

## RESEARCH NOTE

## *Graphis lueckingiana*, a New Species from Cameroon

Santosh Joshi<sup>1,2</sup>, Dalip K. Upreti<sup>1</sup>, Jae-Seoun Hur<sup>2\*</sup><sup>1</sup>CSIR-National Botanical Research Institute, Uttar Pradesh 226001, India<sup>2</sup>Korean Lichen Research Institute, Sunchon National University, Suncheon 57922, Korea

\*Corresponding author: jshur1@sunchon.ac.kr

### ABSTRACT

A new species of *Graphis* is described from Cameroon, Africa. The new taxon is distinguished by a greyish-green, glossy, uneven, and continuous thallus. Further, it possesses stellately branched lirellae, and its entire lobes are covered almost completely with thick thalline margin. It also has a completely carbonized proper exciple, which is considerably thick at the base, one-spored asci, and muriform hyaline to yellowish ascospores.

**Keywords:** Crustose, Lichen, Muriform, Mount Oku, Kilum forest

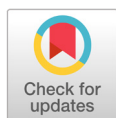
A study of specimens of the genus *Graphis* Adans., collected during a field trip organized in 2015 in the western part of Cameroon, revealed several noteworthy species [1]. From the bulk of the collected material, we found an interesting species. This species is remarkable among other *Graphis* species in its montane habitat and unique taxonomical characteristics, including a carbonized proper exciple thick at the base and ascospores becoming yellowish at maturity, found rarely in the genus. A detailed study and subsequent comparison with other species showed that the material differed from any currently known species of *Graphis*. Therefore, it is described here as the new species *Graphis lueckingiana*.

The material was deposited in the herbarium of the Korean Lichen Research Institute (KoLRI), Sunchon National University. Morphological characteristics were examined using a stereomicroscope (Nikon SMZ645; Nikon, Tokyo, Japan) and a compound microscope (Nikon Eclipse E200) at higher magnifications of 40 $\times$  and 1,000 $\times$  prior to KOH application. Lugol's iodine solution was used to check the amyloidity of ascospores. All measurements were obtained from material mounted in water. Chemistry was analyzed following the procedure of Orange et al. [2].

*Graphis lueckingiana* S. Joshi, Upreti & Hur sp. nov. (Fig. 1)

MycoBank No.: MB826960

This species is close to *Graphis elixiana*, but differs by large ascospores and lacking lichen substances in thallus.



### OPEN ACCESS

pISSN : 0253-651X  
eISSN : 2383-5249

Kor. J. Mycol. 2018 December, 46(4): 491-494  
<https://doi.org/10.4489/KJM.20180053>

**Received:** October 08, 2018

**Revised:** October 26, 2018

**Accepted:** November 01, 2018

© 2018 THE KOREAN SOCIETY OF MYCOLOGY.



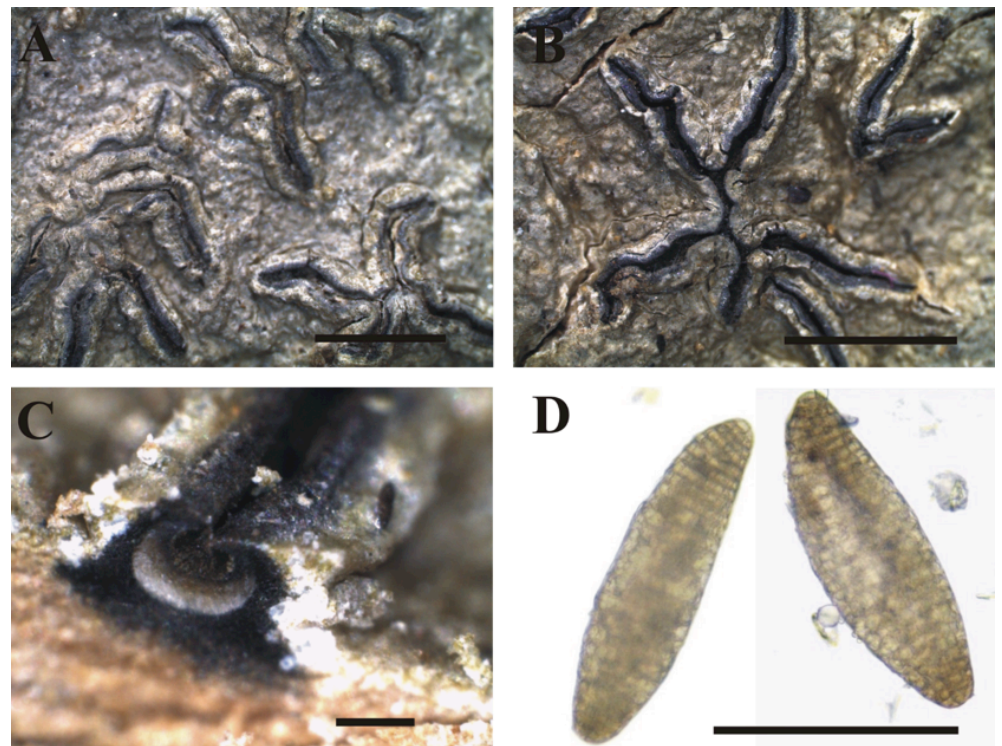
This is an Open Access article distributed under the terms of the Creative Commons Attribution-Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Type:** Africa, Cameroon, North-West Region, Mount Oku, Kilum forest, (N06°12'13.88", E10°30'53.27"), elev. 2765 m, on bark of *Prunus* sp., 09 May 2015, Jae-Seoun Hur, CR150182 (KoLRI 036241—holotype).

