

## Occurrence of East Himalayan floral elements in the Eastern Ghats of Andhra Pradesh: V. Asteraceae

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### Abstract

Of the 119 taxa of Asteraceae recorded from the Eastern Ghats of Andhra Pradesh, 85 are found in Eastern Himalayan region of India, and 27 of them are common and found throughout the Eastern Ghats of the state and remaining are with restricted distribution. All the taxa are systematically enumerated with updated nomenclature and distribution pattern in the Eastern Ghats districts of Andhra Pradesh.

**Key words:** Asteraceae, Eastern Himalaya, Eastern Ghats, Andhra Pradesh, Distribution

### INTRODUCTION

The Eastern Ghats, the warmer spot of biodiversity of Peninsular India are an assemblage of discontinuous hill ranges, distributed in four southern and Eastern states of India: Orissa, Andhra Pradesh, Karnataka and Tamilnadu, 60 % of them lying in Andhra Pradesh. In Andhra Pradesh, the Ghats lies between 13°32' – 18° 20' N Latitude and 78° 30' – 84°08' E Longitude. Eastern Himalaya, one of the 34 global biodiversity hotspots is situated between Central Nepal to Myanmar in the East encompassing south-east Tibet, North Bengal, Bhutan and North-East India. The Eastern Himalayas in India covers Arunachal Pradesh, Sikkim and Darjeeling hills of West Bengal. Relevant information on both the regions has been presented in earlier papers of this series (Rao *et al* 2009 a & b; Rao *et al* 2010a & b) and Singh (1971).

Asteraceae (= Compositae, *nom.cons. et nom. alt.*), the largest family of the plant kingdom with 23,600 species and 1620 genera (APG III, 2009) is cosmopolitan in distribution. In India, the family is represented by 900 species (Hajra *et al* 1995). Eleven groups are recognized within the family (APG III, 2009): Barnadesioideae, Mutisioideae, Stifftioideae, Wunderlichioideae, Gochnatioideae, Hecastocleioideae, Carduoideae, Pertyoideae, Gymnarrhenioideae, Cichorioideae, Corymbioideae, and Asteroideae.

### METHODOLOGY

In four of our earlier papers in the series (Rao *et al* 2009a & b; 2010a & b) we covered grasses, orchids, sedges and other monocots of Eastern Himalayas found in the Eastern Ghats of Andhra Pradesh. In Present paper, we focus on asters (Asteraceae). Current data on Asteraceae is based on our team studies in the past two decades in the Eastern Ghat area and with reference to specimens deposited in different regional and national herbaria. We also

consulted relevant literature pertaining to the Asteraceae of Eastern Ghats of Andhra Pradesh: Gamble (1921); Rao *et al* (1986, 1999); Rao & Harasreeramulu (1986); Ellis (1990); Venkataraju & Pullaiah (1995); Lakshminarayana *et al* (1997); Pullaiah & Rani (1999); Venkaiah (2004); Suryanarayana & Rao (2007); Chetty (2008); Pullaiah & Karuppusamy (2008); Rao & Kumari (2008); Reddy *et al* (2008); and Narayanaswamy (2012). With respect to Asteraceae of Eastern Himalayas of India we followed primarily Hajra *et al* 1995 a & b and also Hara (1966, 1971), Ohashi (1975), Hara *et al* (1982), Mehra *et al* (1983), Rao & Hajra (1986), Kaul & Haridasan (1987); Grierson & Springate (2001), Mukherjee (1988), Baishya *et al.* (2002), Giri *et al* (2008), Das & Ghosh (2011). Voucher specimens cited in the paper are the deposits of S.K. University Herbarium (SKU), unless otherwise mentioned. All the plant names are updated following the Plant List (2010).

