

## Species

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# A note on family Asteraceae of Todgarh-Raoli Wildlife Sanctuary, Rajasthan, India

Purohit CS\*

## ABSTRACT

The present paper deals with 37 species belonging to 28 genera of the family Asteraceae collected from Todgarh-Raoli wildlife sanctuary. Seventeen genera and twenty-seven species are reported here as additions to the Flora of Todgarh-Raoli wildlife sanctuary, Rajasthan. Besides this, *Blumea paniculata* (Willd.) M.R. Almeida reported here for the first time from Rajasthan. In addition to the above, five genera and twelve species were first reported for the flora of the Aravalli range. Seventeen genera and twenty-seven plant species are additions to the flora of Todgarh-Raoli Wildlife Sanctuary, Rajasthan.

**Keywords:** Addition, Asteraceae, Rajasthan, Aravalli range, Todgarh-Raoli wildlife sanctuary

## 1. INTRODUCTION

Asteraceae is known as the sunflower family, with approx. thirty-two thousand species belonging to 1900 genera from all over the world. India has represented 950 species belonging to 167 genera. Out of which, 125 species belonging to 62 genera were reported from Rajasthan (Shetty and Singh, 1987). In the Aravalli range, Asteraceae represents 50 species belonging to 29 genera (Otaghvari et al., 2015). Kanther, (2019) has done extensive work on the vegetation of the Todgarh-Raoli wildlife sanctuary and reported 14 species belonging to 13 genera of the family Asteraceae.

Many researchers Katewa et al., (2003), Sharma et al., (2005), Sharma and Katewa, (2007), Jain et al., (2011), Kanther and Gena, (2012), Galav et al., (2013), Aftab et al., (2016), Sharma and Bano, (2016), Kanther, (2018), Singh and Yadav, (2018), Sharma, (2019), Sharma and Khandal, (2019), Tomar and Sharma, (2019), Purohit, (2019), Purohit et al., (2019), Purohit, (2020a), Purohit, (2020b), Purohit, (2020c), Purohit, (2020d), Purohit et al., (2020a), Purohit et al., (2020b), Purohit, (2021), Purohit and Kulloli, (2022), Purohit et al., (2024) have been reported some plants from Todgarh-Raoli wildlife sanctuary and surrounding area.

### Study area

Todgarh-Raoli Wildlife Sanctuary is located within the Aravallis range, which is the most fragile ecosystem, and geographically, it is situated between 73°40'–74°10' East longitudes and 25°20'–26°0' North latitudes, covering an area of 495.27 km<sup>2</sup> and extended in three districts, viz. Rajsamand, Pali, and Ajmer, in the south-western part of Rajasthan State. It is a protected area expressing the full range of habitats in the Aravalli range. It is important from a biogeographical point of view since it forms patches of Dhok and Salar forests. It has exceptional diversity and interspersed habitat, and includes areas of Dhok, Salar, dryland, seasonal streams, cascading mountains, newly formed dunes formed on western hill aspects, and fine grooves of mixed wood lands. This sanctuary makes an ecotone between the hilly forests of Aravallis and Thar, in the north-west. The hills of this sanctuary act like a barrier, checking the eastward extension of the desert.

## 2. MATERIAL & METHODS

Kanther, (2019) has done extensive work on the vegetation of the Todgarh-Raoli wildlife sanctuary, reporting 14 species belonging to 13 genera of the family Asteraceae. While working on the floristic diversity of the Todgarh-Raoli Wildlife Sanctuary (Rajasthan) from 2015 to 2019, the author collected a total of 636 plant species, out of which 37 plant samples of the family Asteraceae were collected from different locations of this sanctuary and processed for the preparation of voucher specimens as per standard procedure. These collected herbarium samples were deposited at the Botanical Survey of India, Jodhpur (BSJO). After critical study and scrutiny of relevant literature Blatter and Hallberg, (1920), Sharma and Tiagi, (1979), Bhandari, (1990), Shetty and Singh, (1987), Tiagi and Aery, (2007) and herbaria (BSJO, BSA, RUBL, JAC, BLAT, DCH, CAL), these plant samples were identified and enumerated here alphabetically.

## 3. ENUMERATION

### *Acanthospermum hispidum* DC. [Figure 1]

An erect, pseudodichotomously branched, hispid, annual herb, up to 40 cm high. Leaves are simple, obovate, margin serrate. Capitula solitary in forks of branches, yellow. Achene is compressed with 2 spines at the apex and many lateral hooked spinules.

#### *Fl. & Fr.*

July – Nov.

#### *Local name*

Badi-kanti.

#### *Distribution*

Rajasthan: Ajmer (Johns Gunj); Banswara (Loharia); Jaipur (Durgapura); Jhalawar; Sirohit (Mount Abu); Todgarh-Raoli wildlife sanctuary (Jhamuda, Kabradata).

#### *Specimen examined*

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Jhamuda, 25°43.633'N & 73°54.747'E, 385m, 27.07.2017, coll. C.S. Purohit 32839 (BSJO – 40425, 40426); India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Kabradata Oran, 25°42.736'N & 73°55.517'E, 445m, 10.09.2017, coll. C.S. Purohit 33269 (BSJO – 39817, 39816).

### *Ageratum conyzoides* L. [Figure 1]

Annual herbs, up to 40 cm high. Leaves opposite, ovate, crenate-serrate on margins. Heads are bluish-purple, in many flowered, terminal corymbs. Achenes ribbed, ribs short bristly, black.

#### *Fl. & Fr.*

Most of the year.

*Local name*

White-weed, Bhakumbar.

*Distribution*

Rajasthan: Bikaner (Lunkaransar); Banswara (Khora forest); Bundi (Hindoli); Jaipur (Ram Niwas Garden); Sirohi (Mount Abu); Todgarh-Raoli wildlife sanctuary (Kabradata).

*Specimen examined*

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Kabradata Oran, 25°42.736'N & 73°55.517'E, 445m, 10.11.2017, coll. C.S. Purohit 33264 (BSJO – 39774, 39775).

**Ageratum houstonianum Mill. [Figure 2]**

Erect or decumbent herbs up to 55 cm high, clothed with patent white hairs. Leaves ovate, triangular. Heads in terminal and axillary dense corymbs. Achenes were 5-angled, linear-oblong, hairy, black.

*Fl. & Fr.*

Most of the year.

*Local name*

Bhakumbar

*Distribution*

Rajasthan: Bikaner (Lunkaransar); Ganganagar; Jodhpur (Mandore); Todgarh-Raoli wildlife sanctuary (Sarkaniya Beri).

*Specimen examined*

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Jojawar Range, Sarkaniya Beri, 25°45.729'N & 73°54.944'E, 451m, 02.03.2019, coll. C.S. Purohit 38027 (BSJO – 42488, 42489).

**Bidens biternata (Lour.) Merr. & Sheriff.**

Erect annual herbs, up to 120 cm high. Leaves cauline; upper leaves small, opposite or alternate. Heads 10–30 flowered, solitary, yellow. Achenes are linear, compressed, glabrous, 4-angled, and shortly strigose.

*Fl. & Fr.*

Aug. – Dec.

*Distribution*

Rajasthan: Banswara (Dagia Bowji); Bikaner (Lunkaransar); Jaipur (Amer); Kota (Shahabad); Jodhpur (Mandore); Sirohi (Mount Abu); Todgarh-Raoli wildlife sanctuary (Jawaja, Sadon ka Bas, Uman ki kui, Bhanwar bhata, Thoria deh, Kalalia).

*Specimen examined*

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bhim Range, Jawaja, 25°39.921'E & 73°59.945'N, 546m, 03.08.2016, coll. C.S. Purohit 33156 (BSJO – 40719, 40720); India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bijajiguda Range, Sadon ka Bas, 26°00.663'N & 74°07.825'E, 418m, 09.08.2016, coll. C.S. Purohit 33156 (BSJO – 41063, 41064).





