SPECIES

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Zingiber montanum (J. Koenig) Link ex A. Dietr. (Zingiberaceae): An addition to the Flora of Odisha

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ABSTRACT

While documenting the ethnobotanical information on food and medicinal values of Zingiberaceous plants of Odisha, the reported plant was found growing near a stream from Ranpur block of Nayagrah District, Odisha. After critical microscopic observation and review of available literature, the specimen is identified as *Z. montanum* (J. Koenig) Link ex A. Dietr. It is newly added to the Flora of Odisha. The detailed taxonomic description, phenology, photographs, and conservation status of the plant are provided in this paper.

Keywords: New report, Odisha, Taxonomy, *Zingiber montanum*, Zingiberaceae

1. INTRODUCTION

Gingers are well-known monocotyledonous flowering plants of the family Zingiberaceae, with around 57 genera and 1600 species over the globe (Maknoi et al., 2021). Of these, 22 genera and 178 species exist in India (Sanglyne and Nongkynrih, 2022). In Odisha, the family is represented by 25 species under eight genera (Saxena and Brahmam, 1995; Kar et al., 2018; Misra and Sahoo, 2015). They are aromatic rhizomatous herbs with pseudo-stem, single leaves, and inflorescences with distinct shapes and colours (Irayanti and Yadnya-putra, 2020).

About 150 species of the *Zingiber* Mill genus are well distributed throughout Southeast Asia (Wang, 2000; Wu and Larsen, 2000). *Zingiber montanum* (J. Koenig) Link ex A. Dietr. was first described by Koenig as *Amomum montanum* (Retzius et al., 1788). *Z. cassumunar* and *Z. montanum* were known to be conspecific, so the earliest name Z. *montanum* should be the correct name (Bai et al., 2019). *Zingiber purpureum* was initially published by (Roscoe, 1815). The genus *Zingiber* is represented by seven species in the Western Ghats of South India (Fischer et al., 1928). In Odisha, five species of *Zingiber* were reported in Flora of Orissa (Saxena and Brahmam, 1995).

2. MATERIALS AND METHODS

This study was carried out on the period of June 2022 to April 2023. During documentation of ethnobotanical information on food and medicinal values of Zingiberaceous plants in Odisha, it was observed that many gingers were

cultivated by the rural and tribes because of their direct value, either in the form of medicine, drink, spices, food, or ornaments. During our ethnobotanical survey, the said plants were collected from the Gochha forest range near the village Lakhamunduli of Ranpur block, Nayagarh District, Odisha (Figure 1).

