

NERVILIA SIMPLEX VAR. HIMACHALENSIS (ORCHIDACEAE): A NEW VARIETY FROM HIMACHAL PRADESH, INDIA

Rimjhim Chandra and Khyanjeet Gogoi¹

Department of Botany, Government College, Sultanpur- 176 314, Chamba, Himachal Pradesh, India

¹Regional Orchid Germplasm Conservation and Propagation Centre (Assam Circle), Daisa Bordoloi Nagar, Talap- 786 156, Tinsukia, Assam, India

Abstract

A new variety, *Nervilia simplex* var. *himachalensis* from Himachal Pradesh, NorthWestern Himalayas, India is described and illustrated. The new variety is distinct from the typical *Nervilia simplex* by its 2 flowered inflorescence with purple-white fringed flowers, leaves with 13 main veins, petiole erect, about 2-6 cm long, presence of ca. 1.3 cm broad sheath at the base of flowers, and 1.5-2.0 cm long capsule.

Introduction

THE GENUS *Nervilia* Comm. ex Gaudich. (1829: 422) comprises about 83 species (POWO, 2024), widely distributed in the Old-World tropics, from Australia and the South-West Pacific Islands to sub-Saharan Africa (Gale *et al.*, 2015, 2018; Pettersson, 1991). In India, the genus is represented by 16 species including 7 endemics (Jalal *et al.*, 2012). The taxonomy of the genus is problematic because of its hysteranthous habit (Gale *et al.*, 2014) and development of flowers and leaves in different seasons (Chen and Gale, 2009). *Nervilia* is often leafless at the time of flowering and the flowers are followed by a vegetative stem bearing a single photosynthetic leaf (Niissalo *et al.*, 2020). The leaves in the genus are palmately veined and often polygonal or lobed. The populations are often small, isolated, and prone to demographic stochasticity (Gale *et al.*, 2018). In Himachal Pradesh, the genus is represented so far by 3 species: *Nervilia concolor* (Blume) Schltr, *N. gammieana* (Hook.f.) Pfitzer, and *N. plicata* (Andrews) Schltr. (Vij *et al.*, 2013); two species, *Nervilia concolor* (*N. aragoana* Gaudich.) and *N. gammieana* (Hook.f.) Schltr. were reported as new records for Himachal Pradesh by Vij *et al.* in 2008.

During a field trip to the forest area of Kangra district, Himachal Pradesh in NorthWestern Himalayas in June 2023, the first author noticed the growth of a *Nervilia* species in flowering condition in Sukar Forest, Vayu Vihar, District Kangra, Himachal Pradesh (Fig. 1). About 20 plants were found growing in clump with a

long green stem and terete leaves, all in flowering condition. These plants were two flowered and resembled *Nervilia simplex* (Thouars) Schltr., but differed in inflorescence, floral and morphological characters (Table 1). The plants were collected for further studies and preparation of voucher specimens for the herbarium. Based on available literature (Atthanagoda *et al.*, 2021; Chen *et al.*, 2009; Chowdhery, 1998; Gogoi, 2018, 2019; Gogoi *et al.*, 2023; Hegde, 2017, revised; King and Pantling, 1898; Lucksom, 2007; Misra, 2019; Pearce and Cribb, 2002; Pradhan, 1979; Singh *et al.*, 2019) and a critical examination of the flowers, the specimen was identified as a variety of *Nervilia simplex* and has been described here as *Nervilia simplex* var. *himachalensis*.

