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Extended distribution of *Eulophia diffusiflora* M.W. Chase, Kumar & Schuit, *Dendrobium macrostachyum* lindl., and *Luisia inconspicua* (hook.f.) King & pantl.; (Orchidaceae) in Jagdalpur block of Bastar district, Chhattisgarh, India

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Abstract
The Jagdalpur block is located in the southern part of the Chhattisgarh state in India. It is the administrative headquarters of the Bastar Division and District. Jagdalpur is the fourth largest city of Chhattisgarh. The Jagdalpur block lies between 19.18°N and 81.92°E. The total area of the Jagdalpur block is 720 km². The average elevation is 552 m (1811 ft.). The Jagdalpur block has a tropical savanna climate (Koppen climate classification Aw), with three main seasons: summer, monsoon, and winter. The block is rich in flora and fauna. Many field studies of orchids were carried out in several locations across in 2025. In this study, We find out the three species of orchid flora, (*Eulophia diffusiflora* M.W. Chase. Kumar &Schuit, *Dendrobium macrostachyum* Lindl., and *Luisia inconspicua* (Hook.f.) King & Pantl.) that are epiphytes and terrestrial in their natural environment and were found in the extended distribution of this region of Jagdalpur block, Bastar District, Chhattisgarh, India. With regard to botanical names, distribution, location, altitudinal range, phenology, and place of collection (occurrence), the study provides a concise account of the species mentioned above spread across the study region.

Keywords: Epiphytic orchid, *Eulophia diffusiflora* M.W. Chase, Kumar & Schuit, *Dendrobium macrostachyum* Lindl., *Luisia inconspicua* (Hook.F.) King & Pantl., terrestrial orchid, Jagdalpur, Bastar, Chhattisgarh, India

Introduction

The Jagdalpur block is located in the southern part of the Chhattisgarh state in India. It is the administrative headquarters of the Bastar Division and District. Jagdalpur is the fourth largest city of Chhattisgarh. The Jagdalpur block lies between 19.18°N and 81.92°E. The total area of the Jagdalpur block is 720 km². The average elevation is 552 m (1811 ft.). The Jagdalpur block has a tropical savanna climate (Koppen climate classification Aw), with three main seasons: summer, monsoon, and winter.

The orchid term comes from the Ancient Greek ὄρχις (*órkhis*), literally meaning "testicle," because of the shape of the twin tubers in some species of *Orchis*. The term "orchid" was introduced in 1845 by John Lindley in *School Botany* as a shortened form of *Orchidaceae*.

These are the second-largest families of flowering plants and are comprised of a unique assemblage of highly advanced monocotyledonous plants. They exhibit amazing diversity in terms of the size, shape, structure, number, density, color, and fragrance of their flowers, and many species show intraspecific variation in floral color.

With roughly 30,000–35,000 species spread across 750–800 genera, the Orchidaceae family is essentially widely dispersed. It is recognized in 155 genera and 1263 taxa in India (Singh *et al.,* 2019) [31]. In MP in Central India, Singh *et al.*,(2001) [30] observed 89 species belonging to 34 genera. 69 species under 34 genera are distributed in Chhattisgarh (Khanna *et al.,* 2005) [17], of which 52 taxa under 21 genera are distributed in Chhattisgarh (Singh *et al.,* 2019) [31], 50 taxa under 22 genera were found in Chhattisgarh (Pandey *et al.,* 2023), and 68 species under 29 genera were found in the state of Chhattisgarh (Garg *et al.,* 2025) [8]. of which 30 species under 17 genera were reported in Kanger Valley National Park (Kotia *et al.,* 2013) [19] and 24 species under 13 genera were found in Kanger Valley National Park (Naik *et al.*,2024) [21], of which 29 species under 17 genera have been reported in the Bastar region of Chhattisgarh (Khanna *et al.,* 2005) [17]. The current studies demonstrated the extended distribution of three orchid flora (*Eulophia diffusiflora* M.W. Chase, Kumar & Schuit., *Dendrobium macrostachyum* Lindl., and *Luisia inconspicua* (Hook.f.) King & Pantl.) in the Jagdalpur block of the Bastar District, Chhattisgarh, India,