**Figure 1** Photo plate shows Asteraceae of Todgarh-Raoli wildlife Sanctuary i.e. *Acanthospermum hispidum* DC.; *Ageratum conyzoides* L.; *Blumea lacera* (Burm.f.) DC.; *Cyathocline purpurea* (Buch.-Ham. ex D. Don) Kuntze; *Echinops echinatus* Roxb.; *Emilia sonchifolia* (L.) DC.; *Glossocardia bosvallea* (L.f.) DC.; *Launaea asplenifolia* (Willd.) Hook.f.; *Tridax procumbens* (L.) L.; *Xanthium strumarium* L. (Photo: C.S. Purohit).





**Figure 2** Photo plate shows Asteraceae of Todgarh-Raoli wildlife Sanctuary i.e. *Ageratum houstonianum* Mill.; *Blainvillea acmella* (L.) Philipson; *Blumea mollis* (D. Don) Merr.; *Blumea virens* DC.; *Caesulia axillaris* Roxb.; *Cyathocline purpurea* (Buch.-Ham. ex D. Don) O. Ktze (Photo: C.S. Purohit).

**Blainvillea acmella (L.) Philipson [Figure 2]**

Erect annual herbs, faintly aromatic, much branched up to 50 cm high. Lower leaves opposite; margins sparsely serrate; upper leaves small, alternate, ovate-oblong. Head solitary, white, arranged in a panicle leafy cyme, yellow or yellowish white. Achenes tuberculed, densely pubescent.

**Fl. & Fr.**

Aug. – Nov.

**Local name**

Kanghi.

**Distribution**

Rajasthan: Banswara (Pipalkhunt); Bhilwara (Bhimar village); Jaipur; Kota (Shahabad); Tonk (Benthali); Todgarh-Raoli wildlife sanctuary (Aasan).

**Specimen examined**

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bijajiguda Range, Aasan, 25°57.117'N & 74°07.938'E, 442m, 03.09.2018, coll. C.S. Purohit 33573 (BSJO – 42226, 42227).

**Blumea lacera (Burm.f.) DC. [Figure 1]**

Erect, aromatic, densely glandular-pubescent, up to 80 cm high. Leaves elliptic-oblong, coarsely dentate. Heads pedunculate, open corymbose panicles. Achenes brown, oblong, hairy.

**Fl. & Fr.**

Jan. – May.

**Distribution**

Rajasthan: Bikaner (Public Park); Todgarh-Raoli wildlife sanctuary (Goramghat low land).

**Specimen examined**

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bhim Range, Goramghat low land, 25°38.120'N & 73°46.758'E, 476m, 14.09.2017, coll. C.S. Purohit 33365 (BSJO – 41169).

**Blumea mollis (D. Don) Merr. [Figure 2]**

An agreeably fragrant, erect, viscid, annual herb, 30 – 90 cm high. Leaves obovate, margin irregular serrate, pubescent on both sides. Heads in axillary and terminal corymbs, purple, Cypsela oblong, 4 – 5 angled.

**Fl. & Fr.**

Feb. – April.

**Distribution**

Rajasthan: Banswara (Parla ka Pul); Jaipur (Amer); Kota (Shahabad); Sirohi (Mount Abu); Udaipur (Banki block); Todgarh-Raoli wildlife sanctuary (Thoria deh).

**Specimen examined**

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Thoria deh, 25°48.622'N & 73°58.408'E, 462m, 22.02.2019, coll. C.S. Purohit 31051 (BSJO – 42334, 42335).

**Blumea obliqua (L.) Druce**

Erect, suberect or decumbent, annual hairy herb, up to 50 cm high. Leaves alternate, oblong-ellipsoid, dentate at margin. Capitulum solitary, terminal. Achenes ellipsoid, ribbed yellowish, pubescent; pappus whitish-pink.

**Fl. & Fr.**

Oct. – May.

**Distribution**

Rajasthan: Banswara (Chirola village); Barmer (Gypsum halt); Jaipur (Doasa); Sirohi (Mount Abu); Todgarh-Raoli wildlife sanctuary (Vagda Jha).

**Specimen examined**

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Vagda Jha, 25°49.347'N & 73°58.197'E, 548m, 17.09.2017, coll. C.S. Purohit 33417 (BSJO – 42016, 42017).

**Blumea paniculata (Willd.) M.R. Almeida [Figure 3, 4 & 8]**

Panicled Blumea is a perennial herb with a slender stem. The leaves are lobed and tiny flower-heads are born in panicles with wiry branches. The fruit is a white feathery ball, probably meant for air dispersal of seeds.

**Fl. & Fr.**

Nov. – Feb.

**Distribution**

Todgarh-Raoli wildlife sanctuary (Thoria deh, Raoli Range).

**Specimen examined**

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Ghora Nal, Thoria deh, 25°48.786'N & 73°58.408'E, 481m, 22.02.2019, coll. C.S. Purohit 31048 (BSJO).

**Blumea virens DC. [Figure 2]**

Erect, glabrous herbs, up to 150 cm high. Leaves sessile, margin serrate with apiculate teeth, oblanceolate. Head in compact, terminal, leafy panicles, yellow. Achene oblong-columnar, ribbed, sparsely hairy, pale brown. Pappus white.

**Fl. & Fr.**

Jan. – April.

**Distribution**

Kota; Todgarh-Raoli wildlife sanctuary (Gauri kund).

**Specimen examined**

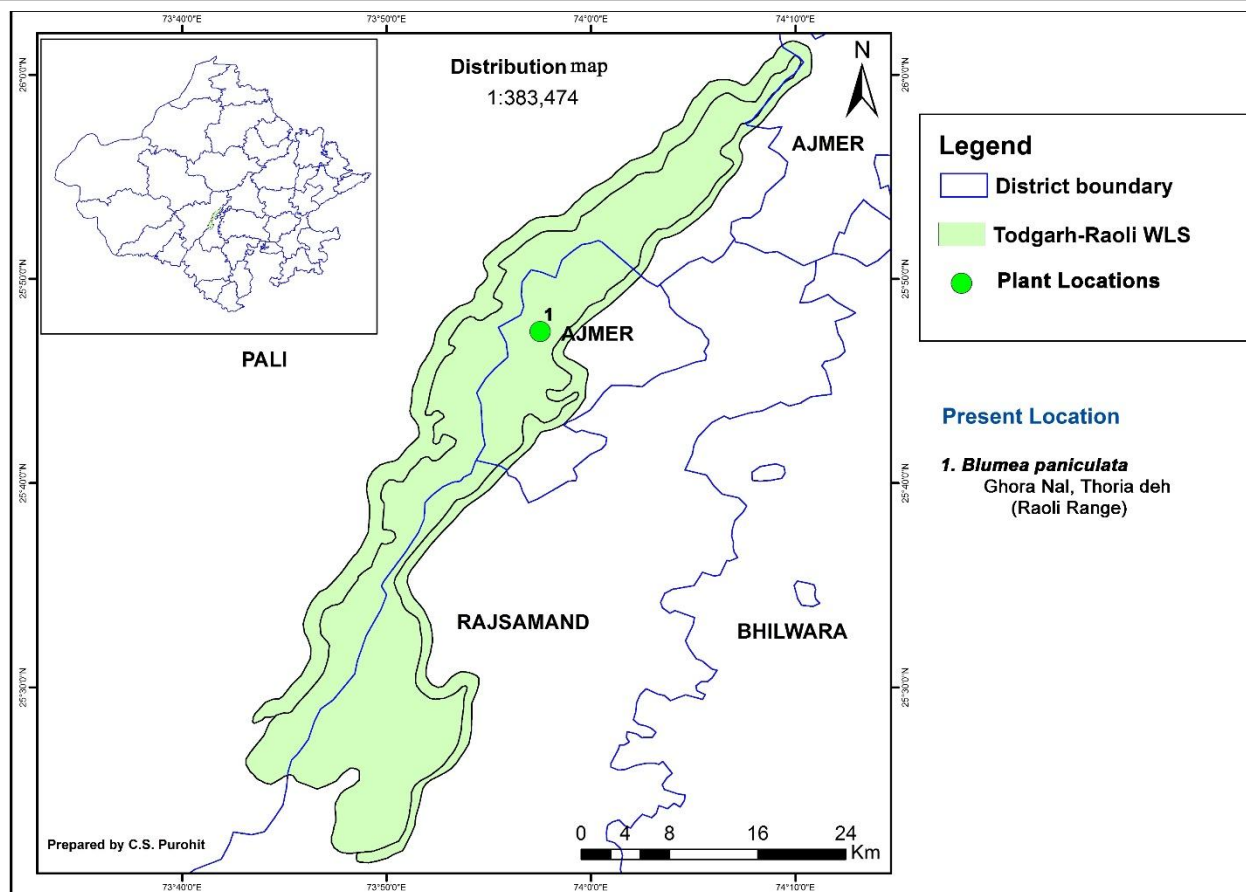
India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bhim Range, Baghana, Gauri kund, 25°30.818'N & 73°49.553'E, 551m, 06.03.2019, coll. C.S. Purohit 38047 (BSJO).





