

MICRHYSTRIDIUM

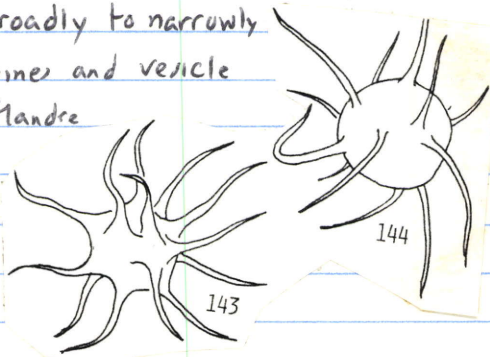
Deflandre 1937

emend Sarjeant 1967

MICRHYSTRIDIUM Deflandre 1937, emended by Sarjeant 1967, p. 204: "Acritarchs with spherical to oval shells not divided into fields or plates, bearing processes with closed tips, most often simple, rarely branching or ramifying, without distal connections of any kind. The processes are generally less than 20 microns. Release of shell contents by formation of a crescentic to horseshoe-shaped opening or by loss of an irregularly shaped portion of one surface; exceptionally up to 1/3 of the shell is lost. Pylomes or archaeopyles are not developed". (Hystrichosphaera (= Micrhystridium) inconspicuum: Deflandre 1935, p. 233, Pl. 9:11-12).- text-fig.3:143,144.

Diagnosis (in Staplin et al 1965): Vesicles sub-spherical to sub-polygonal, of small to moderate size; several to numerous spines which are hollow, closed at the tips, cavity opening into and continuous with the vesicle interior; spines broadly to narrowly conical, no differentiation in wall structure between spines and vesicle

Remarks: The upper size limit of 20 μ originally implied by Deflandre was abandoned by Staplin. Examination of the type species of *Baltisphaeridium*, *B. longispinum* shows that this form differs in the structure of the vesicle wall.



MICRHYSRIDIDIUM

Deflandre 1937 emend

Sargeant & Stancliffe 1994 p. 12

Genus *Micrhysridium* Deflandre 1937, p. 31-32; emend. nov.

Micrhysridium Deflandre 1937, p. 31-32; Deflandre 1947a, p. 6; Deflandre 1947b, p. 18-19; Valensi 1953, p. 39; Downie 1958, p. 339-340; emend. Staplin 1961, p. 408; Eisenack 1962a, p. 96; emend. Downie and Sargeant 1963, p. 92; Downie, Evitt and Sargeant 1963, p. 7; emend. Staplin, Jansonius and Pocock 1965, p. 180; Norris and Sargeant 1965, p. 40-41; Deflandre and Deflandre 1965a, p. 1-5; Deflandre and Deflandre 1965b, p. 85-89; Stockmans and Willièrè 1966, p. 468; emend. Sargeant 1967, p. 201-204; Schön 1967, p. 528; Volková 1968, p. 20; Cramer 1970, p. 91-107; Davey 1970, p. 361-362; emend. Lister 1970, p. 77-78; Loeblich Jr. 1970a, p. 727-728; Singh 1971, p. 398; Cramer and Díez 1972, p. 167; Chibrikova 1972, p. 186; Wicander 1974, p. 27; Morbey 1975, p. 47; Anderson 1977, p. 24; Playford 1977, p. 27; Jiabo 1978, p. 119; Cramer and Díez 1979, p. 90; Eisenack, Cramer and Díez 1979a, p. 381-383; Colbath 1979, p. 18; Doming 1981, p. 194; Cookson and Eisenack 1982, p. 56-57; Courtinat 1983, p. 17; Turner 1984, p. 118; Courtinat 1989, p. 220; Le Hérisse 1989, p. 157; Stancliffe 1990, p. 176-177; Fensome et al. 1990, p. 315.

Junior synonyms.

A: Designated by Eisenack, Cramer and Díez 1979a, p. VII-VIII and concurred with by the present authors:

Ecmelostoiba Wicander 1974, p. 20
Ecthymabrachion Wicander 1974, p. 21
Ephelopalla Wicander 1974, p. 22
Exilisphaeridium Wicander 1974, p. 24
Guttatisphaeridium Wicander 1974, p. 27
Pustulisphaeridium Wicander 1974, p. 31
Uncinisphaera Wicander 1974, p. 34

B: Designated in the present paper:

Brachiprojectidium Habib and Knapp 1982, p. 346
Lecithodinium Habib and Knapp 1982, p. 346-347
Nannobarbophora Habib and Knapp 1982, p. 347-348
Solisphaeridium Staplin, Jansonius and Pocock 1965, p. 183-184

Subgenera.

Type subgenus:

Micrhysridium (*Micrhysridium*) Deflandre 1937, p. 31-32; emend. Sargeant and Stancliffe, herein; autonym.