Materials and Methods

a. Study Area

The Jagdalpur block is located in the southern part of the Chhattisgarh state in India. It is the administrative headquarters of the Bastar Division and District. Jagdalpur is the fourth largest city of Chhattisgarh. The Jagdalpur block lies between 19.18°N and 81.92°E. The total area of the Jagdalpur block is 720 km². The average elevation is 552 m (1811 ft.). The Jagdalpur block has a tropical savanna climate (Koppen climate classification Aw), with three main seasons: summer, monsoon, and winter.

Bastar district is located in the southern direction of Chhattisgarh State of India. The headquarters of Bastar district and Bastar division is Jagdalpur. Its area is 6596.90 square kilometers. Bastar district is surrounded by Kondagaon, Dantewada, Sukma and Bijapur. The population of Bastar district was 14,13,199 in 2011, covering the present district of Kondagaon. There were 6,98,487 men and 7,14,712 women. There are 70 percent tribal communities in the population of Bastar, such as Gond, Maria, Muriya, Bhatra, Halba, Dhruva community (http://bastar.gov.in/en/about -dstrict/) [2].

Bastar district has been divided into seven Blocks / Tehsil, Jagdalpur, Bastar, Bakavand, Lohandiguda, Tokakal,

Darbha. Bastar district is also rich in the natural resources and simple living style of tribal community. Bastar district is full of dense forests, high hills, waterfalls, caves and wild animals. The people of Bastar district are rich in rare artwork, liberal culture and innate nature (http://bastar.gov.in/en/about -district/) [2].

b. Identification and Field Survey

During the field visit of the various part of Jagdalpur block of Bastar District, Southern Chhattisgarh and adjoining areas, we came across interesting species of orchids, and upon critical observations of the collected specimens and made a herbarium followed by the procedure by Jain & Rao, (1977) [13], and the specimens, they were identified. Review the relevant literature (Hooker,1890 [10]; Joseph, 1987 [16]; King 1898 [18]; Bose and Bhattacharjee, 1999 [4]; Chowdhery, 1998 [6]; Hynniewta, *et al.*, 2000 [11]; Santapau and Kapadia, (1966) [28]; Chowlu, 2022 [7]; Singh *et al*., 2001 [30]; Khanna *et al*., 2005 [17]; Amit *et al.*, 2010 [1]; Kotia *et al*., 2013 [19]; Singh *et al*., 2019 [31]; Jalal, 2018 [14]; Jalal, 2020 [15]; Rawat *et al.*, 2023 [27]; Pandey *et al*.,2023 [23]; Naik *et al.*, 2024 [21]; Misra *et al.*, 2004 [20]; Saxena & Brahmam, 1995 [29]. Sharma & Lakshminarasimhan,1996 [30]; Rajwade & Patel, 2023 [26]; Garg *et al*.,2025 [8]); Weblinks; https://powo.science.kew.org. [24]; http://www.theplantlist.org. [32]; https://wfoplantlist.org. [34]; https://www.gbif.org. [9]; https://www.tropicos.org. [33] and Botanical survey of India was consulted for updating species names, revealing that these species have been reported from the Bastar District of Southern Chhattisgarh, India. The current collection thus report forms the two species of Epiphytic and one Terrestrial orchid species from the Jadgalpur Block, Bastar District, Chhattisgarh, India. We are here to provide a description, phenology, and other relevant notes on the species for easy identification.