**Figure 3** Photo plate shows flower of *Blumea paniculata* (Willd.) M.R. Almeida – an addition to flora of Rajasthan from Todgarh-Raoli wildlife sanctuary, Rajasthan (Photo: C.S. Purohit).





**Figure 4** Maps shows distribution of *Blumea paniculata* (Willd.) M.R. Almeida from Todgarh-Raoli wildlife sanctuary, Rajasthan (Prepared by C.S. Purohit).

#### ***Caesulia axillaris* Roxb. [Figure 2]**

An erect, suberect, semi-aquatic to aquatic, succulent annual herb, up to 40 cm high. Leaves are elliptic-lanceolate and serrulate. Heads: many, axillary, compound sessile head, pale pink or white. Achenes, notched at the tip, winged on the margins. Pappus is 2-ribbed and apiculate.

#### ***Fl. & Fr.***

Aug. – Nov.

#### ***Distribution***

Rajasthan: Ajmer (Nasirabad); Banswara (Lamero tank); Barmer; Kota (Shahabad); Tonk (Siras forest); Todgarh-Raoli wildlife sanctuary (Satpalia forest).

#### ***Specimen examined***

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bhim Range, Satpalia forest, 25°25.381'N & 73°45.588'E, 443m, 21.09.2017, coll. C.S. Purohit 33447 (BSJO – 41849).

#### ***Centratherrum anthelminticum* (L.) O. Kuntze**

Erect, aromatic herb up to 150 cm high. Leaves simple, elliptic-ovate, coarsely serrate. Heads in terminal corymbose, panicles, purple. Achene terete, 10-ribbed, glandular hairy. Pappus 2-seriate, plumose, inner ones long.

*Fl. & Fr.*

July – Nov.

*Distribution*

Rajasthan: Banswara; Jaipur (Amer); Kota (Sitabari); Sirohi (Mount Abu); Todgarh-Raoli wildlife sanctuary (Aasan).

*Specimen examined*

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, 25°57.160'N & 74°06.919'E, 422m, coll. C.S. Purohit 33415 (BSJO – 42019), 16.09.2017.

**Cyathocline purpurea (Buch.-Ham. ex D. Don) O. Ktze. [Figure 1 & 2]**

Erect, aromatic, annual herbs, up to 150 cm high. Leaves sessile, 1–2 pinnatipartite, segments serrate-dentate to lobed. Heads in terminal, corymbose panicles, purple. Achene is oblong, smooth. Pappus absent.

*Fl. & Fr.*

Oct. – March.

*Local name*

Bandhariya.

*Distribution*

Rajasthan: Banswara (Wadita Hillage forest); Bhilwara (Bijolian); Chittorgarh (Bassi); Jodhpur; Kota; Tonk (Benthali); Todgarh-Raoli wildlife sanctuary (Kabradata, Goramghat).

*Specimen examined*

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Kabradata, 25°42.736'N & 73°55.517'E, 445m, 10.09.2017, coll. C.S. Purohit 33247 (BSJO – 41137, 41138); India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bhim Range, Goramghat, Jogmandi, 25°38.401'N & 73°52.291'E, 452m, 27.02.2019, coll. C.S. Purohit 38008 (BSJO – 42456, 42457).

**Echinops echinatus Roxb. [Figure 1]**

Erect, white-tomentose, up to 100 cm high perennial herbs. Leaves sessile, oblong, pinnatifid, spinescent. Heads violet or white, solitary, arranged in compact, globose. Achene silky. Pappus short, cylindric, yellowish-white.

*Fl. & Fr.*

October – May.

*Local name*

Oont-kantelo.

*Distribution*

Rajasthan: Banswara (Bari Ghata); Bikaner (Nal-Diatra, Pawanpuri); Jaipur; Kota (Shahabad); Nagaur (Tausar); Sirohi (Mount Abu); Todgarh-Raoli wildlife sanctuary (Shree Dev Narayan temple, Kundal).

*Specimen examined*

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Jojawar range, Shree Dev Narayan Temple, 12.09.2017, coll. C.S. Purohit 33317 (BSJO – 39875, 39876); India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bijajiguda Range, Kundal, 26°00.140'N & 74°10.175'E, 441m, 24.02.2019, coll. C.S. Purohit 31076 (BSJO – 42397, 42398).

***Eclipta prostrata* (L.) L.**

Prostrate or decumbent, hairy, annual herbs, often rooting at lower nodes. Leaves opposite, ovate-elliptic. Heads hemispherical, white, solitary. Achenes angular, compressed, cuneate, tuberculate, with thickened margins, brown. Pappus a ring of thick, collate.

***Fl. & Fr.***

Throughout the year.

***Local name***

*Jal-magra, Karusalnkanni.*

***Distribution***

Rajasthan: Banswara (Paloda); Bikaner (Nal-Diatra, Chhatergarh); Churu (Sujangarh); Jaipur (Amer); Kota (Kishanganj); Nagaur (Mundwa); Sirohi (Mount Abu); Todgarh-Raoli wildlife sanctuary (Barar, Vanjari, Satukheda).

***Specimen examined***

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bhim Range, Barar, 25°38.929'N & 74°00.443'E, 636m, 02.08.2016, coll. C.S. Purohit 33007 (BSJO – 40692, 40693); India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Vanjari, 25°46.534'N & 74°03.321'E, 577m, 15.09.2017, coll. C.S. Purohit 33385 (BSJO – 41199, 41200).

***Emilia sonchifolia* (L.) DC. [Figure 1]**

Erect, diffused or prostrate annual herb, up to 25 cm high. Lower leaves ovate to obovate; upper leaves lanceolate, sagittate-amplexicaule. Heads solitary, or in lax corymbs, purple. Achenes oblong, 5-ribbed, scabrid on ribs. Pappus copious, white.

***Fl. & Fr.***

Throughout the year.

***Distribution***

Rajasthan: Banswara (Kotharia); Jaipur (Ramgarh); Kota (Shahabad); Sirohi (Mount Abu); Udaipur (Jaisamand); Todgarh-Raoli wildlife sanctuary (Raja ka Dhana, Halela, Badinda-gui, Lewa ki Nal, Jhamuda).

