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Notes on the identity and distribution of *Zingiber roseum* (Roxb.) Roscoe in Odisha

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ABSTRACT

Zingiber roseum (Roxb.) Roscoe and *Zingiber rubens* Roxb. are closely allied species having identification difficulties. The distribution of *Z. roseum* was considered doubtful in Odisha. Critical observation of the morphology of both species of genus *Zingiber* revealed that *Z. roseum* differs from *Z. rubens* in the size of the flower, colour of the labellum, size of the ovary, colour of the anther, and shape of the epigynous glands. The recent collection of *Z. roseum* from Similipal Biosphere Reserve, Odisha, confirms the distribution of the species in Odisha. Comparison of the description, detailed micro-morphology and field photographs of the species is provided for easy identification.

Keywords: Identity, Status, Odisha, Similipal Biosphere Reserve, *Z. roseum*

1. INTRODUCTION

The genus *Zingiber* Mill. (Zingiberaceae) includes about 210 species worldwide (POWO 2024). These species are well distributed throughout Australia, India, Indonesia, Malaysia, Japan, New Guinea, the Philippines, Laos, Cambodia, Thailand, etc. (Sabu, 2006; Mao and Dash, 2020). About 24 species of *Zingiber* were described by Baker (1890-92) from British India. Schuman (1904) reported the occurrence of 55 species in India. The majority of the species thrive in dense forests, open or disturbed forests and grasslands, particularly at higher altitudes. However, some species can grow in the plains at lower elevations (Sabu, 2006). The genus *Zingiber* is the second largest genus of the family Zingiberaceae in Odisha, consisting of seven correctly identified species, such *as Z. capitatum, Z. montanum, Z. purpureum, Z. zerumbet, Z. officinale, Z. rubens,* and *Z. jagannathii* (Saxena and Brahmam, 1995; Priyadarshini et al., 2023; Sahu and Priyadarshini, 2025).

During field exploration, as a part of the project 'Taxonomy, Diversity and Conservation of Gingers (Zingiberaceae) in Odisha', detailed morphology of each species of Zingiberaceae was studied. Comparison of the description and morphological characters of the species in the *Zingiber* genus revealed that *Z. roseum* is closely identical to *Z. rubens*. Haines (1961) speculated that *Z. roseum* might be a variation of *Z. rubens* with a more robust inflorescence. Babu (1977) confirmed the

statement, saying that these two species are closely similar and only differ in the colour of the bracts and purple-streaked tip. Jha and Verma (1995) conducted a careful analysis of these species and concluded that they are two separate species.

While scrutinizing the available literature, it was found that Panigrahi et al. (1964) documented the occurrence of *Z. roseum* from Lergaon, Batipathar for the first time. Saxena and Brahmam (1995) in 'Flora of Orissa' Vol-III mentioned the identity of *Z. roseum* given by Panigrahi et al. (1964) as a doubtful species. *Z. rubens* and *Z. roseum* have similar habits and floral morphology; however, Haines (1924) distinguished *Z. roseum* from *Z. rubens* with notable distinction in his description, which was collected from the Sal forest in Singbhum, Jharkhand. With comparison of the description and morphological characters of the existing species, our study revealed that *Z. roseum* is not identical with *Z. rubens*. Few workers have studied the ethnobotany, phytochemical and pharmacology analysis of *Z. roseum*, where the identity of the species is not clear (like Nayak et al., 2014; Panda et al., 2020; and Rosi et al., 2023). A detailed description and micro-morphological photographs of *Z. roseum* and *Z. rubens* is provided for a better understanding of the identity and occurrence of *Z. roseum* in Odisha (Table 1; Figures 1, 2 & 3).