Fig 1: habitat of the Dendrobiuma macrostachyum lindl. and *Luisia inconspicua* (hook.f.) king & Pantl

Results and Discussions

While conducting a survey of the forest areas and adjoining areas of Jagdalpur block, Bastar district, in June-July 2025. An around various forest areas, 3 species belonging to 3 genera of two Epiphytic and one terrestrial orchid were recorded. Epiphytic orchids begin to appear from 500m to 570 m above sea level onwards. Apart from climatic conditions, altitude plays a vital role in the distribution of

orchids. *Eulophia diffusiflora* M.W. Chase, Kumar & Schuit., *Dendrobium macrostachyum* Lindl., and *Luisia inconspicua* (Hook.f.) King & Pantl., are critical and distributed in the area of Jagdalpur blocks of Bastar district. These species are more sensitive and have a restricted distribution in the area. The species are affected by the many anthropogenic activities, (Forest Fire, Cutting of tree, formation of agricultural land, illegal Timber collection). So, these are at high risk of near extinction.

Enumeration of species: The enumeration is alphabetically arranged; botanical name, botanical description, flowering month, locality, distribution, and photographs are provided here (Fig: 1, Plates.1, 2, &3).

Key to species

1. Plant epiphytes, monopodial.....3.
2. Plant Terrestrial …….6.
3. Plant sympodial……4.
4. Occasionally stem branched, 10-25 cm in length, leave terete, linear lanceolate, 5-7cm across, Flowers less than 0.5cm across, minute bilobed epichile……. *Luisia inconspicua* (Hook.f.) King &Pantl.
5. Stem pendulous, stem unbranched, stout, leaves linear-lanceolate: Inflorescence distinctly lateral, never terminal: labellum otherwise: petals laceolate, yellowish; labellum panduriform; capsules ca. 2 cm long……. *Dendrobium macrostachyum* Lindl.
6. Terrestrial herb, Inflorescence exceeding leaves, many flowered, flowers not fully open ……*Eulophia diffusiflora* M.W. Chase, Kumar &Schuit.

1. *Eulophia diffusiflora* M.W.Chase, Kumar &Schuit, Phytotaxa 491: 52 (2021); Geodorum laxiforum Grif. Calcuta J. Nat. Hist. 5: 356 (1845); Hook.f., Fl. Brit. India 6: 18 (1890); S. Misra, Orch. Orissa: 560 (2004) ;(Plate. 3).

Plant terrestrial, 30–50 cm tall (including leaves); corm 4.5–5 cm, ovoid, slightly compressed, greenish brown, with scars of fallen leaves; roots few, vermiform, 0.2 cm thick; pseudo stem 10×1 cm, enclosed by four foliar imbricatng sheaths; leaves 2–4, cauline, alternate, elliptic lanceolate, acute, undulate, subequal, 13–36 × 8–12 cm, many veined, midvein prominent beneath; inforescence lateral from the base of newly developed leafy shoot and shorter than it, 20–30 cm; peduncle erect, 20–27×0.2 cm, green, decurved at the top, with four membranous tubular sheaths; raceme laxly flowered with 6–12 medium sized flowers; rachis decurved, 2.5– 4 cm long with two sterile bracts; bracts green, oblong lanceolate, 1.1 × 0.3 cm, membranous with acute apex, 3 veined; pedicel with ovary 1.3 cm long, ribbed; flowers white of-white, sepals and petals spreading, 1.5– 2.5 cm across; sepals subequal, 5-veined, oblong lanceolate; dorsal sepal 2.1×0.6–0.7 cm; lateral sepals 2.2× 0.8 cm; petals broader, obovate oblong, 2.3×1.2 cm, apex acute obtuse, 7-veined; lip 2.1×1.5–1.7 cm, broadly obovate, emarginated, sessile on the base of column, entire, ventricose at the base; sides of the hypochile erect; epichile undulate, edge deflexed, two irregular rows of thick warts starting from the base of the epichile and ending before the apex, hypochile golden brown within, epichile yellow at base and pink at apex; column stout, short, oblong, slightly dilated, 0.5–0.6 × 0.3 cm long; stigma squarish, 0.2 cm long, anther broadly ovate orbicular in outline, 0.3–0.4 cm, white with brown tinge, the locules pouch like; pollinia yellow, obliquely oblong ovoid, porate behind, 0.2 × 0.15 cm, stipe hyaline, subquadrate.

