distinction between the two taxa can be made due to the valve width, with *P. rabenhorstii* var. *rabenhorstii* being consistently narrower (16.0–18.0 μm). Other infraspecific taxa within *P. rabenhorstii* (*P. rabenhorstii* var. *franconica* Krammer [7], *P. rabenhorstii* var. *cuneata* Krammer & Lange-Bertalot in Krammer [7], *P. rabenhorstii* var. *elegans* (Hustedt) Krammer [7]) have considerable smaller valve size. Furthermore, *P. rabenhorstii* var. *cuneata* and *P. rabenhorstii* var. *elegans* have cuneate and narrower rounded valve ends. *Pinnularia subrabenhorstii* Krammer [7] has smaller valve size and weakly undulated valve margins, thus making the distinction from *P. micevskii* straightforward.

A large-celled *Pinnularia* species, which belongs to the section Distantes, that is similar in valve size to *P. micevskii*, is *P. obaesa* Van de Vijver [12], described from the Antarctic King George Island. Nevertheless, the valves of *P. obaesa* have a rectangular outline with very broadly rounded apices which are rarely subrostrate. In comparison, the valve outline in *P. micevskii* is not rectangular and the valve ends are consistently subrostrate with the valve margins strongly tapering towards the apices. Another taxon, *P. australorabenhorstii* Van de Vijver [12], was also added to the section Distantes from the Antarctic King George Island (Van de Vijver [12]). However, *P. australorabenhorstii* can be distinguished from *P. micevskii* by the valve outline (linear-elliptical to lanceolate-elliptical with convex valve margins in *P. australorabenhorstii*), valve size (length = 50.0–65.0 μm, width = 16.0–17.5 μm in *P. australorabenhorstii*) and stria density (6–7(8)/10 μm in *P. australorabenhorstii*).

Pinnularia micevskii does resemble *P. kerguelensis* Heiden (in Heiden & Kolbe [23]) with regard to the valve outline and size, as well as the shape of the valve apices. The proposed lectotype for *P. kerguelensis* by Simonsen [24] is only a fragment of a valve that does not really allow proper identification. A decent photographic documentation for *P. kerguelensis* is provided by Van de Vijver et al. [11]. A distinction from *P. micevskii* can be observed in the linear-lanceolate to linear-elliptic valves, with slightly convex valve margins in *P. kerguelensis*. Furthermore, irregular silica ornamentation is present in the axial and central areas of *P. micevskii*, a feature absent in *P. kerguelensis*.

We consider the combination of characters (valve outline, shape of the valve apices, valve size, irregular silica ornamentation) in *P. micevskii* as sufficient for a straightforward distinction from other taxa of the section Distantes in *Pinnularia*.

Pinnularia lata (Brébisson) Rabenhorst var. *lata* [16] (Figs 3: 1–3)

Basionym: *Frustulia lata* Brébisson [25].

Valves broadly linear-elliptic, with convex margins and broadly rounded, unprotracted apices. Valve length 128.5–148.0 μm, and valve width 36.0–39.5 μm (n = 15). Axial area broad, 1/4 to 1/5 of valve width, linear to lanceolate, gradually expanding towards central area. Central area asymmetrical, large lanceolate, 1/2 to 1/3 of valve width. Central area well defined, bordered on each side by 4–5 shortened striae. Raphe strongly lateral, outer raphe fissures weakly curved to linear, and inner fissures weakly curved. Proximal raphe endings strongly deflected towards one valve side, terminated with large and distinct, comma shaped central pores. Distal raphe fissures sickle shaped, positioned in prominent terminal areas, clearly discernible in LM. Transapical striae broad, widely separated, radiate in mid-valve becoming parallel near valve apices, 2–3 in 10 μm. Interstriae prominent, of equal or greater width than striae.