***Specimen examined***

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bhim Range, Raja Ka Dhana, 25°26.275'N & 73°52.450'E, 700m, 11.08.2016, coll. C.S. Purohit 33186 (BSJO – 41122, 41123); India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bhim Range, Halela-Badinda gui, 25°22.685'N & 73°48.007'E, 739m, 11.08.2016, coll. C.S. Purohit 33200 (BSJO – 41150, 41151); India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Jhamuda, Lewa ki Nal, 25°43.962'N & 73°54.875'E, 413m, 11.09.2017, coll. C.S. Purohit 33273 (BSJO – 39812); India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Jhamuda, Lewa ki Nal, 25°43.962'N & 73°54.875'E, 413m, 11.09.2017, coll. C.S. Purohit 33280 (BSJO – 39799, 39800).

***Erigeron bonariensis* L.**

Erect, annual, hairy herbs, up to 80 cm high. Leaves simple, linear-lanceolate, serrate-incensed. Heads in pyramidal leafy panicles. Achenes, thinly hairy. Pappus hairy, dirty white.

***Fl. & Fr.***

December – July.

***Distribution***

Rajasthan: Ajmer (Pachkund); Bhilwara (Samodi); Bikaner (Chhatergarh); Ganganagar (Menawali); Nagaur (Thanwala); Pali (Sadri); Sirohi (Mount Abu); Tonk (Ghass village); Todgarh-Raoli wildlife sanctuary (Shree Dev Narayan temple).



*Specimen examined*

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Jojawar range, Shree Dev Narayan Temple, 25°46.396'N & 73°57.060'E, 12.09.2017, coll. C.S. Purohit 33318 (BSJO – 39873, 39874).

**Glossocardia bosvallea (L.f.) DC. [Figure 1]**

Small, suberect, decumbent, diffusely branched, glabrous, annual herbs up to 40 cm high. Leaves 2 – 3-pinnate; segments linear. Heads numerous, yellow, solitary. Achenes, oblong, flattened, hairy, dark brown. Pappus brown bristles.

*Fl. & Fr.*

Aug. – Oct.

*Local name*

Chiria-ka-chugga.

*Distribution*

Rajasthan: Banswara (Wadita); Jaipur (Jaigarh); Jodhpur; Kota (Kishanganj); Nagaur (Thanwla); Sirohi (Mount Abu); Todgarh-Raoli wildlife sanctuary (Katarghati, Halela, Badinda gui).

*Specimen examined*

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Katarghati, 25°43.885'N & 73°59.160'E, 674m, 30.07.2016, coll. C.S. Purohit 32931 (BSJO – 40644, 40645); India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bhim Range, Halela-Badinda-gui, 25°22.685'N & 73°48.007'E, 739m, 11.08.2016, coll. C.S. Purohit 33201 (BSJO – 41152).

**Gnaphalium polycaulon Pers. [Figure 5]**

Prostrate or decumbent, slender, annual herbs, up to 15 cm high. Leaves linear-oblongate. Heads yellowish-white, in dense, terminal, and axillary, leafy spikes. Achenes oblong, minutely papillose. Pappus hairs 1-seriate, free, white.

*Fl. & Fr.*

Nov. – Mar.

*Distribution*

Rajasthan: Banswara (Ghatol); Bikaner (Sagar Pond, Mud village); Jodhpur (Kailana); Kota (Shahabad); Nagaur (Merta City); Sirohi (Mount Abu); Todgarh-Raoli wildlife sanctuary (Mayali mata temple, Thoria deh).

*Specimen examined*

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bhim Range, Mayali mata temple, 25°27.635'N & 73°45.348'E, 419m, 26.09.2017, coll. C.S. Purohit 33479 (BSJO – 42080, 42081); India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Thoria deh, Ghora Nal, 25°48.786'N & 73°58.557'E, 481m, 22.02.2019, coll. C.S. Purohit 31047 (BSJO – 42350, 42351).

**Gnomophalium pulvinatum (Del.) Greuter [Figure 5]**

Small, diffuse, prostrate, densely whitish to grayish lanate tomentose annual herbs. Leaves spatulate. Head congested in terminal clusters, surrounded by terminal leaves. Achene oblong, minutely papillose. Pappus setae white.

*Fl. & Fr.*

December – April.



**Figure 5** Photo plate shows Asteraceae of Todgarh-Raoli wildlife Sanctuary i.e. *Gnaphalium polycaulon* Pers.; *Gnaphalium pulvinatum* (Del.) Greuter; *Pluchea tomentosa* DC.; *Pluchea arguta* Boiss.; *Grangea maderaspatana* (L.) Poir.; *Laphangium affine* (D. Don) Tzvelve. (Photo: C.S. Purohit).





**Figure 6** Photo plate shows Asteraceae of Todgarh-Raoli wildlife Sanctuary i.e. *Launaea asplenifolia* (Willd.) Hook.f.; *Pentanema indicum* (L.) Ling.; *Pentanema vestitum* (Wall. ex DC.) Ling.; *Sclerocarpus africanus* Jacq. ex Murr.; *Sonchus oleraceus* L.; *Verbesina encelioides* (Cav.) Benth. & Hook.f. ex A. Gray; *Vernonia cinerea* (L.) Less. (Photo: C.S. Purohit).



***Distribution***

Rajasthan: Banswara; Bikaner (Gajner lake, Mankasar); Jodhpur (Birai); Sirohi (Mount Abu); Todgarh-Raoli wildlife sanctuary (Taheshwar Mahadev, Sarupa).

***Specimen examined***

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bijajiguda Range, Sarupa, Taheshwar mahadev temple, 25°49.954'N & 73°56.474'E, 426m, 26.02.2019, coll. C.S. Purohit 31098 (BSJO – 40438, 40439).

***Grangea maderaspatana (L.) Poir. [Figure 5]***

Prostrate, hairy, annual herb, spreading from the stump, up to 30 cm high. Leaves oblanceolate, coarsely serrate-dentate lobes. Heads globose, leaf opposed, or terminal clusters, yellow. Achenes compressed, glabrous, glandular. Pappus absent.

***Fl. & Fr.***

Almost throughout the year.

***Distribution***

Rajasthan: Banswara (Ghatol); Barmer (Ghandav Luni bed); Jaipur (Bara-gaon); Kota (Kelwara); Sirohi (Mount Abu); Todgarh-Raoli wildlife sanctuary (Chappali).

***Specimen examined***

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bhim Range, Chappali, 25°29.072'N & 73°49.090'E, 558m, 24.09.2017, coll. C.S. Purohit 33464 (BSJO – 42062).

***Laphangium affine (D.Don) Tzvelve. [Figure 5]***

Erect, biennial herb, up to 40 cm high. Leaves spatulate, margin entire. Heads densely terminal corymbs, pale yellow. Achenes oblong, compressed, papillose. Pappus white, bristles deciduous separately.

***Fl. & Fr.***

Jan. – April.

***Distribution***

Rajasthan: Bhilwara (Amarpura); Ganganagar (34 G.B.); Jaipur (Amer); Swaimadhopur (Ranthambhore); Todgarh-Raoli wildlife sanctuary (Kundal).

***Specimen examined***

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bijajiguda Range, Kundal, 26°00.140'N & 74°10.175'E, 441m, 24.02.2019, coll. C.S. Purohit 31077 (BSJO – 42399, 42400).

***Launaea aspleniifolia (Willd.) Hook.f. [Figure 1 & 6]***

Erect, suberect, or ascending biennial multicauline herbs. Leaves in basal rosette, oblanceolate. Heads in pseudodichotomously, pedunculate terminal panicles, yellow. Achene was columnar, roughly ribbed, angled. Pappus hairs white, deciduous.

***Fl. & Fr.***

Oct. – March.

***Distribution***

Rajasthan: Jaipur (Jagatpura, Amer); Jhalawar; Jodhpur; Kota (Chhabra); Todgarh-Raoli wildlife sanctuary (Kot-Kirana, Baghmal).