## RESULTS AND DISCUSSION

The update of our studies revealed the presence of 119 species of asters in the Eastern Ghats of Andhra Pradesh, of which 85 herbaceous taxa belongs to 53 genera are found in Eastern Himalayan region of India. Twenty seven of those are common and found throughout the Eastern Ghats, nineteen taxa are restricted to single district and 15 of those are located in Vishakhapatnam district. Of the 85 taxa, four are endemic to India. *Blumea* is the dominant genus with 10 species, followed by *Conyza* (5 species), *Launaea* (4), *Bidens*, *Sonchus*, *Wedelia* (3), *Acmella*, *Ageratum*, *Anaphalis*, *Emilia*, *Laggera*, *Senecio*, *Vernonia* (2) and remaining with single species. Northern Eastern Ghats of the state harbor 78 Eastern himalayan species and the Southern part of the Eastern Ghats, 67 species. Of the 78 species, Visakhapatnam district alone have 15 species, not recorded from other parts of Eastern Ghats of the state (Table 1). Four more species have restricted distribution in one district: *Blumea laciniata* (Kurnool), *Emilia scabra* (Chittoor district), *Senecio nudicaulis* (Srikakulam district), *Wedelia wallichii* (West Godavari district)

All the taxa are systematically enumerated with updated nomenclature along with their distribution pattern in the Eastern Ghats districts of Andhra Pradesh, district-wise in the Table 1.

**Table 1.** Asteraceae of Eastern Himalayas found in the Eastern Ghats of Andhra Pradesh. [Abbreviations used: Districts: ATP: Anantapur; CTR: Chittoor; EG: East Godavari; GNT: Guntur; KDP: Kadapa; KMM: Khammam; KNL: Kurnool; KSN: Krishna; NLR: Nellore; PKSM: Prakasam; SKLM: Srikakulam; VSKP: Visakhapatnam; VJN: Vizayanagaram; WG: West Godavari; MBNR: Mahaboobnagar]

Name of the species	Distribution in EG-AP (districts)	Voucher Specimen
<i>Acanthospermum hispidum</i> de Candolle	Throughout	25815
<i>Acmella paniculata</i> (Wallich <i>ex de Candolle</i> ) R.K. Jansen [= <i>Spilanthes calva</i> de Candolle]	Rayalaseema, SKLM, VSKP, VJN, WG	28254
<i>Acmella uliginosa</i> (Swartz) de Cassini [= <i>Spilanthes uliginosa</i> Swartz]	ATP, CTR, NLR; VSKP	28771
<i>Adenostemma lavenia</i> (Linnaeus) Kuntze	Rayalaseema, NLR, EG, VSKP	31160
<i>Adenostemma lavenia</i> f. <i>angustifolium</i> (C.B. Clarke) Kostermans [= <i>A. angustifolium</i> Arnott]	CTR, EG, VSKP	13245

