, Pakistan, Nepal, Bhutan, Myanmar, Bangladesh, China, Taiwan, Vietnam.

Specimens examined : TAMIL NADU : Levedala, Ooty, Nilgiris, 2128 m, *J. S. Gamble* 16652 (CAL). SIKKIM : Locality not mentioned, 2736-3648 m, *J. D. H.* s.n. (CAL). JAMMU & KASHMIR : Liddar valley, 1824-2128 m, 15. 7. 93, *Duthie* 13064 (CAL).

1.2. subsp. **micrantha** (Skvortsov) Boufford in *Ann. Missouri Bot. Gard.* 69 : 959. 1982. *C. micrantha* Skvortsov in *Bull. Glavn. Bot. Sada* 103 : 36. 1977.

Type : China, Gansu, at the temple of Tcheibsenhit 9000', 30 Aug. 1901, *V. Ladygin* 514 (*Holotype* : LE).

Fl. & Fr. : Sept. - Nov.

Distrib. : INDIA : Temperate and grassy alpine areas, moist places, thickets and montane coniferous forests, 2736-5000 m. Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh, Sikkim. Pakistan, Nepal, Bhutan, Myanmar, China.

Specimens examined : JAMMU & KASHMIR, July 1956, *T.A. Rao* 584 (CAL) (2 specimens); Sedau, Kashmir, 2135 m, 15.9.1961, *J. N. Vohra* 94 (CAL).

2. **Circaea cordata** Royle, *Illustr. Bot. Himal.* 211, t. 43, fig. 1, a-i. 1834 ; *C.B. Clarke* in *Fl. Brit. India* 2 : 589. 1879 ; *Collett*, *Fl. Simlensis* 196. 1900 ; *Nair*, *Fl. Bashahr Himalayas* 115. 1977 ; *Hoch & Raven* in

Nasir & Ali, *Fl. Pakistan* 139 : 3. 1981 ; *Chowdhery & Wadhwa*, *Fl. Himachal Pradesh* 1 : 292. 1984 ; *Boufford* in *Ann. Missouri Bot. Gard.* 69:829. 1982. *C. cordiophylla* Makino in *Bot. Mag. Tokya* 20 : 42. 1906. *C. kitagawae* Hara in *J. Jap. Bot.* 10 : 595. 1935.

Type : India, Kotgarh, *J. Royle* (*Lectotype* : LIV).

Fl. & Fr. : July - Sept.

Distrib. : INDIA : Western Himalaya in subtropical forests between 1980-2432 m. Jammu & Kashmir, Himachal Pradesh ; Assam (*Boufford l.c.*). Pakistan, Nepal, China, Japan, Taiwan, C.I.S.

Specimens examined : JAMMU & KASHMIR: *Jai*, Kashmir, 1980 m, 17.8.1962. *Wadhwa & Vohra* 423 (CAL) (2 specimens).

3. **C. mollis** Siebold & Zucc., *Abh. Akad. Muench.* 4 : 134. 1843 ; *Boufford* in *Ann. Missouri Bot. Gard.* 69 : 841. 1982. *C. coreana* H. Lev., in *Fedde. Repert. Spec. Nov. Regni Veg.* 4 : 226. 1907. *C. lutetiana* Linn. var. *taquetii* H. Lev., in *Fedde Repert. Spec. Nov. Regni Veg.* 7 : 340. 1909.

Type : Japan ("Nipponia"), *P. Siebold* (*Lectotype* : L.).

Fl. & Fr. : July - Oct.

Distrib. : INDIA : North-eastern region in subtropical deciduous forest, 1200-1500 m. Manipur, Nagaland. Myanmar, China, Japan, Korea, Vietnam, Laos, C.I.S.

Specimens examined : NAGALAND : Naga hills, Kegwina, *C. B. Clarke* 41176 D (CAL) ; MANIPUR : Ukhrul, *F. Kingdon-Ward* 17971 (CAL).

Notes : *Clarke* (*J. Linn. Soc. Bot.* 25 : 23. 1889) recorded *C. quadrisculata* Maxim from India and this species has recently been included

in the 'Flowering Pl. of India, Nepal and Bhutan by Naithani (1900). Clarke's specimens [(INDIA: Nagaland, Kohima, 4500', 30.10.1885, *C. B. Clarke* 41378 (CAL)] has been studied and found that it is nothing but *C. mollis* Siebold & Zucc. *C. quadrisculata* Maxim is distributed in Central Far East Asia, N. & S. Korea, China, Japan and C.I.S.

4. *C. repens* Wall. ex Asch. & Mag. in Bot. Zeit. 28 : 761. 1870 ; Wall., Numer. List. No. 6341. 1832, *nom. nud.* ; Hoch & Raven in Nasir & Ali, Fl. Pakistan 139 : 5. 1981 ; Chowdhery & Wadhwa, Fl. Himachal Pradesh 1 : 292. 1984 ; Naithani, Fl. Chamoli 1 : 238. 1984. *C. lutetiana sensu* C.B. Clarke in Fl. Brit. India 2 : 589. 1879 *non* Linndl. 753. *C. alpina* Linn. var. *himalaica* C. B. Clarke in Fl. Brit. India 2 : 589. 1879.

Type : Nepal, vicinity of Kathmandu, 1821, N. Wallich 6341 (*Lectotype* : K).

Fl. & Fr. : July - Oct.

Distrib. : INDIA. Throughout the Himalayas in subtropical and temperate forests, along the

grasslands or in slopes and valleys. 1824-3344 m. Jammu & Kashmir, Himachal Pradesh, Punjab, Uttar Pradesh, West Bengal, Sikkim, Assam, Arunachal Pradesh. Pakistan, Nepal, Bhutan, Myanmar, China.

Specimens examined : UTTAR PRADESH : Dafia Dhoorm, Kumaon, 2600 m, 28.8.1973, C.M. Arora 50063 (CAL). SIKKIM : Locality not mentioned, 1887, Dr. King's Collector s.n. (CAL) ; "Himal. Bor. oce., 7-8000', T. Thomson s.n. (CAL) ; Locality not mentioned, 7-10,000', J.D.H. s.n. (CAL).

2. EPILOBIUM Linn. Sp. Pl. 347. 1753.

Chamaenerion Seg., Pl. veron. 3 : 168. 1754. *Chamerion* (Raf.) Raf., Herb. Raf. 51. 1833. *Lectotype* : *Epilobium hirsutum* Linn. (Britton & Brown, 1913).

Distrib. : 'Worldwide mostly at high latitudes and altitudes except Antarctica with major species groups in North America, Eurasia, Australasia ; mostly in temperate zone, only in the mountains in the tropics ; c. 185 species in the world ; 30 species in India, all are in the Himalayas.

KEY TO THE SECTIONS

- 1a. Leaves alternate or spirally arranged, floral tube absent ; flowers slightly zygomorphic, petals entire, stamens in a single whorl ... Sect. 1. *Chamaenerion*
- b. Leaves opposite atleast below the inflorescence ; floral tube present ; flowers actinomorphic, petals cleft or emarginate, stamens in 2 unequal whorls ... Sect. 2. *Epilobium*

Section 1. CHAMAENERION Tausch, Hort. Canal. fasc. 1. 1823. *Lectotype* : *Epilobium angustifolium* Linn. (Designated by Raven, 1976).

KEY TO THE SPECIES

- 1a. Leaves linear to lanceolate with distinct submarginal veins ; bracts sublinear, much smaller than cauline leaves, seeds with conspicuous chalazal collar ... 3. *E. angustifolium*

- b. Leaves narrowly ovate, elliptic to lanceolate without submarginal veins ;
bracts foliaceous, lanceolate to elliptic, about half as long as cauline leaves ;
seeds with distinct chalazal collar ... 2
- 2a. Style pubescent near the base ; stem densely strigillose ; primary leaf
veins distinct ; seeds 1-1.3 mm long ... 3
- b. Style glabrous ; stem usually glabrescent ; primary leaf veins obscure ;
seeds 1.3-2.1 mm long ... 12. *E. latifolium*
- 3a. Secondary leaf veins conspicuous and distinctly reticulate ; petals 8-14 mm
long ; fruiting pedicels 1.5-5 cm long ; plant up to 120 cm tall ... 7. *E. conspersum*
- b. Secondary leaf veins obscure ; petals 20-25 mm long ; fruiting pedicels
1-3 cm long ; plant up to 45 cm tall ... 24. *E. speciosum*

Section 2. EPILOBIUM- *Epilobium* sect. *Lysimachion* Tausch, Hort. Canal. fasc. 1, 1823-
Lectotype : *Epilobium hirsutum* Linn. (Designated by Munz, 1965).

