

CHARACTERIZATION OF *COELOGYNE NITIDA* (WALL. EX D.DON) LINDL. (ORCHIDACEAE) COLLECTIONS FROM SOUTH SIKKIM, INDIA

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Abstract

Coelogyne nitida is an important member of the genus *Coelogyne*, distributed throughout Himalayan region and SouthEast Asia. In this study, a total of 17 *C. nitida* germplasm collections were characterized for various morphological and floral characters during the flowering season of 2020 at ICAR-NRC for Orchids, Pakyong. Amongst the various characters studied, it was observed that the number of flowers per inflorescence was recorded upto 9-12 which is higher than the previously reported number (4-8 flowers per raceme). This character needs to be studied to a greater extent to confirm the expression for further usage.

Introduction

THE GENUS *Coelogyne* Lindl. comprising approximately 200 known species, is distributed from the Himalayan region through SouthEast Asia and the tropical Pacific regions far East of Fiji. The main centres of distribution are Borneo, Sumatra, and Himalayas (Chen and Clayton, 2009; Clayton, 2002; George and George, 2011; Gravendeel *et al.*, 2005). *Coelogyne* species grow in wide range of altitudes ranging from sea level upto 4000 m amsl. These are predominantly epiphytes, but some species can grow over rocky cliffs as lithophytes or even as terrestrials in humid environment (Clayton, 2002; Comber, 1990). *Coelogyne* was established by Lindley in 1821 and was recognized under 5 sections within the genus in 1854. Further expansion of this division was made by Reichenbach (1861), Pfitzer and Kraenzlin (1907), Butzin (1974, 1992), Pradhan (1979), de Vogel (1992), and Clayton (2002). At present, 4 subgenera and 19 sections are recognized (Gravendeel *et al.*, 2005). Regional floristic accounts on *Coelogyne* were made by Banerji and Thapa (1969), Seidenfaden (1975), Pradhan (1979), Das and Jain (1980), Banerji and Pradhan (1984), Seidenfaden and Wood (1992), Cootes (1999, 2001), Comber (2001), Pearce and Cribb (2002) *etc.*

Coelogyne nitida is generally found in sub-tropical zones of India (North Himalaya, Sikkim, West Bengal), Nepal, Bhutan, China, Laos, Myanmar, Bangladesh, and Thailand. In India, it is distributed within the altitude range of 1300-2950 m amsl in the states of Uttar Pradesh, Uttarakhand, Sikkim, West Bengal, Arunachal Pradesh, Assam, Meghalaya, Nagaland, Manipur, and Mizoram (Maity *et al.*, 2019). It grows primarily as an epiphyte (rarely lithophytic) on tall trees, moss-covered rocks *etc.* It is a rhizomatous herb with erect, ovoid-

oblong to cylindrical, lightly ridged, and glossy pseudobulbs. Leaves narrowly oblong, acute, and petiolate. Inflorescence proteranthous with 4 to 8 flowers arranged in slightly zigzag manner (Deva and Naithani, 1986; Hegde, 1984; King and Pantling, 1898). Flowers white coloured with narrowly oblong, subacute to obtuse sepals and narrowly oblong-lanceolate, subacute petals. Lip 3-lobed, ovate, white, disc yellow bordered with red on apical lobe, side lobes oblong, 4 yellow eye marks, apical lobe round and disc with 3-lamellae. Column slender, slightly arcuate and winged. Anther ovate with 4 pollinia.

Material and Methods

A total of 17 *C. nitida* germplasm collections, available at ICAR-NRC for Orchids, Pakyong, were studied for various vegetative and floral characters during the flowering season (April-June, 2020). These plants were collected from evergreen forests (2450 m amsl) of Ravangla, South Sikkim district of the Indian state of Sikkim (Fig. 1). The plants were studied for different characters including pseudobulb length, pseudobulb diameter, number of ridges, number of scales on young shoot, leaf length, leaf width, leaf petiole length, number of flowers/inflorescence, pedicel length, spike length, inflorescence length, inter-flower node length, dorsal sepal length, dorsal sepal width, petal length, petal width, lateral sepal length, lateral sepal width, lip length, lip width, column length, column width, fruit length, fruit width, and stalk length. Statistical analysis was performed for all the characters by using Microsoft Excel V 2010.

Results and Discussion

Plant is epiphytic. *Rhizome* short densely covered by scaly sheaths, *Pseudobulbs* clustered or shortly

