SURVEY OF THE STRATIGRAPHICAL DISTRIBUTION OF DINOFLAGELLATES, ACRITARCHS AND TASMANITIDS IN THE JURASSIC

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ABSTRACT

Tables are presented embodying all information currently available on the stratigraphical distribution of dinoflagellates, acritarchs and Tasmanitids in the Jurassic of the world. These are organized in terms of the internationally agreed stages and, wherever correlation so permits, the standard ammonite zonation for north-west Europe (type area for the world Jurassic). The information presented in the tables is commented on in the text, wherever necessary. The following new taxonomic combinations are proposed: *Gorgonisphaeridium diversispinosum* (Wall, 1965); *Polysphaeridium amalthei* (W. Wetzel, 1966); *Polysphaeridium? caminuspinum* (Wall, 1965); *Polysphaeridium? langi* (Wall, 1965); *Polystephanephorus speciosus* (Alberti, 1961); and *Adnatosphaeridium? perforatum* (Alberti, 1961).

INTRODUCTION

In 1962, a paper summarising the information then available on the stratigraphic distribution of fossil microplankton with tests composed of organic substances in the Jurassic was presented by one of us (W.A.S.S.) at the First International Colloquium on the Jurassic, held in Luxembourg. (The paper was eventually published in 1964). Since that date, our knowledge of these organisms has grown enormously. It has come to be recognised that the so-called "hystrichospheres" are a heterogeneous assemblage. The majority of the Jurassic forms are resting cysts of dinoflagellates: in addition, a number of spherical forms with walls perforated by mural canals (the Tasmanitids) have been shown to be zoosporangia of Prasinophyceae. There remain a relatively small number of genera whose affinity is still problematical: these are now termed "acritarchs."

Reviews of the stratigraphical distribution of dinoflagellate, acritarch and Tasmanitid genera (DOWNIE & SARJEANT, 1967a, 1967b) and of the stratigraphical distribution of dinoflagellate species (SARJEANT, 1967a) have been published in the intervening period, but the growth of knowledge renders these already out of date: moreover, they were published in terms of stratigraphic systems and stages only. It therefore seems to us that a new and more refined review of stratigraphical information should be presented.

Although we believe that dinoflagellates will ultimately enable a stratigraphical correlation equally as accurate as, and more widely applicable than, do the ammonites, we see no need (now or in the future) to produce a scheme of microplankton zones for the Jurassic, comparable to that produced for the Upper Cretaceous by CLARKE and VERDIER (1967). We feel that it is preferable to utilise a single scheme of zone names for each stage of each system, in each case ideally based on a single fossil group. Though a zone may well

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prove to be more readily or more precisely identifiable by use of another fossil group entirely, this does not necessarily justify a change either in the names or the boundaries of that zone. For the Jurassic, it is clear that the ammonites should take precedence as the bases for zonal nomenclature (vide ARKELL, 1945): in the accompanying tables, therefore, the data is presented in terms either of ammonite zones or of stages that are, by definition, groups of ammonite zones.

For the sake of consistency and coherence, the ammonite zonation for northwest Europe, chosen by Arkell (for excellent reasons) as type area for the Jurassic of the World, is used wherever accuracy of correlation permits; it should be noted, however, that we are well aware that in several instances the zonal ammonite species does not occur in the region to which the charts refer. [Works consulted in establishing correlations include AGER & WALLACE, 1966; ARKELL, 1933, 1946, 1956; COPE, 1967; COPE & ZEISS, 1964; and TORRENS 1967, 1969).

The stages of the uppermost Jurassic remain to be internationally agreed; despite published reports to the contrary, no firm decisions were taken in this regard at either of the two Jurassic Colloquia held in Luxembourg. For the reasons expressed by COPE, SARJEANT, SPALDING and ZEISS (1964), we believe that a "long" Kimmeridgian stage, extending up to and including the Pallasioides Zone and followed by the Portlandian Stage, is preferable to a "short" Kimmeridgian stage, ending at the Elegans (ex. Gravesia) Zone and succeeded by a "long" terminal Jurassic stage, whether "Tithonian" or "Volgian". (The fact that the two latter stages have type localities *outside* northwest Europe is the most cogent reason for this judgement). In this paper, therefore, the stage-names "Kimmeridgian" and "Portlandian" are used throughout in the spirit of ARKELL (1946).