KEY TO THE SPECIES

- 1a. Stigma 4 lobed ; stems covered with long spreading hairs .. 2
- b. Stigma entire ; stems subglabrous or covered with short villous hairs or
gland tipped hairs ... 3
- 2a. Leaves clasping ; petals 8-20 mm long ; stigma exerted beyond anthers
at anthesis ... 11. *E. hirsutum*
- b. Leaves not clasping ; petals 4-9 mm long ; stigma surrounded by
anthers of longer stamens at anthesis ... 19. *E. parviflorum*
- 3a. Stems and leaves densely villous ... 26. *E. trichophyllum*
- b. Stems and leaves subglabrous or variously pubescent but not villous ... 4
- 4a. Stems not pubescent throughout, more or less lacking distinct raised hairy
lines decurrent from petioles ... 5
- b. Stems pubescent all round, or if so only on upper stem and with 2-4
raised hairy lines decurrent from petioles ... 9
- 5a. Plants forming short basal soboles, often clumped ; stems occasionally
with persistent basal scales ... 6
- b. Plants with basal rosettes, turions or stolons not soboles ; stems often
with persistent basal scales ... 8
- 6a. Ovaries white canescent ; seeds with conspicuous chalazal collar ;
leaves oblong-lanceolate to narrowly ovate ... 16. *E. minutiflorum*
- b. Ovaries pubescent but not white canescent ; seeds with inconspicuous
chalazal collar ... 7
- 7a. Leaves with petioles 2-8 mm long ; petals 4-7 mm long ... 21. *E. royleanum*
- b. Leaves sessile ; petals 7-10 mm long ... 4. *E. brevifolium*

8a. Plants with dense appressed tomentum all over and leafy rosettes at base ; petals 8-16 mm long ; leaves elliptic to lanceolate or ovate	...	18. <i>E. pannosum</i>
b. Plants strigillose all over, sometimes subglabrous below midstem and with basal filiform stolons ending in condensed turions ; petals 4-8 mm long ; leaves sublinear to narrow lanceolate or elliptic	...	17. <i>E. palustre</i>
9a. Inflorescence variously pubescent but without any glandular hairs	...	10
b. Inflorescence variously pubescent but always with glandular hairs	...	13
10a. Leaves subsessile to sessile, lower petioles 1-2 mm long	...	11
b. Leaves with distinct petioles, 2-11 mm long	...	12
11a. Underground stem with leafy soboles ; leaves shorter than internode ; inflorescence more or less glabrous or sparsely strigillose	...	6. <i>E. clarkeanum</i>
b. Underground stem straight, non rhizomatous ; leaves more or less equal to the internodes ; inflorescence pubescent	...	22. <i>E. semiamplexicaule</i>
12a. Leaves narrowly lanceolate to sublinear ; petioles up to 9 mm long ; seeds papillose, 0.7-1 mm long	...	8. <i>E. cylindricum</i>
b. Leaves lanceolate to narrowly ovate, petioles up to 5 mm long ; seeds reticulate, 0.9-1.3 mm long	...	27. <i>E. tibetanum</i>
13a. Underground stem with soboles, stolons or rosettes but not fleshy turions with or without scales	...	14
b. Underground stem with fleshy turions which leave coriaceous scales	...	21
14a. Stem base with crowded brown scales	...	15
b. Stem base without scales	...	16
15a. Leaves ovate, elliptic, lanceolate or oblong-lanceolate, margin densely serrulate ; stigma capitate ; seeds obovoid	...	17
b. Leaves oblong-lanceolate, margin obscurely denticulate or subentire ; stigma clavate ; seeds fusiform	...	13. <i>E. ladakhianum</i>
16a. Petals 7-12 mm long ; capsules 5-9 cm long, on pedicels 0.5-2 cm long ; leaves (0.8) 1.5 - 6.5 cm long ; stems erect	...	23. <i>E. sikkimense</i>
b. Petals 5 - 6.5 mm long ; capsules 3.5 - 5 mm long ; on pedicels 0.4-1 cm long ; leaves 0.6-2.3 cm long ; stems mostly ascending	...	29. <i>E. williamsii</i>
17a. Seeds with a conspicuous pellucid beak at the chalazal end ; leaves lanceolate, serrulate	...	25. <i>E. stracheyanum</i>
b. Seeds with a short chalazal collar	...	18
18a. Stigma clavate ; leaves subsessile ; seeds papillose	...	15. <i>E. leiophyllum</i>
b. Stigma capitate	...	19
19a. Pubescence of inflorescence predominantly glandular ; leaves subsessile ; seeds smooth, acuminate	...	30. <i>E. wattianum</i>

- b. Pubescence of inflorescence predominantly strigillose ; leaves evidently petiolate ... 20
- 20a. Leaves narrow ovate to rarely lance-oblong, base rounded to broadly cuneate ; petals 5-8 mm long, white to rose-purple ; stigma surrounded by anthers at anthesis ; stems with 2 strigillose lines on the internodes ... 2. *E. amurense* ssp. *amurense*
- b. Leaves oblong, oblong-ovate to elliptic, base subrounded, subcordate to broadly cuneate ; petals 5.5 - 13 mm long, pinkish purple ; stigma elevated above the anthers at anthesis ; stems with 4(or 2) strigillose lines on the internodes ... 28. *E. wallichianum*
- 21a. Flowers 6-14 mm long, pedicels mostly less than 5 mm long in fruit ; seeds 1.1-1.5 mm long ... 22
- b. Flowers mostly less than 6 mm long, pedicels 5-20 mm long in fruit ; seeds up to 1.1 mm long ... 23
- 22a. Leaves elliptic, often narrow, scarcely denticulate ; stigma surrounded by anthers ... 9. *E. glaciale*
- b. Leaves ovate to lanceolate with rounded base ... 24
- 23a. Petals 4.5-6 mm long ; seeds 0.9 - 1 mm long ; stigma clavate to subcapitate ... 10. *E. gouldii*
- b. Petals (7-) 10-16 mm long ; seeds 1.2 -1. 5 mm long ; stigma subcapitate ... 14. *E. laxum*
- 24a. Inflorescence erect ; leaves crowded, subsessile, 1.5 - 2.5 cm long ; plants low growing, less than 20 cm tall ... 5. *E. chitralense*
- b. Inflorescence suberect or nodding, at least in bud ; leaves mostly longer than 2.5 cm, petiolate ; plants mostly longer than 20 cm ... 25
- 25a. Leaves lanceolate, 3 - 6 cm long ; petals 4 - 6 mm long ; seeds coarsely papillose ... 20. *E. rhynchospermum*
- b. Leaves narrowly ovate, 1.5 - 3.5 cm long ; petals 3 - 4.2 mm long ; seeds finely papillose ... 1. *E. aitchisonii*

1. ***Epilobium aitchisonii*** Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2 : 376. Pl. 37B. 1962 ; Hoch and Raven in Nasir & Ali, Fl. Pakistan 139:31. 1981.

Type : Pakistan, Sikaram, Kurram valley (ca 35°54'N, 70°20'E), 3550 m, 7 Aug. 1879, Aitchison 939 (*Holotype* : K, Photo !).

Fl. : July - Sept. ; *Fr.* : Aug. - Nov.

Distrib. : INDIA : Western Himalaya in valley regions near water course on stony and sandy beds, 2736-3344 m. Jammu & Kashmir, Himachal Pradesh. Pakistan, Afghanistan, Iran.

Specimens examined : HIMACHAL PRADESH: Chamba (Pangi), 16.8.99, 9-1100', Harosekh s.n. (CAL).

2. ***E. amurense*** Haussk. ssp. ***amurense*** - Chen *et al.*, Syst. Bot. Monogr. 34 : 121. 1992. *E. amurense* Haussk., in Oesterr. Bot. Zeit. 29:55.1879 ; Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2(12) : 367. 1962. *E. laetum* Wall. ex Haussk., Monogr. Epil. 218. 1884 (*E. laetum* Wall. Numer. List. No. 6329. 1832, *nom. nud.* quoad A). *E. amurense* Haussk. ssp. *laetum* (Wall. ex Haussk.) Raven in Bull. Brit. Mus. (Nat.

Hist.) Bot. 2 : 367. 1962. *Type* : Nepal, towards Gosainthan, 1821-1822, *Wallich* 6329A (*Lectotype* : K, designated by Chen *et al.*, 1992). *E. nepalense* Haussk. in Oesterr. Bot. Zeit. 29:53. 1879 *et in* Monogr. Epil. 218. 1884. *E. tetragonum sensu* C.B. Clarke in Fl. Brit. India 2:586. 1879, *p.p. non* Linn. 1753.

Fl. : July - Aug. : *Fr.* : Aug. - Oct.

Distrib. : INDIA : Himalayas in moist places, slopes, nearby streams, 2100-3650 m, Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh, West Bengal, Sikkim, Meghalaya. Pakistan, Nepal, Bhutan, China, Japan, Korea, Siberia (C.I.S.).

Specimens examined : SIKKIM : North side of Sinchal, *T. Anderson* 586 (CAL) ; locality not mentioned, *Griffith* s.n. (CAL) ; locality not mentioned, 6-12000', *J.D.H.* s.n. (CAL).

3. ***Epilobium angustifolium*** Linn. Sp. Pl. 347. 1753 ; C.B. Clarke in Fl. Brit. India 2:582. 1829 ; Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2(12) : 346. 1962 ; Kachroo *et al.*, Fl. Ladakh 83. 1977 ; Nair, Fl. Bashahr Himalayas 116. 1977 ; Hoch & Raven in Nasir & Ali, Fl. Pakistan 139 : 11. 1981 ; Chowdhery & Wadhwa, Fl. Himachal Pradesh 1 : 292. 1984 ; Naithani, Fl. Chamoli 1:239. 1984. *Chamaenerion angustifolium* (Linn.) Scop., Fl. Carinol., ed. 2, 1:271. 1772. *E. spicatum* Lam., Fl. France 3 : 482. 1778. *Chamerion angustifolium* (Linn., em.) Holub, Folia Geobot. Phytotax. 7 : 86. 1972.

Type : Probably from Sweden (*Holotype* : LINN 486. 1 ; Photo, CAL !).

Fl. : July - Sept. : *Fr.* : (July) Aug. - Oct.

Distrib. : INDIA : North Western and Eastern Himalayas in temperate zone, in scattered colonies mostly along the water

course. 2000-4500 m. Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh, Sikkim. Pakistan, Bhutan, Myanmar, China, Japan, Korea ; Europe, Pacific Coasts, N. America.

