

Siddhartha SINGH DEO^a and Shuvadeep MAJUMDAR^{b,*}: *Folioceros paliformis*,
A New Synonym of *F. kashyapii* (*Anthocerotaceae: Anthocerotophyta*)

^aDepartment of Botany, Banwarilal Bhalotia College, Asansol, West Bengal, 713303 INDIA;

^bDepartment of Botany, Parimal Mitra Smriti Mahavidyalaya, Mal, Jalpaiguri, West Bengal, 735221 INDIA

*Corresponding author: shuvadeep.majumdar@gmail.com

(Accepted on September 1, 2021)

Summary: Close morphological similarities between *Folioceros kashyapii* S.C.Srivast. & A.K.Asthana and *F. paliformis* D.K.Singh (*Anthocerotaceae: Anthocerotophyta*) as well as overlapping key diagnostic characters suggest the two species to be conspecific and hence, *F. paliformis* is synonymised under *F. kashyapii*.

The genus *Folioceros* D.C.Bharadwaj (*Anthocerotaceae: Anthocerotophyta*) is represented in India by 12 species with as many as seven of its taxa being endemic to the country (Singh et al. 2016). Two such species, viz. *F. kashyapii* S.C.Srivast. & A.K.Asthana and *F. paliformis* D.K.Singh drew our attention as examination of the protologue of the species revealed great similarity between the two. Both the species are endemic to Eastern Himalayas and the North-East India. *Folioceros kashyapii* have been reported from Meghalaya, Nagaland and Sikkim (Srivastava and Asthana 1989). However, no subsequent collections have been made from any of these states or elsewhere from the country. *Folioceros paliformis* was reported from Arunachal Pradesh (Singh 1987 [1989]) and Assam (Barbhuiya and Singh 2012, Verma et al. 2012).

Critical examination of *F. kashyapii* reveals similarity with *F. paliformis* in almost all major characters. Both the taxa have swollen outgrowths on the dorsal surface of the thallus with unistratose palisade cells and with spongy, mucilaginous chambers with 1–3-layered schizogenous cavities; morphologically

identical involucre; stomatiferous capsule wall with up to 16 stomata per sq. mm; nearly identical size of stomata (averaging $67 \times 33 \mu\text{m}$ with two guard cells in *F. kashyapii* and $45\text{--}56 \times 10\text{--}15 \mu\text{m}$ with guard cells in *F. paliformis*); morphologically identical chloroplast; antheridial jacket layer cells usually arranged in 4 tiers; androecia with up to 30 antheridia per androecial chamber; antheridial body (without stalk) nearly similar in dimensions ($190\text{--}224 \mu\text{m}$ long in *F. kashyapii* and $185\text{--}225 \mu\text{m}$ long in *F. paliformis*) (Singh 1987 [1989], Srivastava and Asthana 1989).

The spores of *F. kashyapii* are papillate (under light microscope) or more or less baculate, with apically smooth baculae (Srivastava and Asthana 1989) whereas the spores of *F. paliformis* are ornamented with minute baculae as well as spinules on both the surfaces. The other difference observed during comparison of both the taxa is the spore size ($36\text{--}44 \mu\text{m}$ diameter in *F. kashyapii* and $25\text{--}35 \times 28\text{--}35 \mu\text{m}$ in *F. paliformis*). However, Majumdar and Singh (unpublished) described *F. paliformis* from Anjaw District of Arunachal Pradesh with double sculptured spores with minutely papillose sporoderm studded with baculae arranged singly or in groups of 2–5 on both distal and proximal surface and spore size ranging between $22.5\text{--}37.5 \mu\text{m}$ in diameter. The elaters and their dimensions provided are not compared as complete mature elaters were not reported in the protologue of *F. kashyapii* (Singh 1987 [1989], Srivastava and Asthana

1989).

Thus, it can be concluded that the characters of *F. kashyapii* are well within the range of *F. paliformis* and appear conspecific. Hence, *F. paliformis* is proposed here as a synonym of *F. kashyapii*.

