

Research article

***Indigofera hirsuta* L. (Fabaceae) - A new record for Odisha, India**

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Abstract: *Indigofera hirsuta* an annual weed of the family Fabaceae, collected from Mayurbhanj and Balasore districts of Odisha is reported here as a new addition to the flora of Odisha. The plant resembles very close to *Indigofera astragalina*, but the former is densely hirsuted with brown hairs on petals, sepals and fruits along with a longer peduncle giving a distinct morphological feature. The species *I. hirsuta* has multifarious ethnomedicinal properties. A detailed description with photographs, habitat and phenology of the species are provided for easy identification.

Keywords: *Indigofera hirsuta* - Leguminosae - New species record - Taxonomy - Odisha.

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INTRODUCTION

Indigofera L. is the third largest genus of the family Fabaceae. The name *Indigofera* indicates the primary source of 'indigo dye' produced by the members of this genus. According to Schrire *et al.* (2009) about 750 species of the genus is well distributed worldwide, where Africa and Madagascar is known to be the centre of diversity. The genus is represented with about 100 species in tropical Asia to Pacific regions (de Kort & Thijsse 1984, Wilson & Rowe 2004, Schrire 2005). In Odisha, the genus holds 17 species under tribe Indigoferae (Saxena & Brahmam 1994–96).

Indigofera astragalina DC. shows resemblances with *I. hirsuta* L. forming a single polymorphic species. However, the difference is clearly demarcated by Gillette (1960) by analyzing 24 specimens from India. As a result, both the species can be discriminated by some well-marked morphological features that are represented below (Table 1). The characters used for differentiating *I. astragalina* from *I. hirsuta* includes number of leaflets, length of rachis, length of peduncle, length and breadth of pod, number of seeds, colour of hairs on pod. There are few literature available showing the medicinal importance of different parts of *I. hirsuta*. Leaf juice of this plant has been given as a drug to improve infant immunity by traditional medicine practitioners. It exhibits tolerance to several diseases and pests (Muhammad *et al.* 2019). Leaf juice is used internally to treat liver disease, whereas leaf decoction is used to treat jaw and ulcers, gravel, epilepsy or infantile convulsions, diabetes, leprosy, tuberculosis, infections, snake bites, malaria and eyelid inflammation (Burkill 1995).

MATERIALS AND METHODS

During the exploration of invasive species in the north-eastern districts of Odisha, it was observed that a few patches *Indigofera hirsuta* population was growing in roadsides of Jamujhadi, Chaulasabira localities of Balasore district (21°13' 42.53" N, 86°39' 17.43" E) and Takatpur, Baripada, Mayurbhanj district (21° 55' 45.82" N, 86° 46' 06.71" E) (Fig. 1).

Field photographs were taken showing the detailed morphological characters of the species. The collected specimens were critically examined under the microscope (Figs. 2 & 3) and after scrutinizing the available literature and with the help of The flora of British India (Hooker 1872–97); The flora of the presidency of Madras (Gamble & Fischer 1915–36); The Botany of Bihar and Orissa (Haines 1921–25); Flora of Orissa (Saxena & Brahmam 1994–96), the species was identified as *Indigofera hirsuta*. A detailed description with

photographs, habitat, phenology and threat status including a table differentiating the variation from its allied species *I. astragalina* is provided for easy identification. The specimen was mounted and assigned an accession number *i.e.* 3177 on the herbarium sheet by following standard protocol and deposited in the Herbarium of Department of Botany, Maharaja Sriram Chandra Bhanja Deo University, Baripada.

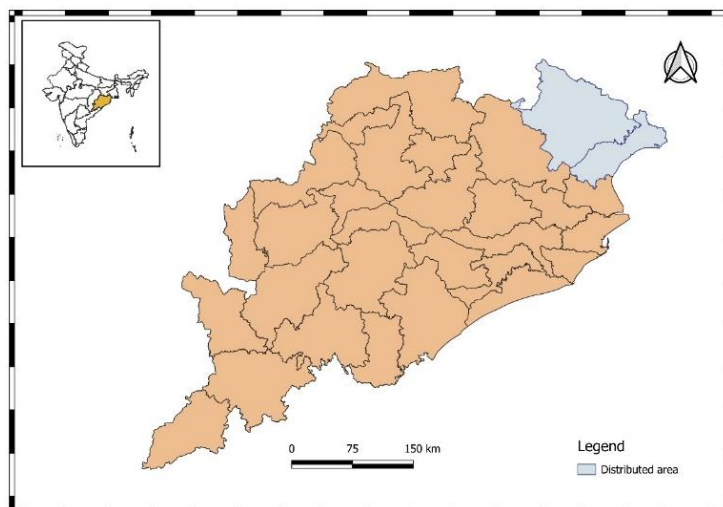


Figure 1. Map showing the distribution of *Indigofera hirsuta* L. in Odisha, India.

