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# Study on New Addition to the Angiospermic Flora of Bankura District, West Bengal, India

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ABSTRACT: Present study was carried out in Bankura District of West Bengal, India. During field explorations lots of plant specimens were collected. Herbarium sheets for most of them were prepared following standard herbarium techniques. Identification of prepared herbarium specimens was done with regional and national floras with contemporary taxonomic revisions. Twelve new species of angiosperms are added to the angiosperm flora of Bankura District, West Bengal, India. Taxonomic information including accepted name, basionym, phenology, material examined and distributional data for each species have been provided.

Keywords: Angiosperm, new additions, Bankura District, West Bengal.

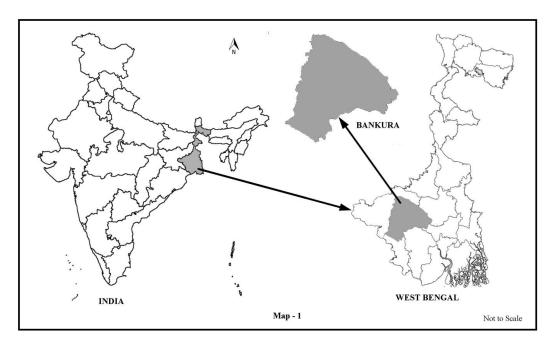
#### INTRODUCTION

The district Bankura of West Bengal (Map 1) is situated between 22° 46′ and 23° 38′ North latitudes and between 86° 36′ and 87° 46′ East longitudes (Forest Directorate, Government of West Bengal 1964). It covers an area of 6,882 sq. km (Dept of Forests, Bankura, 2019) and bounded by the districts of Bardhaman (Burdwan), Hooghly, West Medinipur (Midnapore) and Purulia in the north, north-east, south and west borders respectively.

The District Bankura connects the plains of West Bengal and the plateau of Chhotanagpur and thus this district can be demarcated into three topographical divisions as, an eastern plain land, a western hilly region and then a connecting undulating uneven tract in the middle region. Among the hills the Susunia hill rises to 439.5m (1,442 feet) above mean sea level. The Biharinath hill is 447.8 m (1,469 feet) above mean sea level (Sanyal, 1994) and it is the highest peak of the

district along with a more hilly region is the Jhilimili and its adjoining places.

The Flora of Bankura District is perhaps the first and only complete source of information on the flora of Bankura district (Sanyal, 1994). A few reports of occurrence of new species of plants were published in recent years. Except few occurrence of a few new species are mentioned, however, no description or collection record given (Mandal and Nandi 2012; Karmakar and Rahaman 2015; Karmakar and Rahaman 2022; Mandal et al., 2022; Sinhababu and Banerjee 2013; Banerjee et al., 2013; Rahaman and Karmakar 2015; Banerjee and Sinhababu 2017; Banerjee and Sinhababu 2018; Banerjee and Sinhababu 2020; Bishnoi et al., 2021; Karmakar and Rahaman 2022; Singh et al., 2022; Vasu and Hasan 2022; Pradhan, 2023). Present study is a part of continuous monitoring of the flora of concerned region during a period between 2014-2022.



#### MATERIALS AND METHODS

Present study was carried out in between 2014-2022 in Bankura District of West Bengal, India. During field explorations lots of plant specimens were collected. Herbarium sheets were prepared following standard herbarium techniques (Manual of Herbarium Technique, ENVS, BSI). Taxonomic identification of prepared Herbarium specimens was done with regional and national floras, contemporary taxonomic revisions. Many of them were identified with BSI and other reputed institutes with herbarium. Plant material in prepared herbarium sheets were deposited at the Herbarium of the Taxonomy and Biosystematics Laboratory, Kalyani University, West Bengal, India. During study of the prepared herbarium specimen, made from collections of the concerned area, the authors found many hitherto-unreported plant species. Plant species in this present work are arranged according to APG II Classification. For information in relation to identification of three species, namely, Iphigenia indica (L.) A. Gray ex Kunth, Cyperus niveus Retz., and Portulaca pilosa L., some help was taken from the website 'indiabiodiversity.org'.

