

## ADDITION OF FIVE NEW GENERIC ASTERACEOUS MEMBERS TO THE FLORA OF ODISHA, INDIA

G S J P JENA<sup>1</sup>, RAMAKANTA MISHRA<sup>2</sup>, SMARANIKA NAYAK<sup>2</sup>  
AND KUNJA BIHARI SATAPATHY<sup>3</sup>

<sup>1</sup>Department of Botany, S.G. College, Kanikapada, Jajpur - 755011, Odisha, <sup>2</sup>P.G. Department of Botany, Bio systematic Laboratory, Utkal University, VaniVihar, Bhubaneswar- 751004, Odisha  
<sup>3</sup>School of Applied Sciences, Centurion University of Technology and Management, Bhubaneswar-752050, Odisha

Email: kbs\_bot@rediffmail.com

Date of online publication: 30th September

DOI:10.5958/2455-7218.2020.00025.X

The proper taxonomic identification presumes first and foremost priority in the scientific documentation of biodiversity. During the present floral inventory five unreported Asteraceous members were recorded from different parts of Odisha. They are *Baccharis salicifolia* (Ruiz & Pavón) Pers., *Calyptocarpus vialis* Less., *Cirsium arvense* (L.) Scop. var. *arvense*, *Pluchea indica* (L.) Less., and *Pseudelephantopus spicatus* (Juss. ex Aubl) C.F. Baker. A detailed botanical description along with notes on nomenclature, ecology, geographic distribution and coloured photographs of each species have been provided to facilitate easy identification in the field. On close verification of herbarium specimens and proper scrutiny of literature published till date on these taxa, it can be proclaimed that these are new addition to the Flora of Odisha.

**Key words:** New record, Asteraceae, Flora of Odisha

Now-a-days systematic documentation of phytodiversity has presumed instantaneous research priority (Singh 2012). To this end, preliminary research priority is to report the biological diversity and distribution of various life forms at local, regional, and global scales (Khuroo *et al.* 2007). Proper taxonomic identification of the biota is an important requisite for scientific documentation of biodiversity (Dar *et al.* 2012). Odisha is highly enriched state of India with a large number of diversified flora. It lies between 80°37' - 86°53' East longitudes and 16°78' - 22°15' North latitudes and covers an area of 155, 820 sq. km. The average rainfall is 1500 mm and average humidity is 44-47%. The peak temperature is usually experienced during April-May which reaches as high as 48°C with a mean maximum temperature is 35 °C and a mean minimum temperature of 24°C. It is underlain by Precambrian rock. Six types of soils namely coastal and river alluvium, lateritic, red, black cotton soils are found along with Tropical semi-evergreen, Tropical moist deciduous, Tropical dry deciduous, sub-tropical broad-leaved and littoral as well as marshy forest. Being Asteraceae one of the largest and cosmopolitan angiospermic families, its proper

documentation and investigation of new taxa in any area is of prime importance. The present investigation was intended to document and identify the Asteraceous unreported new taxa in the areas under study namely Jajpur, Keonjhar and Angul districts of Odisha.

### MATERIALS AND METHODS

During the population inventory of plants some interesting specimens of Asteraceous members have been collected from different parts of Jajpur, Keonjhar and Angul districts of Odisha. This study was conducted in different parts of these three districts of the state during 2010-2015. Standard taxonomic procedures were followed for collection and preservation of voucher specimens in the form of herbarium (Bridson and Forman 1998). The plant specimens were verified by matching with the preserved specimens housed in the herbarium units of Regional Plant Resource Centre (Bhubaneswar), Post Graduate Department of Botany, Utkal University, and CSIR-Institute Minerals and Materials Technology, Bhubaneswar, Odisha and found that these specimens have not been collected earlier and preserved. On consultation of all the relevant