The organization of the tables has been largely conditioned by the volume of information available. The study of the organic-walled microplankton of the Jurassic is still at a pioneer stage: Britain, northern France and Germany are the only areas whose microplankton assemblages have been the subject of intensive study at any level. Even in these areas, the Lower and Middle Jurassic assemblages described to date are relatively few. In several instances (e.g. VALENSI, 1953; WALL, 1965; SARJEANT, 1966a), they are dominated by small acritarchs, especially micrhystridia; this may well be a facies phenomenon, since GOCHT (1970) has described a German Bathonian assemblage wholly lacking in micrhystridia. The Upper Jurassic assemblages are rather better known: the correlations between European and Australasian assemblages (see SARJEANT, 1968a) afford an impressive demonstration of the stratigraphical potential of dinoflagellates.

TAXONOMIC PROPOSALS

1. The species *Baltisphaeridium diversispinosum* WALL (1965, p. 154, pl. 1, figs. 1-2, pl. 7, fig. 1) from the English Lias (Sinemurian and Pliensbachian) of Dorset and Yorkshire, England, appears morphologically referable to the genus *Gorgonisphaeridium* Staplin, Jansonius & Pocock. The new combination *Gorgonisphaeridium diversispinosum* (Wall, 1965) is therefore here porposed.

2. The species *Hystrichosphaeridium amalthei* W. WETZEL (1966, p. 317, pl. 31, figs. 2, 2*a*, 2*b*), from the Lias (U. Toarcian) of Germany, does not accord with the emended diagnosis of *Hystrichosphaeridium* proposed by DAVEY and WILLIAMS (1966b). Since it has numerous processes, it is referable to the genus *Polysphaeridium* Davey & Williams, 1966b, as presently defined (though it should be noted that the group of Middle Jurassic forms

placed in this genus is not necessarily related to the Cretaceous and Tertiary forms). The new combination *Polysphaeridium amalthei* (W. Wetzel, 1966) is therefore here proposed.

3. Neither of the two species *Hystrichosphaeridium caminuspinum* WALL (1965, p. 165, pl. 9, fig. 4,) and *H. langi* WALL (1965, p. 163, pl. 6, figs. 9-11, pl. 9, fig. 9), both from the English Lias (respectively from the Turneri Zone, Lower Sinemurian, and from the lowest Hettangian to topmost Sinemurian) accords with the revised diagnosis of *Hystrichosphaeridium* as proposed by DAVEY and WILLIAMS (1966b). A provisional reassignment of both species to the genus *Polysphaeridium* Davey & Williams appears appropriate. The new combinations *Polysphaeridium? caminuspinum* (Wall, 1965) and *Polysphaeridium? langi* (Wall, 1965) are therefore here proposed.

4. The species *Cannosphaeropsis speciosa* ALBERTI (1961, pp. 37-38, pl. 9, fig. 13), from the Upper Dogger of Hildesheim, Germany, may be seen, from Alberti's figure, to have processes arranged in groups, the latter being without or with only partial distal connexion: it is therefore clearly referable to the genus *Polystephanephorus* Sarjeant, 1961c. The new combination *Polystephanephorus speciosus* (Alberti, 1961) is therefore here proposed.

5. Allocation of the species *Cannosphaeropsis perforata* ALBERTI (1961, p. 37, pl. 9, fig. 14) from the Upper Dogger of Hildesheim, Germany, to a genus which (following the work of WILLIAMS & DOWNIE, 1966) is otherwise unrepresented in the Jurassic, seems undesirable. Unfortunately, the character of the archaeopyle cannot be determined from Alberti's photograph: however, it seems probable that this species, like other similar Middle and Upper Jurassic forms, will prove to have an apical archaeopyle. Hence it appears appropriate to reassign this species to the genus *Adnatosphaeridium* Williams & Downie, 1966. The new combination *Adnatosphaeridium? perforatum* (Alberti, 1961) is thus here proposed.