Other subgenera:

Micrhysridium (*Brachiprojectidium*) Habib and Knapp 1982, p. 346; stat. nov., emend.

Micrhysridium (*Lecithodinium*) Habib and Knapp 1982, p. 345; stat. nov., emend.

Micrhysridium (*Microbaculidinium*) Habib and Knapp 1982, p. 346-347; stat. nov., emend.

Micrhysridium (*Nannobarbophora*) Habib and Knapp 1982, p. 347-348; stat. nov., emend.

Micrhysridium (*Odontothrix*) Habib and Knapp 1982, p. 348-350; stat. nov., emend.

Original diagnosis: (Deflandre 1937, p. 31-32). See page 2.

Emended diagnosis: Acritarchs with a spherical, oval to rounded-subpolygonal vesicle whose outline in optical section is not significantly modified by the bases of the spines. Vesicle size small, generally less than 20 μ m; larger species very rarely range above 27 μ m in diameter. Eilyma typically single-layered, rarely two-layered. Surface psilate to granulate or with other fine microstructure, but not divided into fields or plates. Arising from the vesicle, generally at right angles to the eilyma, are from 9 to 35 spines with closed tips, usually simple but rarely clavate. The spines may flare somewhat at their bases. Spines hollow to solid; if hollow, their central cavity may or may not communicate with that of the vesicle. A few spines may exhibit distal bifurcations or have small holes in their mid section. The spine length can range from ca. 1.5 μ m to greater than the vesicle diameter. Release of vesicle contents occurs by formation of a linear slit or a crescentic to horseshoe-shaped opening (epityche) or by opening of a cryptosuture, causing loss of

an irregularly shaped portion of one surface: regularly formed circular to polygonal openings (pylomes) are not developed.

Remarks: Since the last emendation by Lister (1970), a number of observations on the genus have been made which require modifications of its diagnosis. The morphology of the eilyma has been included in the emendation, without exclusion of either single- or double-layered forms; however, the latter are uncommon and may ultimately merit generic separation. Though the vesicle opening is taken into consideration, its position is not specified, since this is not considered critical for recognition of the genus (as was the case in the diagnosis proposed by Lister 1970, p.77-78). The number of spines is restricted, since species with fewer or more numerous spines are more appropriately placed into other genera. The distal morphology of the processes is discussed in more detail than in previous diagnoses, with exclusion of forms having multifurcate tips. However, it is not possible to exclude all forms with terminal furcation since some species, otherwise conforming to the revised

generic concept, have a few processes with distal bifurcations among many that are acuminate.

Micrhystridium is differentiated from *Veryhachium* and *Dorsenidium* by having a greater number of spines arising from a vesicle whose shape is not modified by their position and number. *Estias-tra* and *Barbestiastra* likewise have few spines, but these genera have conical spines whose broad bases combine to give outline to the vesicle. *Baltisphaeridium* is generally larger and has spines with closed bases, while *Polygonium* is also generally larger, with cuneiform spines open proximally and having bases that merge with the vesicle wall. *Multiplicisphaeridium* and *Gorgonisphaeridium* have spines which are distally furcate or ramifying. Both *Filisphaeridium* and *Comasphaeridium* have more than 35 spines (usually many more), these being very slender and often wiry. *Tylotopalla* has a rosette of small branches at the tips of its spines while *Buedingisphaeridium* does not have true spines but only verrucae and tubercles.

Our concepts of all these genera are illustrated, for easy reference, in Text-figure 1 and their morphologies compared in Table 1; the holotypes of the genera are illustrated in Text-figures 2, 4 and 6. It is recognised that *Micrhystridium* remains a polymorphic genus, consisting of small spiny process-bearing acritarchs whose detailed morphology is difficult to resolve under the optical microscope.

Genus *Micrhystridium* DEFLANDRE 1937

1937 *Micrhystridium* DEFLANDRE, pp. 31-32.

For additional synonymy see SARJEANT & STANCLIFFE (1994: 12).

Type species: *Micrhystridium inconspicuum* (DEFLANDRE 1937) DEFLANDRE 1937 [OD]

Discussion: We concur with WICANDER, PLAYFORD & ROBERTSON (1999: 17) that SARJEANT & STANCLIFFE's (1994: 22-23) emendation of *Micrhystridium* DEFLANDRE 1937 is unacceptably broad, with diverse characters (e.g., eilyma uni- or bilayered). Accordingly, the commonly agreed circumscription of *Micrhystridium* is adopted here, i.e., incorporating spherical forms with a single-layered eilyma from which arise simple, hollow, acuminate processes opening into vesicle interior.

QUINTAVALLE & PLAYFORD 2006

WICANDER, PLAYFORD & ROBERTSON
1999

Genus *MICRHYSTRIDIUM* Deflandre, 1937

Type species.—*Micrhystridium inconspicuum* Deflandre, 1937; by original designation.