#### RESULT AND DISCUSSION

Among the many herbarium specimen deposited at Herbarium of the Taxonomy and Biosystematics Laboratory, Kalyani University, most are identified as plant species already reported from this district. From the rest of the specimen so far identified, twelve hitherto-unreported plant species were found to occur in this district. They are listed here in enumeration and their families are recognized according to APG II Classification. One plant species of the twelve new reports, Pancratium zeylanicum L., is a new report for the state of West Bengal too. However, *Pancratium zeylanicum* L. was previously described as cultivated plant (Guha-Bakshi, 1984) from Murshidabad district

of west Bengal but in this study it was found in wild. *Iphigenia indica* (L.) A. Gray ex Kunth was reported from present Jharkhand (Haines, 1924) but the area was included in Bengal province at that time. Prain (1903), though mentioned this species has a distribution in West Bengal, no fresh collection was reported after him. In that sense this plant is also a new record for present area of the state of West Bengal (Plate 1 and 2).

### TAXONOMIC ENUMERATION

**Pancratium zeylanicum** L., Sp. Pl. 290. 1753; Hook.f., Fl. Brit. India 6: 285.1892; Pullaiah & Karuppusamy, Fl. Eastern Ghats 6: 42. 2020. (Amaryllidaceae). Plate

Bulbous, perennial herb; bulb globose, 2.3-5 cm diam. Leaves 8-12, bifarious, 15-29cm, linear-lanceolate, acuminate. Scape shorter than the leaves; spathes as long as the corolla tube. Flowers sessile, white, fragrant, 5-8 cm diam; cup broad, subequally 12-toothed; teeth large; perianth tube as long as the lanceolate lobes or shorter; throat broadly funnel-shaped; filaments 2.5-3 cm. longer than the cup; anthers about 6 mm long. Capsules subglobose, 3-cornered; seeds many, angular.

Flowering and Fruiting: April - June. In deciduous forests of the hills. Specimen examined, Paul-1204, Sushunia Hill.

Rhynchostylis retusa (L.) Blume, Bijdr. Fl. Ned. Ind. 286. 1825; Hook.f., Fl. Brit. India 6: 32.1890; Prain, Bengal Plants 2: 1020. 1903; Haines, Bot. Bihar & Orissa 3(6): 1230. 1924. Kothareddy et al. (2019) Orchids Eastern Ghats 241. 2019. (Orchidaceae). Plate 1b

Robust, epiphytic herb. Leaves oblong-lanceolate, channeled with sharply pointed praemorse apex, coriaceous. Flowers pedicel late, bracteate, in dense, cylindric, drooping racemes, pale pink with deeper-coloured spots; lip spurred; spur distant from the base of lip; column prolonged into foot; spur saccate,

laterally compressed; side lobe of lip absent. Capsules ovoid-oblong, winged, reflexed.

*Flowering and Fruiting*: April-July. In forest areas. Specimen examined, Paul-1654. Katiam, Bankura.

Zeuxine strateumatica (L.) Schltr., in Bot. Jahrb. Syst. 45: 394. 1911; Kothareddy et al. (2019) Orchids Eastern Ghats 277. 2019; Zeuxine sulcata (Roxb.) Lindl., Gen. Sp. Orch. Pl. 485. 1840; Hook.f., Fl. Brit. India 6: 106. 1890; Haines, Bot. Bihar & Orissa 3(6): 1161. 1924. (Orchidaceae). Plate 1c.

Delicate terrestrial herb, 10-20 cm long. Rhizomes short, fleshy. Leaves  $1\text{-}1.5 \times 0.2\text{-}0.5$  cm, obovate-lanceolate, membranous, sometimes tinged with brown. Flowers pale pinkish or pinkish-white, borne in spike of 8-10 cm long; sepals subequal; lip fleshy strongly saccate at the base, with 2 curved papilla with the sac. Capsules ovoid, ellipsoid, 5-8 mm long, with ridges.

Flowering and Fruiting: December-March. In the rice field areas. Specimen examined, Paul-1626, Keshra.

Iphigenia indica (L.) A. Gray ex Kunth, Enum. Pl. 4: 213. 1843; Hook.f., Fl. Brit. India 6: 357. 1892; Prain, Bengal Plants 2: 1074. 1903; Haines, Bot. Bihar & Orissa 3(6): 1146. 1924; Pullaiah & Karuppusamy, Fl. Eastern Ghats 6: 80. 2020. (Colchicaceae). Plate 1d.

Tuberous perennial herbs, to 25 cm high, tuber globose, stem slender. Leaves to  $15 \times 0.7$  cm, linear-lanceolate, glabrous; sheath closed. Flowers 1-3, in a leafy raceme; bracts lanceolate, to 4 cm long; pedicel to 1.5 cm long; tepals 6,  $7 \times 1$  mm, lanceolate, brown, spreading; stamens 6, spreading; filaments flattened; anthers oblong, 1.5 mm long; ovary  $5 \times 3$  mm, oblong, 3-lobed; style absent; stigmas sessile, 3, recurved. Capsule  $1.2 \times 0.6$  cm, obovoid; seeds many, orbicular, compressed, brown.