Flowering: June–July.

Ecological notes: Terrestrial herb found humus rich forest floor in Sal forests area of around 660-670 m altitude.

Locality in Chhattisgarh: Surguja, Baster.

Specimen examined: Chhattisgarh, Surguja, 660-670 M, Ram Kumar Rajwade & Dr. Devendra Kumar Patel.

Distribution: Endemic to India Assam, Andhra Pradesh, Chhattisgarh, Gujarat, Jharkhand, Odisha, Telangana, and Maharashtra.

2. *Dendrobium macrostachyum* Lindl., Gen. Sp. Orchid. Pl.: 78 (1830); Dendrobium macrostachyum Lindl. Gen. & Sp. Orchi, 78; Hook.*f.*, Fl., Brit. India 5:735.1885; Rawat *et al*., Orch. Uttarakhand. 147. 2023; Singh *et al*., Fl. Madhya Pradesh 3: 26-27. 2001; Sharma et. al., Fl. Maharashtra 2:22. 1996; Saxena &Brahmam, Fl. Orrisa 3: 1797. 1995; Santapau and Kapadia, Orch. Bombay 39. t.96-97, f. 98. 1966; Singh *et al*., Orch.India Pict.Gui.218-220. 2019; Jalal, J.S., Orch. Maharashtra: 70-73.2018; Jalal, J.S., Wil. Orch. Goa: 56-57. 2022, (Fig-1, Plate-1).

Plant epiphyte, pseudoulbous, stem thick, grayish brown, 7-50 cm long, crowded, slinder, terete, slightly swollen at the node's internodes sheathed, leafless during flowering. Leaves alternate, distchous, sheathing at the base, sessile, opposite, oblong–lanceolate, acute old ones becomes pale olive green and membranous on drying , inflorescence solitary or cyme, 3 flowered in each node, flowers odorous 2-9×0.3-2.5 cm across, not much spreading , lemon green turning creamy yellow with age, odorous, Bracts 0.2-0.3 cm long, persistant thin, ovate ,pale brown, Sepals not much spreading, dorsal sepals oblong- lanceolate, acute, 5-nerved; lateral sepal, falcate at apex, connivent below with the foot forming mentum, 5 nerved. Mentum long, funnel shaped, Petals ovate- lanceolate, mucronate, 3- nerved. Lip 2 cm long, lemon- green with brownish red nerves, obscurely 3- lobed, with 0.2-0.3 cm long clow. Lateral lobes enveloping column. Mid lobe orbicular, half opening, coclum greenish yellow, 0.3 cm long. Pollinia 4, waxy, yellow oblong. Capsule 3-4 cm long, narrowly spindle shaped, brownish in colour.

Fruiting: June – July.

Ecological note: Plants associate with *Syzygium cumini* (L.) Skeels. Distribution in Jagdalpur, Bastar forest area at elevation range from 550-1085 m.

Locality in Chhattisgarh: Surguja, Bastar.

Specimen examined: Chhattisgarh, Bastar district, forest area, $18^0$937131'N to $81^0$986269' E, Altitude 550M, 29. 06.2025, Ram Kumar Rajwade & Dr. Devendra Kumar Patel.

Distribution: India (Andaman Is., Nicobar Is., West Himalaya, Chhattisgarh, Madhaya Pradesh), Bangladesh, Borneo, Jawa, Lesser Sunda Is., Malaya, Maldives, Myanmar, Nepal, Queensland, Sri Lanka, Sulawesi, Sumatera, Thailand, Vietnam.