Specimens examined : UTTAR PRADESH : Ganges valley, Tehri-Garhwal, 9-10,000' 16.7.83, *J. F. Duthie* 1041 (CAL) ; opposite Gothing, Chamoli dt. 4000 m, 12 Sept. 1975, *B.D. Naithani* 56220 (BSD). JAMMU & KASHMIR: Sonamarg, Kashmir, 10,000' 10.8.13, *Koebel* 90 (CAL) ; Sonamarg, Kashmir, 9000', 24.8.1875, *C.B. Clarke* 27195 (DD).

4. ***E. brevifolium*** D. Don, Prodr. Fl. Nepal 222. 1825 ; Collett, Fl. Simlensis 195. 1900 ; Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2(12) : 361. 1962 ; Chowdhery & Wadhwa, Fl. Himachal Pradesh 1:293. 1984 ; Chen *et al.*, Syst. Bot. Monogr. 34 : 108. 1992.

KEY TO THE SUBSPECIES

- 1a. Plants usually well branched from the base ; leaves ovate with rounded or nearly oblique base
... ssp. 4.1. *brevifolium*
- b. Plants usually well branched above ; leaves elliptic to oblong-lanceolate with cuneate base ... ssp. 4.2. *trichoneurum*
- 4.1. ssp. ***brevifolium*** *E. trichoneurum* var. *brachyphyllum* Haussk. in Oesterr. Bot. Zeit. 29 : 54. 1879.

Type : "Himalaya bor. occid." unplaced locality in North West Himalaya, 1800-2400 m, 1847-1848, *Thomson* s.n. (*Lectotype* : K).

Distrib. : INDIA : Western Himalayas in open places, nearby streams, 1700-4500 m. Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh. Nepal, China.

Specimens examined : HIMACHAL

PRADESH : Kirting, Upper Chenab, Lahul, 2900 m, 12 Aug. 1971, *U.C. Bhattacharya* 45284 (BSD).

- 4.2. ssp. **trichoneurum** (Haussk.) Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2:362. 1962. *E. trichoneurum* Haussk. in Oesterr. Bot. Zeit. 29:54. 1879. *E. hookeri* C.B. Clarke in Fl. Brit. India 2:585. 1879. *nom. superfl.*

Type : India : Assam, Khasi hills, 1500-2100 m, 1850, *J. D. Hooker & Thomson* s.n. (*Lectotype* : K).

Fl. : July Sept. ; *Fr.* : Sept. Oct.

Distrib. : INDIA : North-eastern Himalaya in open places near water course, road sides, disturbed places, 1200-2600 m, Assam, Meghalaya, Manipur, Mizoram, Nagaland, Arunachal Pradesh. China, Nepal, Bhutan, Bangladesh, Myanmar, Vietnam, Malesia, Philippines.

Specimens examined : NAGALAND : Kohima, July 1886. *D. Prain* s.n. (CAL). MEGHALAYA : Khasia, *s.l.* 11 (CAL). MANIPUR : Kapru, 8000'. Nov. 1907, *A. Meebold* 6479 (CAL).

5. **Epilobium chitralense** Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2:379. Pl. 39A. 1962 ; Hoch & Raven in Nasir & Ali, Fl. Pakistan 139:32. 1981 ; Chowdhery & Wadhwa, Fl. Himachal Pradesh 1:293. 1984. *E. cf. himalayense* Wendelbo, Nytt Mog. Bot. 1:47. 1952. *E. cf. stracheyanum* Wendelbo *l.c.* 47. 1952.

Type : Pakistan, Chitral : Wet slope above Shokor Shal, Barum Gol (ca 36° 4' N. 71° 58' E, 3600 m, 23 July 1950, *Wendelbo* (BM ; K, *Isotype*).

Fl. : & *Fr.* : Aug. Sept.

Distrib. : INDIA : Western Himalaya in wet

places, 3350-4600 m, above m.s.l. Jammu & Kashmir, Himachal Pradesh. Pakistan, Iran.

Specimens examined : HIMACHAL PRADESH : Kaspas valley, 20.9.91, *K. P. Janardhanan* 46029 (BSD) ; Koksar, Lahul, 3200 m, 3.7.1973, *U.C. Bhattacharyya* 51791 (BSD) ; Sankoo camp site, Ladakh, 3100 m, 19.8.1976, *B.M. Wadhwa* 59829 (BSD).

6. **E. clarkeanum** Haussk. Monogr. Epil. 220. 1884 ; Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2(12) : 381. 1962 ; Chowdhery & Wadhwa, Indian J. For. 4:329. 1981 ; Chen *et al.*, Syst. Bot. Monogr. 34 : 167. 1992. *E. alpinum sensu* C.B. Clarke in Fl. Brit. India 2 : 586. 1879 *non* Linn. 1753.

Type : Sikkim : Lachen, 3650 m, 16 July 1849, *Hooker* s.n. (*Lectotype* : K).

Fl. : May-July ; *Fr.* : July-Aug.

Distrib. : India : Himalayas in moist alpine zone, 3650-4550 m. Rare. Himachal Pradesh, Sikkim, Myanmar, China.

Specimens examined : SIKKIM : Enumtao La, 14000', 20.7.06, *J.D.H.* 174 (CAL) ; Zemu valley, 14000', 11.7.09, *Smith & Cave* 1249 (CAL).

7. **E. conspersum** Haussk. in Oesterr. Bot. Zeit. 29 : 51. 1879 ; Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2(12) : 350. 1962 ; Chen *et al.*, Syst. Bot. Monogr. 34:40. 1992. *E. reticulatum* C.B. Clarke in Fl. Brit. India 2:583. 1879.

Type : Sikkim, "Lama Konyr" (Kongra Lama), 2450 m, 27 July 1849, *Hooker* s.n. (*Holotype* : K, Photo, CAL !).

Fl. : July - Aug. ; *Fr.* : Sept. - Oct.

Distrib. : INDIA : Himalayas, in scattered colonies at moist open places, nearby ditches, on grassy slopes, mountain ridges, 3300-3600 m, Uttar Pradesh (Kumaon), Sikkim,

Nepal, Bhutan, China, Myanmar.

Specimens examined : UTTAR PRADESH : Shelang glacial, Kumaon, 5600 m, 16. 6. 1958, T.A. Rao 6910 (BSD). SIKKIM : Locality not mentioned, 1889, Dr. King's Collector s.n. (CAL) ; Zemu Valley, 12000', 15.7.09, Smith & Cave 2730 (CAL).

8. **Epilobium cylindricum** D. Don, Prodr. Fl. Nepal. 222. 1825 ; Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2(12) : 355. 1962 ; Collett, Fl. Simlensis 194. 1900 ; Singh & Kachroo, For. Fl. Srinagar 178. 1976 ; Hoch & Raven in Nasir & Ali, Fl. Pakistan 139 : 19. 1981 ; Chowdhery & Wadhwa, Fl. Himachal Pradesh 1:293. 1984 ; Naithani, Fl. Chamoli 1:240. 1984 ; Chen *et al.*, Syst. Bot. Monogr. 34 : 80. 1992. *E. roseum* Schreb. var. *cylindrium* (D. Don) C.B. Clarke in Fl. Brit. India 2 : 585. 1879. *E. beauverdianum* H. Lev. in Fedde Repert. Sp. Nov. Regni Veg. 8 : 138. 1910. *E. christii* H. Lev. l.c. 9:19. 1910.

Type : Nepal, Schopuri Hill, N. of Kathmandu, Aug. 1821, Wallich 6328 (*Lectotype* : BM).

Fl. : June - Sept. : *Fr.* : July - Oct.

Distrib. : India. Himalayas, in wet places, swamps, along streams and road sides, 1400-3300 m. Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh, West Bengal, Sikkim, Arunachal Pradesh, Afghanistan, Pakistan, Nepal, Bhutan, China, C.I.S., Iran.

Specimens examined : JAMMU AND KASHMIR: Himal. Bor. occ. 6-9000', T. Thomson s.n. (CAL) ; Nowbug, Kashmir, 13 Sept. 1876, C.B. Clarke 31251A (CAL). SIKKIM: Lachen, 25.8.1982, P. Chakraborty 2328 (CAL).

9. **E. glaciale** Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2 : 368. Pl. 34B. 1962 ; Hoch &

Raven in Nasir & Ali, Fl. Pakistan 139 : 27. 1981.

Type : Pakistan, Baltistan, Sokha Glacier, right bank (ca 35°50' N., 76°05'E), 4500 m, above m.s.l., moist rocks, 21 Aug. 1939, S. Russell 1606 (BM).

Distrib. : INDIA : Western Himalaya in moist places in subalpine zone. 3040-4550 m. Jammu & Kashmir. Pakistan.

Specimens examined : JAMMU & KASHMIR: Panikhar, Ladakh, 7.8.1988, Chowdhery & Uniyal 85914 (BSD) ; Ganglas, Ladakh, 7.8.1998, Chowdhery & Uniyal 86047 (BSD).

10. **E. gouldii** Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2(12) : 371. Pl. 35B. 1962 ; Chen *et al.*, Syst. Bot. Monogr. 34 : 149. 1992.

Type : China, Xizang (Tibet), Gyangze to Pagri ("Gausta to Phari Drong"), north of Yadong, approximately 28° 55'N, 89° 33'E, 3650-4350 m, above m.s.l., 13 Aug. 1938, Gould 1452 (*Holotype* : K ; Photo !).

Fl. : & *Fr.* : July - Aug.

Distrib. : India : Himalayas in alpine meadows between 3650-4350 m, Jammu & Kashmir, Sikkim. China.

Specimens examined : JAMMU & KASHMIR: Gudhai valley Astor dt. 11-12, 000', 22.7.1892, J. F. Duthie 12198 (CAL). Giri and Banerjee (J. Bombay Nat. Hist. Soc. 81 : 227-228. 1984) reported this species from Kashmir.