Flowering & fruiting: July-September. In deciduous forest of the hills. Specimen examined, Paul-1449, Sushunia Hill.

Phoenix acaulis Roxb., Pl. Coromandel 3: 69. 1820; Hook.f., Fl. Brit. India 6: 426. 1892; Prain, Bengal Plants 2: 1096. 1903; Haines, Bot. Bihar & Orissa 3(5): 924. 1924; Pullaiah & Karuppusamy, Fl. Eastern Ghats 6: 129. 2020. (Arecaceae). Plate 1e.

Bushy shrub, Stem short, sometimes bulbous, covered with persistent leaf bases, leaves 0.6-1.5 m. long; leaflets stiff, 10-15 cm long, fascicled, apex acicular; petioles 20-30 cm long, with few spiny leaflets at base. Male spadix 50-60 cm long; spathe 30-40 cm long; boat-shaped, woody. Fruiting spadix 40-50 cm long; reddish-brown. Fruits ellipsoid-oblong, about 1.5 cm long, orange-yellow; mesocarp edible.

Flowering and Fruiting: May-January. In forest areas. Specimen examined, Paul-2106, Gouripur.

Cyperus niveus Retz., Observ. Bot. 5: 12. 1789; Hook.f., Fl. Brit. India 6: 601. 1893; Prain, Bengal Plants 2: 1142. 1903; Haines, Bot. Bihar & Orissa 3(5): 939. 1924; Fischer 3: 1640. 1931; Pullaiah & Karuppusamy, Fl. Eastern Ghats 6: 219. 2020. (Cyperaceae). Plate 1f.

Rhizomatous sedge; rhizome short, horizontal, sympodial with wiry rootlets; culm to 30 cm high, nodose at base. Leaves many near base of the culms,

narrowly linear with filiform tips, shorter than culm, 2-3 mm wide; sheaths numerous, brown, striate, persistent. Inflorescence umbellate heads; bracts usually 2, to 5 cm long, unequal, leaf-like. Spikelets 3-10 in a head 12-15 × 4-5 mm, oblong-elliptic, compressed, 16-30-flowered, almost white; rachilla not winged. Glumes 3.5 × 1.1 mm, ovate-lanceolate, compressed. Stamens 3; filaments long, persistent; anther exserted, linear. Style 1.5 mm long; stigma 3, shorter than the style. Achene 2 mm long, obovoid, dark-brown.

Flowering & fruiting: April-July. In deciduous forest of the hills. Specimen examined, Paul-1392, Sushunia Hill

Portulaca pilosa L., Sp. Pl. 445. 1753; Pullaiah & Rao, Fl. Eastern Ghats 1: 104. 2002. (Portulacaceae). Plate 2a.

Succulent perennial herbs, roots tuberous, fusiform; stem reddish, decumbent. Leaves  $6\text{-}15 \times 1\text{-}3$  mm, oblong or linear, terete, apex obtuse; stipules hairy. Flowers terminal, solitary or 2-4, sessile, subtended by an involucre of 3-6 cauline leaves. Sepals  $2\text{-}4 \times 1\text{-}2\text{.}5$  mm. Petals 4-6, bright yellow,  $5\text{-}10 \times 3\text{-}8$  mm, obovate. Stamens 10-20 or more; filaments c. 3 mm long. Styles 3-5-armed. Capsules 2-3 mm across, globose. Seeds black, granulate.

Flowering & fruiting: September-December. In deciduous forest of the hills. Specimen examined, Paul-1350, Sushunia Hill.

*Tamarix ericoides* Rottl. in in Ges. Naturf. Freunde Berlin Neue Schriften 4:214. 1803; Hook.f., Fl. Brit. India 1: 249.1874; Prain, Bengal Plants 1: 242.1903; Haines, Bot. Bihar & Orissa 1(2): 52. 1921; Pullaiah & Rao, Fl. Eastern Ghats., 1: 106. 2002. (Tamaricaceae). Plate 2b.