3. *Luisia inconspicua* (Hook.f.) King & Pantl., Ann. Roy. Bot. Gard. (Calcutta) 8: 203 (1898); Rawat *et al*., Orch. Uttarakhand. 242. 2023; Chowlu K., Orch. Namsai,

Arunachal Pradesh. 136-137. 2022; Singh *et al*., Fl. Madhya Pradesh 3: 36-37. 2001; Saxena &Brahmam, Fl. Orrisa 3: 1811. 1995; Singh *et al*., Orch.India Pict. Gui. 299-300. 2019. (Fig-1, Plate-2).

Plant Epiphytic herbs, Stem terete, Branched, covered with leafy sheaths 14-18×0.3cm. Leaves terete, erect, sessile, 2.5-5.6×0.1-0.3cm, inflorescence lateral, few flowered; peduncle short; rachis 0.2-0.3cm long; floral bracts triangular, acute. Flower 6-8, 0.4×0.4cm across, pale yellow or creamy, odorous, Dorsal Sepal similar, ovate-lanceolate, 0.2×0.1cm, speading, green with purple line of back side, acute at apex. Lateral sepal 0.3×0.2 cm ovate-lanceolate, acute at apex. Petal ovate-elliptic, 0.3×0.1cm, spreading, acute at apex. Lip 0.4×0.2cm, trilobed, hypochile saccate; lateral lobes rounded; mid lobe flate, decurved, apex minutely 2-lobules, green. column 0.2×0.1cm, erect, purple cavity. Anther cap shortly beaked. Pollinia small, 2, Fruit 2×2cm across.

Flowering: July -August.

Ecological notes: Epiphyte on tree trunks of *Madhuca indica* J.F. Gmel. in Sal forests around 660-670 m to 1000m altitude.

Species examined: Chhattisgarh, Bastar, Jagdalpur block, $18^0$937131'N to $81^0$986269' E, Altitude 500M, 29. 06. 2025, Ram Kumar Rajwade & Dr. Devendra Kumar Patel.

Locality in Chhattisgarh: Bastar**,** Surguja, Bilaspur.

Distribution: India (Chhattisgarh, Madhya Pradesh, Arunachal Pradesh, Himachal Pradesh, Jharkhand, N.E., Assam, Odisha, Uttarakhand, West Bengal), Bangladesh, Bhutan, Nepal, China South-Central.

Table 1: Distribution of *Eulophia diffusiflora* M.W. Chase, Kumar &Schuit. *Dendrobium macrostachyum* lindl. and *Luisia inconspicua* (Hook.f.) King & Pantl., In Jagdalpur, Bastar District, Chhattisgarh, India

S. No.	Name of Genera	Name of Species	Habit	Distribution in Chhattisgarh (*)	Location (Current Study)
1.	*Eulophia* R.Br.ex Lindl. Synonyms: *Geodorum*	*E. diffusiflora* M.W.Chase, Kumar &Schuit, Synonyms: *G. laxiflorum* Grif.	Terrestrial	Not reported	Jagdalpur, Bastar,
2.	*Dendrobum* Sw.	*D. macrostachyum* lindl.	Epiphytes	Surguja	Jagdalpur, Bastar
3.	*Luisia* Gaud. Synonyms: *Gastrochilus* D. Don	*L. inconspicua* (Hook.f.) King & Pantl., Synonyms: *G. inconspicuus* (Hook.f.) Kuntze	Epiphytes	Bilaspur	Jagdalpur, Bastar

Abbreviation: - *=according to Singh *et al.*, 2001, Khanna *et al.*, 2005**,** Garg *et al.*, 2025

Table 2: Altitudinal range and Phenology, in *Eulophia diffusiflora* M.W. Chase, Kumar &Schuit, *Dendrobium macrostachyum* lindl., and *Luisia inconspicua* (Hook. f.) King & Pantl. In Jagdalpur, Bastar District, Chhattisgarh, India