11. **E. hirsutum** Linn. Sp. Pl. 1 : 347. 1753 ; C.B. Clarke in Fl. Brit. India 2:583. 1879 ; Collett, Fl. Simlensis 194. 1900 ; Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2(12) : 355. 1962 ; Nair, Fl. Bashahr Himalayas 116. 1977 ; Hoch & Raven in Nasir & Ali, Fl. Pakistan 139 : 11. 1981 ; Chowdhery & Wadhwa, Fl. Himachal Pradesh 1:294. 1984 ; Chen *et al.*, Syst. Bot. Monogr. 34 :

57. 1992. *Chamaenerion hirsutum* (Linn.) Scopoli, Fl. Carniol ed. 2, 1:270. 1772. *E. villosum* Thunberg, Prodr. 75. 1794. *E. sericeum* Benth. in Wall. Cat. No. 6325. 1832, *nom. nud.* *E. laelum* Wall. Cat. No. 6329. 1832, *nom. nud.* *E. hirsutum* var. *sericeum* Benth. ex C.B. Clarke in Fl. Brit. India 2:584. 1879. *E. hirsutum* var. *laetum* Wall. ex. C.B. Clarke in Fl. Brit. India 2 : 584. 1879.

Type : Europe (exact locality not mentioned) (*Holotype* : LINN 4863).

Fl. : July - Aug. ; Sept. - Oct.

Distrib. : INDIA : Throughout the Himalayas in subtropical to temperate zone in scattered colonies in wet places, nearby streams, river beds, road sides : 900-3500 m above m.s.l. Jammu & Kashmir, Himachal Pradesh, Punjab, Uttar Pradesh. Pakistan. Nepal, China, Japan, C.I.S. ; Africa, Europe, introduced in North America.

Specimens examined : JAMMU & KASHMIR : Kashmir, *s.l.* K. 22(CAL) (2 specimens) ; Kashmir, July 1956, *T.A. Rao* 743 (CAL) (3 specimens) ; Tangmarg, Kashmir, 2135 m, 11.9. 1961, *Wadhwa & Vohra* 3 (CAL).

12. *Epilobium latifolium* Linn., Sp. Pl. 1:347. 1753 ; Clarke in Fl. Brit. India 2:583. 1879 ; Haussk., Monogr. Epil. 190, t. 1 f. 16. 1884 ; Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2(12) : 348. 1962 ; Kachroo *et al.*, Fl. Ladakh 83. 1977 ; Hoch & Raven in Nasir & Ali, Fl. Pakistan 139 : 13. 1981 ; Chowdhery, Wadhwa, Fl. Himachal Pradesh 1 : 294. 1984. Naithani, Fl. Chamoli 1:240. 1984 ; Chen *et al.*, Syst. Bot. Monogr. 34 : 34. 1992. *Chamaenerion latifolium* (Linn.) Fries & Lange, Fl. Dan. 17, 49 :7. 1877. *Chamerion latifolium* (Linn.) Holub in Folia Geobot. Phytotax. 7 : 86. 1972. *E. kesamitisu* Yamazaki in J. Jap. Bot. 65 : 141. 1990.

Type : U.S.S.R. "Siberia, 4," (Possibly Kamchatka), 1733-43, *Gmelin* (*Holotype* : Linn. 482.2 ; Photo, CAL !).

Fl. : June - Aug. ; *Fr.* : Aug.- Oct.

Distrib. : INDIA : Western Himalaya, in colonies on unstable grounds, mountain slopes, nearby glaciers, 3000-4600 m. Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh. Afghanistan, Pakistan, China, Japan, C.I.S. ; Europe, North America.

Specimens examined : JAMMU & KASHMIR : Kolahoi, Kashmir, 11-12000' 8.8.93, *J. Duthie* 13496 (CAL). UTTAR PRADESH : Nelang Kacha, Uttarkashi dt. 3800 m, July, 1988, *Naithani* 75772 (BSD) ; Valley of flowers, Garhwal, 3800 m, 19.8. 1963, *U.C. Bhattacharyya* 29555 (BSD) ; Kedarnath glacier, Garhwal, 4300 m, 27.9.1958, *M.A. Rau* 8677 (BSD).

13. *E. ladakhianum* T.K. Paul in ed. Affins *E. williamsii* Raven, sed caules simplices, 3-7 cm longiis, foliis oblongo-lanceolatus, marginibus obscura denticulatus, petala 3.5-4 mm longa, stigma clavatum, semina fusiformis differt.

Type : India : Jammu & Kashmir, Ladakh, Ganglas-Khardung La, 8.8. 1988, *Chowdhery & Uniyal* 86083 (*Holotype* : CAL) ; Ladakh, Panikhar, 30.7.1988, *Chowdhery & Uniyal* 85919 (*Paratype* : BSD).

Fl. & Fr. : July - Aug.

Distrib. : INDIA : Himalayas in moist places along water course. Jammu & Kashmir.

14. *E. laxum* Royle, Ill. Bot. Himal. Mount. 211, t. 43, f.2. 1835 ; Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2(12) : 369, 1962 ; Singh & Kochroo, For. Fl. Srinagar 178. 1976 ; Hoch & Raven in Nasir & Ali, Fl. Pakistan 139 : 28. 1981 ; Chowdhery & Wadhwa, Fl. Himachal Pradesh 1:294. 1984 ; Chen *et al.*, Syst. Bot. Monogr.

34:137. 1992. *E. amplexans* Benth. ex Wall. Numer. List. No. 6330, 1832, *nom. nud.* *E. tetragonum* var. *amplexans* C.B. Clarke in Fl. Brit. India 2:587. 1879. *E. duthiei* Haussk., Monogr. Epil. 205. t. 9, f. 54. 1884.

Type : India : Uttar Pradesh, Mussooree, Royle s.n. (*Holotype* : LIV).

Fl. & Fr. : July - Sept.

Distrib. : INDIA : Western Himalayas in meadows, 2100-4800 m. Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh, Pakistan, China, C.I.S.

Specimens examined : JAMMU & KASHMIR : Muzaffarabad, Kashmir, 18.9.99 *Inayat* s.n. (CAL). UTTAR PRADESH : Kushklayan, Tehri Garhwal, 3200-3500 m, 25.9.74, *Vishwanathan* 54962 (BSD); Borindiyar, Tehri dt., 3500 m, 16.9.1974, A. K. Goel, 66097 (BSD). HIMACHAL PRADESH: Chamba, Aug. 1880, *Robert Ellis* 342 A (CAL).

15. *Epilobium leiophyllum* Haussk in Oesterr. Bot. Zeit. 29 : 52. 1879. Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2(12) : 376. 1962 ; Hoch & Raven in Nasir & Ali, Fl. Pakistan 139 : 29. 1981 ; Chowdhery & Wadhwa, Fl. Himachal Pradesh 1:295. 1984. Naithani, Fl. Chamoli 1 : 240. 1984. *E. origanifolium sensu* C. B. Clarke in Fl. Brit. India 2:586. 1879, *p.p. non* Lam. 1790.

Type : Himachal Pradesh, West of Lara, Spiti valley 4, Sept. 1847, *Thomson* (*Lectotype* : K ; Photo, (CAL !)).

Fl. : July - Sept. ; *Fr.* : Aug. - Oct.

Distrib. : INDIA : Himalayas in temperate to alpine meadows 2000-4000 m. Jammu & Kashmir, Himachal Pradesh, Punjab, Uttar Pradesh, Sikkim. Pakistan, Afghanistan, Iran, W. Asia.

Specimens examined : HIMACHAL PRADESH: Laka, Dharmasala, 11000', 17th Oct. 1874, C.B. Clarke 23890 (CAL) ; Indus valley from Jilphsi to Lei, 12-14000', July '65, *Dr. Stolizka* s.n. (CAL). SIKKIM : Chamnago, 12000', 27.7.10, W.W. Smith. 3870 (CAL).

16. *E. minutiflorum* Haussk. in Oesterr. Bot. Zeit. 29:55. 1879 ; Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2(12) : 382. 1962 ; Hoch & Raven in Nasir & Ali, Fl. Pakistan 139 : 34. 1981 ; Chowdhery & Wadhwa, Fl. Himachal Pradesh 1:295. 1984. Naithani, Fl. Chamoli 1:240. 1984 ; Chen *et al.*, Syst. Bot. Monogr. 34 : 161. 1992. *E. modestum* Haussk. in Oesterr. Bot. Zeit. 29:55. 1879. *E. palustre sensu* C.B. Clarke in Fl. Brit. India 2:585. 1879, *p.p.*

Type : Banks of the river Sadsihur (Sajur Suyi ?) Gaziatep ("Aintab"), Turkey, 26 June 1865, *Haussknecht* 812 (*Lectotype* : JE).

Fl. : June - Aug. ; *Fr.* : July - Sept.

Distrib. : INDIA : In Western Himalayas in open places nearby streams, river banks disturbed places, 2000-4500 m. Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh. Iran, Turkey, Afghanistan, Pakistan, China, Mangolia, Korea.

Specimens examined : JAMMU & KASHMIR: Phyang, Leh. 3800 m, 15.8.1975, M.V. Viswanathan 54703 (BSD) ; Khardung La, Ladakh, 13000', 15.8.76, B.M. Wadhwa 59937 (BSD). UTTAR PRADESH : Way to Knaripass, Chamoli dt. Sept. 1980, B.D. Naithani 63780 (BSD).

17. *E. palustre* Linn. Sp. Pl. 348. 1753 ; C.B. Clarke in Fl. Brit. India 2:585. 1879 ; Raven in Bull. Brit. Mus. (Nat. Hist.) Bot 2(12). 1962 ; Kachroo *et al.*, Fl. Ladakh 84. 1977. Chowdhery & Wadhwa, Fl. Himachal Pradesh 1:295. 1984 ; Hoch & Raven in Nasir & Ali, Fl. Pakistan 139:83.