*Specimen examined*

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bijajiguda Range, Kot-Kirana, 25°51.770'N & 74°06.174'E, 518m, 13.09.2017, coll. C.S. Purohit 33335 (BSJO – 39928); India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Baghmal, 25°49.412'N & 73°59.462'E, 532m, 23.02.2019, coll. C.S. Purohit 31059 (BSJO – 42370, 42371).

***Launaea procumbens* (Roxb.) Ramaya & Rajagopal**

Much branched, suberect, glabrous, perennial herbs, up to 20 cm high. Leaves in rosette, sessile, oblong, margin spinulose-dentate teeth white. Heads 5-8, cylindric, yellow. Achenes ribbed, truncate, pale yellow. Pappus simple, soft and white.

*Fl. & Fr.*

Sept. – Mar.

*Local name*

Jangli-gobhi.

*Distribution*

Rajasthan: Banswara (Ghatol); Barmer (Pachpadra, Sudani); Bikaner (Chhatergarh); Churu (Sujangarh); Kota; Nagaur (Nagaur city); Sirohi (Mount Abu); Todgarh-Raoli wildlife sanctuary (Bheelon ki Nal, Tilakheda, Katarghati).

*Specimen examined*

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Bheelon Ki Nal, 25°43.229'N & 73°55.794'E, 444m, 27.07.2016, coll. C.S. Purohit 32824 (BSJO – 40455, 40456); India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Tilakheda, 25°45.930'N & 73°59.203'E, 489m, 30.07.2016, coll. C.S. Purohit 32946 (BSJO – 40672, 40673).

***Parthenium hysterophorus* L.**

Erect, aromatic, perennial herbs, up to 1 m high. Leaves alternate, highly divided; segments linear. Heads white, in lax, axillary and terminal, corymbose cymes. Achenes flattened, black, corolla and styles persistent at the apex of the achene. Pappus absent.

*Fl. & Fr.*

Aug. – Feb.

*Local name*

Congras-grass.

*Distribution*

Rajasthan: Banswara (Ghatol); Bhilwara (near Railway station); Barmer (Pachpadra); Bikaner (Chhatergarh); Chittorgarh (Hazikhera); Churu (Sujangarh); Jaipur (Sanganer); Kota; Nagaur (Nagaur city); Sirohi (Mount Abu); Todgarh-Raoli wildlife sanctuary (Bagad).

*Specimen examined*

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bhim Range, Bagad, 25°37.079'N & 73°54.732'E, 652m, 02.08.2016, coll. C.S. Purohit 32995 (BSJO – 40114, 40115).

***Pentanema indicum* (L.) Ling. [Figure 6]**

Erect, rigid, slender, perennial herbs up to 80 cm high. Leaves oblong-lanceolate, margin shallowly serrulate. Heads in solitary and terminal panicles, yellow. Achenes were small, terete, silky pubescent. Pappus white, or yellowish later, absent in ray florets.

*Fl. & Fr.*

Aug. – Feb.

**Distribution**

Rajasthan: Banswara (Hura Bowji); Barmer (Silly pasture); Bhilwara (Shahpur); Ganganagar (Kumbharnwali); Tonk (Kakor forest); Todgarh-Raoli wildlife sanctuary (Todgarh, Jogmandi).

**Specimen examined**

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Todgarh, 25°43.885'N & 73°59.160'E, 674m, 04.09.2018, coll. C.S. Purohit 33595 (BSJO – 42260, 42261); India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bhim Range, Goramghat-Jogmandi, 25°38.401'N & 73°52.291'E, 452m, 06.09.2018, coll. C.S. Purohit 31004-B (BSJO – 42275).

**Pentanema vestitum (Wall. ex DC.) Ling. [Figure 6]**

Erect, stout, glandular, softly pubescent-villous annual herbs, up to 50 cm high. Leaves oblong, margin shallowly serrate. Heads solitary, yellow. Achenes brown, sparsely pubescent. Pappus bristles fine, usually 10, yellowish-white.

**Fl. & Fr.**

May. – Oct.

**Distribution**

Rajasthan: Alwar; Jaipur; Kota (Devari); Udiapur; Todgarh-Raoli wildlife sanctuary (Jogmandi).

**Specimen examined**

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bhim Range, Goramghat-Jogmandi, 25°38.401'N & 73°52.291'E, 452m, 06.09.2018, coll. C.S. Purohit 31004-A (BSJO – 42274).

**Pluchea arguta Boiss. [Figure 5, 7 & 9]**

Erect, much branched shrub, up to 2 m high. Leaves oblong-oblongate, sessile, alternate, coarsely serrate-dentate. Head in terminal compound sub-corymbose, white. Achenes spindle-shaped, 3-angled, with fine hairs along the angles, brown. Pappus hairs 1-seriate, dirty white, antrorsely barbellate.

**Fl. & Fr.**

Nov. – March.

**Distribution**

Rajasthan: Jodhpur; Todgarh-Raoli wildlife sanctuary (Thoria deh).

**Specimen examined**

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Thoria deh, 25°48.622'N & 73°58.408'E, 462m, 22.02.2019, coll. C.S. Purohit 31050 (BSJO).

**Pluchea lanceolata (DC.) Clarke**

Erect under-shrubs, up to 30 cm high. Leaves oblanceolate. Heads ovoid or campanulate, in compound corymbs, pinkish purple. Achenes minute, oblong. Pappus hairs connate at the base.

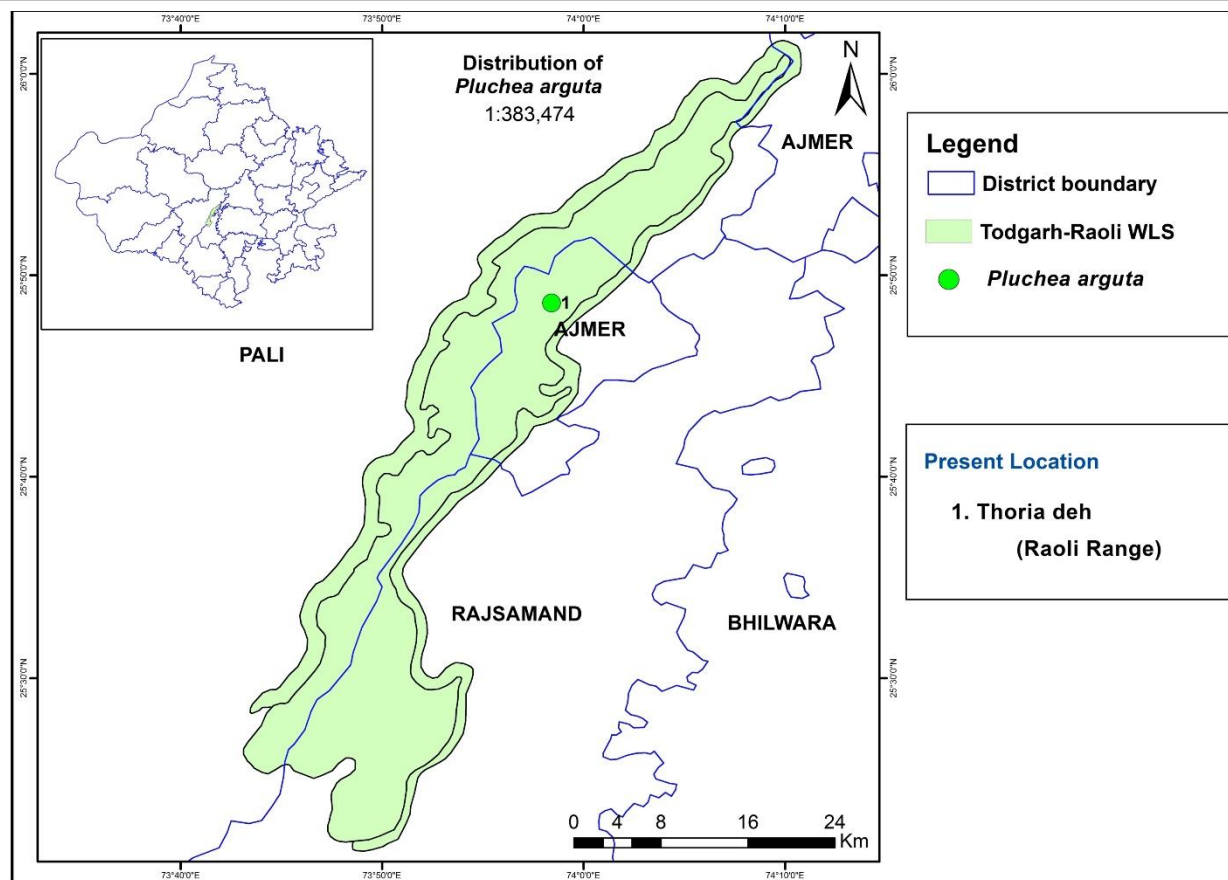
**Fl. & Fr.**

Oct. – July.

