

## The Genus *Eupatorium* Linn. (Asteraceae) in North-East India

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(Received 9 October 1979)

The present paper is a contribution towards a taxonomic revision of the introduced genus *Eupatorium* in North-East India. Eight species are treated in this paper.

**Keywords:** *Eupatorium*, Introduced genus, Revision, North-East India

### Introduction

During the last few decades, there has been an increasing immigration of a large number of foreign plants into the subcontinent of India, many of which have become weedy and adventive in nature causing considerable damage to Indian agriculture and forestry. The genus *Eupatorium* with about 1200 species mostly centred around Central and South America and a few in Europe, Asia and Africa, is represented by eight species in the North-Eastern region of India. Of these, three species have proved to be very adventive. Being a recent introduction, the genus has not been dealt with in detail in any of our floras. Hooker (1881) has dealt with only two species in detail along with a casual mention of some species which are now very adven-

tive. Kanjilal et al. (1939) deal with only one species—*E. cannabinum* Linn., while Malhotra and Jain (1978) have given a preliminary account of the genus and have reported only seven species. Nevertheless, some of the adventive species of this genus have become a menace to the forest trees, depriving of the much-needed nutrition and sunshine for the saplings of many economically important species. Hence there has been an increasing interest developed by botanists and foresters in India towards this introduced, weedy genus. All the same a systematic account of the genus is lacking and there exists considerable amount of confusion regarding the identity and nomenclature of the species.

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\* The abbreviation 'NEHU' is yet to find a place in the *Index Herbariorum*

The present study is to fill in such a lacuna and is based on the collections and observations of the authors as well as other collections deposited in the Herbarium of North-Eastern Hill University (\*NEHU) and Botanical Survey of India, Shillong (ASSAM).

### Taxonomic Treatment

*Eupatorium* Linn. *Sp. Pl.* 836. 1753 et *Gen. Pl.* ed 5, 5 : 363. 1754 (After Mithridates VI the Great, known as Eupater 123-63 B. C., King of Pontus)

Herbs to undershrubs, often straggling; leaves dentate or entire, very rarely alternate. Heads corymbose or paniculate, homogamous, few to many-flowered. Involucre 1-many seriate. Receptacle naked or sometimes pubescent. Corolla infundibuliform or campanulate, never yellow. Anthers appendiculate, obtuse or rarely sagittate at base; stylar branches long, exerting, obtuse at the top. Achenes oblong, truncate at apex, 4-5 -angled, glabrous or with ciliate ribs and glandular shining spots. Pappus uniseriate, rigid, feathery, forming a crown at the top of the achene.

Species about 1200, mostly centred around Central and South America, and a few in Europe, Asia and Africa. About eight species in NE India.

### Key to Species

1a. Heads 5-10 flowered

2a. Involucral bracts rounded or oblong  
 . . . . *E. cannabinum*

2b. Involucral bracts, acute, subacute or obtuse.

3a. Leaves palmately 3-5 nerved;  
 plants scabrous pubescent  
 . . . . *E. nodiflorum*

3b. Leaves penni-nerved; plants otherwise

4a. Leaves ovate-elliptic, sharply and closely serrate, scabrous; achenes with conspicuous raised. shining glands

. . . *E. chinense*

4b. Leaves ovate-lanceolate or young ones linear-lanceolate, distantly and shallowly serrate, membranous; achenes eglandular . . . . *E. birmannicum*

1b. Heads more than 10 flowered

5a. Leaves entire; heads paniculate  
 . . . . *E. triplinerve*

5b. Leaves dentate or serrate; heads corymbose

6a. Leaves 3-nerved at base; nearly glabrous; involucre 1-2 seriate; bracts equal . . . . *E. riparium*

6b. Leaves penni-nerved, pubescent, at least on veins; involucre 3-5 seriate; bracts unequal (outer smaller and inner larger)

7a. Stems sparsely pubescent, striate; leaves triangular, oblong or rhomboidal; involucral bracts 5-seriate; corolla light violet or white; pappus 5 mm long