1981 ; Naithani, Fl. Chamoli 1:240. 1984 ; Chen *et al.*, Syst. Bot. Monogr. 34:154. 1992. *E. palustre* Linn. var. *typicum* C.B. Clarke in Fl. Brit. India 2:585. 1879. *E. palustre* Linn. var. *majus* C.B. Clarke l.c. 585. *E. palustre* Linn. var. *minimum* C.B. Clarke l.c. 585. *E. spitianum* Chowdhery et Murthy in Indian J. For. 12(3) : 244. 1984, *Syn. nov.* (*Holotype* : India, Himachal Pradesh Gette, Spiti dt. 4300 m, 3.8.1972. U.C. Bhattacharya 49272A CAL! *Isotype* : BSD !).

Type : Presumably Sweden, Linn (*Holotype*: Linn 486/6, Photo, CAL !).

Fl. : June - Aug. ; *Fr.* : Aug. - Sept.

Distrib. : INDIA : North western Himalayas in marshy and boggy places from temperate to alpine meadows, 2800-4500 m. Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh. Pakistan, Nepal, China, Japan, C.I.S. ; Europe, North America, Greenland.

Specimens examined : JAMMU & KASHMIR: Nima mud, Ladakh, 14500', 17.8.1931, Kolz 2344 (DD). PUNJAB : Indus valley, 7.1865, Dr. Stolozka s.n. (CAL). UTTAR PRADESH: Bhyundar valley, Garhwal, 3000m, 1.9.1962, U.C. Bhattacharya 24219 (BSD).

18. *Epilobium pannosum* Haussk. in Oesterr. Bot. Zeit. 29.54. 1879 (Feb.) ; Chen *et al.*, Syst. Bot. Monogr. 34 : 105. 1992. *E. khasianum* C.B. Clarke in Fl. Brit. India 2:585. 1879 (May). *nom. supefl.* *E. brevifolium* ssp. *pannosum* (Haussk.) Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2:363. 1962.

Type : India. Assam, Khasi hills, below Pomrang, 1500 m, 10th Sept. 1850, Hooker & Thomson 2322 (*Lectotype* : Photo, CAL !).

Fl. : July - Oct. ; *Fr.* : Aug. - Nov.

Distrib. : INDIA : Eastern Himalaya in

regions of high rainfall, shaded wet places, sometimes in open pastures, 900-1500 m. Meghalaya (Khasi hills). China, Japan, Northern, Vietnam, Myanmar.

Specimens examined : MEGHALAYA : Khasi hills, Kurz 174 (CAL) ; Khasi hill, Sept., 1850, s.l. 221 (CAL).

19. *E. parviflorum* Schreb., Spicil. Fl. Lips. 146, 155. 1771 ; C.B. Clarke in Fl. Brit. India 2:584. 1879 ; Collectt, Fl. Simlensis 194. 1900 ; Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2(12) : 353. 1962 ; Singh & Kachroo, For. Fl. Srinagar 178. 1976 ; Nair, Fl. Bashahr Himalayas 116. 1977 ; Hoch & Raven in Nasir & Ali, Fl. Pakistan 139:17. 1981 ; Chowdhery & Wadhwa, Fl. Himachal Pradesh 1:296. 1984 ; Naithani, Fl. Chamoli 1:241. 1984 ; Chen *et al.*, Syst. Bot. Monogr. 34:63. 1992. *E. vestitum* Benth. ex Wall. Cat. No. 6327. 1832, *nom. nud.* *E. parviflorum* var. *vestitum* Benth. ex C.B. Clarke in Fl. Brit. India 2:584. 1879.

Type : Germany (From vicinity of Leipzig).

Fl. : July - Sept. ; *Fr.* : Aug. - Oct.

Distrib. : INDIA : Throughout the Himalayas, more frequent in Western Himalayas in scattered colonies, moist places, near by rivers, streams, in open mountain slopes, 1200-2100 m. Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh, Pakistan, Nepal, China, Japan, C.I.S. : Europe, Northern Africa.

Specimens examined : JAMMU & KASHMIR: Dal Doda - Bhadrawala, Aug. 1986, Vohra & Naithani 82772 (BSD) ; Mabasu, N.W. Himalaya, 8000', Aug, 1878, Gamble 6426C (DD).

20. *E. rhyncospermum* Haussk., Monogr. Epil. 211, t.f. 50. 1884 ; Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2:368. 1962 ; Hoch &

Raven in Nasir & Ali, Fl. Pakistan 139:26. 1981.

Type : Kashmir, Baltal, 28 Sept. 1848, Thomson s.n. (*Lectotype* : K).

Fl. : June - Sept. ; *Fr.* : July - Sept.

Distrib. : INDIA : Western Himalayas in moist places, 1520-3648 m. Rare. Jammu & Kashmir, Punjab. Pakistan.

Specimens examined : JAMMU & KASHMIR: Kashmir, T.T., s.n.(CAL).

21. **Epilobium royleanum** Haussk. in Oesterr. Bot. Zeit. 29:55. 1879 ; Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2:358. 1962; Hoch & Raven in Nasir & Ali, Fl. Pakistan 139:23. 1981 ; Chowdhery & Wadhiwa, Fl. Himachal Pradesh 1:297. 1984; Naithani, Fl. Chamoli 1:241. 1984; Chen *et al.*, Syst. Bot. Monogr. 34:98. 1992. *E. roseum* Schreb. var. *indium* C.B. Clarke in Fl. Brit. India 2:584. 1879. *E. roseum* Schreb. var. *dalhousieanum* C.B. Clarke l.c. 584. *E. lividum* Haussk. Monogr. Epil. 201. 1884. *E. himalayanse* Haussk. l.c. 213. *E. royleanum* Haussk. forma *glandulosum* Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2:360. 1962. *E. royleanum* Haussk. forma *glabrum* Raven l.c. 361.

Type : India. 'North-west India' Royle s.n. (*Lectotype* : K, Photo, CAL !).

Fl. : July - Sept. ; *Fr.* : Aug. - Oct.

Distrib. : INDIA : Throughout the Himalayas in moist places, alpine slopes, road sides, 2128-3952 m. Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh, Meghalaya, Sikkim, Afghanistan, Pakistan, Nepal, Bhutan, China.

Specimens examined : Himal. Bor. occ., 7-8000', T. Thomson s.n. (CAL). UTTAR PRADESH : Laulea under Srikanta, Tehri-Garhwal, 8th Aug. '83, J. F. Duthie 1043

(CAL); Jumnotri, Tehri-Garhwal, 3200 m, above m.s.l. 15.6.1961, M.A. Rau 15741 (CAL).

22. **E. semiamplexicaule** Chowdhery et Singh in Indian J. For. 11(1):80. 1988.

Type : India : Himachal Pradesh ; Rakcham in Kinnaur dt. K. P. Janardhanan 52679 A (*Holotype* -CAL ! *Isotype*-BSD!).

Fl. & Fr. : August.

Distrib. : INDIA : Western Himalayas in moist places. Rare. Himachal Pradesh.

Specimens examined : HIMACHAL PRADESH : Rohtang pass on way, 4000 m, Aug. 1985, Balodi & S. Singh 75727 (BSD).

23. **E. sikkimense** Haussk. in Oesterr. Bot. Zeit. 29:52. 1879; Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2(12): 372. 1962 ; Chen *et al.*, Syst. Bot. Monogr. 34 : 139. 1992. *E. sikkimense* ssp. *ludlowianum* Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2:373. 1962. *E. trilectorum* Raven l.c. 374. *E. soboliferum* Raven l.c. 375. *E. squamosum* Raven l.c. 380.

Type : India : Sikkim : Lachen 4250 m, 14 July. 1849, Hooker s.n. (*Lectotype*-K, Photo, CAL !).

Fl. : June - Aug. ; *Fr.* : Aug. - Sept.

Distrib. : INDIA : Throughout the Himalayas in moist rocky slopes, along water course to alpine meadows. 3600-4200 m, Himachal Pradesh, Uttar Pradesh, West Bengal (Darjeeling), Sikkim, Nepal, Bhutan, China, Myanmar.

Specimens examined : SIKKIM : Locality not mentioned, 1888, Dr. King's Collector s.n. (CAL). UTTAR PRADESH : Ghastoli, Garhwal, 4000 m, 16.10.1959, M. A. Rau 10563 (BSD) ; Tejum Haya, Kumaon, 3700 m, 9.01.72, Arora 49693 (BSD). HIMACHAL PRADESH : Jandi, Lahul, 3200 m, 10 Aug. 1870, U.C. Bhattacharya 40706 (BSD).

24. **Epilobium speciosum** Decaisne in Jacquemont Voy. India IV, Bot. 57, t. 69. 1835 ; Chen *et al.*, Syst. Bot. Monogr. 34:38. 1992. *E. gerardium* Wall. Numer. List, No. 6326. 1832, *nom. nud.* *E. latifolium* Linn. ssp. *speciosum* (Decaisne) Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2(12) : 349. 1962. *Chamerion speciosum* (Decaisne) Holub, Folia Geobot. Phytotax 7:86. 1972.

Type : India : Himachal Pradesh, near Yurpo, 3000 m, 1830-31, *Jacquemont* 1739 (*Holotype*-P ; *Isotype*-K, Photo, CAL !).

Fl. : May - Sept. ; *Fr.* : Sept. - Oct.

Distrib. : INDIA : Himalayas from Kashmir to Nepal, in colonies, Mountain slopes, nearby streams, wet places, 3000-4850 m, Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh. Nepal, China.