There have been some doubts regarding date of publication of *F. paliformis*. On suggestion of one of the reviewers of the manuscript, it was found that *F. paliformis* was published in the volume 29 of Bulletin of the Botanical Survey of India bearing the year 1987. However, the official date of publication is 10th December 1989 as mentioned in the journal volume. Hence, according to International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code), Recommendation 31A.1. (Turland et al. 2018) the effective date of publication of *F. paliformis* is 1989 rather than 1987. Therefore, the name *F. kashyapii* has priority over *F. paliformis* as *F. kashyapii* was previously published on 23rd in the month of June in 1989.

Folioceros kashyapii S.C.Srivast. & A.K.Asthana in *Bryologist* **92**(2): 219 (1989).

Type: INDIA. Nagaland, Chumukedima, Oct. 1979, Kumar & Awasthi 3568/79 (LWU–holotype, not seen).

Folioceros paliformis D.K.Singh in *Bull. Bot. Surv. India* **29**(1–4): 176 (1987) [1989], **syn. nov.** **Type:** INDIA. Arunachal Pradesh, West Kameng district, Tipi, 300 m, 16 Apr.

1982, D.K. Singh 11671 (CAL–holotype).

The authors thank Principal, Banwarilal Bhalotia College and the Principal, Parimal Mitra Smriti Mahavidyalaya for encouragement. The authors are also thankful to Dr. M.Dey, Scientist C, Botanical Survey of India for providing literature. We are grateful to the reviewers for their valuable comments and suggestion.

References

- Barbhuiya H.A. and Singh S.K. 2012. Liverwort and Hornwort of Borail Wild Life Sanctuary, Assam, India. *Arch. Bryol.* **134**: 1–12.
- Singh D.K. 1987 [1989]. A new species of *Folioceros* Bharad. (*Anthocerotaceae*) from Arunachal Pradesh, India. *Bull. Bot. Surv. India* **29**(1–4): 176–180.
- Singh D.K., Singh S.K. and Singh D. 2016. Liverworts and Hornworts of India – An Annotated Checklist. Botanical Survey of India, Bhubaneswar.
- Srivastava S.C. and Asthana A.K. 1989. Two species of *Folioceros* from India, including *F. kashyapii* sp. nov. *Bryologist* **92**(2): 219–224.
- Turland N.J., Wiersma J.H., Barrie F.R., Greuter W., Hawksworth D.L., Herendeen P.S., Knapp S., Kusber W.-H., Li D.-Z., Marhold K., May T.W., McNeill J., Monro A.M., Prado J., Price M.J. and Smith G.F. (Eds.) 2018. International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code) adopted by the Nineteenth International Botanical Congress Shenzhen, China, July 2017. *Regnum Vegetabile* **159**. Glashütten: Koeltz Botanical Books.
- Verma P.K., Rawat K.K., Yadav A. and Das N. 2012. The liverwort and hornwort flora of Hoollongapar Gibbon Sanctuary, Jorhat (Assam) –1. *Arch. Bryol.* **152**: 1–16.

S.Singh Deo^a, S.Majumdar^b : ***Folioceros kashyapii***の
新異名, ***Folioceros paliformis*** (ツノゴケ科)

ツノゴケ科の *Folioceros* D.C.Bharadwaj 属はインドに 12 種あり、そのうち 7 種が固有である。固有種の中には東部ヒマラヤ産の *Folioceros kashyapii* S.C.Srivast. & A.K.Asthana と *F. paliformis* D.K.Singh の 2 種が認められていた。ところが、検討の結果、両種は同一種と考えるのが妥当とわかった。*F. paliformis* の発表年は 1987 年とされたが実際には 1989 年 12 月 10 日であり、*F. kashyapii* の発表は 1989 年 6 月 23 日であるため、そ

れに対して先取権がある。したがって、*F. paliformis* は *F. kashyapii* の異名となる。

(^a インド・Banwarilal Bhalotia College,
Department of Botany,

^b インド・Parimal Mitra Smriti Mahavidyalaya,
Department of Botany)