Name of the species	Distribution in EG-AP (districts)	Voucher Specimen
<i>Ageratina adenophora</i> (Sprengel) R.M. King & H. Robinson [= <i>Eupatorium adenophorum</i> Sprengel]	CTR, VSKP	22640 (MH)
<i>Ageratum conyzoides</i> (Linnaeus) Linnaeus	Throughout	32386
<i>Ageratum houstonianum</i> Miller	VSKP	13999
<i>Anaphalis adnata</i> Wallich ex de Candolle	EG, VSKP	694 (CAL)
<i>Anaphalis lawii</i> (Hooker) Gamble	CTR, VJN, SKLM	Venkaiah (2004)
<i>Artemisia japonica</i> Thunberg	VSKP	29641 (MH)
<i>Bidens bipinnata</i> Linnaeus	Rayalaseema, VSKP	30407
<i>Bidens biternata</i> (Loureiro) Merrill & Sherff	Throughout	20014
<i>Bidens pilosa</i> Linnaeus	Rayalaseema, VSKP, WG	30410
<i>Blainvillea acmella</i> (Linnaeus) Philipson	Throughout	7682
<i>Blumea bifoliata</i> (Linnaeus) de Candolle	Rayalaseema, GNT, NLR, KSN, VSKP	21341
<i>Blumea fistulosa</i> (Roxburgh) Kurz	EG, KNL, VSKP	9941
<i>Blumea hieracifolia</i> Hayata var. <i>macrostachya</i> (de Candolle) Hooker	VSKP	Gamble (1921)
<i>Blumea lacera</i> (Burman) de Candolle	KDP, KNL, VSKP	32658
<i>Blumea laciniata</i> (Roxburgh) de Candolle	KNL	9938
<i>Blumea membranacea</i> de Candolle	Throughout	43215
<i>Blumea membranacea</i> de Candolle var. <i>jacquemontii</i> (Hooker) Randeria	VSKP	9956
<i>Blumea axillaris</i> (Lamarck) de Candolle [= <i>B. mollis</i> (D. Don) Merrill]	Throughout	2412
<i>Blumea obliqua</i> (Linnaeus) Druce	Throughout	40704
<i>Blumea oxyodontade</i> de Candolle	CTR, MBNR	30604
<i>Blumea virens</i> de Candolle	CTR, KNL, EG, NLR, VSKP, VJN, SKLM	2162
<i>Blumeopsis flava</i> (de Candolle) Gagnepain	VSKP	Gamble (1921)
<i>Caesulia axillaris</i> Roxburgh	Throughout	20048
<i>Centipeda elatinooides</i> (Lessing) Bentham & Hooker ex Hoffmann [= <i>Centipeda minima</i> (Linnaeus) A. Braun & Ascherson]	CTR, NLR, VSKP	3678
<i>Chromolaena odorata</i> (Linnaeus) R.M. King & H. Robinson. [= <i>Eupatorium odoratum</i> Linnaeus]	Throughout	34418
<i>Conyza bonariensis</i> (Linnaeus) Cronquist	ATP, CTR, KNL, VSKP	30422
<i>Conyza bonariensis</i> var. <i>leiotheca</i> (S.F. Blake) Cuatrec [= <i>C. sumatrensis</i> (Retzius) Walker]	CTR, VSKP	13342

Name of the species	Distribution in EG-AP (districts)	Voucher Specimen
<i>Conyza canadensis</i> (Linnaeus) Cronquist	VSKP	30422
<i>Conyza japonica</i> (Thunberg) Lessing ex de Candolle	VSKP	9993
<i>Conyza leucantha</i> (D. Don) Ludlow & Raven	VSKP	9952
<i>Conyza stricta</i> Willdenow	Throughout	9967
<i>Crassocephalum crepidioides</i> (Bentham) S. Moore	CTR, EG, KNL, SKLM, VSKP, VJN	30476
<i>Cyanthillium cinereum</i> (Linnaeus) H. Robinson [= <i>Vernonia cinerea</i> (Linnaeus) Lessing]	Throughout	2454
<i>Cyathocline purpurea</i> (Buchanan-Hamilton ex D. Don) Kuntze	CTR, EG, VSKP, WG	22573 (MH)
<i>Dichrocephala integrifolia</i> (Linnaeus) Kuntze	CTR, EG, SKLM, VSKP, VJN	9988
<i>Dicoma tomentosa</i> Cassini	Throughout	24976
<i>Echinops echinatus</i> Roxburgh	Throughout	43244
<i>Eclipta prostrata</i> (Linnaeus) Linnaeus	Throughout	28318
<i>Elephantopus scaber</i> Linnaeus	Throughout	33356
<i>Emilia scabra</i> de Candolle	CTR	Chetty <i>et al.</i> , 2008
<i>Emilia sonchifolia</i> (Linnaeus) de Candolle	Throughout	31159
<i>Enydra fluctuans</i> Loureiro	VSKP	33308 (MH)
<i>Erigeron sublyratus</i> Roxburgh ex de Candolle	Rayalaseema, SKLM	4621(CAL)
<i>Galinsoga parviflora</i> P. Cavanilles	CTR, EG, VSKP	9968
<i>Glossocardia bidens</i> (Retzius) Veldkamp [= <i>Glossogyne bidens</i> (Retzius) Alston]	CTR, VSKP, SKLM, VJN	601 (CAL)
<i>Pseudognaphalium affine</i> (D. Don) Anderberg [= <i>Gnaphalium luteoalbum</i> subsp. <i>affine</i> (D. Don) J.Koster]	VSKP	4733 (CAL)
<i>Gamochoeta purpurea</i> (Linnaeus) Cabrera [= <i>Gnaphalium pensylvanicum</i> Willdenow]	CTR, KDP, VSKP	30482
<i>Gnaphalium polycaulon</i> Persson	Throughout	30589
<i>Gnomophalium pulvinatum</i> (Delile) Greuter [= <i>Gnaphalium pulvinatum</i> Delile]	CTR, VSKP	12528 (MH)
<i>Goniocaulon indicum</i> (Klein ex Willdenow) C.B. Clarke [= <i>G. glabrum</i> de Cassini]	Rayalaseema	2779
<i>Grangea maderaspatana</i> (Linnaeus) Poiret	Throughout	32543
<i>Lagascea mollis</i> P. Cavanilles	Throughout	32644
<i>Laggera alata</i> (D. Don) Schultz-Bip. ex Oliver	Rayalaseema, PKSM, VSKP	34042
<i>Laggera crispata</i> (Vahl) Hepper & J.R.I. Wood	Rayalaseema, EG, SKLM, VSKP, VJN	9960