Table 1: Comparison based on morphological characters of *Z. roseum* and *Z. rubens*

Character	***Zingiber roseum* (Roxb.) Roscoe**	***Zingiber rubens* Roxb.**
Flower	Up to 7 cm	Up to 5 cm
Ligule	Densely hairy, brown, up to 0.5cm long	Minutely hairy, white, up to 2.5 cm long
Labellum	White with bright yellow at the margin	Conspicuously red spotted
Anther	Bright yellow towards the anther beak	White to red towards the anther beak
Ovary	Pubescent, 5mm	Pubescent, 3 mm
Epigynous glands	4 mm, lobed at apex	8 mm, not lobed at apex

2. DESCRIPTION

Zingiber roseum (Roxb.) Roscoe in Trans. Linn. Soc. London 8: 348. 1807; Roxb., Asiat. Res.ll: 347. 1810 et FI. Indica 1: 49. 1820; Baker in Hook, f., FI. Brit. India 6: 244. 1892; K. Schum. in Engler, PIfanzenr. 4 (46): 184. 1904; C.E.C. Fisch. in Gamble, FI. Pres. Madras 3: 1489. 1928; Manilal, FI. Silent Valley: 314: 1988; K.G. Bhat, High. PI. Indian Subcont. 4: 71. 1993; M. Sabu & Mangaly, Proc. 2nd Symp. Fam. Zingiberaceae: 21.1996; M. Sabu, Folia Malaysiana 4(1): 45. 2003. *Amomum roseum* Roxb., PI. Corom. 2: t. 126. 1800.

Herb. Rhizome thick, fleshy, white to pale yellow, with many roots. Leafy shoot, 1.2 m tall, pseudostem 3.5 cm in girth, slightly puberulose. Leaves oblong-lanceolate, petiolate, petiole 0.5 cm, lamina 31-34 × 6-7 cm, glabrous on upper surface, puberulose beneath; hairs white; apex acuminate; ligule hairy, brown, 0.5 cm long. Inflorescence half-immersed in soil, red, arising from rhizome; Peduncle short; spike 5-6 cm long, oblong. Bracts ovate, 2-lobed, red, 4.2-5 × 1 cm.; bracteoles linear-lanceolate, slightly hairy, shorter than the bracts, 3.5 -3.8 × 0.5 cm. Flowers c. 6.5 cm long, pale yellow. Calyx tubular, 3-lobed, 1.5 × 0.5 cm. Corolla, 3 lobed, pink tinged, central corolla lobe 3.2 × 0.4 cm, lateral corolla lobes 2.5 × 0.4 cm each; corolla tube 2.5 × 0.3 cm, white. Labellum 3 × 0.9 cm, oblong, slightly 3-lobed, margin recurved, crisp, white, pale yellow at the margin of lobes. Lateral staminodes are small, 2 × 0.5 mm, yellow. Anther 1.3 × 0.4 cm, pale yellow, beak 8 × 2 mm, incurved, yellow; filament short, 2 × 2 mm. Epigynous glands 2, small, free from each other. Ovary 5 × 3.5 mm, pubescent, tri-locular, axile placentation; style long, filiform; stigma 3 × 1 mm, ciliate.

Specimen examined: India, Odisha, Mayurbhanj, Similipal Biosphere Reserve, 06.07.2024 Priyadarshini, Tudu, Jena & Sahu MSCBUB/1256 (Herbarium of Department of Botany, MSCB University, Baripada, Odisha).

Ecology: Found growing at an elevation of 546 m. in semi-evergreen forest (21°44'12.42" N & 86°26'45.03".