. . . . *E. odoratum*

7b. Stems, branches and involucral bracts glandular hairy, not striate; leaves ovate-rhomboid; involucral bracts 3-seriate; corolla white; pappus hairs 2.5-3 mm long

. . . . *E. adenophorum*

1. *Eupatorium adenophorum* Spreng. *Syst.* 3: 420. 1826; Koster in *Blumea* 1: 502. 1935—*E. glandulosum* H B & K *Nov. Gen. Sp.* 4: 122. 1820  
non Michx (figure 8)

Tall, much-branched herbs, annuals or biennials; stems and young parts densely covered with stalked glands; leaves petiolate, broadly elliptic or rhomboid-elliptic, dentate at the upper part and entire at base, penni-nerved, nerves glandular beneath; blades 4-9 × 2-5 cm; heads corymbose, terminal, pedunculate, campanulate, many flowered, 4-6 mm; involucre campanulate, 3-seriate; bracts of the outer series shorter, lanceolate, elliptic, acute, glandular on the margin; corolla 2.5 mm long, infundibuliform, 5-lobed, white; anthers obtuse at both ends; stylar branches shortly exceeding the corolla; achenes linear-oblong, slightly curved, 1-1.5 mm long, 5-angled, glabrous; pappus dirty white, nearly as long as the corolla.

*Fl & Fr:* February-April, extending even to May.

*Distribution:* Indigenous to Mexico, W Indies and New Zealand. Now common throughout the North-East India, above 1000 m. Commonly associated with *E. riparium* and frequently forming pure strands.

*Notes:* This species can be biologically controlled by *Procecidochares utilis* (Diptera) and by the fungus *Cercospora eupatorii* (King 1966).

*Specimens examined:* Meghalaya: Khasi Hills (1000-2000 m) *P Kharkongor* 800 (NEHU); *S K Kataki* 33043 (ASSAM); *G K Deka* 33176 (ASSAM); *S Chowdhury* 31886 (ASSAM) Nagaland: Kohima *R R Rao* 86 (NEHU).

2. *Eupatorium birmannicum* DC. *Prodr.* 5:170. 1836; C. B. Cl. *Comp. Ind.* 32:1876

Erect, glandular pubescent herbs; leaves ovate-lanceolate or young ones linear-lanceolate, opposite or the upper ones alternate, shallowly and distantly serrate, membranous, glandular hairy, penni-nerved; corymbs dense; heads 4-5 flowered; inner involucre bracts linear-obtuse, glabrous; achenes 5-ribbed, eglandular, 3 mm long (with pappus); pappus dirty white, uniseriate, feathery.

*Fl & Fr:* October-January.

*Notes:* Not a very common plant in the region. Hooker (1881) mentions that this is a Japanese plant and is not different from *E. cannabinum* Linn. However, this species can be easily separated from *E. cannabinum* by the presence of acute or subacute involucre bracts

*Specimens examined:* Assam: Sibsagar U. N. *Kanjilal* 3566 (ASSAM); Meghalaya: Jaintia Hills (Jowai Road) *G. K. Deka* 17243 (ASSAM).

3. *Eupatorium cannabinum* Linn. *Sp. Pl.* 838. 1753; DC, *Prodr.* 5. 180, 1836; C. B. Cl. *Comp. Ind.* 34, 1876; Hk. f. *Fl. Brit. India* 3: 243. 1881; *Kanjilal et al.*, *Fl. Assam* 3: 108, 1939—*E. heterophyllum* DC. *loc. cit.* 180, 1836.—*E. punduanum* Wall, *ex DC. loc. cit.* 179, 1836; C. B. Cl. *Comp. Ind.* 33. 1876.—*E. nodiflorum* non Wall. *ex DC.* 1836.—*E. simsonii* C. B. Cl. *loc. cit.* 32 1876

Coarse, perennial herbs, often straggling; leaves penni-nerved, opposite, 1.5-2.5 × 2-6 cm, lanceolate or ovate-lanceolate, coarsely serrate, acuminate, scabrous-pubescent above, lateral nerves almost obscure, base narrowed into a petiole; heads corymbose, 5-8 flowered; involucre bracts oblong or rounded, in many series, unequal; corolla regular, 5-lobed; anthers appendaged; stylar branches long, obtuse; achenes truncate, 6 mm, ridged, black at maturity; pappus

white, uniseriate, feathery, about twice the length of the achene.