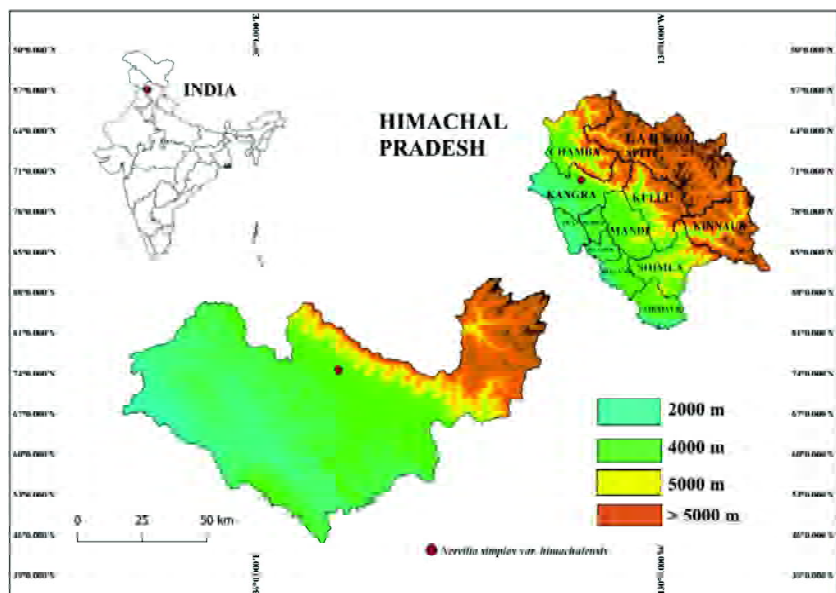


Fig. 1. Distribution map of *Nervilia simplex* var. *himachalensis*.

Detailed comparison between *Nervilia simplex* and *Nervilia simplex* var. *himachalensis* is shown in the Table 1.

Material and Methods

Fresh plant material in its vegetative condition was collected during a botanical excursion in Kangra district, Himachal Pradesh, India on 25 June 2023. All the photographs were taken with a Canon DIGITAL IXUS 980 IS. The measurements and species description were made from living plants following the terminology for morphological descriptions by Beentje (2012). Specimens were deposited at the Herbarium, TOSEHIM, Assam and High Altitude Western Himalayan Regional Centre, Solan.

Taxonomic Description

Nervilia simplex* var. *himachalensis Rimjhim C., K.Gogoi. var. nov.

Type: INDIA, Himachal Pradesh, Kangra district, 300 m., 25 June 2023, Rimjhim C.002 (holotype: TOSEHIM, Herbarium, Assam; isotype: High Altitude Western Himalayan Regional Centre, Solan (Figs. 2A-F, 3).

This new variety is morphologically similar to *Nervilia simplex* (Thouars) Schltr. but differs from this species by the 2 flowered inflorescences with purplish white flowers, leaves with 11 main veins, petiole erect, about

2-6 cm long, presence of a 1.3 cm broad sheath below the base of flower, and 1.5-2.0 cm long capsule.

Terrestrial plant with sub globose to ovoid *tuber*, 2.0-2.5 × 1.8-2.0 cm. *Leaf* abaxially pale green, adaxially green with fine white reticulate venation, cordate, 2.0-4.5 × 2.0-3.0 cm, slightly fleshy, adaxially sparsely setulose throughout, with 11-13 main veins, base cordate, margin undulate, apex acute; *petiole* erect, 2-6 cm. *Inflorescence* erect 4-7 cm long, erect, terete, slender, glabrous, 2-flowered; sheath below the base of flower *ca.* 1.3 cm across; *peduncle* pale green, with 3-4, tubular, stem clasping sheaths. *Floral bract* lanceolate, ovate-acuminate at apex. *Flower* erect, not resupinate, not widely open (semi-closed), 1.5-2.7 cm across. *Sepals* pale green with faint grey lines, lanceolate, apex acute or acuminate; *dorsal sepal* *ca.* 2.0 × 0.2 cm, apex acute; *lateral sepal* is 1.5 × 0.3 cm. *Petals* white creamy and purple from the apex, narrowly lanceolate, 1.5-2.0 × 0.2-0.4 cm. *Lip* strongly reflexed above middle, white tinged, purple fringed and white at base, about 2.0 × 0.6 cm when closed, spurless, simple or 3 lobed, lateral margins erect apical margins irregularly fimbriate, *ca.* 1.5 × 0.6 cm long, lateral margins erect and loosely enclosing *column*, apical margin irregularly lacerate or fimbriate; lateral lobes (when present) sub-orbicular, small; disk papillose, with 3 longitudinal ridges extending from near base almost to apex. *Capsule* is 2 cm long (Fig. 4A-H).

Table 1. Morphological characters differentiating *N. simplex* var. *himachalensis* and *N. simplex*.