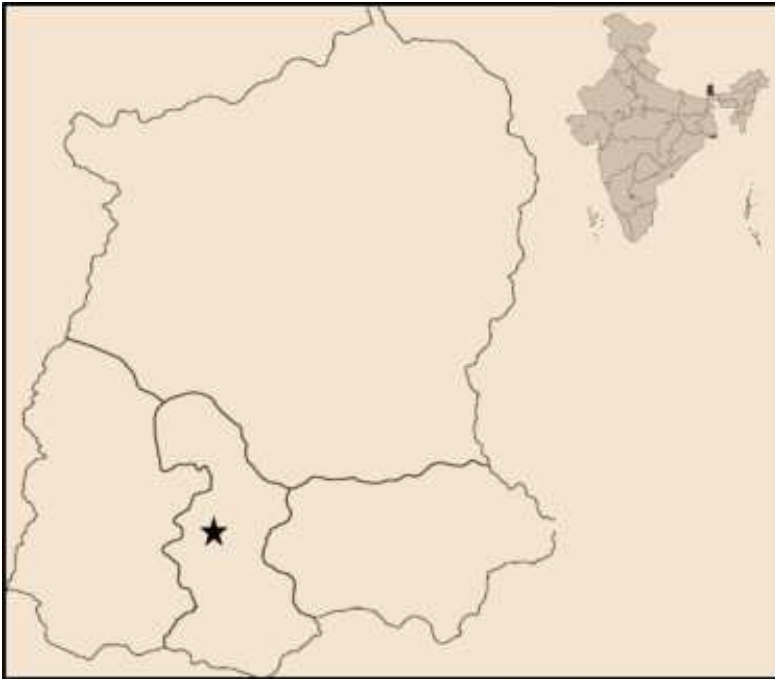


Fig. 1. Distribution map of *C. nitida* in Ravangla, South Sikkim, India.

distant, ellipsoid, 5-9 × 1.5-2 cm², 3-6 ridged, glossy, pale green to light yellow coloured, 2 leaves at apex and ovate, papery sheathed at base. *Leaf petiole* 3-8 cm long, blade obvate to elliptical, 16-25 × 2.1-4 cm², membranous, acute tip. *Inflorescence* proteranthous or rarely synanthous, 13-19 cm long (Table 1). *Raceme* 9 to 12-flowered (opening together). *Flowers* fragrant, fleshy, white emerging from inflorescence nodes distanced at 0.8-1.6 cm in zigzag manner. *Peduncle* partially covered with rhizome scale. *Pedicel* cream white with 2.3-3 cm long, slightly curved. *Medial sepal* elliptical 2.4-2.8 × 0.7-1.4 cm², tip acute. *Lateral Sepals* elliptic-oblong, 2.2-3.2 × 0.6-1 cm². *Petals* obvate to elliptic, 2-2.9 × 0.5-0.8 cm. *Lip* broadly ovate or elliptic in outline when flattened, 1.5-2.1 × 0.7-1.3 cm², outside white colour and inside colour range from white to yellow with brown patches. *Column* curved, 1.4-1.7 × 0.5-0.9 cm². *Fruit* ellipsoid, 4-5 × 0.8-1.3 cm², stalk 1-3 cm long. This species has been previously described by King and Pantling (1898), Hegde (1984), Deva and Naithani (1986) and reported that,

in this species raceme is having upto 4-8 flowers. Here, we have observed the plants with number of flowers as 9-12 per inflorescence (Table 1; Fig. 2A-C). This character needs to be studied for multiple seasons to know consistency in expression and effect of environmental conditions in manifestation of this character. The plants which express consistently across the seasons will be identified as stable morphological variants for further use. Though the pace of hybridization in this species is slower than many other genera in the family Orchidaceae, 119 hybrids have so far been evolved using species as well as cultivars of this genus. *C. nitida* is scented species and this character easily gets transferred into its progenies. Three hybrids are *C. moorean-ochracea* (*C. mooreana* × *C. nitida*), *C. parishii-ochracea* (*C. parishii* × *C. nitida*), and *C. Fredensborg* (*C. nitida* × *C. lawrenceana*). The multi-floral and straight inflorescence character of these

accessions will be useful in breeding of *Coelogyne* for



Fig. 2. A-C. *Coelogyne nitida*: A, Inflorescence with 11-12 flowers; B, Flower; C, Floral parts.

Table 1. Details of characters studied on *C. nitida* germplasm collections.

Characters (cm)		Mean±SE	Range	SD
Pseudobulb	length	6.51±0.27	5-9	1.06
	diameter	1.77±0.04	1.5-2	0.17
Number of ridges		3.88±0.20	3-6	0.80
Number of scales on young shoot		4.63±0.30	3-8	1.20
Leaf	length	21.03±0.62	16-25	2.47
	width	3.14±0.11	2.1-4	0.45
	petiole length	5.24±0.32	3-8	1.30
Number of flowers/Inflorescence		10.29±0.12	9-12	0.51
Pedicel length		2.72±0.06	2.3-3	0.23
Spike length		26.18±0.71	21-31	2.93
Inflorescence length		15.63±0.47	13-19	1.92
Inter-flower node length		1.21±0.06	0.8-1.6	0.26
Dorsal sepal	length	2.53±0.03	2.4-2.8	0.14
	width	1.11±0.04	0.7-1.4	0.15
Petal	length	2.41±0.07	2-2.9	0.3
	width	0.64±0.02	0.5-0.8	0.08
Lateral sepal	length	2.56±0.06	2.2-3.2	0.25
	width	0.89±0.03	0.6-1	0.13
Lip	length	1.86±0.04	1.5-2.1	0.15
	width	0.9±0.04	0.7-1.3	0.16
Column	length	1.52±0.03	1.4-1.7	0.11
	width	0.53±0.02	0.5-0.9	0.1
Fruit	length	4.40±0.11	4-5	0.42
	width	1.03±0.03	0.8-1.3	0.12
Stalk length		1.73±0.13	1-3	0.52

pot plants where more number and straight inflorescence characters are desired.

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