Discussion.—Sarjeant and Stancliffe (1994, p. 12) emended the diagnosis of *Micrhystridium* to include forms whose eilyma may be bilayered. Moreover, they limited the number of processes to between nine and 35, and included forms with solid processes or hollow processes uncommunicative with the vesicle interior, as well as forms that may have a few distally bifurcate processes. We do not agree with this emendation as it is too broad and encompasses too many dissimilar features. We prefer to follow the generally accepted circumscription of *Micrhystridium*, which encompasses forms with a psilate eilyma and psilate, hollow, distally acuminate processes that freely communicate with the vesicle cavity.

MICRHYSTRIDIUM

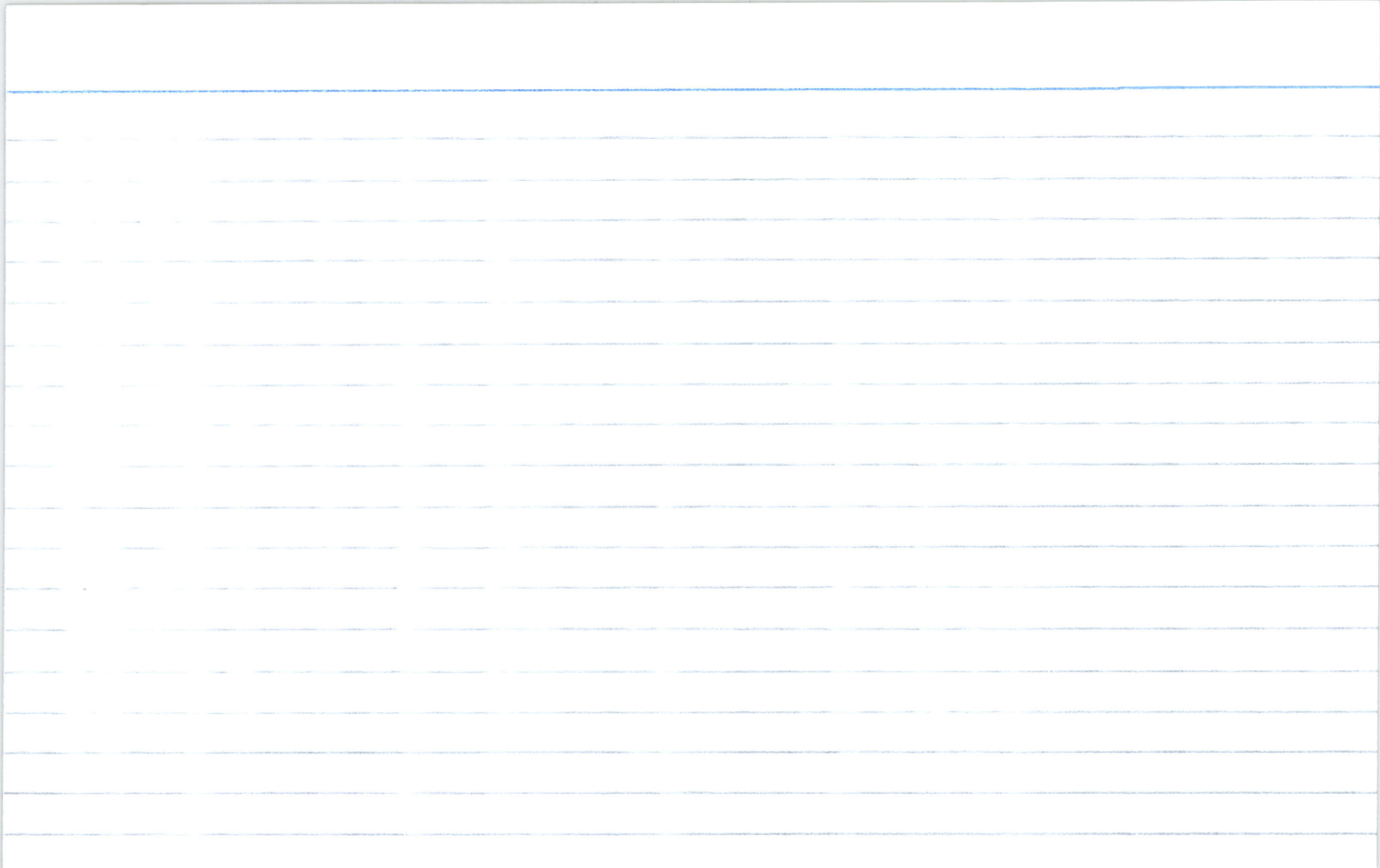
Genus *Micrhystridium* Deflandre, 1937

Type species.—*Micrhystridium inconspicuum*
Deflandre, 1937 [OD].