Morphological characters	<i>Nervilia simplex</i>	<i>Nervilia simplex</i> var. <i>himachalensis</i>
Leaf size	7-9 cm long 4-6 cm wide; petiole 1-3(5)	5-6 cm long and 5.0-7.5 cm wide; petiole 2-6
Leaf vein	7 main prominent veins	11-13 main prominent veins
Inflorescence	1 flowered	2 flowered
Flower	1.8-2.5 cm across; sepals and petals green; lip white tinged pale green at base and sometimes with a yellowish patch at centre; opening widely	1.5-2.7 cm across; sepals pale green, petals white creamy and purple from the apex; lip white tinged, purple fringed and white at base; not widely open, semi closed
Sepals	2.0-2.5 × 0.12-0.25 cm	1.3-1.5 × 0.3-0.5 cm
Dorsal sepal	2.3 × 0.2 cm	2.0 × 0.2 cm
Lateral sepal	2.0 × 0.2 cm	1.5 × 0.3 cm
Petals	1.8-2.3 × 0.1-0.2 cm	1.5-2.0 × 0.2-0.4 cm
Peduncle	Green	Pale green
Sheath below the base of flower	Absent	Present about 1.3 cm long
Fruit stalk	17 cm	18-20 cm
Fruit capsule	1.0-1.5 cm long	2 cm long
Tuber	1.2 cm across	2.5 cm across

Specimen Examined

India, Himachal Pradesh, Kangra district, 25 June 2023,
Rimjhim C., K. Gogoi. 002.

Flowering

May-June

Habitat

Growing on the forest floor covered with dry pine needles of *Pinus roxburghii*, the Chir pine tree at an altitude around 1500 m.

Distribution

India (Kangra district, Himachal Pradesh)

Etymology

The specific epithet refers to the Himachal Pradesh, India from where the plant was collected.

Conservation Status

Only a small population with 20 mature individuals was presently found at Sukar Forest, Vayu Vihar, district Kangra, Himachal Pradesh, India. This is a community