S. No.	Botanical Name	Altitudinal range (MASL)	Phenology
1.	*Eulophia diffusiflora* M.W. Chase, Kumar &Schuit,	660-670M	June-July
2.	*Dendrobium macrostachyum* Lindl.	550M	June- July
3.	*Luisia inconspicua* (Hook. f.) King& Pantl.	500M	July- August

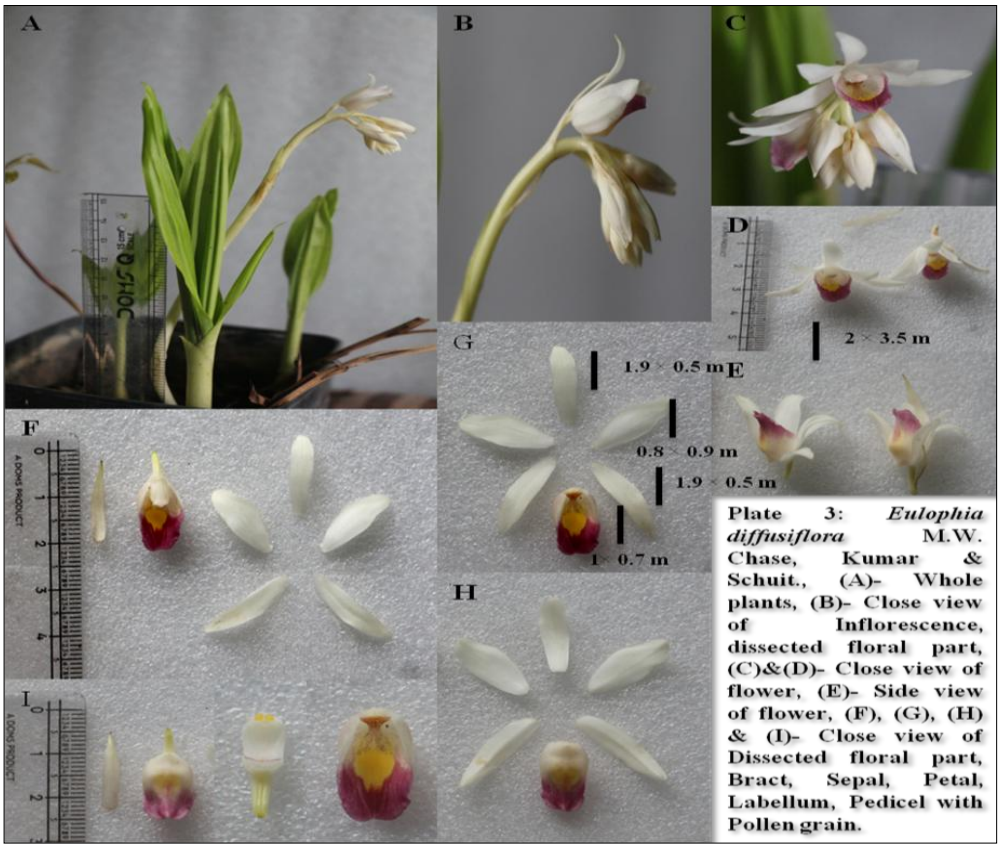

Plate 3: *Eulophia diffusiflora* M.W. Chase, Kumar & Schuit., (A)- Whole plants, (B)- Close view of Inflorescence, dissected floral part, (C)&(D)- Close view of flower, (E)- Side view of flower, (F), (G), (H) & (I)- Close view of Dissected floral part, Bract, Sepal, Petal, Labellum, Pedicel with Pollen grain.