**Distribution**

Rajasthan: Bikaner (Lunkaransar); Bundi (Nenwa); Jaipur (Jobner); Jodhpur (Birai); Nagaur (Tunkalia); Pali (Sardar Samand); Tonk (Banetha); Todgarh-Raoli wildlife sanctuary (Taheshwar Mahadev temple).





**Figure 7** Maps shows distribution of *Pluchea arguta* Boiss. from Todgarh-Raoli wildlife sanctuary, Rajasthan (Prepared by C.S. Purohit)

#### Specimen examined

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bijajiguda Range, Taheshwar mahadev temple, 25°49.954'N & 73°56.474'E, 426m, 29.07.2016, coll. C.S. Purohit 32911 (BSJO – 42687, 42688).

#### *Pluchea tomentosa* DC. [Figure 5]

Tall glandular pubescent under-shrub, up to 2 m high. Leaves ovate, coarsely dentate. Heads in compound corymbs, many, purple. Achene hairy, terete to subangular, of marginal ones; Pappus hairs reddish, barbellate, caducous.

#### Fl. & Fr.

Aug. – Dec.

#### Distribution

Rajasthan: Ajmer (Pushkar); Udaipur (Jaisamand); Todgarh-Raoli wildlife sanctuary (Sadon ka Bas, Vayad Bhairuji).

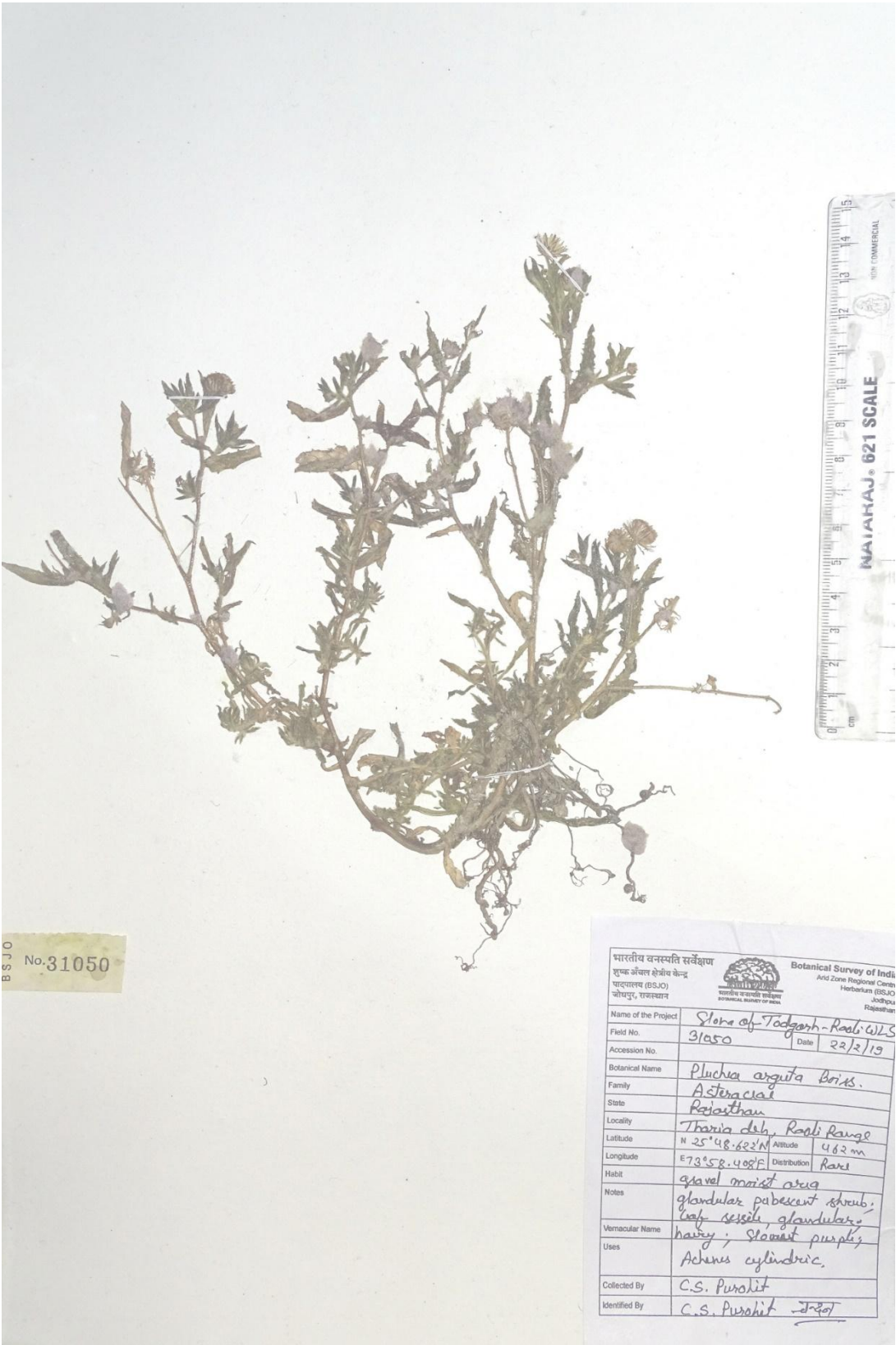
#### Specimen examined

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bijajiguda Range, Sadon ka Bas, 26°00.663'N & 74°07.825'E, 418m, 09.08.2016, coll. C.S. Purohit 33160 (BSJO – 41071, 41072); India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Jojawar Range, Vayad Bhairuji, 25°39.659'N & 73°52.606'E, 478m, 07.09.2018, coll. C.S. Purohit 31016 (BSJO – 42298, 42299).



**Figure 8** Herbarium sheet of *Blumea paniculata* (Willd.) M.R. Almeida – an addition to flora of Rajasthan from Todgarh-Raoli wildlife sanctuary, Rajasthan (Photo: C.S. Purohit)





**Figure 9** Herbarium sheet of *Pluchea arguta* Boiss. recollection after 65 years for Rajasthan from Todgarh-Raoli wildlife sanctuary, Rajasthan (Photo: C.S. Purohit).



***Pulicaria angustifolia* DC.**

Erect, annual herbs, up to 50 cm high, with woody root-stock. Leaves sessile, linear-oblong, entire. Heads yellow, solitary, terminal. Fruit achenes, oblong, terete, sparsely hairy. Outer row of pappus forming a setulose-lacinate cup; inner row of white barbellate hairs.

***Fl. & Fr.***

Oct. – Mar.

***Local name***

Sonela.

***Distribution***

Rajasthan: Barmer (Sheo); Bikaner (Kodamdeshar); Kota (Chhabra); Nagaur (Jaswantgarh, Ladnun); Swaimadhopur (Bayana); Todgarh-Raoli wildlife sanctuary (Goramghat, Jogmandi).