Distribution: *Pinnularia lata* var. *lata* was observed only from the epipelon of glacial Lake Crno, on Mt. Šar Planina. Lake Crno is one of the largest glacial lakes in Macedonia, with surface area of 33520 m^2 and mean depth of 5 m. Lake Crno is located at an altitude of 2165 m a.s.l. Krammer [7] notes *P. lata* var. *lata* as widespread in the northern alpine regions of Europe, in oligotrophic waters rich in oxygen and also in aerial habitats.

Observations: The morphology of *P. lata* var. *lata*, observed herein from Lake Crno, resembles the lectotype specimens depicted in Krammer [7]. This species might be confused with *P. micevskii*, but a distinction can be made due to the consistently convex valve margins in *P. lata* var. *lata* (opposed to the consistently parallel margins in *P. micevskii*) and the absence of the irregular silica ornamentation in the axial and central areas of *P. lata* var. *lata* (feature clearly observable in *P. micevskii*). Furthermore, *P. micevskii* has much narrower valves (W = 22.0–26.0 μm) compared to *P. lata* var. *lata*.

Pinnularia lata var. *minor* (Grunow) Cleve [3] (Figs 4: 1–10)

Basionym: *Navicula lata* var. *minor* Grunow [26].

Valves linear-elliptic, with slightly convex margins and unprotracted, narrowly rounded apices. Valve length 36.0–47.0 μm, and valve width 12.5–14.0 μm (n = 35). Axial area narrow to moderately wide, 1/6 to 1/8 of valve width, linear, expanded

near central area. Central area large rhombic-lanceolate, rarely rectangular, 1/2 of valve width or wider. Central area well defined, bordered on each side by 2–4 shortened striae. Raphe weakly lateral, outer raphe fissures linear to weakly curved, and inner fissures linear. Proximal raphe endings deflected towards one valve side, terminated with large and distinct, tear-drop shaped central pores. Distal raphe fissures sickle-shaped, positioned in prominent terminal areas, clearly discernible in LM. Distal raphe fissures occasionally question mark shaped. Transapical striae broad, closely spaced, radiate in mid-valve becoming parallel to weakly convergent near valve apices, 5–7 in 10 μm. Interstriae of narrower width than striae.

Distribution: *Pinnularia lata* var. *minor* was found only on Mt. Šar Planina, western Macedonia. It was observed within the epipelon of the spring of River Pena, at an altitude of ca. 2500 m a.s.l. At lower altitude it was observed in a mixed sample of organic sediment and green algal filaments from a small lake near Čardak, at 2320 m a.s.l.

Observations: The line drawing for *N. lata* var. *minor* in Grunow [26] is 45.0 μm long and 13.0 μm wide, with 4–5 striae in 10 μm. No distinctive features were observed between the specimens from Macedonia and the protologue drawing for *P. lata* var. *minor*. In addition, one specimen of *P. lata* var. *minor* is depicted in Reichardt [27], from Grazer Bergland in Austria, being somewhat larger than the specimens observed herein (length = 59.0 μm, width = 15.0 μm, striae = 5 in 10 μm).

***Pinnularia subalpina* sp. nov.** (Figs 5: 1–7)

Description: Valves linear-elliptic in large and medium-sized specimens (with parallel to weakly convex margins) to elliptic in smaller specimens (with strongly convex margins). Valve apices broadly rounded, unprotracted, subrostrate only in largest specimens. Valve length 52.0–84.0 μm, and valve width 20.0–21.5 μm (n = 20). Axial area broad, rarely narrow, 1/5 to 1/6 of valve width, linear, expanded near central area. Axial area lanceolate in smallest specimens only. Central area asymmetrical, large rhombic-lanceolate, 1/2 of valve width. Central area mostly well defined, bordered on each side by 2–4 shortened striae. Raphe strongly lateral, outer raphe fissures weakly curved to linear, and inner fissures linear. Proximal raphe endings deflected towards one valve side, terminated with large and distinct, tear-drop shaped central pores. Distal raphe fissures sickle-shaped, positioned in prominent terminal areas, clearly discernible in LM. Transapical striae broad, closely spaced, radiate in mid-valve and parallel near valve apices, 3–5 in 10 μm. Interstriae of equal or narrower width than striae. Only in the smallest specimens the interstriae are more prominent.