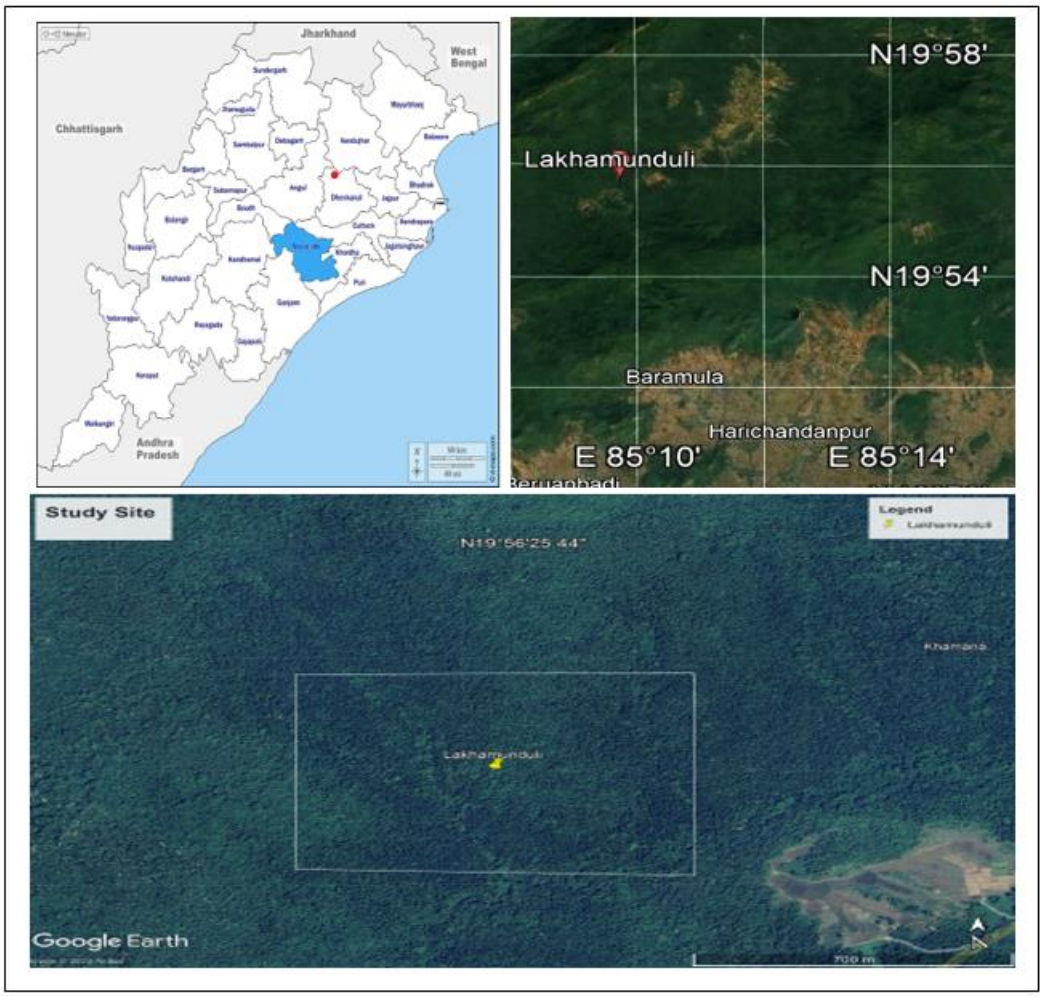

Figure 1 Map showing the locality of *Zingiber montanum* (J. Koenig) Link ex A. Dietr. in Odisha

The location of the collected plants was between N 19°55'46.7" & E 85°10'26.5". Field photographs were taken showing the morphology of different parts of the plant (Figure 2). On critical examination of the live specimen under a microscope (Figure 3) and with the help of available literature, the identity of the species was confirmed as *Z. montanum* (J. Koenig) Link ex A. Dietr. Pollen collected from fresh flower buds was processed, and the pollen morphology was studied under a microscope (Figure 4). After checking the literature thoroughly, the species was found as a new addition to the flora of Odisha. The rhizome was mostly taken by the tribes and rural people for curing stomach disorders and arthritis.