***Specimen examined***

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bhim Range, Goramghat, 25°38.401'N & 73°52.291'E, 452m, 20.09.2017, coll. C.S. Purohit 33443 (BSJO – 41356, 41357); India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bhim Range, Goramghat-Jogmandi, 25°38.401'N & 73°52.291'E, 452m, 27.02.2019, coll. C.S. Purohit 38004 (BSJO – 42450, 42451).

***Sclerocarpus africanus* Jacq. ex Murr. [Figure 6]**

Erect, annual hispid herb, up to 100 cm tall. Leaves opposite, ovate, margin serrate. Heads solitary or leaf opposed, yellow. Achenes oblong, smooth. Pappus absent.

***Fl. & Fr.***

Aug. – Nov.

***Distribution***

Rajasthan: Banswara (Anang Sagar); Jaipur (Ramgarh); Kota (Shahabad); Sirohi (Mount Abu); Todgarh-Raoli wildlife sanctuary (Khanda bhaga, Jhamuda).

***Specimen examined***

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bijajiguda Rnage, Khanda Bhaga, 25°53.382'N & 74°04.899'E, 507m, 01.08.2016, coll. C.S. Purohit 32970 (BSJO – 40159, 40160); India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Jhamuda, 25°43.633'N & 73°54.747'E, 385m, 31.08.2018, coll. C.S. Purohit 33502 (BSJO – 42114, 42115).

***Sonchus oleraceus* L. [Figure 6]**

A rough, erect, glabrous annual herb, up to 90 cm high. Leaves oblong, sessile, entire, or serrate. Heads in irregular, umbellate cymes, yellow. Achenes ovoid, longitudinally 3-ribbed on lateral faces, transversely muriculate between the ribs. Pappus white, longer than achenes.

***Fl. & Fr.***

Oct. – Mar.

***Local name***

Aakadiyo.

**Distribution**

Rajasthan: Banswara (Ghatol); Bikaner (Bichwali); Jaisalmer; Kota (Chhabra); Nagaur (Kuchaman, Didwana); Sirohi (Mount Abu); Todgarh-Raoli wildlife sanctuary (Aasan).

**Specimen examined**

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bijajiguda Range, Aasan-Mata Temple, 25°57.117'N & 74°07.938'E, 442m, 23.02.2019, coll. C.S. Purohit 31068 (BSJO – 42387, 42388).

**Tridax procumbens L. [Figure 1]**

A low straggling or procumbent, hispid, annual herb, up to 60 cm high. Leaves ovate-elliptic, margin deeply inciso-dentate. Heads solitary, on terminal peduncles, yellow. Achenes oblong, black, silky hairy. Pappus unequal, plumose, aristate.

**Fl. & Fr.**

Most of the year.

**Local name**

Pilo-bayoni.

**Distribution**

Rajasthan: Banswara (Paloda); Barmer (Viratra); Bikaner (Malkisar); Chittorgarh (Bassi); Churu (Gopalpura); Ganganagar (Bhadra); Jaipur (Ramgarh); Jodhpur (Kailana, Machiya Biological Park); Kota (Shahabad); Nagaur (Chhoti Khatu); Todgarh-Raoli wildlife sanctuary (Bheelon ki Nal, Satumoda, Sadon ka Bas, Lewa ki Nal, Gauri Kund, Aasan, Jamun temple).

**Specimen examined**

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Bheelon Ki Nal, 25°43.229'N & 73°55.794'E, 444m, 27.07.2016, coll. C.S. Purohit 32830 (BSJO – 40465, 40466); India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Satumoda, 25°42.552'N & 73°55.386'E, 457m, 28.07.2016, coll. C.S. Purohit 32875 (BSJO – 40505, 40506); India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Sadon ka Bas, 26°00.663'N & 74°07.825'E, 418m, 09.08.2016, coll. C.S. Purohit 33143 (BSJO – 40853, 40854); India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Jhamuda, Lewa ki Nall, 25°43.962'N & 73°54.875'E, 413m, 11.09.2017, coll. C.S. Purohit 33282 (BSJO – 39855, 39856).

**Verbesina encelioides (Cav.) Benth. & Hook.f. ex A. Grey [Figure 6]**

Erect, much-branched, densely puberulous, annual herb, up to 90 cm high. Leaves alternate, broadly ovate. Heads in cymes, solitary, golden yellow. Achenes obovate, winged, with 2, subulate pappus-awns.

**Fl. & Fr.**

July – March.

**Local name**

Jhuti-surajmukhi.

**Distribution**

Rajasthan: Ajmer (Pachkunda); Bikaner (Jodhasar); Churu (Sujangarh); Ganganagar (Marjanda); Jodhpur (Kailana, Tiveri); Nagaur (Merta city); Todgarh-Raoli wildlife sanctuary (Jawaja, Shri dev narayan temple).

*Specimen examined*

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bhim Range, Jawaja, 25°39.921'E & 73°59.945'N, 546m, coll. C.S. Purohit 33018 (BSJO – 40711, 40712); India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Modiya, Shri Dev narayan temple, 25°46.396'N & 73°57.060'E, 457m, 02.03.2019, coll. C.S. Purohit 38018 (BSJO – 42472, 42473).

**Vernonia cinerea (L.) Less. [Figure 6]**

Erect or decumbent, perennial herb, up to 100 cm high. Leaf blade rhombic-ovate or ovate, margin mucronate-serrate. Heads in divaricat corymbose cymes, violet or pink. Achenes cylindric, 8 – 10 ridges, glandular. Pappus 2-seriate, white.

*Fl. & Fr.*

July – Nov.

*Distribution*

Rajasthan: Banswara (Jolana); Barmer (Balotra) Jaipur (Ramgarh); Jaisalmer (Amar Sagar) Kota (Kishanganj); Todgarh-Raoli wildlife sanctuary (Pipleshwar Mahadev, Do Kui, Aasan).

*Specimen examined*

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bijajiguda Range, Pipleshwar Mahadev, 25°55.583'N & 74°03.889'E, 432m, 01.08.2016, coll. C.S. Purohit 32962 (BSJO – 40171, 40173); India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Do Kui, 25°49.412'N & 73°59.462'E, 532m, 15.09.2017, coll. C.S. Purohit 33395 (BSJO – 42545, 42546); India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Bijajiguda Range, Aasan, 25°57.117'N & 74°07.938'E, 442m, 03.09.2018, coll. C.S. Purohit 33567 (BSJO – 42219, 42220).

**Xanthium strumarium L. [Figure 1]**

Erect, unarmed, annual herb, up to 1.5 m high. Leaves ovate-suborbicular, toothed. Heads in terminal and axillary racemes, greenish-yellow. Achenes ovoid or elliptic, compressed, enclosed in spinescent involucre, glabrous. Pappus absent.

*Fl. & Fr.*

September – April.

*Local name*

Chirchita, Ridariyo.

*Distribution*

Rajasthan: Bikaner (Chhatergarh, Shivbari); Jaipur (Doasa); Jaisalmer (Pokaran); Kota (Shahabad); Sirohi (Mount Abu); Todgarh-Raoli wildlife sanctuary (Kabradata).

*Specimen examined*

India, Rajasthan, Todgarh-Raoli wildlife sanctuary, Raoli Range, Kabradata, 25°42.736'N & 73°55.517'E, 445m, 10.09.2017, coll. C.S. Purohit 33238 (BSJO – 41221, 41222).

**4. RESULT AND DISCUSSION**

This sanctuary represents the dominant family, Poaceae, which is also dominant in Rajasthan State. Family Asteraceae represent the third dominant family in this sanctuary as well as for the Aravalli range and Rajasthan state. Kanther, (2019) also reported the 3rd dominant family in the Todgarh Sanctuary.