literatures (Das and Misra 1998, 2000, Pattnaik *et al.* 2006, Behera and Misra 2007, Reddy and Pattnaik 2011, Rout *et al.* 2012, Biswal *et al.* 2013, Kalidass and Kar *et al.* 2014, Sarvanan *et al.* 2014, Murugan *et al.* 2015, Rahman *et al.* 2016, Murugan *et al.* 2017, Mishra *et al.* 2018a,b, Jena *et al.* 2018) as well as the local floras of the area (Haines 1922-1924, Mooney 1950, Saxena and Brahmam 1994-1996) it was found that these species belonging to the family Asteraceae have not yet been reported from within the geographical boundary of Odisha and thus, turned out to be five new distribution records for the state. However, these specimens were identified by using the e Flora of China (Shi and Greuter 2011, Shu 2011, Cao 2011) and e Flora of North America (Keil 2012, Scott *et al.* 2012, Strother, 2012). The collected voucher specimens were preserved and deposited to the Post Graduate Department of Botany, Utkal University Vani Vihar, Bhubaneswar, Odisha.

## RESULT AND DISCUSSION

During the present floristic survey, several wild populations of five interesting Asteraceous genera were located from different parts of Jajpur, Keonjhar and Angul districts of Odisha. The flowering and fruiting specimens of the said species were collected, photographed and herbarium specimens prepared. After thorough detailed study of their morphological characters and consultation of relevant literature and floras these could be identified as (i) *Baccharis salicifolia* (Ruiz & Pavón) Pers., (ii) *Calyptocarpus vialis* Less., (iii) *Cirsium arvense* (L.) Scop., (iv) *Pluchea indica* (L.) Lessing and (v) *Pseudelephantopus spicatus* (Juss. ex Aubl.) C.F. Baker. The occurrence of these taxa in different areas of Odisha is of much phytogeographical importance and extends the distributional ranges of these species to Eastern part of Indian. Besides, these are the new plant records for Odisha State. The correct nomenclature, diagnostic botanical characters, ecological notes, phenology, interesting field observations etc. in respect of

the above mentioned species have been provided below along with citation of specimens studied.

### Enumeration

***Baccharis salicifolia*** (Ruiz & Pavón) Pers. Syn. Pl. 2: 425. 1807.

**Synonym:** *Baccharis araucana* Phil. Anales Univ. Chile 87 698 1894. *Baccharis fevillei* DC. Prodr. 5 403 1836. *Baccharis parviflora* Less. ex Schltld. & Cham. Linnaea 5: 146. 1830. *Pingraea marginalis* DC. Candollea 48(1): 218. 1993.

**Vernacular name (s):** Mayamedha (O), Mule's or mule fat, Seep willow, Water wally (E).

**Habit:** Perennial shrubs 50-400 cm. **Habitat:** terrestrial chersophyte. **Stems:** glomeruliform, spreading to ascending, prasinous to pale phaeoic, proximally simple, distally, scarcely ramified striate-angled, glabrous or puberulous, resinous and ± resino-oleic. **Leaves:** cauline, alternate; present at flowering; pumilo-petiolate or sessile, blades elliptic to elliptic-lanceolate, moderately falcate, 25-160 × 2-25 mm, bases attenuate, margins generally sharply serrate from bases to apices, occasionally entire, apices acute to acuminate, faces glabrate, dotted with gland, ± resinous. **Heads:** in terminal, compound corymbiform arrays. **Involucres:** like a hemisphere, staminate, 26 mm, pistillate 2-6 mm. **Phyllaries:** 20-30 in 2-4 series, uninnerved, ovate to lanceolate, 2-5 mm, margins squamous, erose or asymmetrically dentate, midribs prominent, medians prasinus or rubrus, apices (porraceous or pheoic-purple) obtuse to acuminate (pale and xeric, glabrous). **Receptacles:** platyform, tholiform, smooth and glabrous, epaleate. **Staminate florets:** 10-45, corollas leucoish to gilvus, 3-7 mm, tubes equal to tenuiformly infundibuliform throats, lobes five, spreading-reflexed, deltate to lanceolate-ovate. **Pistillate florets:** 50-150, corolla candid, 2.5-3.5 mm, nematiorm-tubular, pentalobed, spreading-reflexed, ± deltate to lanceolate-ovate. **Calyx:** pappi persistent, 3-7 mm, 25-40 leucoish to tawny,

