

## Checklist of orchids of Biswanath district of Assam, India, with a new record for the state

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### Abstract

The present study is the result of surveys carried out during the period 2016-2021 in Biswanath district of Assam. A total of 39 orchid species divided into 26 genera are inventoried. *Galeola nudifolia* Loureiro is reported as a new record for the flora of the state. Coloured photographs along with a short description and a regional distribution map for this taxon are provided.

### Résumé

La présente étude est le résultat d'enquêtes menées au cours de la période 2016-2021 dans le district de Biswanath en Assam. Au total, 39 espèces d'orchidées réparties en 26 genres sont inventoriées. *Galeola nudifolia* Loureiro est signalé pour la première fois dans la flore de l'état. Des photographies en couleur ainsi qu'une brève description et une carte de répartition régionale pour ce taxon sont fournies.

**Key words:** *Galeola nudifolia*, orchid flora, taxonomy

**Mots clés :** flore d'orchidée, *Galeola nudifolia*, taxinomie

## Introduction

The flora of Assam is very diverse due to a great variety of habitats and topographies. Ranging from the grasslands and riparian lands of the Brahmaputra basin towards the foothills of Himalayas, the region hosts a myriad of plant species. Biswanath district located in the centre of the state includes several habitats favorable to orchids such as grasslands, moist deciduous forests and semi-evergreen forests. The north of the district is occupied by Behali Reserve Forest, the last remnant patch of semi-evergreen forest which extends towards the foothills of Arunachal Pradesh, and the famous Kaziranga National Park covering the south.

As mentioned in a previous article (Gogoi *et al.*, 2021), the knowledge on the flora of Assam is only based on the monumental works of Hooker (1872-1897), Kanjilal *et al.* (1934–1940) or Gogoi (2019) who published “Orchids of Assam - A pictorial guide” which proved to be a comprehensive account on the orchid wealth of the state. The flora of Biswanath district has recently been inventoried in series of publications (Borah *et al.*, 2018; 2019a,b; 2020a,b,c,d; 2021; Kakati *et al.*, 2021) but the checklist of orchids has yet to be published. Here, we aim to provide an updated checklist of orchids in this district. We also report one new regional record for the flora of Assam.

## Methods

Data was collected following repeated field trips to all the corners of the district from 2016 to 2021. Our observations were carried out mainly in Behali Reserve forest and surrounding unprotected areas of Kaziranga National Park, which has now been added in the park boundaries. The plant specimens collected were photographed in the field, press dried and mounted on herbarium sheets following the standard methods of Jain & Rao (1977). The nomenclature of the species was followed using (POWO, 2021). Identifications were done using relevant literature (King & Pantling, 1898; Deva & Naithani, 1968; Pradhan, 1979; Hedge, 1984; Deorani & Naithani, 1995; Chowdhery, 1998; Pearce & Cribb, 2002; Lucksom, 2007; Chen *et al.*, 2009; Swami, 2017; Gale *et al.*, 2018; Misra, 2019; Gogoi, 2019;

Singh *et al.*, 2019) and scrutiny of the herbarium specimens housed in the collections of ASSAM, ARUN, E, K, & PE. The voucher collected specimens were deposited in TOSEHIM, Regional Orchids Germplasm Conservation & Propagation Centre (Assam).

## Results

A total of 39 species of wild orchids have been recorded (Table 1) falling under 26 genera. The genus *Dendrobium* Swartz (1799: 82) is the most dominant with 4 species, followed by the genera *Acampe* Lindley (1853: 1), *Phalaenopsis* Blume (1825: 294) and *Zeuxine* Lindley (1825: 18) with 3 species each.

Table 1. Annotated checklist of Orchids of Biswanath district (Abbreviations used: no.-Voucher n°, H-Habit, E-Epiphytic, T-Terrestrial, HS- Saprophytic herb)

Taxon	no.	H
<i>Acampe praemorsa</i> (Roxburgh) Blatter & McCann var. <i>longepedunculata</i> (Trimen) Govaerts	BRF218	E
<i>Acampe praemorsa</i> (Roxburgh) Blatter & McCann	BRF526	E
<i>Acampe ochracea</i> (Lindley) Hochreutiner	BRF1091	E
<i>Aerides odorata</i> Loureiro	BRF987	E
<i>Bulbophyllum roxburghii</i> (Lindley) Reichenbach f.	BRF399	E
<i>Calanthe masuca</i> (D. Don) Lindley	BRF568	T
<i>Chrysoglossum ornatum</i> Blume	BRF527	T
<i>Cleisocentron pallens</i> (Cathcart ex Lindley) N. Pearce & P.J. Cribb	BRF383	E
<i>Cleisostoma subulatum</i> Blume	BRF382	E
<i>Cleisostoma tenuifolium</i> (Linnaeus) Garay	BRF789	
<i>Corymborkis veratrifolia</i> (Reinwardt) Blume	BRF575	T
<i>Cymbidium aloifolium</i> (Linnaeus) Swartz	BRF219	E
<i>Cymbidium bicolor</i> Lindley	BRF235	E
<i>Dendrobium aphyllum</i> (Roxburgh) C.E.C. Fisch	BRF101; MT123	E
<i>Dendrobium lituiflorum</i> Lindley	BRF538	E

