The Glasgow Naturalist (2014) Volume 26, Part 1, 109-110

The solitary planktonic chrysophyte *Dinobryon faculiferum*: an alga species typically restricted to brackish environments found inhabiting a freshwater loch in northern Scotland

Pauline Lang & Jan Krokowski

Ecology Assessment Unit, Scottish Environment Protection Agency, Angus Smith Building, 6 Parklands Avenue, Eurocentral, Holytown, North Lanarkshire, ML1 4WQ, Scotland, UK

E-mail: pauline.lang@sepa.org.uk

Dinobryon faculiferum (Willén) Willén [= *Dinobryon petiolatum* T. Willén] is a solitary planktonic chrysophyte ('golden') alga (Lang *et al*., 2011) typically restricted to brackish environments (Willén, 1963), and hence not currently recognized in John *et al*. (2011). One of several solitary life forms in the genus, *Dinobryon faculiferum* is distinguished from similar species (e.g., *D. borgei*) by a prominently elongate spine, length usually 40 - 60 µm (Willén, 1963), although this characteristic feature can at times be quite variable (Willén, 1992) (Fig. 1*a*, *b*). Although primarily documented from sea water (e.g., Unrein *et al*., 2010), *D. faculiferum* has also been recorded amongst the phytoplankton of a saline lake in Venezuela (Lewis & Riehl, 1982) but never previously from U.K. freshwater habitats.

In the course of analysing phytoplankton samples collected as part of the Scottish Environment Protection Agency's ongoing assessment of the ecological status of freshwater lochs in Scotland (Lang *et al*., 2013), *Dinobryon faculiferum* was observed sporadically (e.g., 1 – 3 cells per 100 ml sub-sample) in Loch Kinord, between 2009 and 2012, and often co-occurred with a number of other *Dinobryon* species (e.g., *D. bavaricum*; *D. borgei*; *D. crenulatum*; *D. divergens*; *D. sociale*; *D. suecicum*).

Loch Kinord is a freshwater loch in northern Scotland, located approximately 50 km inland from the North Sea coastline. Its water quality characteristics have been described elsewhere (Lang *et al*., 2012). Perhaps the water environment provided by Loch Kinord is slightly brackish (annual mean sodium and chloride concentrations respectively 9.23 mg L^{-1} and 18.05 mg L^{-1} in 2012), which generally fits in with the current distribution pattern of *D. faculiferum* (Willén, 1963; Unrein *et al*., 2010). However, this constitutes the first known record of the species from British freshwaters (D. John, *pers. comm*.).

Although widely-regarded as a marine species, we have shown that *D. faculiferum* is also capable of inhabiting freshwater environments. Whether our Scottish specimens of *D. faculiferum* are genetically similar to coastal populations derived from elsewhere in Europe remains to be determined, but identifies an area that would benefit from further research.

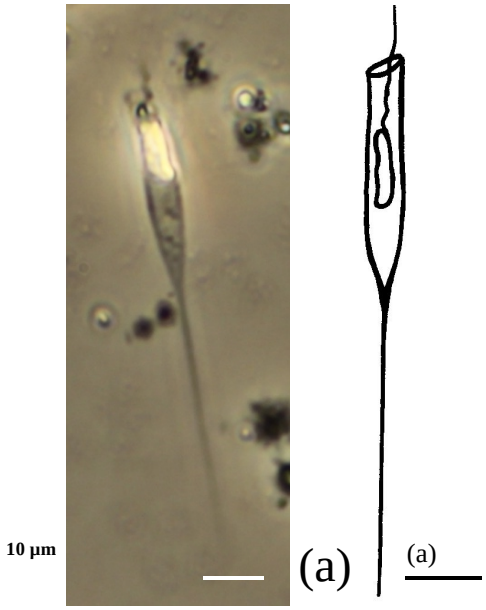

Fig. 1. *Dinobryon faculiferum*. (*a*) Photomicrograph of *D. faculiferum* preserved in Lugol's iodine. Scalebar, 10 µm. (b) Line drawing of *D. faculiferum*.

ACKNOWLEDGEMENTS

Thanks especially to Dr Fernando Unrein (IIB-INTECH, Argentina), Dr Pavel Skaloud (Charles University, Prague) and Professor David John (Natural History Museum London) for formally verifying the identity of *D. faculiferum*. We are grateful to Dr Elizabeth Haworth (Freshwater Biological Association) for confirming that no U.K. records of *D. faculiferum* pre-existed in the Fritsch Collection. We also thank Dr Kevin Murphy (University of Glasgow) for proof-reading an earlier version of the manuscript.

REFERENCES

John, D.M., Whitton, B.A. & Brook, A.J. (2011). *The Freshwater Algal Flora of the British Isles*, 2nd Edition. Cambridge University Press, Cambridge.

Lang, P., Ross, N., Krokowski, J. & Doughty, R. (2011). The elusive planktonic freshwater

chrysophyte *Bitrichia longispina*: a first record for Scottish lochs and comparison with the commoner species, *Bitrichia chodatii*. *The Glasgow Naturalist* 25, 106 – 108.

Lang, P., Krokowski, J. & Ross, N. (2012). The rare green alga *Pediastrum privum* (Chlorophyta, Sphaeropleales) in a Scottish kettle loch: new to British freshwaters. *The Glasgow Naturalist* 25, 139 – 142.

Lang, P., Procházková, L., Krokowski, J., Meis, S., Spears, B.M., Milne, I. & Pottie, J. (2013). The bizarre Eustigmatacean alga, *Pseudostaurastrum limneticum* (Borge) Chodat, in a shallow, nutrient-enriched Scottish loch: new to the British Isles. *The Glasgow Naturalist* 25, (in press).

Lewis, W.M. & Riehl, W. (1982). Phytoplankton composition and morphology in Lake Valencia, Venezeula. *International Review of Hydrobiology* 67, 297 – 322.

Unrein, F., Gasol, J.M. & Massana, R. (2010). *Dinobryon faculiferm* (Chrysophyta) in coastal Mediterranean seawater: presence and grazing impact on bacteria. *Journal of Plankton Research* 32, 559 – 564.

Willén, T. (1963). Notes on Swedish plankton algae. *Nova Hedwigia* 5, 39 – 56.

Willén, T. (1992). *Dinobryon faculiferum*, a new name for *Dinobryon petiolatum* (Chrysophyceae: Dinobryaceae). *Taxon* 41, 62 – 63.