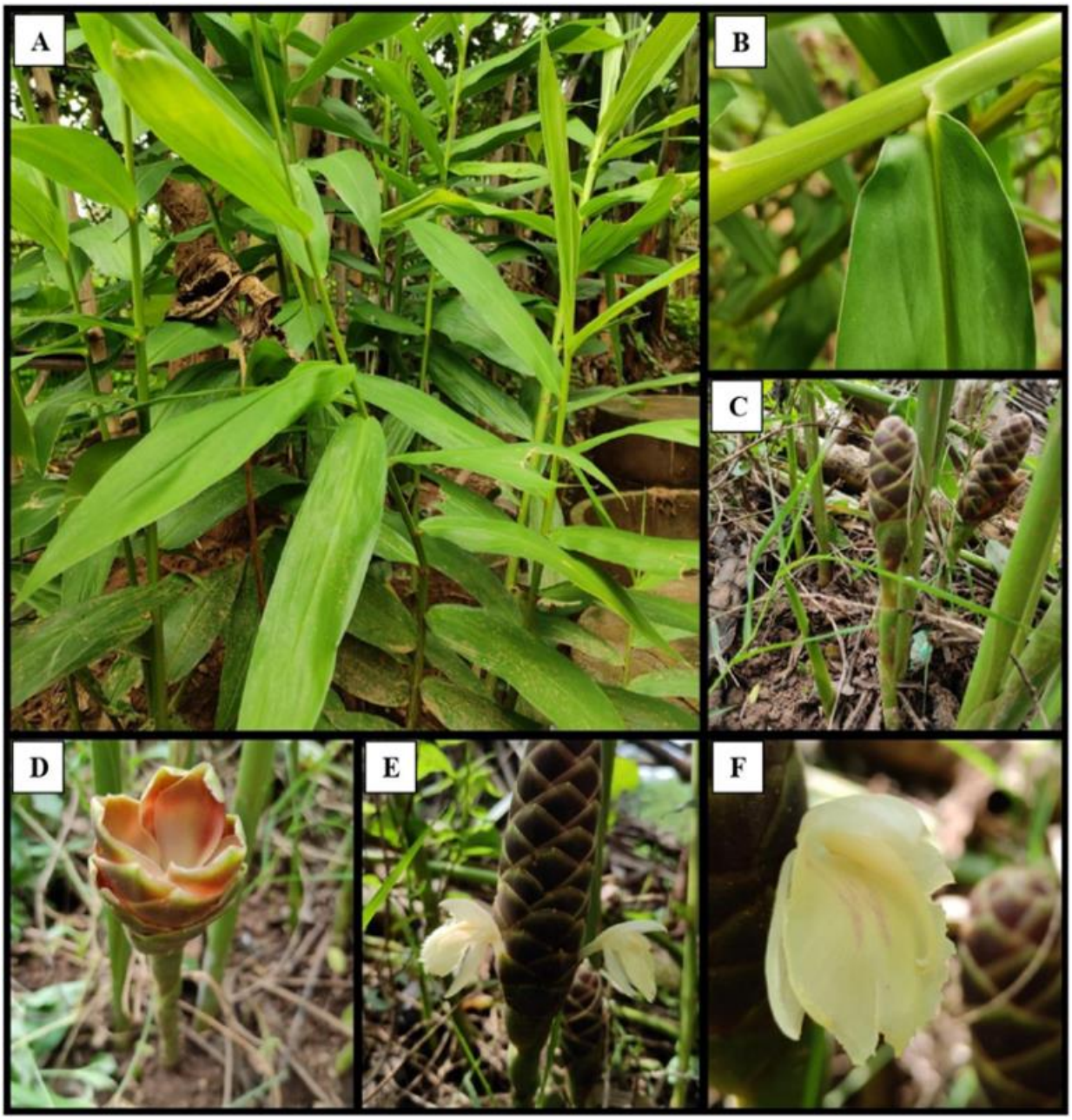

Figure 2 Field photographs of *Zingiber montanum* A. Whole plant B. Ligule C. Spike inflorescence D. Bracts E. Flowers arising from Inflorescence F. Flower