Type (here designated): Mt. Šar Planina, Lake Crno, sediment, depth 0.5 m, collection date: 7 August 2003, leg. Z. Levkov (Accession no. MKNDC 003047). Holotype! Illustrated in Figure 5: 3 (circled specimen on slide MKNDC 003047/A). Slide BRM Zu9/49 (isotype!).

Etymology: The specific epithet ("*subalpina*") refers to its resemblance with *P. alpina*, but nevertheless smaller valve size.

Distribution: *Pinnularia subalpina* was observed from two lakes on Mt. Šar Planina, Lake Crno located at an altitude of 2165 m a.s.l. and a small lake near Čardak, located at an altitude of ca. 2300 m a.s.l. In Lake Crno this species was observed within the epipelon of the lake's sediment at depth of about 0.5 m, whereas in the small lake near Čardak it was observed from a mixed sample of organic sediment and green algal filaments.

Observations: *Pinnularia subalpina* is most similar to *P. alpina* W. Smith [28] in respect to the valve outline, the shape of the valve apices and the central pores. Nevertheless, the valve size of *P. alpina* (length = 100.0–220.0 μm, width = 38.0–48.0 μm, given in Krammer [7]) is significantly larger than in *P. subalpina*. Furthermore, the axial area in *P. alpina* is distinctly lanceolate in comparison to the mostly linear axial area in *P. subalpina*.

With respect to the valve outline *P. subalpina* also resembles *P. lata* var. *curta* (Grunow) Cleve [3] (=*Navicula lata* var. *curta* Grunow [29]). The drawing of *N. lata* var. *curta* by Grunow [29] is wider (width = 29.5 μm) than any of the observed specimens of *P. subalpina*. Hence, we find the valve width as a sufficient feature to tell apart *P. subalpina* from *P. lata* var. *curta*. A similarity between *P. lata* var. *curta* f. *elliptica* Mayer [4] and *P. subalpina* can be observed with respect to the valve size and the shape of the central area. *Pinnularia lata* var. *curta* f. *elliptica* can be distinguished from *P. subalpina* due to the more rhombic valve outline and narrower rounded valve apices.

Pinnularia subalpina is similar to *P. lata* in respect to the valve outline, the shape of the central area and the shape of the central pores. Nevertheless, valves of *P. lata* are significantly larger (length = 128–148 μm, width = 36.0–39.5 μm, observed herein). Values for the lowest valve length (50.0 μm) and the lowest valve width (14.0

µm) of *P. lata* given in Krammer [7] might not be accurate, since all of his depicted specimens are longer that 88.0 µm and wider than 28.0 µm. *Pinnularia subalpina* can be distinguished from *P. lata* due to the valve size.

Pinnularia subalpina is comparable to *P. rabenhorstii* var. *rabenhorstii* (Grunow) Krammer [7] (=*Navicula rabenhorstii* Grunow [30]) with regard to the valve length, the shape of the central area and the stria density. *Pinnularia subalpina* can be distinguished from *P. rabenhorstii* var. *rabenhorstii* due to the narrower valve width (16.0–18.0 µm), consistently linear valves and broadly subrostrate valve apices in *P. rabenhorstii* var. *rabenhorstii*.

Pinnularia alpiniformis Van de Vijver & Beyens in Van de Vijver et al. [11] is characterized by a very broad axial area with lanceolate shape and a large, asymmetrical central area which is not clearly separated from the axial area. It can be easily differentiated from *P. subalpina* by the shape of the axial and central areas and the valve width.

***Pinnularia rabenhorstii* (Grunow) Krammer var. *rabenhorstii* [7]** (Figs 6: 1–10)

Basionym: *Navicula rabenhorstii* Grunow [30].

