

**Supplementary Table S1.** Sampling sites for *Fragilaria* and *Ulnaria* strains, isolated from Lake Baikal with associated physical and chemical characteristics.

**Supplementary Table S2.** Characteristics of nucleotide sequences of *rbcL* and 18S rRNA genes.

**Supplementary Table S3.** Morphometric measurements.

**Supplementary Table S4.** Reproductive compatibility of strains from different populations of *Ulnaria acus*.

**Supplementary Table S5.** Reproductive compatibility of strains from different populations of *Ulnaria danica*.

**Supplementary Table S6.** Ranges of morphometric measurements.

**Supplementary Table S7.** Comparison of the morphological characters for identification among some species of *Fragilaria* and *Ulnaria*.

**Supplementary Table S8.** Genetic distances between different taxonomic groups of diatoms. The distance in nucleotides was calculated as the expected number of banners of the full blast length in the studied data sets based on the selected model of DNA evolution.

**Supplementary Alignment\_ *rbcL*.** Multiple sequence alignment of *rbcL* gene fragments.

**Supplementary Alignment\_18S.** Multiple sequence alignment of 18S rRNA gene fragments.

**Supplementary Fig. S1.** Ranges of morphometric parameters for all measured strains and diagnoses of related taxa. Rows on a scatter plot correspond to strains and points correspond to individual cells Fra group (red), Uln1 group (green), Uln2 group (blue) Parameter ranges as given in diagnoses of various taxa proposed in this group (see Supplementary Table S3) are shown with colored bars below scatter plots. Strains which have their *rbcL* sequenced are colored according to which clade they're in: Fra group (red), Uln1 group (green), Uln2a group (blue), Uln2b group (fuchsia); the rest are shown in gray. Data on the diagnoses of various taxa were taken from the literature (see Supplementary Table S7).

**Supplementary Fig. S2.** Valve structure of four monoclonal hybrid strains. LM. A – 0.0319-A, hybrid of strains from Lake Baikal (AxBK 280) and Lake Matano, Indonesia (5.0227-F); B – 0.0228YH, hybrid of strains from Lake Baikal (AxBK 280) and Lake Khuvsgul, Mongolia (5.0903-A); C – 0.0228-YD, hybrid of strains from Lake Baikal (AxBK 280) and Lake Khubsugul, Mongolia (5.0903-A); D – 0.0319-YB, hybrid of strains from Lake Baikal (AxBK 280) and Lake Matano, Indonesia (5.0227-F). Scale bar: 10  $\mu$ m.

**Supplementary Fig. S3.** Hybrid 0.0228-YH (SEM). Two complete valves (A – inside view; B –outside view). C, D – apex detail of Figure S3A; E – central area detail of Figure S3A;

F, G – apex detail of Figure S3B; H – central area detail of Figure S3B. Scale bar: A, B – 50  $\mu\text{m}$ ; C-H – 5  $\mu\text{m}$ .

**Supplementary Fig. S4.** Hybrid 0.0228-YD (SEM). Two complete valves (A – inside view; B – outside view). C, D – apex detail of Figure S4A; E – central area detail of Figure S4A; F, G – apex detail of Figure S4B; H – central area detail of Figure S4B. Scale bar: A, B – 50  $\mu\text{m}$ ; C-H – 5  $\mu\text{m}$ .

**Supplementary Fig. S5.** Hybrid 0.0319-A (SEM). Two complete valves (A – inside view; B – outside view). C, D – apex detail of Figure S5A; E – central area detail of Figure S5A; F, G – apex detail of Figure S5B; H – central area detail of Figure S5B. Scale bar: A, B – 50  $\mu\text{m}$ ; C-H – 5  $\mu\text{m}$ .

**Supplementary Fig. S6.** Hybrid 0.0319-YB (SEM). Two complete valves (A – inside view; B – outside view). C, D – apex detail of Figure S6A; E – central area detail of Figure S6A; F, G – apex detail of Figure S6B; H – central area detail of Figure S6B. Scale bar: A, B – 50  $\mu\text{m}$ ; C-H – 5  $\mu\text{m}$ .

**Supplementary Fig. S7.** Variety of apical spine morphology of Fra group valves. Scale bar: 1  $\mu\text{m}$ .