<i>Dendrobium mannii</i> Ridley	BRF102; MT103	E
<i>Dendrobium moschatum</i> (Banks) Swartz	BRF791	
<i>Dendrolirium lasiopetalum</i> (Willdenow) S.C. Chen & J.J. Wood	BRF364	E
<i>Didymoplexis pallens</i> Griffith	BRF137	HS
<i>Epipogium roseum</i> (D. Don) Lindley	BRF952	HS
<i>Galeola nudifolia</i> Loureiro	BRF1567	HS
<i>Gastrochilus obliquus</i> (Lindley) Kuntze var. <i>suavis</i> (Seidenfaden) Z.H. Tsi	BRF528	E
<i>Hetaeria affinis</i> (Griffith) Seidenfaden & Ormerod	BRF384	T
<i>Liparis viridiflora</i> (Blume) Lindley	BRF1121	E
<i>Luisia trichorrhiza</i> (Hooker) Blume	BRF385	E
<i>Papilionanthe teres</i> (Roxburgh) Schlechter	BRF567	E
<i>Phalaenopsis deliciosa</i> Reichenbach f.	BRF217	E
<i>Phalaenopsis lobbii</i> (Reichenbach f.) H.R. Sweet	BRF372	E
<i>Phalaenopsis mannii</i> Reichenbach f.	BRF131	E
<i>Pholidota imbricata</i> Hooker	BRF418	E
<i>Pinalia bractescens</i> (Lindley) Kuntze	BRF787	
<i>Pomatocalpa spicatum</i> Breda	BRF386	E
<i>Pomatocalpa undulatum</i> (Lindley) J.J. Smith	BRF145	E
<i>Rhynchostylis retusa</i> (Linnaeus) Blume	BRF537; MT87	E
<i>Tropidia angulosa</i> (Lindley) Blume	BRF778	T
<i>Tropidia curculigoides</i> Lindley	BRF529	T
<i>Zeuxine nervosa</i> (Wallich ex Lindley) Bentham ex Trimen	BRF365	T
<i>Zeuxine strateumatica</i> (Linnaeus) Schlechter	MT97	T
<i>Zeuxine longilabris</i> (Lindley) Trimen	MT136	T

The total number of species inventoried is less than the number reported for the other districts of Assam, such as Lakhimpur with 140 species (Gogoi *et al.*, 2021), Dibrugarh with 113 species (Gogoi *et al.*, 2012a,b), Tinsukia with 95 species (Gogoi, 2012) and Karbi Anglong with 106 species (Gogoi & Yonzone, 2013a,b).

## Taxonomic treatment

*Galeola nudifolia* is a species which has never been recorded in Assam earlier.

*Galeola nudifolia* Loureiro, *Flora Cochinchinensis* 2: 521 (1790).

Type: Vietnam, in sylvis Cochinchinae, *Loureiro s.n.*, (Holotype: BM)

Material studied: India, Assam, Biswanath district, Behali Reserve forest, 22.04.2021, *D. Borah, N. Das & P. Kafley* 1567 (Herbarium of TOSEHIM, Regional Orchids Germplasm Conservation & Propagation Centre).

