

(2450–2451) Proposals to conserve the names *Selenopemphix* against *Margosphaera*, and *S. nephroides* against *M. velata* (Dinophyceae)

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- (2450) *Selenopemphix* P.N. Benedek in *Palaeontographica*, Abt. B, Paläophytol. 137: 47. Feb 1972, nom. cons. prop.
Typus: *S. nephroides* P.N. Benedek.
- (=) *Margosphaera* E. Nagy in *Acta Bot. Acad. Sci. Hung.* 11: 208. 31 Mar 1965, nom. rej. prop.
Typus: *M. velata* E. Nagy.
- (2451) *Selenopemphix nephroides* P.N. Benedek in *Palaeontographica*, Abt. B, Paläophytol. 137: 47–48, t. 11, fig. 13; t. 16, fig. 1–4. Feb 1972, nom. cons. prop.
Typus: [Germany], Niederrhein, Tönisberg, Präparat 751/100, Geol. Inst. Univ. Köln.
- (=) *Margosphaera velata* E. Nagy in *Acta Bot. Acad. Sci. Hung.* 11: 208–209, fig. 7, t. V, fig. 23–25. 31 Mar 1965, nom. rej. prop.
Typus: [Hungary], Zengővárkony. Mecsek Mountains, borehole no. 59, sample no. 13, plate 2, cross-table nos. 39.9–115.4, Pollen Lab., Hungarian Geol. Inst.

The name *Selenopemphix* P.N. Benedek was proposed in 1972, typified by an Oligocene dinoflagellate cyst: since then it has been recorded and described extensively from Cenozoic deposits, including modern ones. Its species are used as stratigraphic markers, as environmental indicators, and in paleoenvironmental reconstructions. The publication of the names *Selenopemphix* and *S. nephroides* was preceded by publication of the names *Margosphaera* and *M. velata* by Nagy (l.c.) in 1965, based on types from the Miocene of Hungary.

Nagy considered *Margosphaera* to represent “leiosphaerids” (smooth-walled acritarchs) rather than dinoflagellates. As a result, *Margosphaera* and *M. velata* were subsequently almost completely overlooked by dinoflagellate researchers. In retrospect, the morphology of *M. velata* is practically identical to that of *S. nephroides*, and unless the names *Selenopemphix* and *S. nephroides* are conserved against *Margosphaera* and *M. velata* respectively, major changes involving the nomenclature of many taxa would be necessary and would have a seriously destabilizing effect on dinoflagellate nomenclature. The impact would indeed extend beyond dinoflagellate systematics to the disciplines of biostratigraphy and palaeoecology.

Selenopemphix was established for distinctive Cenozoic fossil dinoflagellate cysts of uncertain family affinity that were initially interpreted as being dorso-ventrally flattened. Lentin & Williams (Monogr. Foss. Peridinioid Dinoflag. Cysts: 91–92. 1976) considered that *Selenopemphix* was apically-antapically compressed and recognized its peridinioid affinity, including the intercalary position of its single-plate archeopyle.

Apical-antapical (polar) compression is an unusual and very distinctive feature among dinoflagellate cysts. Although such compression as a meaningful generic criterion was questioned by Bujak (in Special Pap. Palaeontol. 24: 82. 1980), its value as such was restated in an emendation by Head (in J. Paleontol. Mem. 31: 1–62. 1993), and this morphologic feature has generally been used as a distinguishing feature for *Selenopemphix* by subsequent researchers. Head (l.c.) listed *Margosphaera* E. Nagy (l.c.) as a possible senior taxonomic