OTHER TAXONOMIC NOTES

I. In the captions to a table setting forth the stratigraphical ranges of dinoflagellates and acritarchs in the German Jurassic, SCHULZ and MAI (1966) include the names "*Cymatiosphaera intersignata* (Thierg.) n. comb.", "*Ellipsoidictyum ovulum* (Defl.) n. comb.", "*Kalyptea stegasta* (Sarj.) n. comb." and "*Epiplosphaera? capitata* (Cooks. & Eis.) n. comb." Since these proposed combinations are not mentioned in the text and details of the original publication of these specific names are not supplied, these combinations do not satisfy the requirements of the "International Code of Botanical Nomenclature" and are not valid. Nor, in our opinion, are they desirable. The Tasmanitid *Sporangites intersignatus* Thiergart, 1944, from the German Lias, has been reassigned to his genus *Pterosphaeridia* by MÄDLER (1963), a placement which seems satisfactory: the membranate dinoflagellate *Membrani larnax ovulum* Deflandre, 1947d, seems to merit its present status as type species of the genus *Valensiella* Eisenack, 1963 and is certainly not referable to the proximate genus *Ellipsoidictyum* Klement, 1960: the identicality of the genera *Kalyptea* Cookson & Eisenack, 1960b, and *Netrelytron* Sarjeant, 1961a, cannot be assumed till it is demonstrated that the former possesses a distinct inner body: and no grounds are advanced for the provisional placement of COOKSON and EISENACK's (1960b) species into *Epiplosphaera* Klement, 1960. GITMEZ (1969) has transferred it instead to the genus *Tenua* Eisenack emend. Sarjeant 1968.

II. GÓRKA (1965, p. 292) records in the Upper Jurassic of Poland, *Hystrichosphaeridium eoinodes* Eisenack, 1958c, a species originally recorded from the Cretaceous (Aptian) of Germany. This species has since been transferred to *Cordosphaeridium* by EISENACK (1963).

However, it appears to us that Górka's generic assignation is more likely to be correct than her specific assignation: we are therefore retaining the name unmodified in our stratigraphic tables.

III. The genera *Tetrasphaera* Górka, 1965 and *Palaeosphaeridium* Górka, 1965 and their type species *T. rara* Górka, 1965 and *P. infrequens* Górka, 1965, are defined on the bases of single specimens whose morphology was determined only very incompletely. We do not consider that these taxa, as at present defined, are capable of utilisation: but we are retaining them provisionally, in absence of further information regarding their nature and affinity.

IV. Reasons for considering that *Palaeoperidinium nuciformoides* Górka, 1965 is a subjective synonym of *Gonyaulacysta nuciformis* (Deflandre, 1938) have been advanced by one of us (SARJEANT, 1968, p. 227). The two species are here treated as synonymous. Similarly, *Cryptomeriapollenites coralliensis* Lantz, 1968, is treated as a subjective junior synonym of *Pareodinia ceratophora* Deflandre, 1947—an opinion originally advanced by one of us (SARJEANT, 1962a, p. 263) and since accepted by Dr. Taugourdeau-Lantz herself (*pers. comm.* to W.A.S.S.).

STRATIGRAPHICAL NOTES

A. The distribution of Tasmanitids in the Jurassic is markedly erratic: it is clearly subject to some unascertained stratigraphic control. The distribution of named species is shown in the tables: in addition, the following references mention unnamed species:

i. "Spore-like algae"—Triassic to Lower Cretaceous of Alaska (DONNELL, TAILLEUR & TOURTELOT, 1967; TOURTELOT, DONNELL & TAILLEUR, 1966).
ii. Unspecified Tasmanitids and Leiosphaerids are mentioned by WALL (1962) from the English Lias: these presumably are the forms listed by WALL (1965, p. 154) and, as such, incorporated into our tables.
iii. "*Aletes* sp." of SAH (1953) from the Jurassic of Andigama, Ceylon, may well be a Tasmanitid (see MUIR & SARJEANT, 1971, p. 90).
iv. ROGALSKÁ (1962) mentions "Diatomeae" from the Lias and Lower Dogger of Poland: subsequently she has agreed that these are Tasmanitids (see MUIR & SARJEANT, 1971, p. 90).
v. HARRIS (1964) records *Tasmanites* sp. in the Middle Jurassic of Yorkshire, England, from 17 different localities.

B. CAMPBELL and WARREN (1965) include a number of dinoflagellate and acritarch taxa, identified by Dr. G. Norris (then of the New Zealand Geological Survey), in species lists from localities in the Torlesse Group of New Zealand. The age of the Torlesse Group, has not been determined accurately but appears to range from Permian to Lower Cretaceous. Some species listed by Campbell and Warren are quite acceptable components of Jurassic assemblages (*Micrhystridium* cf. *deflandrei* Valensi, 1953; *M. rarispinum* Sarjeant, 1960c), others could be Upper Jurassic or Lower Cretaceous (*Baltisphaeridium* sp., *Pareodinia* sp.), There remain a number of typically Cretaceous forms, whose presence in the Jurassic would be surprising:

Hystrichosphaeridium pulcherrimum Deflandre & Cookson, 1955 (now *Oligosphaeridium*).
H. cf. *complex* (White, 1942) Deflandre, 1946 (now *Oligosphaeridium*).
H. cf. *ferox* Deflandre, 1937.