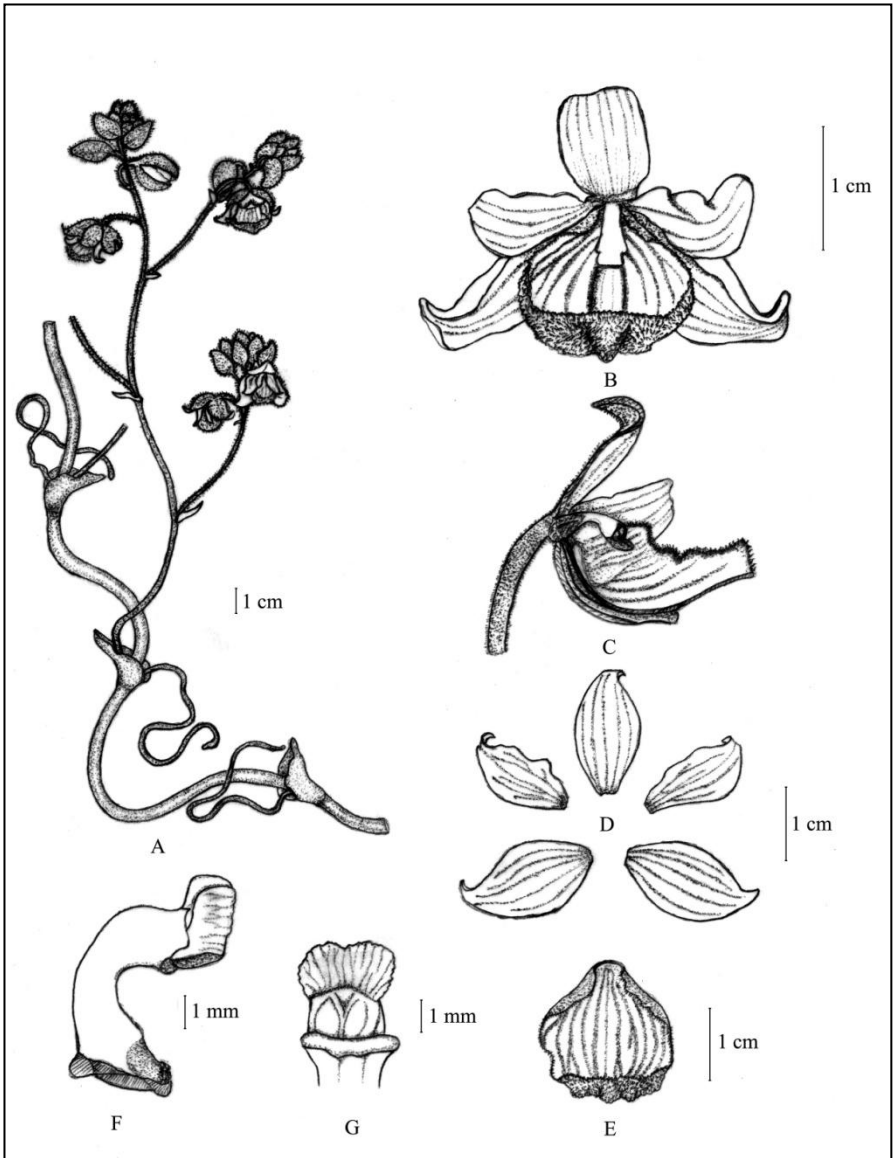
Description (plate 1 & 2): Plants climbing, without leaf. Rhizome nearly creeping, 1 cm across, with many sparse, broadly ovate, fleshy scales. Stem up to 6 m long, branched, lower part almost glabrous, upper part slightly pubescent, often with 1 aerial root at each node. Inflorescence axillary, large, branched, composed of many racemes and panicles, 5–16 cm long; rachis rusty pubescent, bearing flowers in succession near the apex. Basal sterile bracts ovate, 1–2 cm long, glabrous, amplexicaul. Floral bracts ovate, 2–4 cm long, abaxially hairy. Pedicel and ovary 1–1.2 cm long, with short hairs. Flowers yellow, with orange-red veins adaxially. Dorsal sepal sub-elliptic, 1.5–2 × 0.5–1 cm, lateral sepals obviously wider than dorsal sepal, up to 1.5 cm long, abaxially hairy when young. Petals similar to dorsal sepal, 1.4–1.9 × 0.5–1 cm, glabrous. Lip suborbicular, strongly concave, slightly shorter than sepals, 1–1.2 × 1–1.2 cm, shortly hairy adaxially. Column strongly curved, ca. 0.5 cm long.

Flowering: April–May

Habitat: semi-evergreen forest

Distribution: India (Assam, Arunachal Pradesh), Borneo, Cambodia, East Himalaya, Hainan, Jawa, Laos, Malaya, Maluku, Myanmar, New Guinea, Philippines, Sulawesi, Sumatera, Thailand, Vietnam.

Note: *Galeola nudifolia* is the only species in the genus with a climbing habit, with 1 aerial root at each node and an orange lip veined with red on the adaxial surface. The plant was observed from Behali Reserve forest. We could locate only a single plant about 6 meters long, scrambling in a dead wooden log. The area receives several threats from illegal loggers and firewood collectors, who might unknowingly destroy it. Moreover, the area where the orchid blooms is associated with several plants of *Dillenia indica* Linnaeus (1753: 535), which is the favorite food plant of the resident elephant population. The trampling of the latter could be detrimental to the species.



**Plate 1: *Galeola nudifolia***

A: inflorescence, B: flower, C: longitudinal section of flower, D: perigone, E: lip, F & G: column  
 [drawing: Khyanjeet Gogoi ]

## Conclusion

With the new taxon included here, the total number of orchid species present in the state of Assam is raised to 401. So far Behali Reserve Forest (Biswanath district of Assam) acts as the only refuge to the orchids and other native plant species. Illegal logging, extension of agriculture and human settlements, lack of forest personals for effective regulation and firewood collection have led to serious decline in the natural habitats and endanger many species.



### Plate 2: *Galeola nudifolia*

A: habit, B: young shoot, C: inflorescence, D: flower

[ph. Dipankar Borah]



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