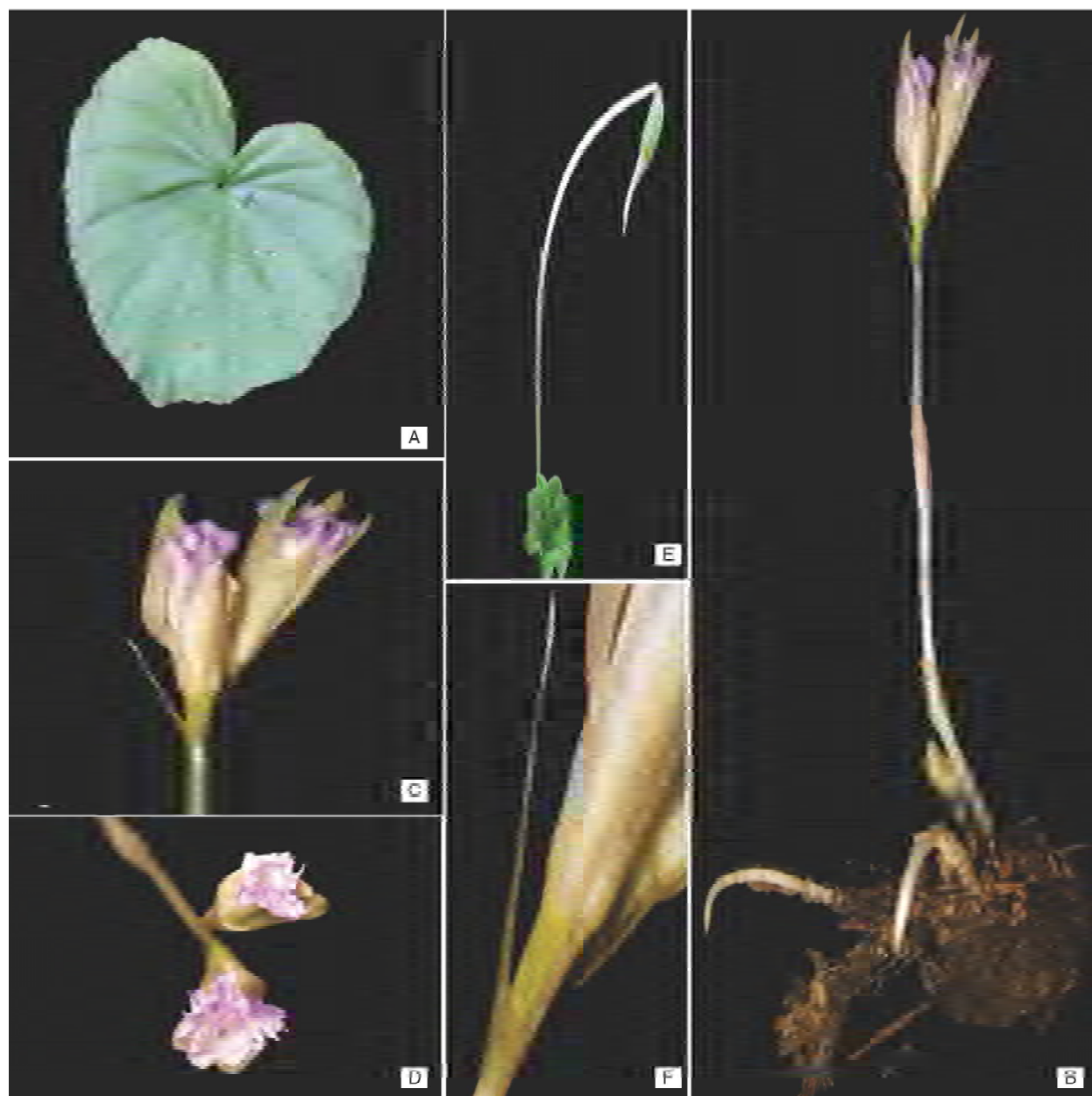


Fig. 2A-F. *Nervilia simplex* var. *himachalensis*: A, Leaf; B, Plant with flower; C, Lateral view of Flowers; D, Close-up view of flower; E, Capsule; F, Sheath below the flower with ovary.



Fig. 3. Closeup of *Nervilia simplex* var. *himachalensis* flowers, in district Kangra, Himachal Pradesh, NorthWestern Himalayas, India.

protected area with very little anthropogenic disturbance. Although there seem to be some suitable habitats in between the currently known locations, there is lack of systematic survey for a biodiversity assessment and conservation. Hence, it may be categorized as data

deficient (DD) following the IUCN guidelines (IUCN, 2019).

Key to the species of *Nervilia* from the Himachal Pradesh

- 1a. Inflorescence with 1 flower ***N. simplex***
- 1b. Inflorescence with 2 or many flowers
 - 2a. Inflorescence with 2 flowers,
 - 3a. Sepals and petals pale green with faint grey lines; lip white tinged, purple fringed and white at base.....
..... ***N. simplex* var. *himachalensis***
 - 3b. Sepals and petals brownish yellow; lip brownish or pale purple ***N. plicata***
 - 2b. Inflorescence with many flowers.
 - 4a. Inflorescence with 4-15 flowers; flowers yellowish green with pale green lip.....
..... ***N. concolor***
 - 4b. Inflorescence with 5 -9 flowers; flowers pink with greenish or yellowish-white lip
..... ***N. gammieana***