Valves linear-lanceolate, with weakly convex margins and unprotracted, broadly truncate apices. Valve length 44.0–72.5 µm, and valve width 13.0–17.0 µm (n = 30). Axial area broad, 1/5 to 1/6 of valve width, linear, expanded near central area. Central area asymmetrical, large rhombic-lanceolate to lanceolate, rarely rounded, 1/2 of valve width. Central area well defined, bordered on each side by 2–3 shortened striae. Raphe weakly lateral, strongly lateral only in longest specimens, outer raphe fissures linear, rarely weakly curved, and inner fissures linear. Proximal raphe endings deflected towards one valve side, terminated with large and distinct, tear-drop shaped central pores. Distal raphe fissures sickle-shaped, positioned in prominent terminal areas, clearly discernible in LM. Transapical striae broad, mostly closely spaced, radiate in mid-valve becoming parallel to weakly convergent near valve apices, 4–5 in 10 µm. Interstriae of equal or narrower width than striae, rarely wider.

Distribution: *Pinnularia rabenhorstii* var. *rabenhorstii* was observed on several localities on Mt. Šar Planina. It was found within the epipelon of the sediment from Lake Crno (2165 m a.s.l.), at 0.5 m of depth, and as an epiphyte on the macrophyte vegetation from a stream above Lake Crno, at an altitude of ca. 2200 m a.s.l. It was also observed in a mixed sample of organic sediment and green algal filaments from a small lake near Čardak, also at altitude of ca. 2300 m a.s.l. *Pinnularia rabenhorstii* var. *rabenhorstii* was also found in the epipelon of the organic sediment from Karanikoličko Lake, at 0.2 m of depth. Karanikoličko Lake is one of the largest lakes on Mt. Šar Planina, with surface area of 26240 m^2, 5.6 m of water depth and is located at 2185 m a.s.l. In addition, *P. rabenhorstii* var. *rabenhorstii* was observed as an epiphyte on mosses from the temporary lake Bolnici I, near glacial Lake Golemo on Mountain of Pelister, at an altitude of 2225 m a.s.l.

Observations: *Pinnularia rabenhorstii* var. *rabenhorstii* was lectotypified by Krammer [7]. The specimens of *P. rabenhorstii* var. *rabenhorstii* observed in Macedonia show similar morphological features as the lectotype specimen from Thuringia, Germany (Figure 5: 4 in Krammer [7]). Small differences can be noticed in the shape of the valve apices. According to Krammer [7] the valve apices in *P. rabenhorstii* var. *rabenhorstii* are broadly subrostrate, while the population from Macedonia is characterized by broadly truncate apices. However, all other features (e.g. valve size and outline, stria density, shape and width of the axial and central area) are comparable to the type. *Pinnularia australoborealis* Van de Vijver & Zidarova [13] has strictly lanceolate valves with convex margins and subrostrate apices, opposite to the almost linear valves, with unprotracted and broadly truncate apices in *P. rabenhorstii* var. *rabenhorstii*. Additionally, the valves of *P. australoborealis* are much narrower than in *P. rabenhorstii* var. *rabenhorstii*.

***Pinnularia rabenhorstii* var. *franconica* Krammer [7]** (Figs 7: 1–12)

Valves linear, with consistently parallel margins. Valve apices protracted, broadly rounded, subrostrate. Valve length 43.5–61.0 µm, and valve width 11.0–14.0 µm (n = 30). Axial area narrow, 1/6 to 1/8 of valve width, linear, expanded near central area. Axial area rarely broad, 1/4 of valve width and lanceolate. Central area large rhombic-lanceolate to rounded, rarely rectangular, 1/2 of valve width or wider. Central area mostly well defined, bordered on each side by 2–4 shortened striae. Raphe weakly lateral, outer raphe fissures linear to weakly curved, and inner fissures linear. Proximal raphe endings weakly deflected towards one valve side, terminated with large and distinct, tear-drop shaped central pores. Distal raphe fissures sickle-shaped, positioned in prominent terminal areas, clearly discernible in LM. Distal raphe