moderately barbellate, apically attenuate bristles in one-three series. **Androecium:** 5 stamens, epipetalous, alternating with corolla lobes, syngenesious, ditheous, connective generally elongate, extrorse, longitudinally dehiscent, anthers obtuse at apex, tailed at base. **Gynoecium:** bicarpellary, syncarpous, ovary inferior, unilocular, one ovule, anatropous, basal placentation, unistylous, style entire, style ramifications glabrate and flattened, devoid of appendages. **Fruit:** light fuscus, obovoid to cylindrical,  $\pm$  constricted, pentanerved, glabrous, 0.5-1.8 mm (Fig-1A).

**Flowering & Fruiting:** January-March (October)

**World distribution:** Mexico, USA, California, Texas, Australia, West Indies and India.

**Indian distribution:** Himachal Pradesh, Jammu & Kashmir, Sikim and Uttarakhand.

**Specimen examined:** Bhadrak, near Rahania on open sandy places, marshes, roadsides, N  $21^{\circ} 12' 525''$  & E  $86^{\circ} 65' 287''$ , 02.9.2018, GSJP & RM 1019 (Herbarium, Utkal University, Vani Vihar, Bhubaneswar).

**Associated species:** Plant is found associated with *Ageratum conyzoides*, *Blumea lacera*, *Emilia sonchifolia* and *Chromolaena odorata*.

***Calyptocarpus vialis*** Less. Syn. Gen. Compos. 221. 1832.

**Synonym:** *Blainvillea tampicana* (DC.) Benth.&Hook.f. Gen. Pl. 2: 370. 1873. *Calyptocarpus blepharolepis* B.L.Rob. Proc. Amer. Acad. Arts 47. 214. 1911. *Calyptocarpus tampicanus* (DC.) Small, Fl. SEUS. 1274. 1903. *Oligogyne tampicana* DC. Prodr. 5:629. 1836. *Synedrella vialis* (Less.) A.Gray Proc. Amer. Acad. Arts xvii. 217. 1882. *Zexmenia hispidula* Buckley Proc. Acad. Sc. Philad. 458. 1861.

**Vernacular name(s):** Kanchukaphala or Ashwatrana (O), Horseherb, Straggler Daisy, Hierba Del Caballo, Lawn flower (E).

**Habit:** perennial herb, 10-30 cm. **Habitat:** terrestrial mesophyte. **Stem:** prostrate, cladate,

rooting at nodes, heavily appressed, strigillose, rubicund to phaeoic. **Leaves:** cauline, opposite, petiolate, petiole 2-9 mm, angustiformly winged towards blade, blades trinerved, leaf blade ovate to approximately ovate,  $40 \times 30$  mm, amphilaterally heavily appressed, scabrelous, base attenuate, margin crenate-dentate, apex acute, apiculate. **Inflorescence:** a head or a capitulum. **Heads:** radiate, axillary, solitary, lowly stalked; peduncle 12-15 mm. **Involucres:** angustiformly oblong-ob lanceolate,  $5-8 \times 2-3.5$  mm. **Phyllaries:** persistent, four, biseriate, concave, lanceolate,  $5-8 \times 3-4$  mm, apex acuminate and apiculate. **Receptacles:** convex, paleate, palea persistent, scarious, pellucid, tenuiformly elliptic,  $3.2-4.7 \times 0.5-1$  mm. **Ray florets:** 3-8, pistillate, fertile; corollas pallid, fulvid,  $4.2-6.5 \times 1.3-1.9$  mm, tritoothed. **Disc florets:** 8-20, hermaphrodite, fertile, corollas pallid, tubes pumilus than infundibuliform throats, lobes 4-5,  $\pm$  deltate, heavily papillose within. **Calyx:** replaced by pappus, pappi persistent, two stout awns, longer one 1-3 mm. **Androecium:** 5 stamens, epipetalous, alternating with corolla lobes, anthers approximately generally united into a tube encircles the style and filaments free i.e. syngenesious, anther ditheous, connective generally elongate, introrse, longitudinally dehiscent, antheropodium cylindrical, generally elongate; anther appendage grandiform, ovate-oblong, longer than wide. **Gynoecium:** bicarpellary, syncarpous, ovary inferior, unilocular, one ovule, anatropous, basal placentation, unistylous, **Fruit:** cypsellae dorsally compressed, oblanceolate, to  $4 \times 2$  mm, angustiform and operculated with dwarf spines, triangle, conspicuously muricate (Fig-1B).