Specimen examined . UTTAR PRADESH : Bed of Kharga stream below Srikanta, Tehri-Garhwal, 13-14000', 8 Aug. '83, *J. F. Duthie* 1042 (b) (CAL) ; Milam, gori valley, Kumaon, 14.8. 1900, *Inayat* 24440 (CAL).

25. **E. stracheyanum** Haussk. Monogr. Epil. 214. t. 3 fig. 37. 1884 ; H. Lev., Ic. Gen. Epil. t. 92. 1910 ; Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2(12) : 368. 1962 ; Naithani, Fl. Chamoli 1:241. 1984.

Type : India : Uttar Pradesh, Kumaon, 2100 m., *Strachey & Winterbottom* 12 (*Lectotype*-JE designated by Raven *l.c.*).

Fl. & Fr. : June - Aug.

Distrib. : INDIA : Western Himalaya, 2100-3500 m above m.s.l. Uttar Pradesh (Kumaon) ; Rare. China (Tibet).

Specimens examined : No specimen is available for study.

26. **E. trichophyllum** Haussk. in Oesterr. Bot. Zeit. 29:53. 1879 et in Monogr. Epil. 205, t.3 fig 38. 1884 ; H. Lev., *l.c.* Gen. Epil. t. 86. 1910 ; Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2(12):374. 1962. *E. organifolium* Lamk. var. *villosum* C.B. Clarke in Fl. Brit. India 2:586. 1879.

Type : India : Sikkim : Latong (near Chotang), 3500 m, 13 July, 1849, *Hooker* s.n. (*Holotype* : K).

Fl. : July.

Distrib. : INDIA : Eastern Himalaya, 3040-3648 m. Sikkim.

This species is only known by the type collection from Sikkim (Latong) collected by Hooker in 1849 and deposited at K and W. Presumably extinct.

27. **E. tibetanum** Haussk. in Oesterr. Bot. Zeit. 29:53. 1879 et in Monogr. Epil. 201. 1884 ; H. Lev., Ic. Gen. Epil. t. 75. 1910 ; Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2(12):357. 1962 ; Hoch & Raven in Nasir & Ali, Fl. Pakistan 139:21. 1981 ; Chowdhery & Wadhwa, Fl. Himachal Pradesh 1:297. 1984. Chen *et al.*, Syst. Bot. Monogr. 34:84. 1992. *E. pseudobscurum* Haussk. in Oesterr. Bot. Zeit. 29 : 53. 1879 ("pseudo-obscure") *E. leiospermum* Haussk. Monogr. Epil. 206, t.5 fig. 45. 1884. *E. roseum* var. *anagallidifolium* C.B. Clarke in Fl. Brit. India 2:585. 1879, *p.p. quoad Pl. cit.* *E. nuristanicum* Rech. in Biol. Skr. Dansk. Vid. Selsk. 10(3) : 61. 1958.

Type : Baltistan, Thalle La to Bagmaharal, 30 Aug. 1856, *Schlagintweit* 5909 (JE).

Fl. : July-Sept. (Dec.) ; *Fr.* : Aug-Oct. (Dec.).

Distrib. : INDIA : Throughout the Himalayas in moist places, nearby water

courses, 2000-3600 m. Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh, Sikkim, Afghanistan, Pakistan, Nepal, Bhutan, China.

Specimens examined : UTTAR PRADESH : Ganges valley, 8-9000', 16 July, 1883, *Duthie* 1047 (CAL) ; Rambara, Garhwal, 2600 m, above m.s.l. 25.9.1958, *M. A. Rau* 8616 (CAL). HIMACHAL PRADESH : Sissu, Lahul, 8.7. 1941, *N.L. Bor* 10287 (CAL).

28. ***Epilobium wallichianum*** Haussk. in Oesterr. Bot. Zeit. 29:54. 1879 ; *Chen et al.*, Syst. Bot. Monogr. 34:132. 1992. *E. nepalense* Haussk. in Oesterr. Bot. Zeit. 29:53. 1879. *p.p. E. tetragonum sensu* C.B. Clarke in Fl. Brit. India. 2:586. 1879 *p.p. non*. Linn. *E. souliei* H. Lev. in Bull. Herb. Boiss. ser. 2, 7:588. 1907. *E. wallichianum* ssp. *souliei* (H. Lev.) Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2(12):360. 1962. *E. sykesii* Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2:366. 1962.

Type : India : Sikkim, 3 Aug. 1849, *Hooker* s.n. (*Lectotype* : K ; Photo, CAL !).

Fl. : July - Aug. ; *Fr.* : Aug. - Sept.

Distrib. : INDIA : North western and Eastern Himalaya in wet places, forest edges, grassy slopes and nearby streams. 1500-3650 m. Himachal Pradesh, Uttar Pradesh, West Bengal, (Darjeeling), Sikkim, Meghalaya, Nagaland. Nepal, Bhutan, China, Myanmar.

Specimens examined : MEGHALAYA : Khasia, 6000', *J.D.H. & T.T* s.n. (CAL). HIMACHAL PRADESH : Pangti, *Mrs. Douli* 52 (CAL) ; Manali, 1800 m, 29 July, 1971, *U.C. Bhattacharya* 44748 (BSD). UTTAR PRADESH : Gangi, Thehri dt., 3500 m, above m.s.l., 11.8.1978, *A. K. Goel* 64368 (BSD).

29. ***E. williamsii*** Raven in Bull. Brit Mus. (Nat. Hist.) Bot. 2(12):378, fig. 38B. 1962 ; Chowdhery & Wadhwa, Fl. Himachal Pradesh 1:297. 1984; *Chen et al.*, Syst. Bot. Monogr. 34:144. 1992.

Type : Nepal : Taglung, South of Tukucha, Kali Gandaki, 3800 m, 15 July 1954, *Stainton, Sykes & Williams* 1800 (*Holotype* : BM).

Fl. : July - Aug. ; *Fr.* : Aug. - Sept.

Distrib. : INDIA : Throughout the Himalayas in moist places near streams on alpine meadows, on banks of glacial lakes. 3500-4250 m. Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh, Sikkim. Nepal, Bhutan, China.

30. ***E. wattianum*** Haussk., Monogr. Epil. 204, t.4 f.41. 1884 ; H. Lev., Ic. Gen. Epil. t. 89. 1910 ; Raven in Bull. Brit. Mus. (Nat. Hist.) Bot. 2(12):377. 1962.

Type : "Tibet (Ladakh ?), 10148', *Bellew* 1873, No. 32. Hort. Kew" (*Lectotype* : K, designated by Raven *l.c.*).

Distrib. : INDIA : Western Himalaya, 4000 m, Uttar Pradesh, Himachal Pradesh. Endemic. Rare.

3. LUDWIGIA Linn., Sp. Pl. 118. 1753.

Jussiaea Linn., Sp. Pl. 388.1753.

Lectotype : *Ludwigia alternifolia* Linn. (Hitchc. & Greene Int. Bot. Cong., 1930, Prop. Brit. Bot. 125. 1929).

Distrib. : Pantropical to subtemperate region with largest groups of species in North and South America and small groups in the old world. c. 80 species in the world ; 7 species in India.

KEY TO THE SPECIES

- | | | |
|--|-----|---|
| 1a. Stamens twice as many as the sepals | ... | 2 |
| b. Stamens as many as the sepals, very rarely (in <i>L. perennis</i>)
more in some flowers | ... | 6 |

- | | | |
|--|-----|-------------------------|
| 2a. Seeds free, not embedded in endocarp, pluriseriate, pollen shed in tetrads | ... | 3 |
| b. Seeds embedded in endocarp, uniseriate, at least below, pollen shed individually | ... | 5 |
| 3a. Raphe equal in diameter to the body of the seeds ; capsule with 8 dark ribs | ... | 4. <i>L. octovalvis</i> |
| b. Raphe not more than 1/5 the diameter of the body of the seed ; capsule 4-angled with 4-ribs | ... | 4 |
| 4a. Plant subglabrous to puberulent, sepals 2-6 mm long ; petals 3.5-5 mm long | ... | 2. <i>L. erecta</i> |
| b. Plant pubescent to villous ; sepals 10-18 mm long ; petals 15-24 mm long | ... | 6. <i>L. peruviana</i> |
| 5a. Seeds pluriseriate and free in the upper 1/4 of the capsule, uniseriate in the lower part ; erect marshy plant with elongate pneumatophores arising from underground roots | ... | 3. <i>L. linifolia</i> |
| b. Seeds uniseriate throughout the capsule, firmly embedded in woody endocarp ; aquatic or marshy plants rooting at the nodes with conspicuous white erect spindle shaded pneumatophores arising in clusters at the nodes floating stems and roots | ... | 1. <i>L. adscendens</i> |
| 6a. Seeds pluriseriate in each locule of the capsule | ... | 5. <i>L. perennis</i> |
| b. Seeds uniseriate in each locule of the capsule | ... | 7. <i>L. prostrata</i> |

1. **Ludwigia adscendens** (Linn.) Hara in J. Jap. Bot. 28:290. 1953 ; Raven in Reinwardtia 6:387. 1963. *Jussiaea adscendens* Linn., Mantissa 1:69. 1767. *J. repens* Linn., Sp. Pl. 388. 1753 ; C.B. Clarke in Fl. Brit. India 2:587. 1879 ; Prain, Bengal Pl. 1:507. 1903.

Type : India : ("Although it appears from his description that Linnaeus had a specimen at the time he described this species, it has apparently not been preserved. There is no doubt as to the application of the name "Raven l.c.).

Fl. & Fr. : Oct. - May.

Distrib. : INDIA : Throughout, often in ditches, ponds, in wet swampy places, from the sea level to 1500 m. Nepal, China, Myanmar, Bangladesh, Sri Lanka, S.E. Asia, Australia.