synonym of *Selenopemphix*. He noted that *Margosphaera* was originally described as an acritarch genus and had been accepted as such by Fensome & al. (in *Contr. Ser. Amer. Assoc. Stratigr. Palynologists* 25: 311. 1990) in their index of acritarchs and prasinophytes, although Muir & Sarjeant (in *Jardiné, Les Acritarches*: 59–117. 1971) included *Margosphaera* in a list of tasmanitid taxa. However, *Margosphaera* has many features of a dinoflagellate cyst akin to *Selenopemphix*. As Head (l.c.: 32) pointed out, “In particular, the ambital folds of the holotype [of *M. velata*] seem to resemble paracingular crests of a protoperidinioid cyst and an interruption of these folds could be construed as a parasulcus. The dark color of this palynomorph is also suggestive of wall pigmentation typical of protoperidinioid cysts.” Influenced in part by the fact that “*Selenopemphix* is a large and important Cenozoic dinoflagellate genus comprising at least 10 ... species ... with many more morphotypes in open nomenclature”, Head was reluctant to affirm *Margosphaera* as the senior synonym of *Selenopemphix*.

Since Head recognized the similarity of *Selenopemphix* and *Margosphaera* in 1993, the potential synonymy of the two genera has, to our knowledge, been ignored by subsequent researchers. In our view, although re-examination of the type of *Margosphaera* would be helpful, there seems little doubt from the illustrations of *Margosphaera velata* (Nagy, l.c.: fig. 7; pl. 5, fig. 23–25) that *Margosphaera* and *Selenopemphix* are synonymous, and without conservation the former name would be considered senior. We thus make the case for conservation of *Selenopemphix*.

As discussed above, *Margosphaera* E. Nagy was long considered an obscure and poorly understood palynomorph genus. In contrast, *Selenopemphix* is an important Cenozoic protoperidiniacean dinoflagellate cyst genus. Benedek (l.c.) originally included two species in the genus, smooth-walled *S. nephroides*, which he designated as the type, and spinulose *S. selenoides*. Fensome & Williams (in *Contr. Ser. Amer. Assoc. Stratigr. Palynologists* 42: 593–595. 2004) listed 21 species of *Selenopemphix*, of which 20 were considered correct; 6 new species of *Selenopemphix* have been introduced since 2004 (unpub. compilation by RF and GW). Many of these species have been used in numerous stratigraphic and paleoenvironmental studies and are known to scientists outside palynology. For example, the lowest occurrence of *Selenopemphix armageddonensis* was used as a key marker near the top of the Miocene Tortonian Stage in GTS 2012

(Gradstein & al., *Geol. Time Scale* 2012: 948. 2012). Also, the lowest stratigraphic occurrence of *Selenopemphix antarctica* in Lower Oligocene sedimentary records is used to infer the onset of a sea-ice plankton ecosystem around the Antarctic continental margin (Houben & al. in *Science* 340: 341–344. 2013). A Google search yielded many entries for *Selenopemphix*—we stopped counting at 50. A Google search of *Margosphaera* yielded just 11 entries. A Web of Science (Thomson Reuters) Core Collection search, which checks only the title and abstract, yielded 43 entries for *Selenopemphix* and no records for *Margosphaera*. If this conservation proposal were not accepted, at least 26 new combinations would be required and there would be a considerable impact on the names in biostratigraphic and paleoenvironmental research.

We also propose that the type of *Selenopemphix*, *S. nephroides* P.N. Benedek (l.c.), be conserved against *Margosphaera velata* E. Nagy (l.c.), as the two appear to be indistinguishable morphologically. The name *S. nephroides* is much used in studies of Cenozoic biostratigraphy and paleoenvironments: for example in Bujak & al. (l.c.) its range base was indicated as a base-Bartonian (Eocene) marker. Zonneveld & al. (in *Rev. Palaeobot. Palynol.* 191: 143. 2013) mapped the distribution of *S. nephroides* in modern oceans and demonstrated its importance as an environmental indicator and its value in paleoenvironmental reconstructions. A Google search elicited only 7 entries for *M. velata*, whereas one for *S. nephroides* generated over 100. As for the genus, the only argument against this proposal is that *Margosphaera velata* E. Nagy has priority.

Acceptance of these proposals would maintain the status quo, keeping fossil dinoflagellate nomenclature stable. Non-acceptance of these proposals would have significant impact on fossil dinoflagellate nomenclature, an impact that would also be felt beyond the boundaries of systematic paleontology.

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