Flowering: July

Distribution: INDIA: Andhra Pradesh, Arunachal Pradesh, Assam, Kerala, Madhya Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura (IFO 2024)

Figure 1: Field photographs of ***Zingiber roseum*** **(Roxb.) Roscoe** A. Habit and Habitat B. Inflorescence C. Ligule D. Attachment of inflorescence from leaf base E. Flowers

Zingiber rubens Roxb. Asian. Res. 11:348 (1810); Baker in Hook.f.Fl.Brit India 6:243 (1892); Haines, Bot. Bihar & Orissa 3:1142-1192 (1924); Saxena & Brahmam in Fl. Of Orissa 3:1909-1910 (1995); A.S.Rao & Verma, Bull. Bot. Surv. India 14:137 (1972).
Vernacular names: Gaigaruda, Bankachika, Banada (O)

Herb. Rhizome fleshy, aromatic, white with brown at the centre. Leafy shoot 150-200 cm high; Leaves simple, alternate, parallel-veined, unicostate; lamina 5.3-47.2 cm long, lanceolate, entire, acuminate apex, upper surface glabrous, lower surface pubescent, with more hairs at midrib. Base sheathing, 4-8.2 cm wide, hairy; ligulate, ligule 0.7-2.2 × 0.8-1.2 cm, membranous, bilobed; leaf base pulvinous, 0.2-0.4 × 0.3-0.9 cm; Inflorescence spike, 8-16 cm long, arises from base of the plant; peduncle 3-14 cm long, sheathed, reddish brown, pubescent, sheaths 3.3-5.2cm long; reddish brown. Flowers ca. 5 cm long, hermaphrodite, zygomorphic; bracts 4.5-5 × 2.4-2.6 cm, tubular, margin thinly membranous, acute, pubescent, reddish white; bracteoles 3-4.5 × 1.5-2 cm, ovate-lanceolate, obtuse, hairy, white, slightly three-lobed, pubescent; calyx three-lobed, c. 1.5 × 2.1 cm, thin, delicate, membranous or white, hairs at apex and outer surface; corolla tube 3.5-4.5 cm long, pale yellow. Labellum 2.5-3 × 1 cm, margin crisped, apex bifurcate; lateral staminodes (2), 1.2 × 0.7 cm, glabrous, delicate, connate at base, obovate, variegated with red spots; anther yellow with red towards apex, 3-4 × 0.2-0.3 cm, connective extended into a hook, 1.1 cm, curved, filament short, 2mm. Style long, filiform, 5.5-5.8 cm; stigma 2 mm, apex ciliate. Epigynous glands (2), 0.9-1 cm long, linear, pale yellow. Ovary villous, 5 × 3 mm, trilocular, axile placentation.

Ecology: Moist deciduous forests
Fl. August-November & Fr. November

Distribution: Bangladesh, China South-Central, East Himalaya, India, Myanmar, Thailand, Vietnam

India: Assam, Arunachal Pradesh, Mizoram, Manipur, Nagaland, Meghalaya, Sikkim, Tripura

Odisha: Phurlijharan; Udaigiri; Similipal, Mayurbhanj district, Nayagarh district, Keonjhar district