Statistical Analysis of Family Asteraceae

The present work enumerates 37 species belonging to 28 genera under family Asteraceae. The dominant genus is *Blumea* represents five species followed by the genus *Pluchea* (3 species). The 24 genera are represented by single species i.e., *Acanthospermum*, *Bidens*, *Blainvillea*, *Caesulia*, *Centratherum*, *Cyathocline*, *Echinops*, *Eclipta*, *Emilia*, *Erigeron*, *Glossocardia*, *Gnaphalium*, *Gnomophalium*, *Grangea*, *Laphangium*, *Parthenium*, *Pulicaria*, *Sclerocarpus*, *Sonchus*, *Tridax*, *Verbesina*, *Vernonia* and *Xanthium*.

Addition for Flora of Rajasthan

During field exploration of the protected area of Todgarh-Raoli wildlife sanctuary in February 2019, the author demarcated and collected a small population of individuals belonging to the genus *Blumea* from Ghora Nal, Thoria Deh (Raoli Range) with lobed leaves, small flower-heads born in panicles with wiry branches, and white feathery ball fruit. After a critical study, it was identified as *Blumea paniculata* (Willd.) M.R. Almeida. It is a first-time report and an addition to the flora of Rajasthan. Previously, it was reported from Pune, Maharashtra. It is also an extended distribution of this plant from Rajasthan.

Addition for Flora of Aravalli Range

In comparison with Asteraceae of the Aravalli range, 71.8% of genera in the Aravalli range are represented in the Todgarh-Raoli Wildlife Sanctuary, whereas 74% of species and varieties in the Aravalli range are represented in this sanctuary. In comparison with Rajasthan flora, 45.2% genera and 29.6% species of the family Asteraceae are represented in this sanctuary. Otaghvari et al., (2015) have done extensive work on the flora of the Aravalli range and reported 50 species belonging to 36 genera under the family Asteraceae (Table 1).

Table 1 Comparison of Asteraceae of this sanctuary with previous publications.

Family	(1)	(2)	(3)	(4)
Asteraceae				
Genus	28	13	39	62
Taxa	37	14	50	125

(1): Todgarh-Raoli wls. (Purohit, 2020a); (2): Todgarh-Raoli wls (Kanter, 2019); (3): Aravalli range (Otaghvari et al., 2015); (4): Flora of Rajasthan

In this paper, five genera, *Centratherum*, *Erigeron*, *Gnomophalium*, *Laphangium*, and *Sonchus* are first time reports and generic additions to the flora of the Aravalli Range. Twelve plant species, i.e., *Ageratum houstonianum* Mill., *Blumea mollis* (D. Don) Merr., *Blumea paniculata* (Willd.) M.R. Almeida, *Blumea virens* DC., *Centratherum anthelminticum* (L.) O. Kuntze, *Erigeron bonariensis* L., *Gnomophalium pulvinatum* (Del.) Greuter, *Laphangium affine* (D. Don) Tzvelve., *Pentanema vestitum* (Wall. ex DC.) Ling., *Pluchea arguta* Boiss., *Pluchea tomentosa* DC., *Sonchus oleraceus* L. are first time reports from the Aravalli range and additions to the flora of the Aravalli range.

Addition for Flora of Todgarh-Raoli wildlife sanctuary

Kanter, (2019) has done extensive work on the Flora of Todgarh-Raoli Wildlife Sanctuary and reported 301 species, out of which 14 belong to 13 genera under the family Asteraceae (Table 1). In this paper, seventeen genera, i.e., *Ageratum*, *Bidens*, *Blainvillea*, *Caesulia*, *Centratherum*, *Cyathocline*, *Emilia*, *Erigeron*, *Glossocardia*, *Gnaphalium*, *Gnomophalium*, *Grangea*, *Laphangium*, *Pentanema*, *Sclerocarpus*, *Sonchus*, and *Verbesina*, are examined. are first time report and generic addition for flora of Todgarh-Raoli wildlife sanctuary and 27 plant species i.e. *Ageratum conyzoides* L.; *Ageratum houstonianum* Mill.; *Bidens biternata* (Lour.) Merr. & Sherff.; *Blainvillea acmella* (L.) Philipson; *Blumea mollis* (D. Don) Merr.; *Blumea obliqua* (L.) Druce; *Blumea paniculata* (Willd.) M.R. Almeida; *Blumea virens* DC.; *Caesulia axillaris* Roxb.; *Centratherum anthelminticum* (L.) O. Kuntze; *Cyathocline purpurea* (Buch.-Ham. ex D. Don) O. Ktze.; *Emilia sonchifolia* (L.) DC.; *Erigeron bonariensis* L.; *Glossocardia bosvallea* (L.f.) DC.; *Gnaphalium polycaulon* Pers.; *Gnomophalium pulvinatum* (Del.) Greuter; *Grangea maderaspatana* (L.) Poir.; *Laphangium affine* (D.Don) Tzvelve.; *Launaea asplenifolia* (Willd.) Hook.f.; *Pentanema indicum* (L.) Ling.; *Pentanema vestitum* (Wall. ex DC.) Ling.; *Pluchea arguta* Boiss.; *Pluchea tomentosa* DC.; *Pulicaria angustifolia* DC.; *Sclerocarpus africanus* Jacq. ex Murr.; *Sonchus oleraceus* L.; *Verbesina encelioides* (Cav.) Benth. & Hook.f. ex A. Grey, are the first-time report and addition to the flora



of the Todgarh-Raoli wildlife sanctuary. Out of these, *Blumea virens* DC., *Pentanema vestitum* (Wall ex DC.) Ling, and *Pluchea tomentosa* DC. are rare plants of Rajasthan, collected from this sanctuary.

### Recollection for Flora of Rajasthan

A rare plant, *Pluchea arguta* Boiss., was reported from Jodhpur, Rajasthan, by and later included in other publications Shetty and Singh, (1987) on the basis of Sarup's publication, but its herbarium sheet was not found in any herbaria of Rajasthan. After that, no one collected this specimen from Rajasthan, but in other states it was collected and reported. During plant exploration, the author collected this plant from the Todgarh-Raoli Wildlife Sanctuary, Rajasthan. So, this sanctuary is a new locality and a recollection of this plant after a gap of 65 years from Rajasthan, based on Sarup's publication (1954).

## 5. CONCLUSION

The present paper deals with 37 species belonging to 28 genera of the family Asteraceae collected from this sanctuary. Among these, one species, *Blumea paniculata* (Willd.) M.R. Almeida, is reported for the first time and is an addition to the flora of Rajasthan. Five genera, i.e., *Centratherum*, *Erigeron*, *Gnomophalium*, *Laphangium*, and *Sonchus*, are first-time reports and generic additions to the flora of the Aravalli Range, and twelve plant species are first-time reports from the Aravalli Range and additions to the flora of the Aravalli Range.

Seventeen genera, i.e., *Ageratum*, *Bidens*, *Blainvillea*, *Caesulia*, *Centratherum*, *Cyathocline*, *Emilia*, *Erigeron*, *Glossocardia*, *Gnaphalium*, *Gnomophalium*, *Grangea*, *Laphangium*, *Pentanema*, *Sclerocarpus*, *Sonchus*, and *Verbesina*, are first-time reports and generic additions to the flora of Todgarh-Raoli wildlife sanctuary, and 27 plant species are first-time reports and additions to the flora of Todgarh-Raoli wildlife sanctuary, Rajasthan.

### Conflicts of interests:

The authors declare that there are no conflicts of interests.

### Funding:

The study has not received any external funding.

### Ethical approval & declaration

In this article, as per the plant regulations followed in the Botanical Survey of India, Arid Zone Regional Centre, Jodhpur, Rajasthan, India, the authors observed the 37 species belonging to 28 genera of the family Asteraceae collected from Todgarh-Raoli wildlife sanctuary, India. The ethical guidelines for plants & plant materials are followed in the study for species collection & identification.

### Data and materials availability

All data associated with this study are present in the paper.

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