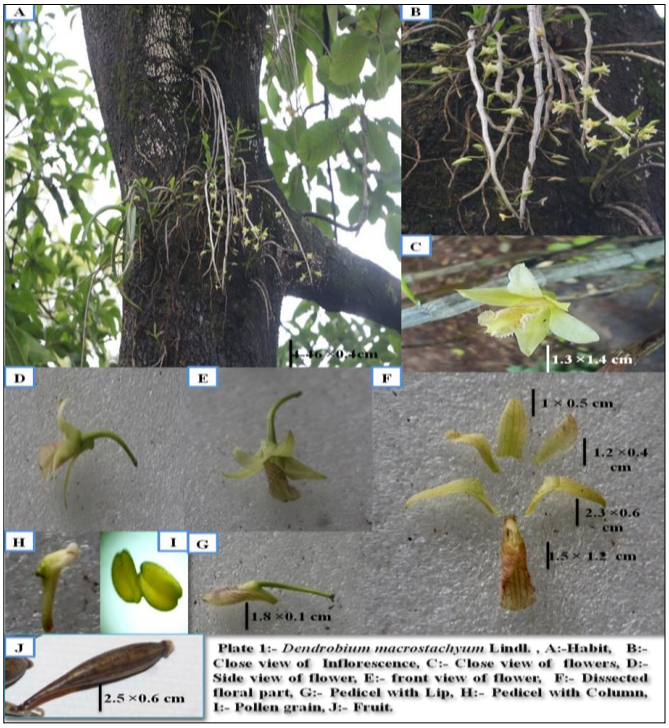

Plate 1:- *Dendrobium macrostachyum* Lindl. , A:-Habit, B:- Close view of Inflorescence, C:- Close view of flowers, D:- Side view of flower, E:- front view of flower, F:- Dissected floral part, G:- Pedicel with Lip, H:- Pedicel with Column, I:- Pollen grain, J:- Fruit.

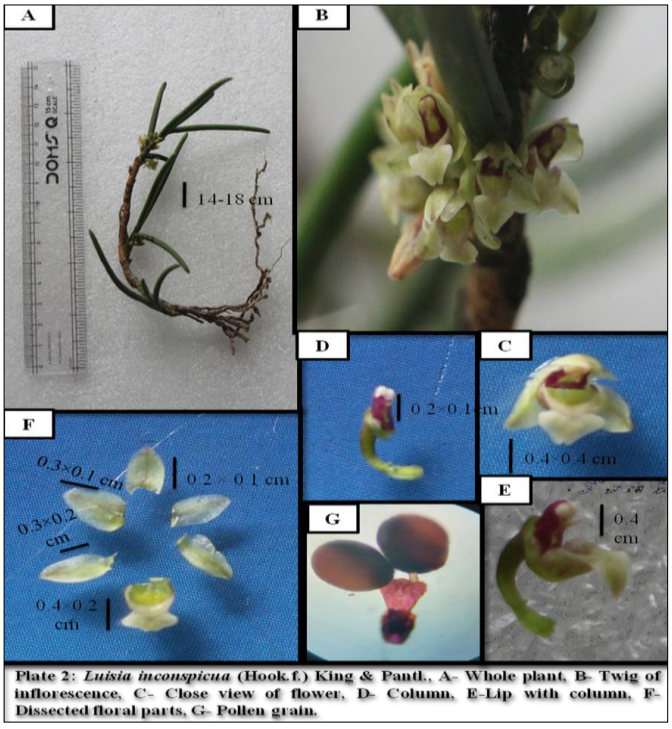

Plate 2: *Luisia inconspicua* (Hook.f.) King & Pantl., A- Whole plant, B- Twig of inflorescence, C- Close view of flower, D- Column, E-Lip with column, F- Dissected floral parts, G- Pollen grain.

Conclusions

Although the forest area of the Jagdalpur block, Bastar district region is so rich in vegetation populations, it gives a platform to grow diverse floral and faunal wealth. Orchids are the unexplored floral wealth of the present study area of the Jagdalpur block of Bastar district of Chhattisgarh. Therefore, the present study highlights the extended distribution of *Eulophia diffusiflora* M.W. Chase, Kumar &Schuit, *Dendrobium macrostachyum* lindl., and *Luisia inconspicua* (Hook. f.) King & Pantl., orchid species and needs more exploration work toward their documentation and conservation.

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