**Description:** Thallus corticolous, crustose, greyish-green to grey, greenish-grey, glossy, continuous, uneven,  $\pm$  verruculose, up to 200  $\mu\text{m}$  thick, corticate; cortex, distinct, continuous, 15~25  $\mu\text{m}$  thick; algal layer trentepohlioid, distinct, continuous, 50~75  $\mu\text{m}$  thick; medulla white, crystalline, mostly endoperidermal; prothallus indistinctly dark brown.

Apothecia lirellate, prominent, short and broad,  $1\sim1.5 \times 0.3\sim0.6$  mm, stellately branched; labia entire, mostly invisible; thalline margin complete, apically thick (*illinata*-morph), becoming thinner or eroded apically in over mature lirellae, 150~180  $\mu\text{m}$  thick; disc concealed to slightly exposed due to over-maturity, brownish, epruinose; proper exciple convergent, completely carbonized, laterally 50~60  $\mu\text{m}$ , basally up to 200  $\mu\text{m}$  thick; epihymenium brownish, granular, 10~15  $\mu\text{m}$  high; hymenium hyaline, densely interspersed with small oil-droplets lining 2~4  $\mu\text{m}$  thick paraphyses and not dissolving in KOH, up to 200  $\mu\text{m}$  high; subhymenium hyaline, indistinct to 25  $\mu\text{m}$  high; asci broadly clavate, 1-spored,  $170\sim215 \times 60\sim90$   $\mu\text{m}$ , I-; ascospores broadly fusiform with round ends to ellipsoidal, multicelled, muriform, hyaline to yellowish,  $145\sim185 \times 35\sim55$   $\mu\text{m}$ , I+ blue-violet.

**Chemistry:** K-, PD-, C-; no lichen substance detected by TLC.



**Fig. 1.** *Graphis lueckingiana*. A, B, habitat (holotype); C, completely carbonized proper exciple; D, ascospores (scale bars: A = 1 mm, B = 0.5 mm, C = 200  $\mu\text{m}$ , D = 100  $\mu\text{m}$ ).

**Table 1.** Characteristics distinguishing *Graphis lueckingiana* (holotype) from relative species.

Species	Lirellae		Excipulum carbonization	Hymenium	Margin	Ascospores				Chemistry
	Emergence	Labia				Ascus	Shape	Size	Color	
<i>G. argentata</i>	prominent	entire	complete	inspersed	complete, apically thin	4~8	muriform	80~140 × 15~35 µm	hyaline to grey-brown	no substances
<i>G. elixiana</i>	prominent	entire	complete	inspersed	complete, apically thick	1	muriform	(90~) 102~130 × (12~) 14~17 µm	hyaline to pale-brown	hirfructic and β-orsellinic acids, atranorin
<i>G. illinata</i>	prominent	entire	complete	clear	complete, apically thick	1	muriform	110~225 × 30~50 µm	hyaline to grey-brown	no substances
<i>G. lueckingiana</i>	prominent	entire	complete	inspersed	complete, apically thick	1	muriform	145~185 × 35~55 µm	hyaline to yellowish	no substances
<i>G. mirabilis</i>	prominent	striate	apically and basally complete	clear	complete, apically thin	1	muriform	150~180 × 30~45 µm	hyaline to grey-brown	no substances
<i>G. phaeospora</i>	prominent	entire or striate	complete	inspersed	complete, apically thin	1~4	muriform	80~140 × 25~35 µm	hyaline to grey-brown	no substances