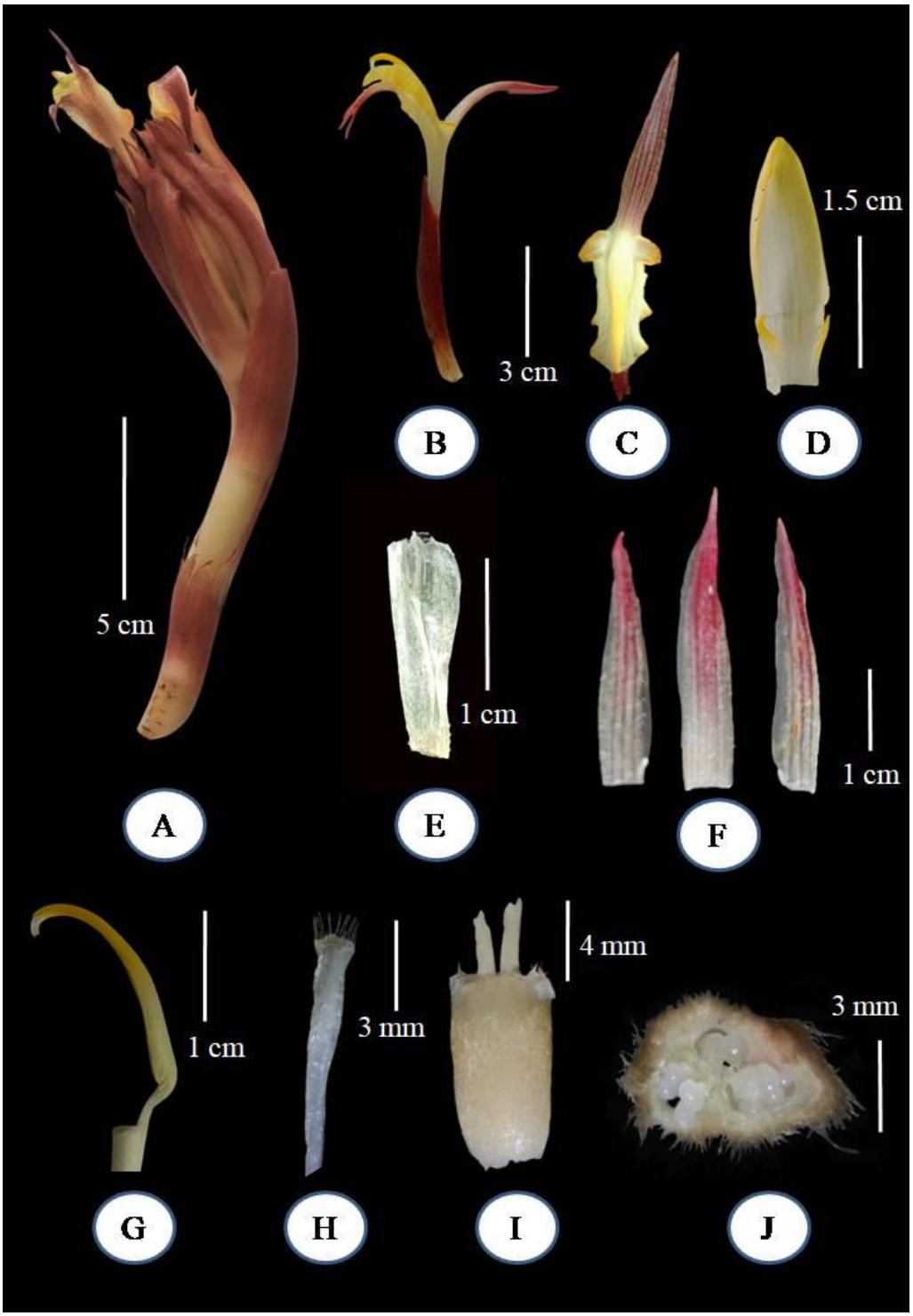

Figure 2: Micro-morphology of ***Zingiber roseum*** A. Inflorescence B. Flower C. Top view of flower D. Labellum E. Calyx F. Corolla lobes G. Anther H. Stigma I. Epigynous glands and Ovary J. Transverse section of ovary