Discussion.—We disagree with Sarjeant and Stancliffe's (1994, p. 12) emendation of *Micrhystridium* Deflandre, 1937 (p. 31, 32), which advocated inclusion of forms with such diverse attributes as a unilayered or bilayered eilyrta, process numbers between nine and 35, and processes that may be solid or hollow (in the latter case, communicating or not communicating with the vesicle interior). Hence, the generally accepted and morphologically more cohesive circumscription of *Micrhystridium* is followed herein, as in Wicander and others (1999, p. 17).

FLAYFORD & WICANDER 2006

extensive remarks in
Booth 1979 *Ther* p. 112-117

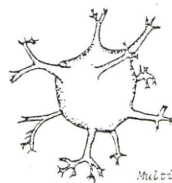


genera of the MICRHYSTRIDIUM group

Sargeant &
Stancliffe
1994



Tylotopalla



Multiplicisphaeridium

TEXT-FIGURE 1

Diagrammatic illustration comparing the morphologies of the constituent genera of the *Microhystridium* group. Not to scale. [Note: The connecting lines do not imply an evolutionary relationship].

TABLE 1

Morphological features of genera of the *Micrhystridium* group. Based on the generic diagnoses, but incorporating some additional observations not necessarily of diagnostic significance.

GENERA	SHAPE AND SIZE OF VESICLE	NATURE OF EKLIMA	VESICLE SURFACE	SPINE SHAPE AND POSITION	NUMBER OF SPINES	SPINE LENGTH TO BODY DIAMETER	OPENING	AGE RANGE	NOTES
<i>Dorsanidium</i>	Polygonal; small to medium	Single	Psilate to anagrenate	Acuminate; in several planes	4 - 10	25 - 100 \pm	Cryptosuture	Early Cambrian to Upper Cretaceous (1 Oligocene sp.)	----
<i>Frankoe</i>	Triangular; medium to large	Single	Psilate to anagrenate	Main spines branched; in one plane	3	25 - 200 \pm	? By epitryche	Early Cambrian to Middle Devonian	----
<i>Necrorythidium</i>	Triangular to quadrangular; medium	Double; inner body distinct	Psilate to finely granulate, rarely striate	Acuminate to cuneiform; in one plane	3 - 6	20 - 100 \pm	Epityche or linear slit	Silurian to Devonian	----
<i>Polyzonium</i>	Polygonal; medium to large	Single	Psilate to granulate	Acuminate; in several planes	11+	30 - 100 \pm	Cryptosuture	Middle Cambrian to Devonian (1 Jurassic sp.)	Spines usually hollow
<i>Stelleobinatus</i>	Polygonal; medium	Single	Psilate to granulate +/- grana or spines	Acuminate; in several planes	8+	30 - 100 \pm	? By epitryche	Ordovician to Devonian (1 Tertiary sp.)	Spine stems ornamented with grana or spinules
<i>Skellinius</i>	Stellate; medium to large	Single	Psilate to granulate	Acuminate; in several planes	8 - 12	50 - 150 \pm	Not reported	Silurian to Carboniferous	Ridges link spines
<i>Striatostellulus</i>	Polygonal; medium	Single	May be striate to costate	Acuminate to cuneiform; in several planes	4 - 10	50 \pm +/-	Epityche	Silurian	Spines may be striate to costate
<i>Striatotheca</i>	Triangular to quadrangular; medium	Single	Striate to costate	Acuminate to cuneiform; in one plane	3 - 4	5 - 100 \pm	Epityche	Ordovician to Devonian	Spine tips may be plugged
<i>Triaculina</i>	Triangular; medium	Double; inner body distinct	Psilate to granulate	Acuminate to cuneiform; in one plane	3	50 - 100 \pm	Not reported	Ordovician to Devonian	Hollow spines, not involving endolyma
<i>Ucellium</i>	Spheroidal to ellipsoidal; small to medium	Single	Psilate to granulate	Acuminate; in one plane	1 - 2 primary	Main spines 50 - 100 \pm ; secondary less than 50 \pm	Not reported	Cambrian to Carboniferous	Primary spines polar in position; plus numerous secondary
<i>Varythidium</i>	Triangular to quadrangular; small to large	Single	Psilate to granulate	Acuminate; in one plane	3 - 4	10 - 200 \pm	Epityche or linear slit	Cambrian to Tertiary [Quaternary records doubtful]	+/- 1 "bristle"
<i>Villosacapsula</i>	Triangular; medium	Single	Cover of microspines	Acuminate to cuneiform; in one plane	3 primary	50 - 100 \pm	Epityche	Ordovician to Devonian (1 Cretaceous sp.)	Spines may be set with spinules; rarely 1-supplementary