Chrysochromulina tobinii **Cattolico, *sp. nov.* (*Chrysochromulinaceae*, *Coccolithophyceae*)**

Rose Ann Cattolico, *Department of Biology, University of Washington, Box 351800, Seattle, WA, USA* (correspondence: racat@uw.edu)

"Chrysochromulina tobinii" Cattolico (in Hovde *et al*. 2018: 315, no fig.) is an invalid binary designation as no figure of the new species was provided as required by ICN Art. 44.2 (Turland *et al.* 2018): "A name of a new species or infraspecific taxon of non-fossil algae published on or after 1 January 1958 is not validly published unless it is accompanied by an illustration or figure showing the distinctive morphological features, or by a reference to a previously and effectively published such illustration or figure." Further information and illustrations were provided by Deodato *et al.* 2019: 2, figs 1 A-F, 2 A-E, 3 A-D, 4 A-E), but no nomenclatural act was proposed in this latter publication and no full and direct reference was given to the diagnosis and holotype by Cattolico (in Hovde *et al.* 2018). These nomenclatural oversights are hereby rectified.

Chrysochromulina tobinii Cattolico, *sp. nov.* (Fig. 1 A-F)

Description: cells are about 5 µm wide, saddle-shaped to globose, and devoid of scales. A lipid body is nestled close to each of two chloroplasts and numerous mitochondria. Plastoglobuli are frequently associated with thylakoidal membranes that encircle an internal pyrenoid. The Golgi apparatus has large, club-shaped cisternae. The haptonema consists of 9 microtubules within the cytoplasm, but 6 or 7 microtubules in the external portion. A rootlet system anchors the two flagella that are sub-apically inserted adjacent to the haptonema. The flagellar complex is anchored in the cytoplasm by a flat ribbon of microtubules and microtubular rootlets associated with each basal body. Fibrous rootlets, several of which are cross-banded, interconnect the two flagellar basal bodies and haptonema.

Type locality: an unspecified freshwater lake, Colorado, USA (39°N, 105°W, approx.), USA, collected by Paul Kugrens.

Holotype: cells from CCMP 291 preserved as a TEM block and deposited as **NY** 03684227.

Isotypes: further cells from CCMP 291 were preserved as a TEM block and deposited as **NY** 03684228; [iconotype] Fig. 1C made of a SEM preparation of Strain CCMP 291.

Etymology: the specific epithet honours my much-loved son, Tobin Cattolico.

Authentic strain: CCMP 291 is available from the Provasoli-Guillard National Center for Marine Algae and Microbiota, East Boothbay, Maine 04544 USA.

Note: All types are of the same clonal culture and thus refer to a single gathering.

I am grateful to Drs Robert A. Andersen, Michael D. Guiry and Wolf-Henning Kusber for their help.

Deodato, C.R., Barlow, S.B., Hovde, B.T. & Cattolico, R.A. (2019). Naked *Chrysochromulina* (Haptophyta) isolates from lake and river ecosystems: An electron microscopic comparison including new observations on the type species of this taxon. *Algal Research* 40(101492): 1-15, 9 figs. Published on-line on 3 April 2019.

Hovde, B.T., Deodato, C.R., Andersen, R.A., Starkenburg, S.R., Barlow, S.B. & Cattolico, R.A. (2018). *Chrysochromulina*: Genomic assessment and taxonomic diagnosis of the type species for an oleaginous algal clade. *Algal Research* 37: 307-319, 7 figs. Published on-line on 21 December 2018.

Turland, N.J., Wiersema, 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. & Smith, G.F., editors (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*, Vol. 159. pp. [i]-xxxviii, 1-253. Glashütten: Koeltz Botanical Books.