This species closely resembles *E. nodiflorum* Wall. ex DC. and is kept under *E. nodiflorum* in the ASSAM Herbarium. But this can be very easily separated from *E. nodiflorum* by the presence of penni-nerved leaves and oblong or rounded involucrel bracts.

Kanjilal et al (*op. cit.* 3:108, 1939) states that this is a "pernicious invasive pest which has practically spread all over the province. Interferes with natural regeneration of timber trees and is a great menace". However, this does not seem to be so dominant as reported by them. Probably this species must have been pushed aside by the overgrowth of other *Eupatorium* spp. namely *E. odoratum* and *E. adenophorum*.

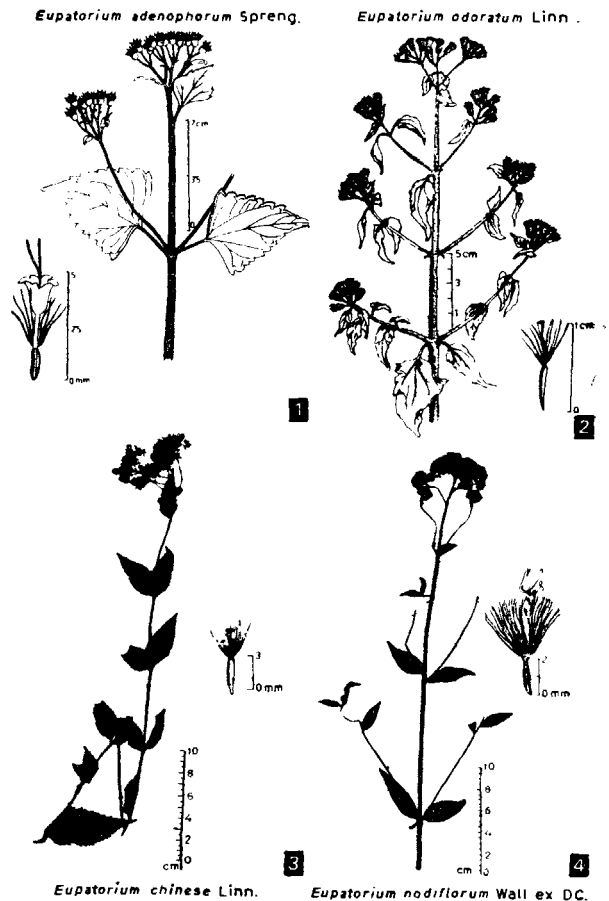
*Fl. & Fr.* : December–March

*Distribution*: Native of Europe, now frequent in Khasi and Jaintia Hills of Meghalaya (1000 to 2000 m).

*Specimens examined*: Meghalaya: K. & J. Hills G. Mann 1167; R. N. De 16844; S. R. Sharma 17590; Shillong G. K. Deka 20391, 21806 (ASSAM) Arunachal Pradesh: Kimin G. Panigrahi 19727 (ASSAM) Naga Hills: N. L. Bor 16140 (ASSAM).

4. *Eupatorium chinense* Linn. *Sf. Pl.* 837, 1753—  
*E. reevesii* Wall. ex DC. *Prodr.* 5: 179, 1836;  
*C. B. Cl. Comp. Ind.* 33. 1876; Hk. f. *Fl. Brit.*  
*India* 3: 243. 1881 (figure 3)

Herbs, 1–2 m tall, glandular pubescent; leaves ovate, acuminate, serrate, glandular pubescent, penni-nerved; heads corymbose, dense, 5-flowered; involucre campanulate; bracts 1–2 seriate, obtuse; achenes 5-ribbed, narrowed at base, 8 mm long (with pappus), minutely specked with conspicuous raised glands; pappus uniseriate, forming a ring at the top of the achene, feathery.



Figures 1–4. 1, *Eupatorium adenophorum* Spreng; 2, *Eupatorium odoratum* Linn.; 3, *Eupatorium chinense* Linn.; 4, *Eupatorium nodiflorum* Wall. ex DC.