Undershrub or shrubs, about 1-2 m tall. Stem much branched, blackish brown, glabrous or subglabrous, two kinds of branches present, young green vegetative branches which are deciduous in winter and ligneous old growing permanent branches. Leaves alternate, scale-like, vaginate, free part lanceolate-ovate, 3-7mm long, base amplexicaul, apex acuminate, keeled, petiole sessile, ex-stipulate. Inflorescence racemes in young and old branches, terminal or lateral. Flowers bisexual, slightly fragrant, subsessile, bracts nearly mplexicaul, triangular, margins irregular denticulate, acuminate, about 3-5 mm long, sepals 5 partite obovater, obtuse, about  $2.5-4 \times 2$  mm across, petals 5, oblong-elliptic, pink, about  $6 \times 4$  mm across. Stamens 5, filaments, about 4 mm long, anthers bi-lobed. Ovary 3 locular, ovules many, styles 3, free, 3, capitate. Fruit capsule, about  $3 \times 1.6$  mm across.

Flowering & fruiting: December-February. In river bed. Specimen examined, Paul-2182, Dwarkeshwar river, Bankura.

Flemingia nana Roxb. FL. Ind. 3: 339. 1832; Prain in Journ. As. Soc. Beng 66: 441. 1876: Haines, Bot. Bihar & Orissa 2(3): 282. 1922; Pullaiah & Ramamurthy, Fl. Eastern Ghats., 2: 241. 2000; F. congesta Roxb. ex-Ait. f. var nana (Roxb.) Baker in Hook. f. Fl. Brit. India, 2: 228. 1876. (Fabaceae). Plate 2c.

Small undershrub, to 30 cm tall, underground stem and branchlets woody. Stipules 1.3 cm, linear, lanceolate. acute, striate, caducous. Leaves 3-foliolate, gland dotted, terminal leaflet  $8\text{-}16\times6\text{-}11$  cm, rhomboid, obovate, margin entire, glabrous above, pubescent on the nerves beneath, lateral leaf- lets  $5\text{-}12\times4\text{-}10$  cm, base oblique, margin entire. glabrous above, pubescent beneath, 3-nerved from base, petioles winged, tomentose, to 25 cm. Bracts caducous 4 mm. Racemes congested, axillary. to 12 cm, flowers 5 mm across, calyx tube 2 mm, lobes to 3.5 m. triangular, acute,

glandular pubescent; corolla pink, standard orbicular, 4  $\times$  4 mm, wings 2  $\times$  1 mm, keels hooded, 4  $\times$  1.5 mm: stamens diadelphous (9+1), staminal sheath 4  $\times$  2 mm, filaments 2 mm, alternately long and short; ovary pubescent. 1 mm. style curved 5 mm. Pod turgid, 0.9  $\times$  0.5 cm, oblong, covered with viscid reddish glands, seeds 2, 2.5 mm, brown, round, glabrous, shining. Flowering & fruiting: December-April. In deciduous forest of the hills. Specimen examined, Paul-1682, Sushunia Hill.

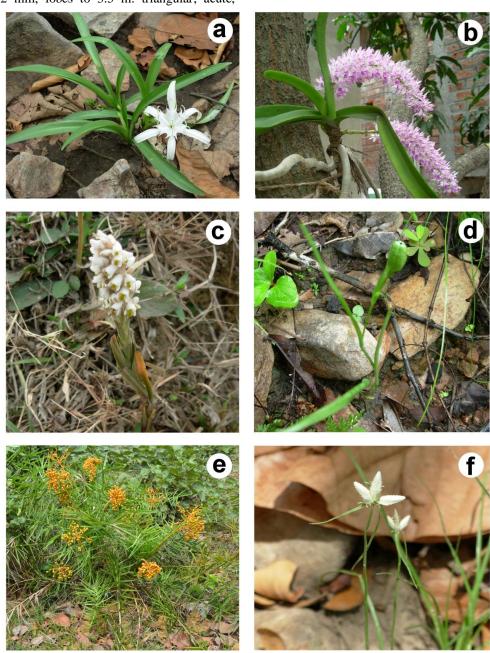


Plate. 1. a. Pancratium zeylanicum L., b. Rhynchostylis retusa (L.) Blume, c. Zeuxine strateumatica (L.) Schltr. d. Iphigenia indica (L.) A.Gray ex Kunth. e. Phoenix acaulis Roxb. f. Cyperus niveus Retz.