**Flowering & Fruiting:** Throughout the year.

**World distribution:** Cuba, Mexico, USA, California, Texas, Australasia, India and China.

**Indian distribution:** Karnataka, Kerala, Maharashtra, Punjab, Rajasthan and Uttar Pradesh.

**Specimen examined:** Angul, Katada, along

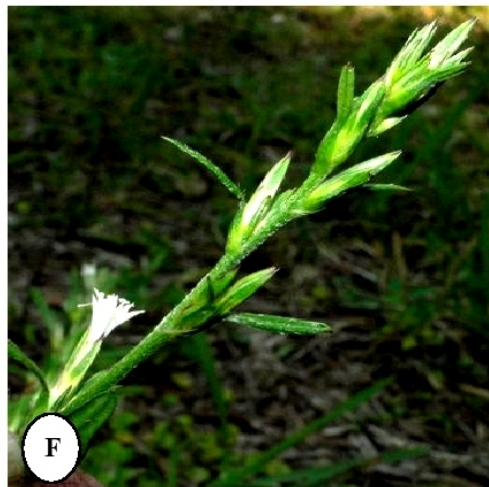




*Baccharis salicifolia* (Ruiz & Pavón) Pers. *Calyptocarpus vialis* Less.



*Cirsium arvense* (L.) Scop. var *arvense* *Pluchea indica* (L.) Less



*Pseudelephantopus spicatus* (Juss. ex Aubl.) Baker A flowering twig of *P. spicatus*

Figure 1(A-F) : Photographs of the specimens

the paths and roads, N 22° 21' 125" & E 86° 11' 175", 22.6.2015, GSJP & RM 1012 (Herbarium, Utkal University, Vani Vihar, Bhubaneswar).

**Associated species:** It is a naturalized weed that generally grows on waste lands. Plant is generally found associated with *Cynodon dactylon*, *Eleusine indica*, *Portulaca oleracea* and *Boerhavia diffusa*.

***Cirsium arvense* (L.) Scop. var. *arvense*** Fl. Carn. ed. 2.2: 126. 1772.

**Synonym:** *Serratula arvensis* L. Sp. Pl. 2: 820. 1753; *Carduus arvensis* (L.) Robson, Brit. Fl. 163. 1777. *Cephalonoplos arvense* (L.) Fourr. Ann. Soc. Linn. Lyon, sér. 2, 17: 95. 1869. *Cirsium albicans* Willk Linnaea 30. 109. 1859. *Cnicus arvensis* (Linnaeus) Roth. Catal. Bot. 1: 115. 1797.

**Vernacular name(s):** Keelapuspa (O), Creeping/Canada/Field Thistle (E).

**Habit:** perennials, dioecious, 30-170 cm.

**Habitat:** terrestrial chersophyte. **Stems:** one, erect, branched on upper part, unwinged, glabrous but moderately arachno-reticulate below capitula. **Leaves:** basal and cauline; 1-3 times pinnately lobed, teeth and lobes hirsutely-tipped, faces concolorous, prasinus and glabrous, abaxially minutely cobwebby, lower cauline leaves moderately petiolate; leaf blade elliptic to elliptic-lanceolate, 5-15 × 1.5-5 cm, segments 3-5 pairs, obliquely triangular-elliptic, with bi or tri teeth each with lateral spinules and an apical spine of about 6 mm, middle and upper cauline leaves isomorphic but epedicellate, base hemi-amplexicaulate.

