

## A compendium of cell and natural unit biovolumes for >1200 freshwater phytoplankton species

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**Abstract.** Cell size determination is a critical part of sampling phytoplankton communities, as size is both a fundamental trait determining species' ecological niches and a quantity necessary for generating unbiased estimates of community composition. The sizes of algal cells span orders of magnitude, driving variation in growth parameters, sinking rates, herbivore defense, and biogeochemical roles. Size variation occurs at both intra- and interspecific levels. Many central questions in community and ecosystem ecology require estimating and comparing the relative abundances of species. Cell counts provide insufficient estimates, due to interspecific variation in cell size, as they over-estimate the importance of abundant, small species. While cell size (or biovolume) estimation has become standard practice in limnology, many older data sets lack this information, limiting their interpretation and utility. To address these challenges, and advance the study of freshwater phytoplankton communities, we have compiled a database of >260 000 algal biovolume estimates, spanning ~400 genera and ~1200 species. This represents the most extensive, standardized, and taxonomically diverse data set of its kind, drawing on both publicly and privately held sources. Estimates of the sizes of colonies or filaments are included, where applicable. With these data researchers will be able to account for intra- and interspecific variation in cell size, enabling new and improved analyses of classic data sets.

**Key words:** *biovolume; cell size; database; estuaries; freshwater; interspecific variation; intraspecific variation; natural unit; phytoplankton; trait estimation.*

The complete data sets corresponding to abstracts published in the Data Papers section of the journal are published electronically in *Ecological Archives* at <http://esapubs.org/archive> (the accession number for each Data Paper is given directly beneath the title).

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