Baltisphaeridium cf. *neptuni* Eisenack, 1958 (now *Achomosphaera*).
Dingodinium sp.

These species are listed in the accompanying tables, but we feel their Jurassic occurence to be in the highest degree questionable.

C. W. WETZEL (1966b) described a new species, *Membranilarnacia amalthei*, on the basis of two specimens from the Lias of Lühnde, Germany. MORGENROTH (1970) records that, in course of a study of the microplankton content of these horizons, he made an intensive search for this species, but failed to find any representatives (p. 355). He therefore considers it to represent a contaminant in Wetzel's slides. However, the distribution of some dinoflagellates species is known to be extremely erratic (e.g. the Jurassic and Cretaceous species of *Prolixosphaeridium*) and some genera and species are consistently rare in all horizons from which they have been recorded (e.g. the species of *Stephanelytron* and *Wanaea* in the European Jurassic). Moreover, *Membranilarnacia amalthei* has not been recorded to date from any higher horizon. For these reasons, we are accepting W. Wetzel's record.

D. DUPIN (1965, pl. 3 figs. 3 and 7) lists the sphaeromorphid acritarchs *Protoleiosphaeridium* sp., *Leiosphaeridia communis* (Naumova, 1950) Downie & Sarjeant, 1964, and *Leiosphaeridia wenlockia* Downie, 1959, from the Upper Jurassic of Aquitaine, France. The status of the genus *Protoleiosphaeridium* has been questioned by DOWNIE and SARJEANT (1963, p. 88): *L. communis* is a Lower Ordovician species and *L. wenlockia* a Middle Silurian species, so that the presence of these species in the Jurassic is unexpected. In view of the present chaotic state of sphaeromorphid nomenclature, we prefer not to reassign these forms: the two latter are listed in the accompanying tables.

E. HOROWITZ (1968, 1970) lists a number of species from the Jurassic and Lower Cretaceous of Israel. The occurrence in the Jurassic of several of the species that he lists is so surprising as to suggest an error either in identification or in the dating of the samples. The photographs provided in some cases do not wholly support the identifications (e.g. *Doidyx anaphrissa* Sarjeant, 1966—wrongly attributed to "Davey *et al.*—pl. 5, fig. 1). His records are cited in the accompanying charts under the names he employs, but they must be considered very much subject to future revision.

F. WALL (1965) gives the precise ranges of most of his English Lias species in his Table 2 (p. 167). However, a number of species, not considered of stratigraphic value because of their long ranges, are not incorporated into this table but are cited in the text (pp. 154-55 and elsewhere), in such ambiguous terms as "Sporadic throughout the British Lias, uncommon"; others, with restricted ranges, achieve incidental and imprecise mention only (e.g. some species mentioned on p. 166). Since time did not permit us to communicate with the author about these occurrences, we have provisionally plotted the former in our tables as present at all horizons and localities listed by Wall, and the latter in vague terms, as occurring in the "Lower Jurassic of Britain". WALL (1965, tab. 2) lists his *Baltisphaeridium infulatum* var. *infulatum* twice, giving it two slightly different ranges; this error does not affect the charts, since it involves only the lower parts of one zone.

G. "*Scriniodinium* sp." of DODEKOVA, 1967 (pp. 14-61, pl. 1, figs. 6-8, text-fig. 1), recorded from the Upper Jurassic of Bulgaria, we consider to be referable to *Scriniodinium playfordi* Cookson & Eisenack, 1960b, and have thus recorded it.

H. ISAGULOVA (1963) lists and figures "hystrichosphaerids" from the Jurassic of the Lvov-Volhynia basin, U.S.S.R., applying the Palaeozoic acritarch nomenclature of S. N. Naumova and B. V. Timofeyev to what her illustrations show to be, at least in part, chorate dinoflagellate cysts. Since no diagnoses or publication details are given, the new taxa she proposes are invalid in the terms of the "International Code of Botanical Nomenclature":

the assignments of other forms to existing Palaeozoic species are in the highest degree questionable. In the few instances where her figures permit identification to species level, we have cited this stratigraphic reference. In all other instances, we have felt unprepared either to list these forms under their existing names or to propose their transfer to other genera.