**Heads:** terminal, in corymbiform arrays, pedunculate, 0.2-5 cm. **Involucre:** tenuiformly ovoid in flower, ± tintinabulate in fruit, 1-2.3 × 1-2 cm, moderately arachnoid tomentose, ± glabrate. **Phyllaries:** imbricate, in 5-7 rows, devoid of wings and scarious appendage; outer and middle phyllaries triangular to ovate, 2.5-9 × 1.3-2.7 mm, apex acute; with a ca. 0.7 mm patent to reflexed apical spinule, inner phyllaries elliptic-lanceolate to approximately linear, 8-22 × 1-3 mm, apex acute - acuminate and scarious. **Receptacles:** flat to convex,

epaleate, operculate with leucoish bristles.

**Peripheral (pistillate) florets:** 12-20 mm, (overtopped by pappi in fruit), tubes 9-16 mm, throats ca. 1.-1.5 mm, lobes 2-3.5 mm.

**Staminate florets:** purpureus or roseus; staminate 10-20 mm, rest of the longer than pappus when head is fully grown, tubes 7-12 mm, throats 1-1.8 mm, lobes 3-6 mm. **Calyx:** pappi persistent, three rows of plumose bristles, leucoish, outer ones approximately similar or dwarfer than inner. 12-33 mm, exceed corollas. **Androecium:** 5 stamens, epipetalous, alternating with corolla lobes, syngenesious, stamen filaments hispid, anther with pumilus sub-entire to lacerate basal appendages, dithecous, connective generally elongate, extrorse, longitudinally dehiscent, anthers obtuse at apex, tailed at base.

**Gynoecium:** bicarpellary, syncarpous, ovary inferior, unilocular, one ovule, anatropous, basal placentation, unistylous, style entire, style tips 1-2.5 mm. **Fruit:** a cypsela phaeoic, 2-5 mm, apical collar indistinguished, tenuiformly obovoid, laterally constricted, with four or highly gracillar spaced longitudinal ribs or striae, apical rim constructing a leioic-margined upright corona; elaiosome coronated by non prominent disk (Fig-1C).

**Flowering & Fruiting:** June-October.

**World distribution:** Europe, Northern Africa and North America, Western and central Asia, Northern India, Japan, China, South Africa, New Zealand, Tasmania, and Australia.

**Indian distribution:** Himachal Pradesh, Uttar Pradesh and Uttarakhand.

**Specimen examined:** Keonjhar, Gonasika, N 21° 46' 896" & E 85° 41' 390", 2.8.2018, GSJP & RM 1022 (Herbarium, P.G. Department of Botany, Utkal University, Vani Vihar, Bhubaneswar).

**Associated species:** Plant is found associated with *Emilia sonchifolia*, *Eleusine indica*, *Sonchus asper* and *Amberboa ramosa*.

***Pluchea indica* (L.) Lessing, Linnaea. 6: 150. 1831.**



**Synonym:** *Baccharis indica* L. *Sp. Pl.*: 861. 1753. *Erigeron denticulatum* Burm.f., *Fl. Indica* 180. 1768.

**Vernacular name(s):** Karpuragandhaa (O), Indian camphor weed/ Fleabane/Pluchea (E).

**Habit:** perennial aromatic shrubs, 1.5-2 m tall.

**Habitat:** Terrestrial chersophyte or halophyte. **Stem:** erect, sulcate-striate, heavily ramified, ramification sharply shortly crispy-hirsute, later glabrate. **Leaves:** cauline, alternate, simple, very lowly petiolate, obovate, 2.5-10 × 1-5 cm, densely pappyrus, blades elliptic-obovate, brightly porraceous, abaxial faces arachnose, abaxially laxly puberulent to minutely glabrous, sericeous, adaxially scarcely puberulent, veinlets conspicuous, base attenuate, margin acutely serrate, apex acute to mucronate.