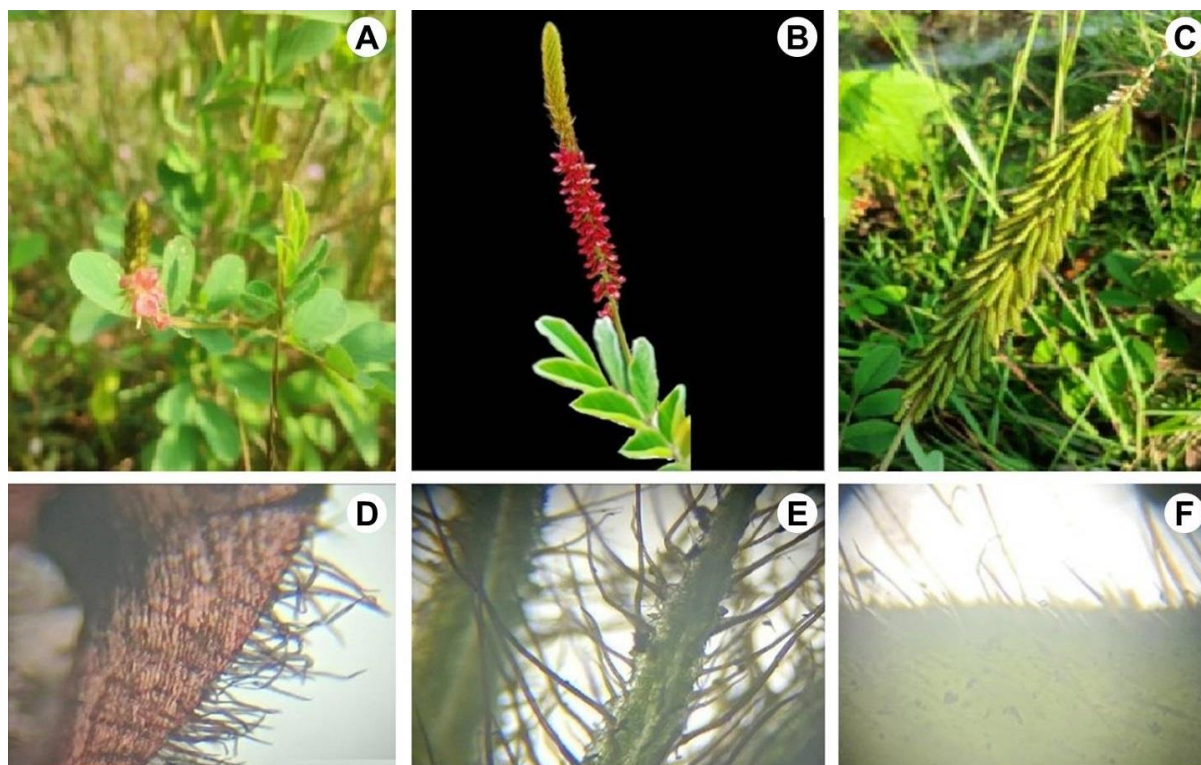


Figure 2. *Indigofera hirsuta* L.: **A**, Natural habitat; **B**, An Inflorescence axis; **C**, Peduncle with pods; **D**, Hairs on petals; **E**, Hairy on sepals; **F**, Fruit surface showing dense brown hairs.

RESULTS AND DISCUSSION

Taxonomic Treatment

Indigofera hirsuta L. Sriniv. & Rao, J. Bombay Nat. Hist. Soc. 58:166.1961. Sp. Pl: 751 (1753); Gillett, Kew Bull 14: 290–295 1960 & in Milne-Redhead & Polhill, Fl. Trop East Africa (Leg) 3: 310(1971).

Undershrub, 150–180 cm; Stem erect, branched, angular (5), pubescent, hairs brown. Leaves alternate, pinnately compound, imparipinnate; rachis 4.5–6.0 cm, leaflets 7–9, 2.5–3.5 cm, opposite, elliptic, apex rounded to mucronate, entire, pubescent, green; stipules two, linear, 1.0–1.2 cm; petiolule 2 mm. Inflorescence in axillary racemes, 15–25 cm long, peduncle 7.5–8.0 cm, bract linear, 4 mm; flower papilionary, complete, hypogynous, 5mm long, pedicel 2 mm. Sepals 5, linear, three larger (5 mm) and two smaller (2 mm). Petals 5; standard 5 × 4 mm, red; wings 5 × 2 mm, red; keel 5 × 2 mm, white towards centre and red outer side, lateral furrows 2 mm.

Stamens 10, diadelphous, dorsifixed; anther 0.5 mm, filament unequal. Ovary monocarpellary, superior, 2 mm long, glabrous, ovule 8, placentation marginal; style 3 mm, stigma capitate. Pods with spreading brown hairs, 1.5–2.0 cm, straight, tetragonous, pointed curved tip; seed 2–3 mm, cuboidal.

Habitat: Frequently found in road sides and open grasslands of Mayurbhanj and Balasore districts of Odisha

Flowering & Fruiting: October–December

Specimen Examined: INDIA, Odisha, Jamujhadi, Chaulasabira localities of Balasore district, 40.74 m, N 21° 13' 42.53" E 86° 39' 17.43"; Takatpur, Baripada, Mayurbhanj district, 200.09 m, N 21° 55' 45.82" E 86° 46' 06.71", 9.11.2023, NK Jena, S Priyadarshini, S Tudu, AK Sahoo & SC Sahu, 3177 (Herbarium of Department of Botany, MSCB University, Baripada).