Name of the species	Distribution in EG-AP (districts)	Voucher Specimen
<i>Launaea acaulis</i> (Roxburgh) Kerr	CTR, VSKP	7329
<i>Launaea asplenifolia</i> Hooker	VSKP	5989
<i>Launaea procumbens</i> (Roxburgh) Ramayya & Rajagopal	ATP, NLR, VSKP	6806
<i>Launaea sarmentosa</i> (Willd.) Schultz-Bipontinus ex Kuntze	ATP, GNT, KSN, VJN, SKLM, NLR, VSKP,	9995
<i>Mikania micrantha</i> Kunth	VSKP	3346 (KU)
<i>Parthenium hysterophorus</i> Linnaeus	Throughout	2407
<i>Pentanema indicum</i> (Linnaeus) Ling (= <i>Vicoa indica</i> (Linnaeus) de Candolle)	Rayalaseema, GNT, NLR, SKLM, VJN, WG	9936
<i>Pluchea ovalis</i> (Persoon) de Candolle [= <i>P. tomentosa</i> de Candolle]	ATP, KNL	22534
<i>Saussurea heteromalla</i> (D. Don) Handel-Mazzetti	VSKP	22592 (MH)
<i>Senecio nudicaulis</i> Buchanan-Hamilton ex D. Don	SKLM	Gamble (1921)
<i>Senecio tenuifolius</i> Burman	Rayalaseema	660
<i>Siegesbeckia orientalis</i> Linnaeus	ATP, CTR, EG, SKLM, VSKP, VJN	9919
<i>Sonchus brachyotus</i> de Candolle	VSKP	9953
<i>Sonchus oleraceus</i> (Linnaeus) Linnaeus	Throughout	9916
<i>Sonchus wightianus</i> de Candolle	ATP, CTR, VSKP	14812
<i>Sphaeranthus indicus</i> Linnaeus	Throughout	12484
<i>Synedrella nodiflora</i> (Linnaeus) Gaertner	Throughout	29220
<i>Taraxacum javanicum</i> van Soest	CTR, KMM	111 (KU)
<i>Tridax procumbens</i> (Linnaeus) Linnaeus	Throughout	34067
<i>Vernonia albicans</i> de Candolle	Throughout	32544
<i>Vernonia anthelmintica</i> (Linnaeus) Willdenow	Throughout	32359
<i>Wedelia chinensis</i> (Osbeck) Merrill	CTR, VSKP	12793 (MH)
<i>Wedelia urticaefolia</i> (Blume) de Candolle ex Wight	Rayalaseema, EG, VSKP	32320
<i>Wedelia wallichii</i> Lessing	WG	327 (CAL)
<i>Xanthium strumarium</i> Linnaeus	Throughout	32358
<i>Youngia japonica</i> (Linnaeus) de Candolle	VSKP	5262

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