Specimens examined : ASSAM : Silchar neighbourhood 7.8.1903, A.T. Gage s.n. (CAL);

Nongpoh, April 1893, Dr. King's Coll. s.n. Acc. No. 17838 (CAL). TAMIL NADU : Manakkal, Thanjavur dt. 30 m, 29.5.1978, V.J. Nair 57199 (CAL, MH) ; near Anamalai, Madurai dt., 15.6.1957, K. Subramanyam 3503 (CAL, MH).

2. **L. erecta** (Linn.) Hara in J. Jap. Bot. 28:292. 1953 ; Raven in Reinwardtia 6:348. 1963 ; Sharma in J. Bombay Nat. Hist. Soc. 66(2): 421. 1969. *Jussiaea erecta* Linn., Sp. Pl. 1:388. 1753.

Type : From America, cultivated in Europe; the seeds perhaps from Cartagena, Colombia, sent by Houston (LINN 552.4 ; cf. Fawcett, J. Bot. Lond. 64:11-12, 1926).

Distrib. : INDIA : Moist places, West Bengal, Maharashtra. Native in the new world, introduced in the old world, throughout tropical Africa. Cultivated in Europe.

Specimens examined : WEST BENGAL :

Indian Botanic Garden, Howrah, 3.11.1967, V.S. Sharma 726 (CAL).

3. **Ludwigia linifolia** (Vahl) Rolla Rao, Fl. Goa, Diu, Daman & Nagerhaveli 1:179. 1985. *Jussiaea linifolia* Vahl, Ecolog. Am. 2:32. 1978 non Poir. 1813. *L. hyssopifolia* (G. Don) Exell, Garcia de orta 5:471. 1957. *J. hyssopifolia* G. Don, Gen. Syst. 2:693. 1832. *J. fissendocarpa* Haines in J. Asiat. Soc. Bengal n.s. 15:314. 1919. *Fissendocarpa linifolia* (Vahl) Bennet in J. Bombay Nat. Hist. Soc. 67:126. 1970.

Type : "America meridionali", von Rohr 188 (C).

Distrib. : INDIA : Throughout in marshy places, rice fields, near lakes and ponds, wet sandy soil up to 500 m altitude. Sri Lanka, Bangladesh, Myanmar, Hong Kong, Malesia, Australia, West Tropical America.

Specimens examined : KARNATAKA : Suratkhal beach, S. Kanara dt., 12.11.1978, Saldanha & Prakash 4047 (CAL). KERALA : way to Ayyappan temple, Idukki dt., 2.9.1977, N.C. Nair 50804 (CAL, MH) ; Port Cochin, 1.11.72, T.A. Rao 9675 (CAL). ANDAMAN & NICOBAR ISLANDS : Prothrapur, S. Andamans, ± 25 m above m.s.l. 23.9.1975, Balakrishnan & Chakraborty 3089 (CAL).

4. **L. octovalvis** (Jacq.) Raven in Kew Bull. 15: 476. 1962 ; Raven in Reinwardtia 6:356. 1963. *Jussiaea octovalvis* (Jacq.) Swartz, Obs. Bot. 142. 1791. *J. suffruticosa* Linn., Sp. Pl. 388. 1753; C.B. Clarke in Fl. Brit. India 2:587. 1879 ; Prain, Bengal Pl. 1:507. 1903. *Oenothera octovalvis* Jacq., Enum. Syst. Plant 19. 1960.

Type : West Indies, Jacquin not seen and probably no longer extant (Raven l.c.).

Distrib. : Pantropical.

KEY TO THE SUBSPECIES

- 1a. Stems and leaves with appressed pubescens or glabrescent, leaves lanceolate or narrowly ovate to linear ... 4.1. subsp. *octovalvis*
 1b. Stems and leaves with long erect hairs, leaves lanceolate to subovate ... 4.2. subsp. *sessiliflora*

- 4.1 subsp. **octovalvis**-*Jussiaea pubescens* Linn., Sp. Pl. 2, 4:555. 1762. *Ludwigia pubescens* (Linn.) Hara in Jap. Bot. 28:293. 1953. *J. parviflora* Camb. in St. Hill., Fl. Brass. Merid. 2:263. 1829.

Fl. & Fr. : Throughout the year.

Distrib. : INDIA : Throughout, in marshy places, near cultivated field up to 1500 m above m.s.l. Indian subcontinent eastwards up to Taiwan, Malesia, Australia, Pacific Islands, S. America, S.E. Africa.

Specimens examined : ASSAM : Near Kaphitoli, 1/2 mile south of Doboka res. forest,

Nowgong dt., 250 m, 22.8.1964, Balakrishnan 39502 (CAL), Garampani, 30.10.56, G. Panigrahi 4206 (CAL). BIHAR : Donuda, Chotanagpur, Nov. 1886, Prain s.n. Acc. No. 178486 (CAL); Ranchi, 7.9.1896, Mokim s.n. Acc. No. 178484 (CAL).

- 4.2 subsp. **sessiliflora** (Micheli) Raven in Kew Bull. 15:476. 1962 ; Raven in Reinwardtia 6:362. 1963. *Jussiaea octonervia* forma *sessiliflora* Micheli in Maritus, Fl. Bras. 13(2) : 171. 1875. *J. villosa* Lam., Encycl. 3:331. 1789. *Epilobium fruticosum* Loureiro, Fl. Cochinch. 1:277. 1790. *J. burmanii* DC. Prod. 3:57. 1828, *J. exaltata*

Roxb., Hort. Beng. 33. 1814, *nom. nud.* et in Fl. Ind. ed. Carey 2:401. 1832. *J. longipes* Griff., Notul. 4:689. 1854. *J. junghuhniana* Miq. Fl. Ind. Bat. 1(1):627. 1855.

Type : Rio de Janeiro, Brazil, *Burchell* 927 (K, *Isotype* : GH).

Fl. & Fr. : Sept. - Dec.

Distrib. : INDIA : Throughout except western desert region ; in the tropical to subtropical marshy places near cultivated fields up to 1300 m altitude. Sri Lanka, China, Japan, Malesia, Australia, Pacific Islands, West Indies to Brazil, North Australia, South America.

Specimens examined : TAMIL NADU : Sattiar MHEP areas, Sirumalai, Anna dt., 600 m above m.s.l. 19.6.1986, *Ramamurthy* 83844 (CAL, MH). KERALA : Karapara river side, Nelliampathy range, Palghat dt., 900 m, above m.s.l. 23.1.1989, *Bhargavan* 82249 (CAL, MH).

5. *Ludwigia perennis* Linn. Sp. Pl. 1:119. 1753, ex cl. verba falsa "foliis oppositis", Raven in Reinwardtia 6:367. 1963 ; Khan & Samshunnahar in S. Khan, Fl. Bangladesh 6:7. 1977. *Jussiaea perennis* (Linn.) Brenan in Kew Bull. 8:163. 1953. *J. caryophylla* Lam. Encycl. 3:331. 1789. *L. parviflora* Roxb., Hort. Beng. 11.1814, *nom.nud.* et in Fl. Ind. ed. Carey. 1:440. 1820 ; C.B. Clarke in Fl. Brit. India 2:588. 1879 ; Prain, Bengal Pl. 1:507. 1903. *L. lythroides* Bl. Bijdr. 1134. 1826. *L. gracilis* Miq., Fl. Ind. Bot. 1(1):629. 1855.

Type : Ceylon, *Hermann* (BM).

Fl. & Fr. : Feb. - Dec.

Distrib. : INDIA : Throughout, in rice fields, swampy areas, up to 1200 m altitude. Tropical and subtropical Asia, Tropical Australia, Africa, New Caledonia.

Specimens examined : ORISSA : Padampur, 31.10.1959, *G. Panigrahi* 20563 (CAL). MADHYA PRADESH : Goona, Oct. 1861, *G. King* 194 (CAL). KARNATAKA : Sellapore, N. Canara, 1881, *W.A. Talbot* 993 (CAL). UTTAR PRADESH : 5 miles before Pharandra, 31.10.63, *C.M. Arora* 1413 (CAL).

6. *L. peruviana* (Linn.) Hara in J. Jap. Bot. 28:293. 1953 ; Raven in Reinwardtia 6:345. 1963. *Jussiaea peruviana* Linn. Sp. Pl. 1:388. 1753. *J. suffruticosa sensu* Trimen, Handb. Fl. Ceylon 2:233. 1894 *non* Linn. *J. speciosa* Ridley in J. Bot., Land. 59.259. 1921 ; Fischer in Gamble, Fl. Pres. Madras 3:1298. 1957 (Repr.ed.) .

Type : Peru, *Feuslee*, J. Obs. : 2, t. 9. 1714.

Fl. & Fr. : Sept. - April.

Distrib. : INDIA : Deccan plateau in tropical to subtropical zones in marshy places, 200-900 m, Tamil Nadu, Kerala. Sri Lanka, Singapore, Malaysia, S. America, Native of New World.

Specimens examined : TAMIL NADU : Siruvani, Coimbatore, 800 m, 3.1.1978, *N.C. Nair* 41480 (CAL); Akthikkadavu, Coimbatore, 7.9.1985, *Rathakrishnan* 82318 (CAL); Sultan-Battery road-Benne forest, Nilgiri dt., 1100 m, 18.7.1960, *K. Subramanyam* 10429 (CAL).

