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有田重彦・大塚泰介：円弧構成モデルによる *Navicula* 殻外形の記述

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#### Abstract

A new model describing the valve outline of pennate diatom, arc-constitutive model is here advocated. We measured the outline of 30 valves belonging to ten *Navicula* species using an arc-gauge, and found out that the outline can be resolved into arcs. Dividing the valve by apical- and transapical axis into four quadrant, the outline in each quadrant can be resolved in maximum four arcs ; main arc from the transapical axis, terminal arc from the apical axis, and two or less supplemental arcs smoothly connecting main- and polar axis. The valves were classified into six types based on the number and convexity/concavity of the supplemental arcs. After averaging the diameters and lengths of each corresponding arc in four quadrants, the valve outline was drawn as a combination of the arcs by using computer aided design (CAD). The drawn outlines were almost agreed with that of the original micrographs. We therefore conclude that the arc-constitutive model well explains valve outline of some pennate diatoms, at least of ten *Navicula* species evaluated in the present study.

Key index words : arc-constitutive model, computer aided design (CAD), main arc, *Navicula*, supplemental arc, terminal arc, valve outline