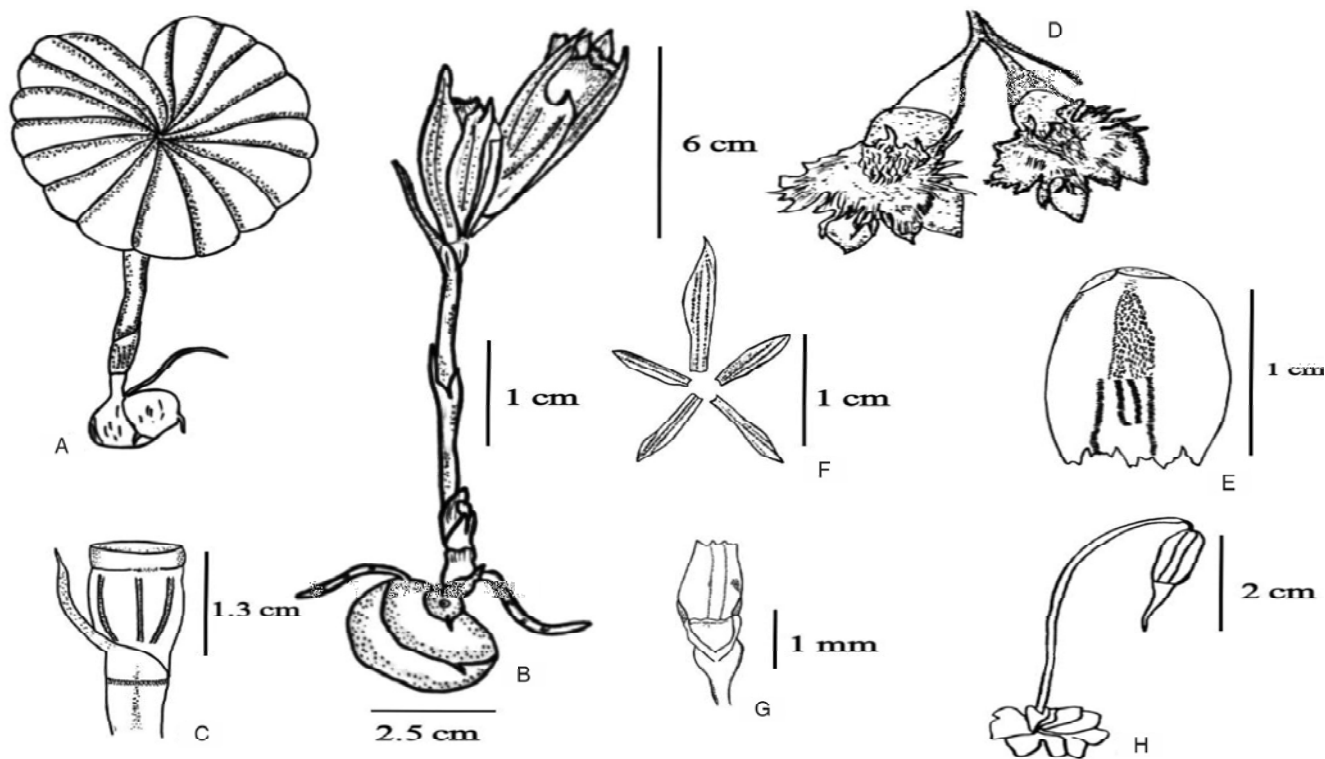


Fig. 4. *Nervilia simplex* var. *himachalensis*: A, Leaf with tuber; B, Flower with tuber; C, Sheath below the flower with ovary; D, Dorsal view of flower; E, Lip; F, Perigone; G, Column; H, Capsule.

Acknowledgement

The authors are thankful to all the reviewers for their valuable comments and suggestions, which helped us improve the quality of the manuscript.