**Synflorescences:** disciform, in corymbiform arrays, flat-topped. **Head:** tenuiformly cylindrical to tintinabulate, 4-7 mm in diam. in fresh condition to 8-11 mm in diam. in dried condition, 5-7 mm, in thick terminal and axillary corymbs, peduncle 1-11 mm.

**Involucres:** ovate, 4-6 mm in diam.

**Phyllaries:** persistent, 6- or 7-seriate, external ones ca. 1.5-2.5 × 1.8 mm, margins ciliolate, apex obtuse, internal ones lanceolate to linear, 3-7 × 0.20-1.3 mm, margins entire, apex obtuse, unequal. **Receptacles:** platyform, glutatey puberulous, epaleate. **Peripheral (pistillate) florets:** abundant, fertile, corolla 2.5-5.5 mm, creamy white- whitish. **Inner or Central (staminate) florets:** 2-7, corolla 3.5-6.5 mm, tubular, hermaphrodite, pentalobed, lobes glandular, creamy white- whitish. **Calyx:** pappi persistent, leucoish, as long as corolla, basally connate, barbellate twenty bristles in one row, about 4-5 mm long **Androecium:** 5 stamens, epipetalous, alternating with corolla lobes, syngenesious; anther dithecous, connective generally elongate, extrorse, longitudinally dehiscent, obtuse at apex, tailed at base. **Gynoecium:** bicarpellary, syncarpous, ovary inferior, unilocular, one ovule, anatropous, basal placentation, unistylous, style entire, highly exserted, style ramifications with obtuse sweeping trichomes reaching

beneath furcation. **Fruit:** a Cypsela, oblong-cylindric, fuscus, pale ribs 5-7, moderately campylar, ca. 1 × 0.5 mm, faces strigillose, or scarcity-glabrous, vestigeal, as a parvo-annulus of basal sclerenchymatous cells of carpopodium (Fig-1D).

**Flowering & Fruiting:** Throughout the year.

**World distribution:** Oceania, Mexico, USA, California, Texas, Australasia, India, China and all other Asian countries.

**Indian distribution:** Himachal Pradesh, Karnataka, Kerala, Maharashtra, Madhya Pradesh, Uttar Pradesh and West Bengal.

**Specimen examined:** Jajpur, Kanikapada, along sides of the agricultural land, N 20° 42' 185" & E 86° 45' 397", 22.6.2015, GSJP & RM 1025 (Herbarium, Utkal University, Vani Vihar, Bhubaneswar).

**Associated species:** Plant is found associated with *Vernonia cinerea*, *Sphenoclea zeylanica* and *Blumea lacera*.

*Pseudelephantopus spicatus* (Juss. ex Aubl.) C.F. Baker, *Trans. Acad. Sci. St. Louis* 12: 45, 55, 56. 1902. N.M. Dutta & D. Mitra in *Ind. For.* 87(5): 308. 1961. Hajra *et al.* *Fl. India* 13:346. 1995.

**Synonym:** *Distreptus spicatus* var. *interrupta* Ram. Goyena *Fl. Nicarag.* 2. 448. 1911. *Elephantopus spicatus* Juss. ex Aubl., *Hist. Pl. Guiane* 2: 808. 1775; *Matamoria spicata* (Juss. ex Aubl.) La Llave & Lex. *Nov. Veg. Descr.* 1: 8. 1824.