Source of description [6, 7].

**Etymology:** The specific name refers to the prominent lichenologist Dr. Robert Lücking (Berlin, Germany).

**Distribution and ecology:** *Graphis lueckingiana* grows on thinned barked trees in humid to subhumid areas of Mount Oku. This mountainous region includes the largest volcano in the western high plateau of Cameroon and forms the largest remaining patch of montane forest in West Africa [3-4]. Because host trees are common and abundant in the mountainous region, *G. lueckingiana* is a ubiquitous lichen species. We used only representative specimens for the documentation. The new taxon was collected at an elevation of 2,745 m with other associated members of *Graphis* and *Pertusaria*.

**Remarks:** Although, *Graphis lueckingiana* occupies large portions of individual trunks, it can easily be intermingled with the greyish bark texture of several trees of Mount Oku, and likely to be overlooked if not actively searched for. Characteristically, this species seems to be widespread in forest patch. The new taxon possesses greyish-green, glossy, uneven, continuous thallus, stellately branched lirellae, entire labia covered completely with thick thalline margin, completely carbonized proper exciple considerably thick at the base, one-spored asci and muriform hyaline to yellowish ascospores.

*Graphis elixiana* A. W. Archer is nearest to the new taxon among different species that have been described previously with an entire labia, completely carbonized proper exciple, inspersed hymenium and muriform hyaline to pale-brown ascospores. However, *G. elixiana* contains hirtifructic and β-orsellinic acids and atranorin as lichen substances. Further, it produces comparatively smaller ascospores of (90~)102~130 × (12~)14~17 µm [5-6]. *Graphis phaeospora* Vain. and *G. argentata* Lücking & Umañ are close to *G. lueckingiana* in lacking lichen substances, but the two species have smaller ascospores and different lirellae morphology (Table 1).

**Additional specimen examined:** Africa, Cameroon, Northwest region, Mount Oku, Kilum forest, (N06°10'58.44", E10°30'33.95"), elev. 2745 m, on bark of *Prunus*, 09 May 2015, Jae-Seoun Hur,

CR150181 (KoLRI 036240).

## ACKNOWLEDGEMENTS

This paper was supported by Sunchon National University Research Fund in 2018 (Grant number: 2018-0287).

## REFERENCES

1. Joshi S, Upreti DK, Egbe AE, Hur JS. New records of *Graphis* from Cameroon, with a key to African species of *Graphis*. *Mycotaxon* 2016;131:925-37.
2. Orange A, James PW, White FJ. Microchemical methods for the identification of lichens. London: British Lichen Society; 2001.
3. Woolley AR. Alkaline rocks and carbonates of the world, part 3: Africa. London: Geological Society of London; 2001.
4. Maisels FG, Cheek M, Chris W. Rare plants on Mount Oku summit, Cameroon. *Oryx* 2000;34:136-40.
5. Archer AW. *Graphidaceae*. In: George AS, McCarthy PM, editors. Flora of Australia: Volume 57, Lichens 5. Canberra: Australian Government Publishing Service; 2009. p. 84-194.
6. Lücking R, Archer AW, Aptroot A. A world-wide key to the genus *Graphis* (*Ostropales*: *Graphidaceae*). *Lichenologist* 2009;41:363-452.
7. Lücking R, Chaves JL, Sipman HJ, Umaña L, Aptroot A. A first assessment of Ticolichen biodiversity inventory in Costa Rica: the genus *Graphis*, with notes on the genus *Hemithecium* (Ascomycota: Ostropales: Graphidaceae). *Fieldiana Bot* 2008;46:1-126.