Distribution: World: The native range of this species is Tropics and Subtropics. India: Andhra Pradesh, Karnataka, Karala, Tamilnadu, Telengana. Odisha: New report for Mayurbhanj and Balasore districts.

Conservation Status: The species is listed as Not Evaluated (NE) as per IUCN 2022.

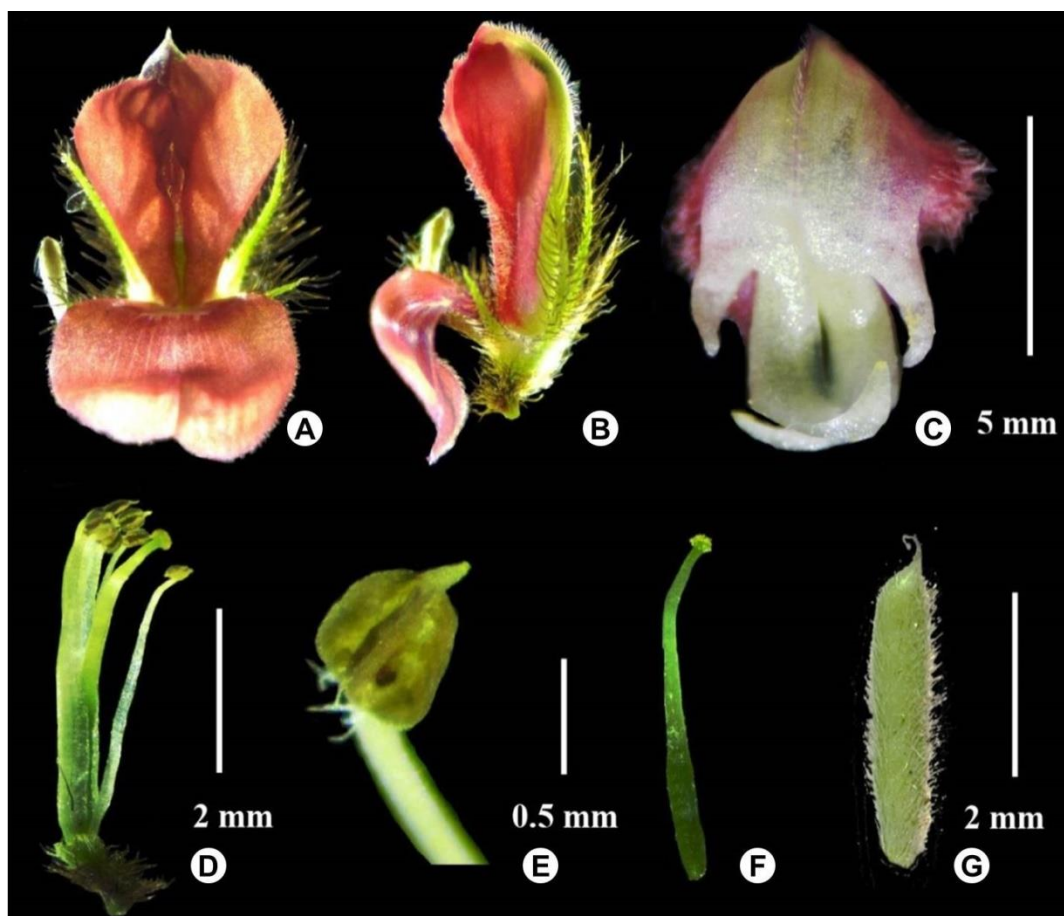


Figure 3. *Indigofera hirsuta* L.: A & B, Flower; C, Lateral furrow on keel; D, Diadelphous stamen; E, Anther; F, Pistil; G, Pod.

Table 1: Morphological differences between *Indigofera astragalina* DC. and *Indigofera hirsuta* L.

Characters	<i>Indigofera astragalina</i>	<i>Indigofera hirsuta</i>
Leaves	Rachis 6–12 cm; Leaflets 9–11, occasionally 7, (1.8–5.0 × 0.6–2.0 cm)	Rachis 9 cm; leaflets usually 7, occasionally 9, (4.0 × 2.5 cm)
Inflorescence	Racemes 6–12 cm; Longest peduncle < 2 cm	Racemes 15–25 cm; Longest peduncle > 2 cm
Pod	Tetragonous, white hairy; seed 4–6; Tip of pod having pointed appendage.	Tetragonous, brown hairy; seed 6–9; Tip of pod having curved appendage.

CONCLUSION

Indigofera hirsuta is an annual weed species originated from Africa and Southern-Asia and become invasive to many places including Australia and USA. The current study represented the plant with detail taxonomy and its important ethno-medicinal properties. In addition to this, the species is also known to be used as green manure in tropical plantation orchards and a cover crop to control soil erosion.

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