**Vernacular name(s):** Shwaajibha (O), Dog's-tongue (E).

**Habit:** Perennial, rigid, rosetiform herb. **Habitat:** terrestrial chersophyte. **Stems:** erect, ramified striate, moderately crinitus or subglabrous. **Leaves:** alternate, basal foliage generally circumglobatus and rosulate, subsessile, scarcely amplexicaul, lower foliage oblong-obovate or oblong-spatulate, 5-25 × 2-6 cm, upper side of the leaves prominently hispidulous on veins and sharply glandular, lower side horridus, moderately horrid-hirsute or subglabrous and glandular, lateral veins 8-11 paired, base attenuate,

margin entire or serrulate, apex obtuse or minutely acute; upper foliage oblong-lanceolate, 2-13 × 0.5-2 cm, attenuate at both ends. **Inflorescence:** in terminal spikes. **Heads:** ± discoid, epedicellate, not individually bracteate, in clusters of 1-6 in paniculo-spiciform arrays 4-10 mm diam., every cluster delineated by 1-2 foliar bracts, bracts 12-45+ × 3-6 mm. **Involucres:** ± cylindrical to oblong, 8-12 × 2-4 mm diam. **Phyllaries:** porraceous, 8 in 4 decussate pairs, outer two dwarfed than inner, the outer phyllaries ovate, inner phyllaries lanceolate, 9-12 mm, lowly hirtellous to pilosulous, hairs 0.2-0.4 mm, very frequently glabrescent, all ± papery, margins entire, tips ± spinous or cuspidatus, abaxial faces of inner four generally dotted with resinous gland distally, univeined, apex acuminate or acute. **Receptacles:** parvulous, naked. **Florets:** 2-7, corollas leucoush or roseous or caeruleo-purpureous, tubes longer than suddenly infundibuliform throats, pentalobed, linear-lanceolate, unequal (abaxial sinus deepest), lowly zygomorphic and pseudoligulate, sharply cleft between two of inner lobes. **Calyx:** pappi persistent, of 8 ± lacinate to aristate scales, bristles campestrial, horrid-barbate, all bent or campylar, 1-10 mm, two bristles frequently bent. **Androecium:** 5 stamens, epipetalous, alternating with corolla lobes, syngenesious, ditheous, connective generally elongate, introrse, longitudinally dehiscent, anthers apically pumilus and obtuse, minutely hastate at base, obtusely auriculate, 1.5-2 mm long, apical appendage acutiform. **Gynoecium:** bicarpellary, syncarpous, ovary inferior, unilocular, one ovule, anatropous, basal placentation, unistylous, style entire, branches nematiform, acute, crinitus, candid, 4-8 mm long. **Fruit:** a cypselae ± clavate, occasionally ± flattened or linear-oblong, decarved or -ribbed, minutely strigillose to hispidulous, 7-8 mm (Fig. 1E & 1F).

**Flowering & Fruiting:** September-January

**World distribution:** Tropical America, Africa, Asia, Taiwan, Philippines, Malay, Archipelago,

Australia, Thailand and Pacific Islands.

**Indian distribution:** Assam, Uttar Pradesh and West Bengal.

**Specimen examined:** Jajpur, Anikana (Bari), on sandy soils and grasslands. N 20° 88' 167" & E 86° 38' 657", 5.11.2018, GSJP & RM 2123 (Herbarium, Utkal University, Vani Vihar, Bhubaneswar).

**Associated species:** It is a naturalized weed that generally grows on waste land and soil. Plant is generally found associated with *Cynodon dactylon*, *Eleusine indica*, *Portulaca oleracea* and *Boerhavia diffusa*.

## CONCLUSION

The authors have gone through all the relevant published literatures (Acharya *et al.* 2009, Das and Kumar 2013, Dash *et al.* 2015, Dhal *et al.* 2006, Kar *et al.* 2014a,b,c, Kar *et al.* 2014, Dhole *et al.* 2015, Kalidass 2015, Kalidass and Srivastav 2015, Mishra *et al.* 2018, Jena *et al.* 2018) and visited all the regional herbarium units present in Bhubaneswar to confirm the occurrence, distribution and habitat of the above described species. It was found that these species were never reported earlier from any region of Odisha, so it can be clearly declared that the above enumerated species are completely new to the flora of Odisha.

The authors are thankful to the Head of Department of Botany, Utkal University, Vani Vihar, Bhubaneswar for providing the necessary facilities for this study.

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