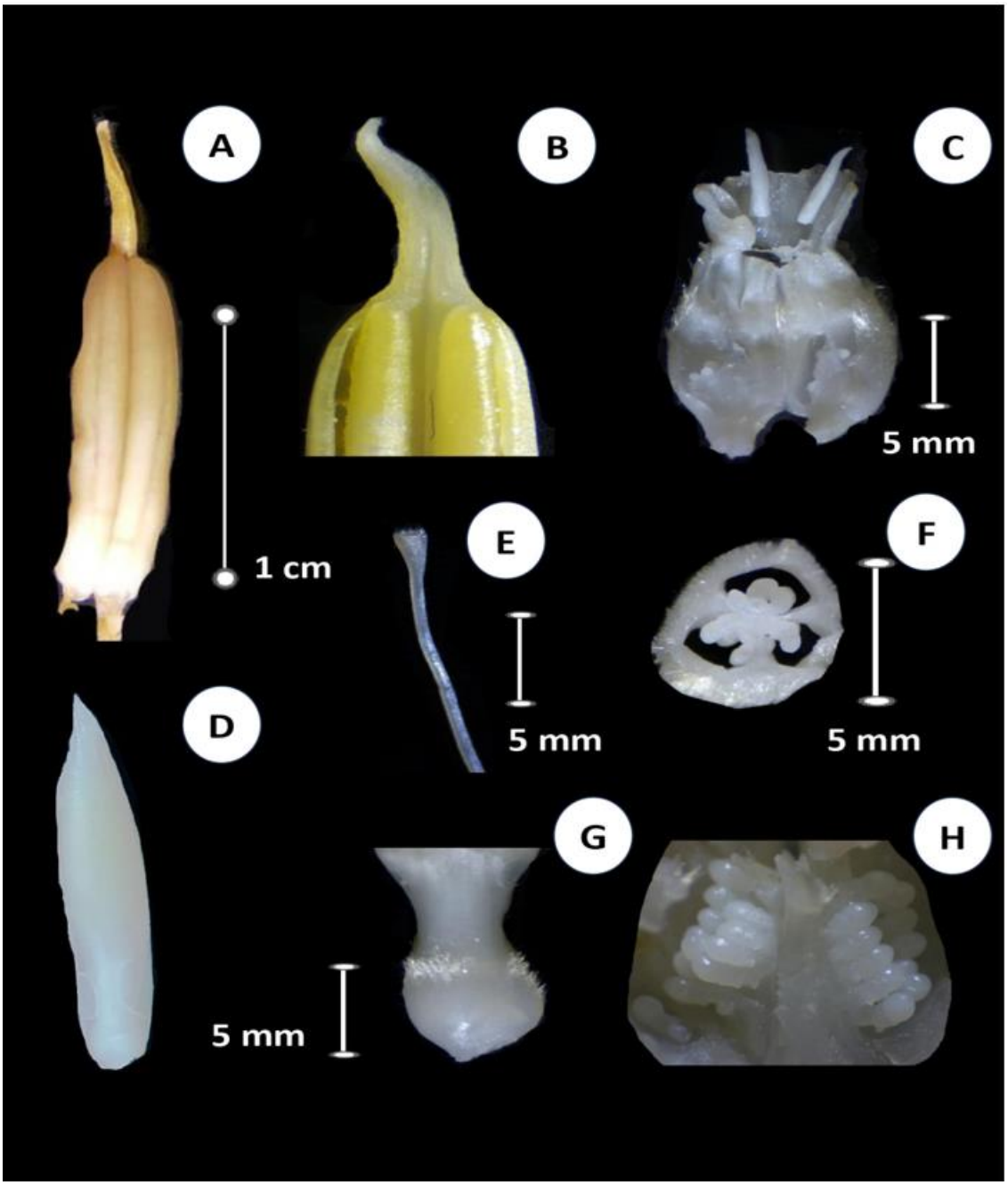

Figure 3 *Zingiber montanum*A. Anther B. Beak-shaped tip portion of anther crest C. Lateral staminodes D. Young flower bud E. Style bearing stigma F. Axile placentation G. Ovary H. L.S. of Ovary