This species is often confused with *E. nodiflorum* Wall. ex DC., but can be easily separated by the involucrel bracts which are obtuse or subacute and the plants are glandular pubescent.

*Fl. & Fr.* : January–March

*Distribution*: Throughout North-East India, but nowhere common.

*Specimens examined*: Meghalaya : K. & J. Hills N. P. Balakrishnan 47136 (ASSAM); Arunachal Pradesh: Rupa R. S. Rao 1342 (ASSAM).

5. *Eupatorium nodiflorum* Wall. ex DC. *Prodr* 5: 179, 1836; C. B. Cl. *Ccmp. Ind.* 33, 1876.—*E. cannabinum* auct. plur., non Linn. 1753. (figure 4)

Herbs; stems terete, ribbed, more or less purplish, particularly young parts; leaves subsessile, elliptic-lanceolate or oblong-lanceolate, acuminate, narrowed at base into a short petiole, sharply serrate, glandular pubescent, distinctly 3-nerved, 3–5 × 1–1.5 cm; heads in dense terminal corymbs; peduncles scabrid, 5-flowered; involucre oblong, 3-seriate; bracts acute, glabrous with shining glands; corolla infundibuliform, 5-lobed, light purple; anthers obtuse at base; achenes oblong, 4–5 angled, glabrous with shining glands, black at maturity, 2 mm long; pappus uniseriate, connate at base, about as long as corolla, sordid white.

*Fl. & Fr.*: October–January

*Specimens examined*: Meghalaya : K. & J. Hills P. C. *Kanjilal* 8682; N. P. *Balakrishnan* 46894; G. K. *Deka* 29518 (ASSAM), Arunachal Pradesh: Kameng J. *Joseph* 40466 (ASSAM).

6. *Eupatorium odoratum* Linn. *Syst. Nat. ed.* 10. 2: 1205, 1759; DC. *Prodr.* 5: 143, 1836; C. B. Cl. *Ccmp. Ind.* 30, 1876—*Chromolaena odorata* (Linn) King Robinson in *Phytolgoia* 20: 204. 1970 (figure 2)

Straggling, much branched hairy shrubs or large herbs; stems terete, ridged, hairy; leaves 3–10 × 1.5–6 cm, ovate to rhomboidal, acute, crenate serrate, hairy on both surfaces subpalmately 3-nerved; heads corymbose, terminal, campanulate, many flowered; involucre campanulate, 5-seriate; corolla light violet or white, 5-lobed, infundibuliform; anthers obtuse; achenes 4–5 angled, 10 mm long, ribs with short, stiff hairs, black at maturity; pappus numerous, connate at base.

*Fl. & Fr.* : December—March

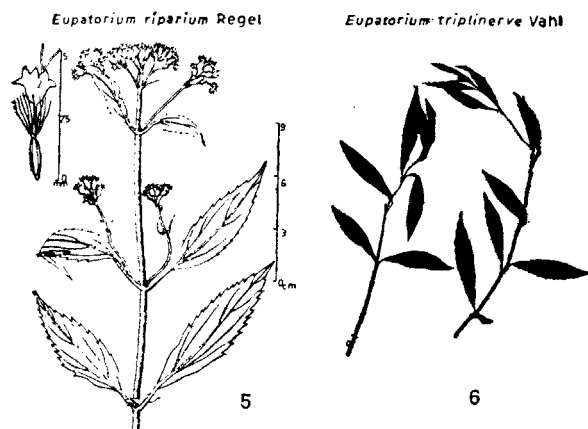
*Distribution*: Native of tropical region, now quite abundant throughout the North-East India, up to 1200 m, in jhummed areas and in deciduous forests.

*Notes*: Hooker (*Fl. Brit. India* 3: 243, 1881) gives a casual reference to this species and says of this 'cultivated, but very rarely in India'. Now, one of the dominant pests causing considerable damage to the forests depriving of the nutrition and sunlight needed for the saplings of forest trees. This species however, does not occur at elevations above 1200 m.