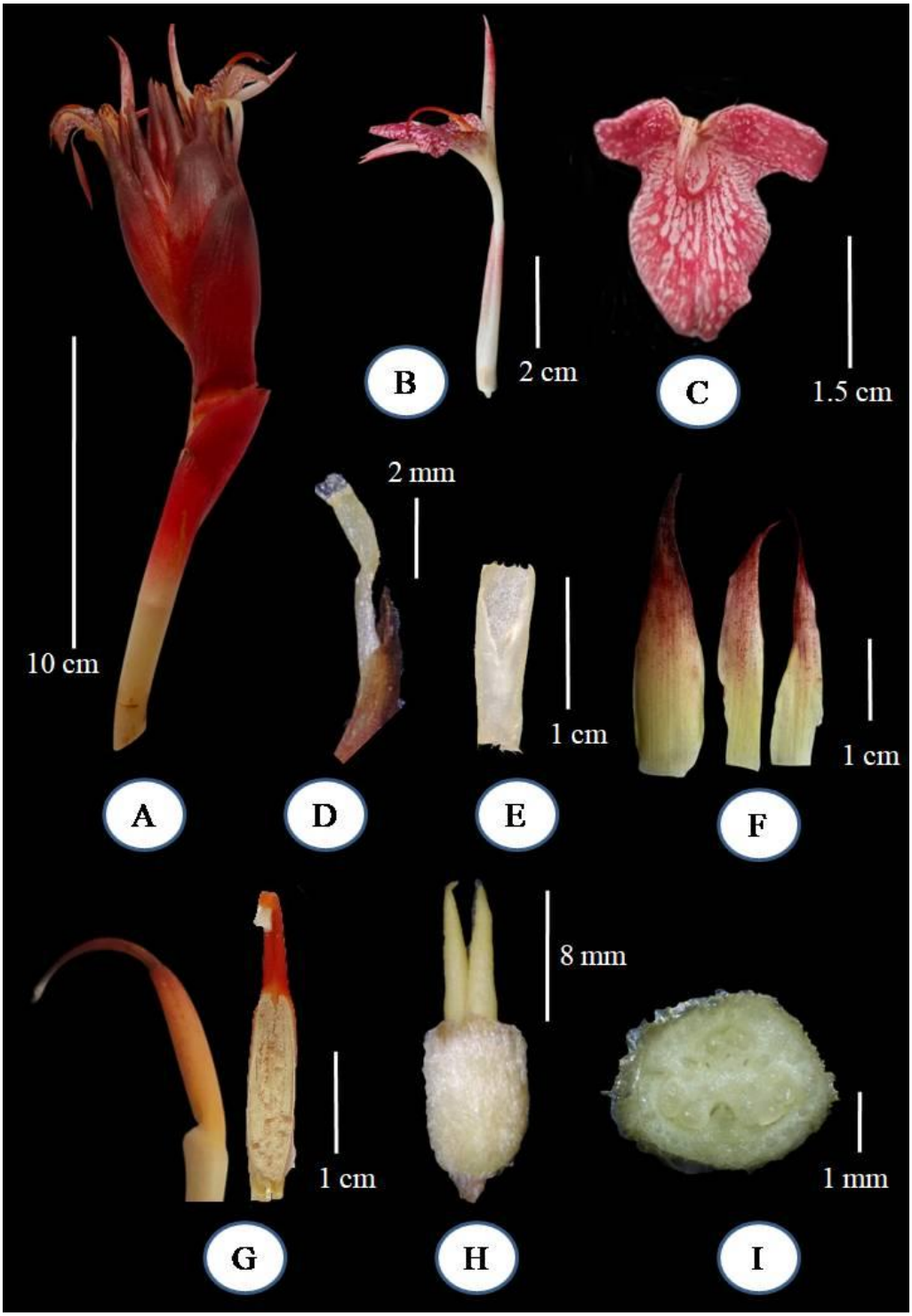

Figure 3: Micro-morphology of ***Zingiber rubens*** A. Inflorescence B. Flower C. Labellum D. Stigma E. Calyx F. Corolla lobes G. Anther H. Epigynous glands & Ovary I. Transverse section of ovary

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Authors contribution
All authors have equally contributed.

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Conflict of Interest
The author declares that there are no conflicts of interests.

Informed consent
Not applicable.

Ethical approval & declaration
In this article, as per the plant regulations followed in the Biosystematics laboratory, Department of Botany, Maharaja Sriram Chandra Bhanja Deo University, Takatpur, Baripada-757003, Odisha, India; the authors observed the identity and distribution of *Zingiber roseum* (Roxb.) Roscoe in Odisha. The ethical guidelines for plants & plant materials are followed in the study for species observation, identification & experimentation.

Data and materials availability
All data associated with this study are present in the paper.

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