7. *L. prostrata* Roxb., Hort. Beng. 11. 1814, *nom.nud.* et in Fl. Ind. ed. Carey 1:441. 1820, C.B. Clarke in Fl. Brit. India 2:588. 1879; Prain, Bengal Pl. 1:507. 1903 ; Raven in Reinwardtia 6:374. 1963 ; Khan & Shamshunnahar in S. Khan, Fl. Bangladesh 6:9. 1977. *Nematopyxis prostrata* (Roxb.) Miq., Fl. Ind. Bat. 1(1):630. 1855. *Jussiaea prostrata* (Roxb.) H. Lev., Fedde Rep. Sp. Nov. 8:138. 1910. *L. fruticosa* Bl., Bijdr. 1133. 1826-27. *L. leucorhiza* Bl. Bijdr. 1133. 1826-27.

Nomatopyxis pusilla Miq., Fl. Ind. Bat. 1(1) : 630. 1855.

Type : India : Bengal, Roxburgh.

Fl. & Fr. : Aug. - Dec.

Distrib. : Throughout, in moist places, rice fields, river beds up to 800 m above m.s.l. Nepal, Bangladesh, Sri Lanka, Myanmar, China, Singapore, Malesia.

Specimens examined : UTTAR PRADESH : Locality not mentioned, *Dr. Stolizka* s.n. ASSAM: Locality not mentioned, *Jenkins* s.n. (CAL). ANDRA PRADESH : Rampa, Godavari,

9.10.1915 *V. Narayanaswami* 553 (CAL). ANDAMAN & NICOBAR : S. Andaman, 31.10.1894, *Dr. King's Collector* s.n. (CAL).

4. *OENOTHERA* Linn. Sp. Pl. 346. 1753.

Onagra P. Miller, Gard. Dict. Abr, ed. 4. 1753.

Hartmannia Spach, Hist. Veg. Phan. 4.378. 1835.

Distrib. : North and South America with a number of species introduced as escape from cultivation throughout the world ; c. 125 species in the world ; 5 species naturalised in India.

KEY TO THE SPECIES

- | | | |
|---|-----|----------------------------|
| 1a. Petals rose to rose-purple ; capsule tapering to a stipe-like sterile portion | ... | 2 |
| b. Petals yellow ; capsule not tapering to a stipe like portion | ... | 3 |
| 2a. Erect or ascending herb without any basal rosette ; petals 4-12 mm long | ... | 3. <i>O. rosea</i> |
| b. Prostrate or decumbent herb with a basal weak rosette ; petals c. 30 mm long | ... | 5. <i>O. tetraptera</i> |
| 3a. Capsule conspicuously enlarged distally ; seeds elliptic, beaked | ... | 4. <i>O. stricta</i> |
| b. Capsule not enlarged distally ; seeds angled, not beaked | ... | 4 |
| 4a. Stem pubescence with reddish-purple pustulate bases on atleast some of the longer hairs ; capsule narrowly-lanceolate in outline with a red median stripe on each valve | ... | 2. <i>O. erythrosepala</i> |
| b. Stem pubescence without reddish-purple pustulate base ; capsule narrowly ellipsoid having no red median stripe on each valve | ... | 1. <i>O. biennis</i> |

1. *Oenothera biennis* Linn. Sp. Pl. 1:346. 1753.

Fl. & Fr. : Aug. - Sept.

Distrib. : INDIA : Cultivated and sometimes naturalised. Jammu & Kashmir, Himachal Pradesh, Tamil Nadu (Nilgiri). Native of North America.

Specimens examined : JAMMU & KASHMIR: Bhadrawala, Kashmir, 17.8.1962, *B.M. Wadhwa & J.N. Vohra* 366 (CAL) ; Kashmir, *T.A. Rao* 100 (CAL).

2. *O. erythrosepala* Borbas, Magyar Bot.

Lapok 2:245. 1903. *O. glazioviana* Micheli in Martius, Fl. Brass. 13(2) : 178. 1882. *O. lamarkiana* auct. mult., non Seringe in DC., Prodr. 3:47. 1828. *O. grandiflora sensu* Munz, Opera Bot. Ser. B, 3:40. 1974, non L'Her ex Aiton, Hort. Kew 2:2. 1789.

Type locality : Hungary, Ranos near Budapest.

Distrib. : INDIA : Cultivated in Himalayas and Nilgiri hills, sometimes escape. Native place unknown, naturalised in all continents except Antarctica.

Specimens examined : TAMIL NADU : Ooty, Nilgiri dt., 2400 m, 24.1.1947., *K.M. Sebastine* 2217 (CAL). SIKKIM : Locality not mentioned, 27 July 1874, *G. King* 1008 (CAL).

3. *Oenothera rosea* Aiton, Hort. Kew ed. 1,2:3. 1789 ; C.B. Clarke in Fl. Brit. India 2:582. 1879 (in nota). *Hartmania rosea* (Aiton) G. Don in Sweet, Hort. Brit. ed 3:236. 1839.

Type locality : Peru.

Fl. & Fr. : April - Sept.

Distrib. : INDIA : Introduced and naturalised almost throughout India as a weed. Native of tropical America.

Specimens examined : ASSAM : Daranga, Kamrup, 20.6.1974, *S.K. Das* 51241 (CAL). MEGHALAYA : Laitumkrak road., 23.4.1957, *G. Panigrahi* 3914 (CAL). TAMIL NADU : Ooty, Nilgiri, 7500', 9.3.1870, *C.B. Clarke* 10533 (CAL).

4. *O. stricta* Ledeb. ex Link. subsp. *stricta* Enum. Pl. Berol. 1:377. 1821. *O. odorata sensu* C.B. Clarke in Fl. Brit. India 2:582. 1879, *non* Jacq. 1795.

Type : Grown from seed at the Botanical Garden of Dusseldorf, Germany, 14 August 1972, from seed collected in Chile, Prov. Concepcion, airport of Concepcion, 1959, H. Nodt 2155718 (*Neotype* : MO). (Dietrich, Ann. Missouri Bot. Gard. 64:538. 1978).

Fl. & Fr. : June - Sept.

Distrib. : INDIA : Cultivated at Kashmir, Punjab, Himachal Pradesh, Uttar Pradesh, Tamil Nadu (Nilgiri), sometimes naturalised. Native of Chile, Argentina, South America.

Specimens examined : TAMIL NADU : Ooty, Nilgiris, 800', 22.3.1870, *C.B. Clarke* 11169 (CAL) ; Kodaikanal, 7000', 23.7.1913. *Rev. Aug. Saulieres* 843 (CAL).

5. *O. tetraptera* Cav. Ic. 3:40, t. 279. 1794 ; C.B. Clarke in Fl. Brit. India 2:582. 1879 ; Gamble, Fl. Pres. Madras 1:366. 1957 (Repr. ed.).

Distrib. : INDIA : Cultivated and naturalised in Uttar Pradesh (Nainital, Kumaon), Tamil Nadu (Nilgiri hills) and Meghalaya (Shillong).

Specimens examined : TAMIL NADU : Kodaikanal, 6500', 2.9.1913, *Rev. Aug. Saulieres* 957 (CAL) ; Ooty, Nilgiris, 7000', 10.3.1870, *C.B. Clarke* 10647 (CAL).

CULTIVATED SPECIES

1. *Clarkia concinna* Greene, Man Bot. San Francisco Bay 136. 1826 ; Babu, Herbaceous Fl. Dehra Dun 189. 1977.
2. *C. elegans* Dough. in Lindl. Bot. Reg. t. 1575. 1829 ; Sharma & Pandey, Exotic Fl. Allahabad dt. 5.1. 1984.
3. *C. pulchella* Pursch, Fl. Am. Sept. i.t. 11. 1814 ; Babu, Herbaceous Fl. Dehra Dun 189. 1977.
4. *Fuchsia arborescens* Sims in Bot. Mag. t. 2620. 1825 ; Gopalan in Nair & Henry, Fl. Tamil Nadu 1:168. 1983.
5. *F. boliviana* Carr. var. *luxurians* Johnston in Rev. Hort. 1876. 150. 1876. *F. corymbiflora* Ruiz & Pav. Fl. Per. 3:87. t. 325. 1802.
6. *F. coccinea* Soland in Ait. Hort. Kew ed. 1, 2:8. 1810.
7. *F. corymbosa* Pritz. Ic. Ind. 1:469. 1861.
8. *F. dependens* Hook.f. Ic. Pl. t. 65. 1837.
9. *F. hybrida* Hort. ex Vilmorin's Blumeng. ed. 3, Sieb. & Voss. 1:332. 1894.
10. *F. magellanica* Lam. Encl. 2:265. 1788 ; Matthew in Rec. Bot. Surv. India 20(1) : 121. 1969.
11. *F. magellanica* Lam. var. *globosa* Lindl. Bot. Reg. t. 1556. 1839.
12. *Oenothera acaulis* Cav. Ic. IV. : 68, t.399. 1797.
13. *O. affinis* Cambess in St.-Hilaire, Fl. Brass.

Mer. 2. : 269. 1829.

14. **Oenothera drummondii** Hooker in Bot. Mag. 61.t.3361. 1834. *Raimannia drummondii* (Hooker) Rose on U.S. Dept. Agri. Contriv. Nat. Herb. 8:330. 1905.
15. **O. grandiflora** L. 'Her. in Aiton, Hort. Kew 2: 2. 1789.
16. **O. laciniata** Hill ssp. **pubescens** (Willd. ex Spreng.) Munz, North Amer. Fl., Ser. 2, 5:109. 1963. *O. pubescens* Willd. ex Spreng. Syst. Veg. 2:229. 1825.
17. **O. longiflora** L., Mant. Pl. 227. 1771, ssp. **longiflora**.
18. **O. mollissima** L., Sp. Pl. 346. 1753.
19. **O. nocterna** Jacq., Coll. 3:205. 1789 ; Gopalan in Nair & Henry, Fl. Tamil Nadu 1:168. 1983.

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