*Specimens examined*: Meghalaya: Khasi Hills C. T. *Thanga* 17 (NEHU); S. R. *Sharma* 17154; G. K. *Deka* 19284; N. P. *Balakrishnan* 49817 (ASSAM) Garo Hills U. N. *Kanjilal* 6934 (ASSAM); Assam: Mikir Hills R. R. *Rao* 55101; N. Lakhimpur: D. M. *Verma* 46247, Sibsagar: U. N. *Kanjilal* 2035 (ASSAM) Arunachal Pradesh: Teju R. S. *Rao* 10216; R. N. *De* 17837 (ASSAM) Nagaland: Rangapahar R. R. *Rao* 82; Kohima A. *Khonglam* 32 (NEHU) Tripura: Vaughmuu to Tlangsang D. B. *Deb* 27137 (ASSAM) Mizoram: Aizal D. B. *Deb* 31194 (ASSAM).

7. *Eupatorium riparium* Regel. *Gaertnflora* 25: 324, t. 525, 1866; Koster in *Blumea* 1. 501, 1935 (figure 5)

Herbs, stems decumbent and rooting at base, terete, often with lenticels on the lower part, young parts hispid and purplish; leaves petiolate, narrowly elliptic-lanceolate, attenuate and acute at both ends, dentate at the upper half of the lamina and entire at base, 3-nerved, 4–10 × 1–3 cm; corymbs paniculate; heads with 5–6 mm long peduncles, more than 10 flowered, 6 × 4 mm; involucre campanulate, 1–2 seriate; bracts equal, subobtuse; anthers shortly sagittate at base; stylar branches slightly ciliate;



Figures 5-6 5, *Eupatorium riparium* Regel; 6, *Eupatorium triplinerve* Vahl

achenes linear-oblong, 4-angled with stiff hairs on ribs, 1.5-2 mm long, black at maturity; pappus forming a ring at the top of the achene, feathery, about as long as the achene.

*Fl. & Fr.* : November-March

*Notes*: One of the dominant species at elevations above 1000 m. Frequently associated with *E. adenophorum* Spreng.

*Specimens examined*: Meghalaya: K. & J. Hills. Shillong R. R. Rao 685 (NEHU); G. K. Deka 11116, 25643; S. Chowdhury 29654 (ASSAM).

8. *Eupatorium triplinerve* Vahl, *Symb.* 3: 97, 1794; Willd., *Sp. Pl.* 3: 1769, 1804.—*E. ayapana* Vent., *Hort. Malam*, 2: t. 3, 1804; DC. *Prodr.* 5: 169 1836 (figure 6)

Herbs, 30-60 cm high, lower nodes creeping and rooting; stems glabrous, terete, young

## References

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 King L J 1966 *Weeds of the World—Biology and*

parts slightly pubescent; leaves subsessile, narrowly elliptic or lanceolate, long acuminate, entire, coriaceous, 3-nerved, from about 1/3 of the lamina, glabrous or slightly pubescent, 6-12 × 1-2 cm; heads paniculate, pedunculate, campanulate, 20 or more flowered; involucre campanulate, 3-seriate; corolla infundibuliform, 5-lobed; anthers obtuse at both ends; stylar branches pubescent; achenes narrowly oblong, 5-angled, pubescent on the ribs, 1.5-2 mm long; pappus forming a crown at the top of the achene, feathery, shorter than corolla.

*Fl. & Fr.* : December-April

*Distribution*: Native of America, rarely cultivated in gardens for its medicinal properties.

*Notes*: Hooker (*Fl. Brit. India* 3: 244, 1881) says that this is an American plant, introduced into Calcutta gardens. Grieve (1931) states that this Brazilian species is bitter aromatic, used as a febrifuge and considered as a remedy for bites of poisonous reptiles and insects. Leaves used to cure fevers, cold and diarrhoea; placed on the forehead in case of headache.

*Specimens examined*: Meghalaya: Umsaw K. & J. Hills G. K. Deka 17140 (ASSAM).

## Acknowledgements

The authors are thankful to Professor P. S. Ramakrishnan, FNA, Department of Botany, North-Eastern Hill University, and to the Deputy Director, Botanical Survey of India, Shillong for encouragement and for providing herbarium and library facilities.

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