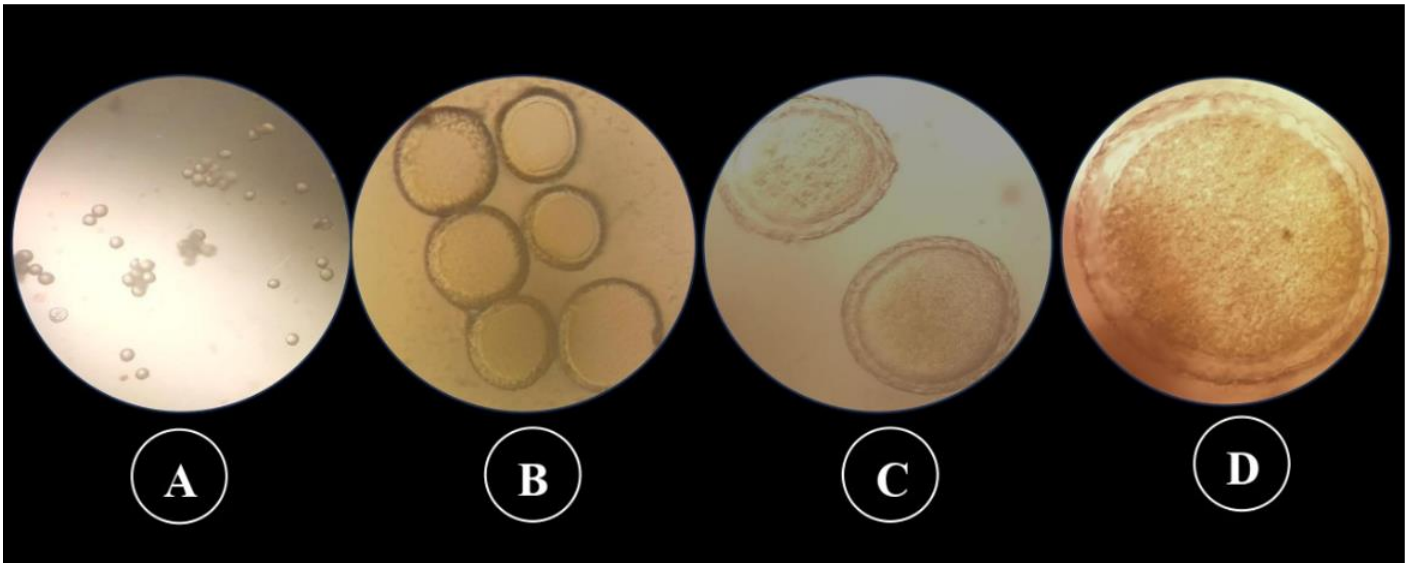

Figure 4 Pollen morphology of *Zingiber montanum* under Magnus electric microscope A: 10X B. 40X C. 40X D.100X

3. TAXONOMIC TREATMENT

Zingiber montanum (J. Koenig) Link ex A. Dietr., Sp.Pl. 1:52.1831; T. Cooke Fl. Pres. Bombay 2: 735, 1907; C. E. C Fisch, in Gamble, Fl. Pres. Madras 8: 1490, 1928; B. L. Burtt & R. M. Smith. Notes Roy. Bot. Gard. Edinburgh 31: 194. 1972; Ramamamoorthy in C. J. Saldanha & Nicolson, Fl. Hassan Dist. 769. 1976; Theilade, Nord. J. Bot. 19(4): 396.1999; M. Sabu, Folia Malaysiana 4(1):27.2003. Perennial rhizomatous herb, 80-90cm tall, pubescent. Leaves 20-36 x 3.5-7 cm sub-sessile, entire, linear-lanceolate, beneath puberulous, lower midrib finely pubescent, upper glabrous, apex acute, base rounded; ligulate, 2 mm. Inflorescence 30-35 cm from ground level, lateral, arises separately from the shoot, peduncle 15-18cm., sheath 3-4 x 1-2cm.; Bracts ovate, 3 x 3cm., purplish brown tinged with green at apex, ended with membranous margin, pubescent. Flower creamy white, 6-7cm; Calyx three-lobed, 2 x 1cm, white, membranous; Corolla lobes 3, Central corolla lobe 2-3 x 1-2cm, lateral corolla lobe 2-2.5cm x 1-1.5cm, linear, obovate; Corolla tube long, 4cm. labellum three-lobed, 3 x 2.5cm, yellowish-white, Suborbicular, margin irregular. Stamen one, 2-3cm, fertile, arching over the labellum, filament short, 2-3mm, anther 1.2-1.5cm, anther beak incurved, 8-9mm, anther crest longer than anther lobes; Staminodes two, lateral, 5 mm; Stigma 1-2mm, filiform, style 6.3cm long. Pollen spherical, inaperturate, 55-60µm diameter. Ovary hairy, Ovoid, 5 x 5mm, axile placentation, hairy, ovules many. Rhizome fleshy, aromatic, lemon yellow inside.

Flowering

July-August

Distribution, Habitat & Ecology

It has been reported from the Malay Peninsula, Srilanka, and Java (Govaerts, 2013). The native range of the species is from South China to Indo-China. In India, it is found widely, growing in many states like Kerala, Tamil Nadu, Karnataka, Andhra Pradesh, Arunachal Pradesh, and Myanmar, Maharastra (Sabu, 2006; Kasarkar et al., 2017). It is reported from nearby stream areas of Ranpur block of Nayagarh district, Odisha.

Conservation status

The species is listed as Not Evaluated (NE) under IUCN (2019) rules.

Specimen examined

India, Odisha, Lakhamunduli village, Ranpur block, Nayagarh district, 18.07.2023, Priyadarshini, Tudu & Sahu 3165 (Herbarium of Department of Botany, MSCB University, Baripada, Odisha).