Ziziphus xylopyrus (Retz.) Willd., Sp. Pl. 1: 1104. 1797. Lawson in Hook. f., Fl. Brit. Ind. 1: 634. 1875; Ziziphus xylopyra Willd., Prain, Beng. Plants 334 1903; Haines, Bot. Bihar & Orissa 1(2): 202. 1921; Ziziphus

*xylopyra* (Retz.) Willd., Pullaiah & Rao, Fl. Eastern Ghats 1: 282. 2002. (Rhamnaceae). Plate 2d. Small thorny tree. Leaves elliptic-oblong or suborbicular, ca  $8.5 \times 4.8$  cm, oblique at base, pubescent or

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hairy beneath, finely serrate. Flowers 4 to 5-merous, in short axillary cymes; calyx glabrous within; lobes obconic, acute; petals greenish white; disc 5-angled.Drupe globose, woody grey-tomentose; stone hard, 2-3-celled, 2-3-seeded.

Flowering and Fruiting: March-January. In deciduous forest of the hills. Specimen examined, Paul-1475, Chhendapathar.

*Eriolaena hookeriana* Wight & Arn. Prodr. Fl. Ind. Orient. 1: 70. 1834; Master in Hook.f., Fl. Brit. Ind. 1: 370, 1874; Prain, Beng. Plants 276 1903; Haines, Bot. Bihar Orissa 1(2): 81. 1921; Pullaiah & Rao, Fl. Eastern Ghats 1: 153. 2002. (Malvaceae). Plate 2e.

Shrub or small tree, to 5m tall. Young stem with stellate hairs. Leaves 8-14 × 7-11cm, broadly ovate-cordate, serrate, often shortly acuminate; petioles 3-8cm long. Flowers infew flowered 7-12cm long axillary cymes at the end of branches; pedicels to 5cm long, hairy; sepals 5, linear-lanceolate; petals 5, obovate, yellow; staminal column to 2 cm long; stamens many, filaments united at various length; stigma 8-10 fid. Capsules 2.5cm diam. ovoid, pubescent; seeds many.

*Flowering and fruiting*: February-March. In deciduous forest of the hills. Specimen examined, Paul-1423, Sushunia Hill.

Ceropegia hirsuta Wight & Arn. Contr. Bot. India 30. 1834; Hook.f., Fl. Brit. India 4: 71. 1883; Prain, Beng. Plants 2:701 1903; Haines, Bot. Bihar Orissa 2(4): 590. 1921; Pullaiah, Sandhya Rani & Karuppusamy, Fl. Eastern Ghats 4: 102. 2011. (Apocynaceae). Plate 2f.

Tuberus, twinning herb, hairy throughout. Leaves ovate to lanceolate, variable, membranous. Flowers few to many, born in cymes; calyx shorter than corolla; corolla depressedly inflated at base, funnel-shaped above, 4–5 cm long, creamy-yellow with purplish red spots; lobes hairy within and along the margin, apex fused, forming an almost globose dome; outer corona saucer-shaped, entire, broadly shallow; inner corona linear and erect; pollinia 5, reddish-brown; ovaries 2, ca. 2 mm long; style very short. Follicles slender, smooth.

Flowering & fruiting: June—September. In deciduous forest of the hills. Specimen examined, Paul- 1095, Sushunia Hill.

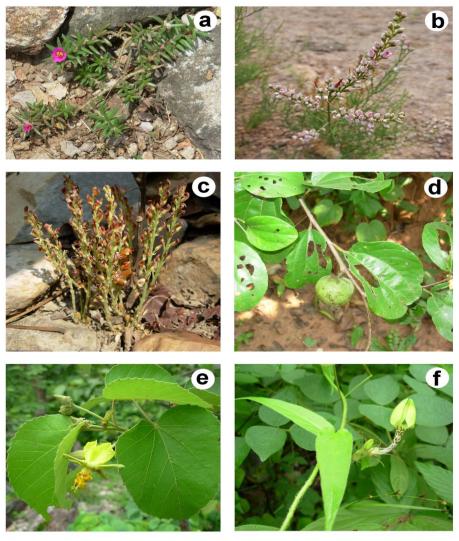


Plate. 2. a. Portulaca pilosa L., b. Tamarix ericoides Rottler & Willd., c. Flemingia nana Roxb. ex W.T.Aiton d. Ziziphus xylopyrus (Retz.) Willd. e. Eriolaena hookeriana Wight & Arn. f. Ceropegia hirsuta Wight & Arn

#### CONCLUSIONS

This is an account of twelve plant species new in occurrence to Bankura district. This forest clad district have many areas still to explore. Thus, the number of plant species may be much more than the number known at present.

#### **FUTURE SCOPE**

The plant wealth and richness of the flora of this district is still having possibility for exploration in both ecological and economic aspects.

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