

## Three New Combinations of Japanese Planktonic Cyanobacteria Species

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**Abstract** Three new combinations of Japanese planktonic cyanobacteria species, *Sphaerospermopsis oumiana*, *Dolichospermum minisporum* and *D. ucrainicum* are proposed.

**Kew words**: *Anabaena*, *Dolichospermum minisporum* comb. nov., *Dolichospermum ucrainicum* comb. et stat. nov., *Sphaerospermopsis oumiana* comb. nov.

Planktonic *Anabaena sensu lato* taxa have been dividing to several new genera and many new combinations have been proposed (e.g. Wacklin *et al.*, 2009; Zapomělová *et al.*, 2009). In this paper, we propose additional three new combinations for Japanese planktonic cyanobacteria species of *Anabaena*.

### 1. *Sphaerospermum oumianum* (M.Watan.) Tuji et Niiyama 2010

Since the genus *Sphaerospermum* Zapomělová *et al.* is illegitimate as it is a later homonym of *Sphaerospermum* Cleve (Zapomělová *et al.*, 2010), the new nomenclatural proposal for *Sphaerospermum oumianum* (M.Watan.) Tuji et Niiyama 2010 becomes necessary. Zapomělová *et al.* (2009) also mentioned the relegation of this species in this genus.

***Sphaerospermopsis oumiana*** (M.Watan.) Tuji et Niiyama, comb. nov.

Basionym: *Anabaena oumiana* M.Watan., Bull. Nat. Sci. Mus., Ser. B. 22: 3, f. 5–7, 14, 15, 19, 21. 1996.

Synonym: *Sphaerospermum oumianum* (M. Watan.) Tuji et Niiyama, Bull. Nat. Sci. Mus., Ser. B. 36: 79, 2010.

### 2. *Anabaena minispora* M.Watan. and *A. spiroides* Kleb. var. *ucrainerica* Schkorb.

Tuji and Niiyama (2010) demonstrated that *Anabaena minispora* and *A. ucrainerica* are included in the cluster A' in 16S rRNA phylogenetic tree, which corresponds to the genus *Dolichospermum*. The morphological characters of both taxa, such as, trichomes isopolar, vegetative cells obligatory with gas vesicles, apical cells similar to vegetative cells, heterocytes intercalary and solitary, akinetes in small distance from heterocytes, also agree with the genus *Dolichospermum* (Watanabe, 1996, 1998; Watanabe *et al.*, 2004; Wacklin *et al.*, 2009). Komárek & Zapomělová (2007) treats *Anabaena ucrainerica* (Schkorb.) M. Watan. as a synonym of *Anabaena mucosa* Komárek-Legn. et Eloranta. However, they are considered to be different species according to the different sizes of vegetative cells and akinetes, and the regularity and diameter of trichome coils (Komarková-Legnerová and Eloranta, 1992; Watanabe, 1996).

***Dolichospermum minisporum*** (M.Watan.) Tuji et Niiyama, comb. nov.

Basionym: *Anabaena minispora* M.Watan., Bull. Nat. Sci. Mus., Ser. B. 24: 5–6, f. 11, 12, 28. 1998.

***Dolichospermum ucrainericum*** (Schkorb.) Tuji et

Niiyama, comb. et stat. nov.

Basionym: *Anabaena spiroides* Kleb. var. *ucrainica* Schkorb., Not. Syst. Inst. Crypt. Hort. Bot. Petropol. 2: 88. 1923.

Synonym: *Anabaena ucrainica* (Schkorb.) M.Watan., Bull. Nat. Sci. Mus., Ser. B. 22: 3. 1996.

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### References

- Komárek, J. and Zapomělová, E. 2007. Planktic morpho-species of the cyanobacterial genus *Anabaena* = subg. *Dolichospermum* — 1. part: coiled types. *Fottea* 7: 1–31.
- Komarková-Legnerová, J. and Eloranta, P. 1992. Planktic blue-green algae (Cyanophyta) from Central Finland (Jyväskylä region) with special reference to the genus *Anabaena*. *Algological Studies* 67: 103–133.
- Tuji, A. and Niiyama, Y. 2010. Phylogenetic study by the morphological and molecular analyses of Japanese planktonic *Anabaena* species. *Bulletin of the National Museum of Nature and Science, Series B* 36: 71–80.
- Wacklin, P., Hoffmann, L. and Komárek, J. 2009. Nomenclatural validation of the genetically revised cyanobacterial genus *Dolichospermum* (Ralfs ex Bornet et Flahault) comb. nova. *Fottea* 9: 59–64.
- Watanabe, M. 1996. Studies on planktonic blue-green algae 6. Bloom-forming species in Lake Biwa (Japan) in the Summer of 1994. *Bulletin of the National Science Museum, Series B* 22: 1–10.
- Watanabe, M. 1998. Studies on planktonic blue-green algae 8. *Anabaena* species with twisted trichome in Japan. *Bulletin of the National Science Museum, Series B* 24: 1–13.
- Watanabe, M., Niiyama, Y. and Tuji, A. 2004. Studies on planktonic blue-green algae 10. Classification of planktonic *Anabaena* with coiled trichomes maintained in the National Science Museum, Tokyo. *Bulletin of the National Science Museum, Series B* 30: 135–149.
- Zapomělová, E., Jezberová, J., Hrouzek, P., Hisem, D., Řeháková, K. and Komárková, J. 2009. Polyphasic characterization of three strains of *Anabaena reniformis* and *Aphanizomenon aphanizomenoides* (Cyanobacteria) and their reclassification to *Sphaerospermum* gen. nov. (incl. *Anabaena kisseleviana*). *Journal of Phycology* 45: 1363–1375.
- Zapomělová, E., Jezberová, J., Hrouzek, P., Hisem, D., Řeháková, K. and Komárková, J. 2010. Nomenclatural note: Polyphasic characterization of three strains of *Anabaena reniformis* and *Aphanizomenon aphanizomenoides* (Cyanobacteria) and their reclassification to *Sphaerospermum* gen. nov. (incl. *Anabaena kisseleviana*). *Journal of Phycology* 46: 415.