References

- Attanagoda, A. G., N. Aberathna, C. Bandara, and P. Kumar. 2021. Taxonomic notes on the genus *Nervilia* (Nervilieae: Epidendroideae: Orchidaceae) in Sri Lanka. *Rheedea*, **31**: 161-74.
- Beentje, H. 2012. *The Kew Plant Glossary, an Illustrated Dictionary of Plant Terms* (revised ed.). Kew Publishing, Royal Botanic Gardens, Kew, U.K.
- Chen, X. and S. W. Gale. 2009. Orchidaceae. In: *Flora of China* Vol. 25 (eds. Z. Y. Wu and P. H. Raven) pp. 197-201. Science Press, Beijing and Missouri Botanical Garden Press, St. Louis, U.S.A.
- Chen, X., Z. Liu, G. Zhu, K. Y. Lang, Z. Ji, Y. B. Luo, X. Jin, P. J. Cribb, J. J. Wood, S. W. Gale, P. Ormerod, J. J. Vermeulen, H. P. Wood, D. Clayton, and A. Bell. 2009. Orchidaceae. In: *Flora of China* (eds. Z. Y. Wu, P. H. Raven, and D. Y. Hong) pp. 1-506. Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis, Missouri, U.S.A.
- Chowdhery, H. J. 1998. *Orchid Flora of Arunachal Pradesh*. Bishen Singh Mahendra Pal Singh, Dehradun, India.
- Gale, S. W., S. Rueangrua, and S. Suddee, 2014. Studies in Asian *Nervilia* (Nervilieae, Epidendroideae, Orchidaceae) IV: *N. umphangensis*, A new species from the Thai-Myanmar border. *Phytotaxa*, **166**(2): 139-44.
- Gale, S. W., J. Li, A. Kinoshita, and T. Yukawa. 2015. Studies in Asian *Nervilia* (Orchidaceae) V: *N. futago*, a cryptic new species from South West Japan confirmed by morphological, cytological and molecular analyses. *Syst. Bot.*, **40**: 413-25.
- Gale, S. W., S. Duangjai, J. Li, Y. Ito, S. Watthana, P. Termwutthipreech, M. L. Cheuk, and S. Suddee. 2018. Integrative analyses of *Nervilia* (Orchidaceae) section *Linervia* reveal further undescribed cryptic diversity in Thailand. *Syst. Biodivers.*, **16**(4): 377-96.
- Gogoi, K. 2018. *Wild Orchids of Assam- A Pictorial Guide*. Assam State Biodiversity Board, Guwahati, Assam, India.
- Gogoi, K. 2019. *Orchids of Assam- A Pictorial Guide*. Dibrugarh University, Dibrugarh, Assam, India.
- Gogoi, K., K. Chowlu, and J. S. Jalal. 2023. The genus *Nervilia* (Orchidaceae) in Arunachal Pradesh (India) with a new addition for the flora of this state. *Richardiana*, **7**: 78-102.
- Hegde, S. N. 2017. *Orchids of Arunachal Pradesh* (eds. N. Tam, J. Tsering, and O. Apang) pp. 168. Department of Environment and Forest, Govt. of Arunachal Pradesh, Itanagar, India.
- IUCN. 2019. Guidelines for using the IUCN red list categories and criteria. Version 14. Prepared by the Standards and Petitions Subcommittee. Available at: https://nc.iucnredlist.org/redlist/content/attachment_files/RedListGuidelines. (Accessed on 27 June 2023).
- Jalal, J. S., P. Kumar, and G. S. Rawat. 2012. *Nervilia pangteyana* sp. nov., a terrestrial orchid from Western Himalaya, India. *Nord. J. Bot.*, **30**: 407-11.
- King, G. and R. Pantling. 1898. *The Orchids of the Sikkim Himalayas*. *Ann. Royal Bot. Gard. Calcutta*, **8**: 1-342.
- Lucksom, S. Z. 2007. *The Orchids of Sikkim and North East Himalaya*. Development Area, Jiwan Thing Marg, Gangtok, East Sikkim, India.
- Misra, S. 2019. *Orchids of India- A Hand Book*. Bishen Singh Mahendra Pal Singh, Dehradun, India.
- Niissalo, M. A., L. M. Choo, H. Kurzweil, T. W. Yam, and G. S. Khew. 2020. A new species of *Nervilia* (Orchidaceae) from Singapore. *Gard. Bull. Singapore*, **72**(1): 1-14.
- Pearce, N. R. and P. J. Cribb. 2002. *Orchids of Bhutan: Flora of Bhutan*. Vol. 3, No. 3. Royal Botanical Garden, Edinburgh, U.K.
- Pettersson, B. 1991. The genus *Nervilia* (Orchidaceae) in Africa and the Arabian Peninsula. *Orchid Monographs*, **5**(1): 1-68.
- POWO. 2024. *Plants of the World Online*. Facilitated by the Royal Botanic Gardens, Kew. Published on the Internet. <http://www.plantsoftheworldonline.org>.
- Pradhan, U. C. 1979. *Indian Orchids Guide to Identification and Culture*. Bharat Lithographing Co., Calcutta, India.
- Singh, S. K., D. K. Agrawala, S. S. Das, A. A. Mao, and P. Singh. 2019. *Orchids of India- A Pictorial Guide*. Botanical Survey of India, Ministry of Environment, Forest & Climate Change, Kolkata, India.
- Vij, S. P., J. Verma, and C. S. Kumar. 2013. *Orchids of Himachal Pradesh*. Bishen Singh Mahendra Pal Singh, Dehradun, India.
- Vij, S. P., J. Verma, and Promila Pathak. 2008. *Nervilia aragoana* Gaud. and *N. gammieana* (Hook.f.) Schltr. (Orchidaceae): Two new records for Himachal Pradesh. *Phytomorphology*, **58**: 213-17.