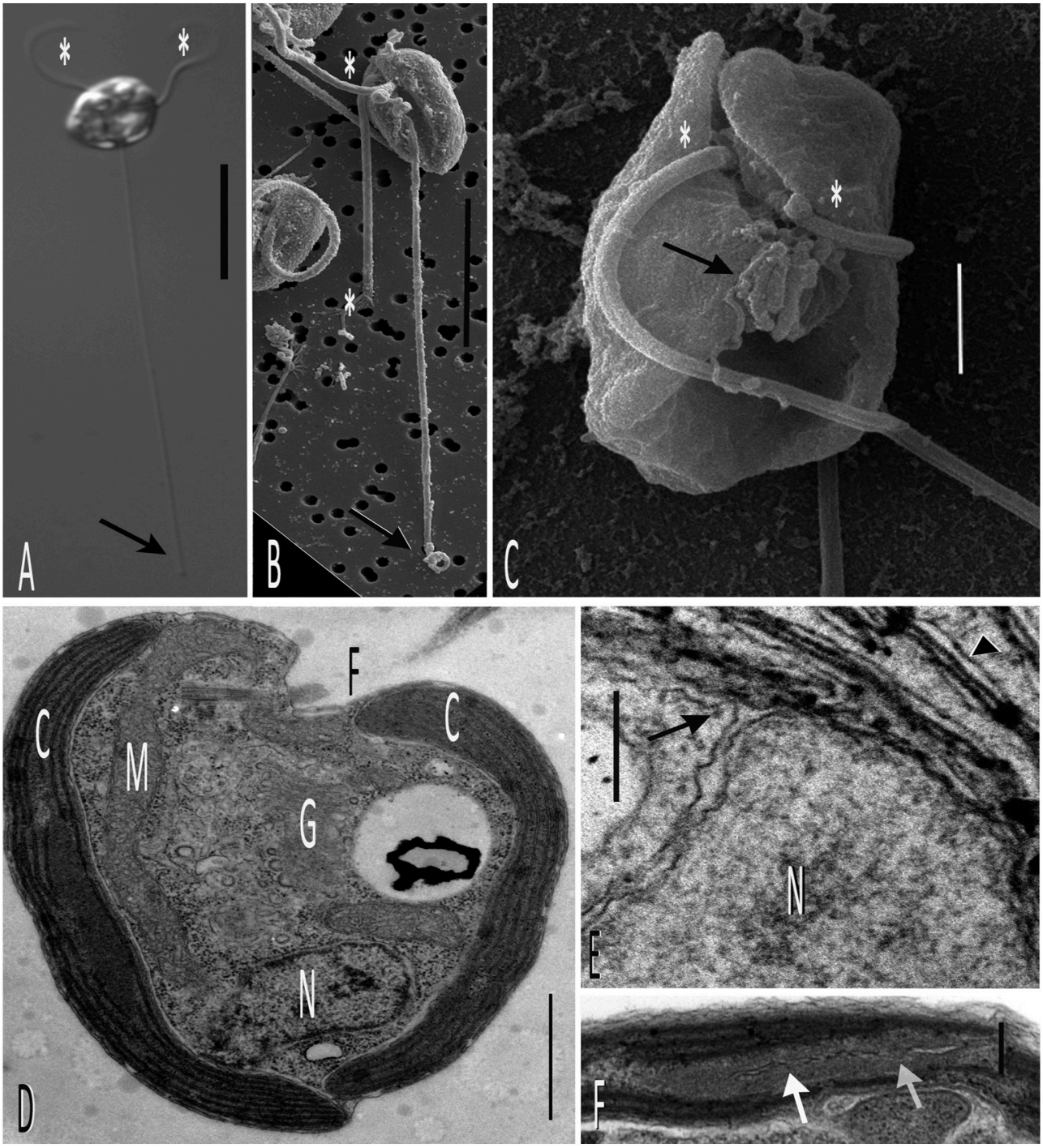

Fig. 1 A-F. Light, SEM and TEM observations of *Chrysochromulina tobinii* Cattolico. A. Globose biflagellate cell (globose when when viewed from the dorsal or ventral view, but the cell is somewhat flattened when viewed laterally) with extended haptonema (arrow) ~7 times the length of the cell and two flagella (asterisks). Nomarski optics; scale bar = 10 μm. B. Saddle-shaped cell, with longitudinal groove, extended haptonema (with coiled tip, arrow, and coils at the insertion point) and two flagella (asterisks). SEM scale bar = 5 μm. C. Saddle-shaped cell, with longitudinal groove containing fully coiled haptonema (arrow), and two flagella (asterisks). SEM scale bar=1 μm. D. Whole cell, with 2 parietal chloroplasts (C) and embedded pyrenoid (P), Golgi apparatus (G), posterior nucleus (N) with chromatin and

nucleolus, and subapical insertion of flagella/haptonema within a groove in the cell (F). TEM scale bar = 1 μm. E. Outer chloroplast and nuclear membranes are continuous (arrow), and thylakoids stacked in layers of three (arrowhead). TEM scale bar = 200 nm. F. Embedded pyrenoid with penetrating tubule (arrows). TEM scale bar = 250 nm. (Reprinted from *Algal Research* with permission. Details of preservation and preparation are as given by Deodato *et al*. 2019).