Diagnosis

Zingiber montanum resembles *Z. zerumbet* as per the taxonomic description (Sabu, 2006). It is distinguished by habitat, lanceolate leaves, the colour of inflorescence, flower, and bifid ligules. *Z. montanum* also shares a close affinity with *Z. purpureum*, which can be

distinguished by having linear-lanceolate leaves, purplish brown bracts, and labellum tinged with purple lines. According to there is a significant variation in the size of peduncles in different species of the genus *Zingiber*.

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Authors Contribution

All authors have equally contributed.

Ethical Approval

Zingiber montanum (J. Koenig) Link ex A. Dietr. (Zingiberaceae): An addition to the flora of Odisha, India. The ethical guidelines for plants & plant materials are followed in the study for sample collection & identification.

Informed consent

Not applicable.

Conflicts of interests

The authors declare that there are no conflicts of interests.

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Data and materials availability

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

REFERENCES AND NOTES

1. Bai L, Maslin BR, Triboun P, Xia N, ková JL. Unraveling the identity and nomenclatural history of *Zingiber montanum*, and establishing *Z. purpureum* as the correct name for Cassumunar ginger. Taxon 2019; 1-16. doi: 10.1002/tax.12160
2. Fischer CEC. Zingiberaceae in JS Gamble. Flora of the Presidency of MadrasLondon 1928; 8:1478-1493.
3. Govaerts R. World Checklist of Zingiberaceae. Richmond, London: Royal Botanic Gardens, Kew 2013.
4. Irayanti NMA, Yadnya-Putra AAGR. A narrative review of Zingiberaceae family as antibacterial agent for traditional medication based on balinese local wisdom. J Pharm Sci 2020; 2:2301-7708.
5. Kar T, Khora SS, Mandal KK. Distributional note on *Curcuma auriantiaca* (Zingiberaceae), in Eastern India. Nelumbo 2018; 60:135-138. doi: 10.20324/nelumbo/v60/2018/138688
6. Kasarkar A, Kulkarni D, Dhudade P, Sabu M. New Report on *Zingiber montanum* (K.D. Koenig) Link. From Kudal, Dist. Sindhudurg, (MS) India. Biosci Discov 2017; 8:270-273.
7. Maknoi C, Saensouk S, Saensouk P, Rakarcha S, Thammarong W. Two new species of *Curcuma* L. (Zingiberaceae) from Thailand. Biodiversitas 2021; 22:3910-3921.
8. Misra RC, Sahoo HK. Occurrence of *Hedychium flavescens* Carey ex Roscoe (Zingiberaceae): A new species record for eastern and central India. E-planet 2015; 13:11-18.
9. Retzius AJ, Kŏnig JG, Copieux, Crusium SL. Observationes botanicae: sex fasciculis comprehensae. Lipsiae Leipzig: Siegfried Lebrecht Crusium 1788; 1-286. doi: 10.5962/bhl.title.11760
10. Roscoe W. XXV. Remarks on Dr. Roxburgh's description of the Monandrous plants of India; in a Letter to the president. Trans Linn Soc London 1815; 11:270–282. doi: 10.1111/j.1096-3642.1813.tb00059.x
11. Sabu M. Zingiberaceae and Costaceae of South India, Indian Association for Angiosperm Taxonomy, Calicut university, India 2006; 229-231.
12. Sanglyne MW, Nongkynrih D. Health-Related Restorative Potential of Zingeberaceae Members with Distribution in Meghalaya, India. Indian Medicine for primary health care system. Kripa Drishti Publication 2022.
13. Saxena HO, Brahmam M. The Flora of Orissa, Regional Research Laboratory and Forest Development Corporation of Orissa, Bhubaneswar 1995; 3:1888-1911.

14. Wang JC. Zingiberaceae. In: Huang T.C. et al. (eds) Flora of Taiwan 2nd Ed. Editorial Committee, Department of Botany, National Taiwan University, Taipei 2000; 5:707–724.
15. Wu TL, Larsen K. *Zingiber*. In: Wu ZI, Raven PH (Eds) Flora of China, Editorial committee. Science Press and Missouri Botanical Garden Press, Beijing and St Louis 2000; 24:323–333.