I. Cookson and Eisenack (1958) described a new species from the Upper Jurassic of Western Australia under the name *Wetzeliella irregularis*. *Wetzeliella* is a typically Tertiary genus whose only other Mesozoic species, *Wetzeliella? neocomica* Gocht, 1957, has recently been made type of a new genus (*Phoberocysta* Millioud, 1969). The generic attribution of the Australian species merits serious reconsideration: if it is indeed correct, the occurrence may result from contamination. For the moment, judgement is reserved and the species is not listed in the tables.

J. Jekhowsky and Goubin (1964) mention the presence of "rare primitive dinoflagellates and *Pterospermopsis*—like forms at some levels" in subsurface samples of Upper Triassic, Lower and Middle Liassic strata from Madagascar (p. 123). They also record, from Upper Liassic, Dogger and Lower Malm, "hystrichosphaerids...and, to a very much lesser extent, dinoflagellates". The single specimen which they illustrate (*ibid*, fig. 8, no. 577) appears to be a *Tenua*.

K. Evitt (1961), in a paper primarily concerned with morphology, illustrates two dinoflagellates, *Gonyaulacysta jurassica* (Defl.) and "Forma B' (a species of *Meiourogonyaulax*), both from the Curtis Formation, Upper Jurassic (Oxfordian) of Dinosaur National Monument, Utah, U.S.A. (p. 390, pls. 1 and 2). He also illustrates a number of forms from the Upper Jurassic of Denmark:

i. "Forma C" (*ibid.*, p. 391, pl. 1, figs. 18-21, pl. 2, figs. 9-12, pl. 3, figs. 1-4). This grouping appears to include several species of the genera *Chytroeisphaeridia* and *Tenua*, having in common an apical archaeopyle and a broadly ovoidal cyst but with variable surface ornament (granules, verrucae, short spines) and with or without traces of a cingulum.

ii. "*Hystrichosphaeridium* sp." (*ibid.*, pp. 391-2, pl. 4, figs. 6, 9-10) comprises chorate cysts having processes of variable character, with or without distal linkage, and always possessing an apical archaeopyle. Pl. 4, fig. 6 appears to be *Surculosphaeridium vestitum* (Deflandre, 1938b) Davey, Downie, Sarjeant & Williams, 1966; pl. 4, figs. 9-10 represent a species of *Systematophora*.

iii. "Forma E" (*ibid.*, p. 391, pl. 5, fig. 7) appears to represent an undescribed species of *Meiourogonyaulax*, perhaps related to *M. staffinensis* Gitmez, 1970.

iv. "*Pareodinia* spp." (p. 400, pl. 8, figs. 20-22) brings together forms having a peridinoid proximate cyst and an intercalary archaeopyle. Pl. 8, fig. 20 appears to represent *Pareodinia ceratophora* Deflandre: Pl. 8, figs. 21-22 may well be species of *Imbatodinium*.

Since the stratigraphical horizon is not stated precisely for these Danish forms and since the taxonomic assignations proposed here are provisional, these records are not incorporated into the Tables.

L. In three instances, single records of dinoflagellate species have not been incorporated in the tables, as a consequence of space limitations. These are:

i. *Dichadogonyaulax pannea* (Norris, 1965), listed by Norris as being present in a borehole core of the Upper Kimmeridgian to Portlandian from Sussex, England, in addition to the occurrence tabulated.

ii. *Nannoceratopsis gracilis* Alberti, recorded from the Upper Pliensbachian of Denmark, by Evitt (1961).

iii. *Micrhystridium lymensis* Wall vars. *gliscum* Wall, 1965 and *rigidum* Wall 1965 are listed by WALL (1965) as present in the Hettangian of South Wales.

CONCLUSIONS

The tables here presented are in large measure self-explanatory and require little comment: readers should form their own judgement, concerning the validity of particular ranges and/or records. The unevenness of knowledge concerning the stratigraphical distribution of acritarchs and dinoflagellate cysts is made apparent; particular gaps in knowledge are the lack of information concerning African, Asiatic, Central and South American and Boreal assemblages (though two papers treating with Greenland assemblages are in press). Knowledge of the assemblages cannot be considered satisfactory at any level in the Jurassic, but information concerning Lower and Middle Jurassic forms is especially meagre. It is hoped that the next decade will show a great expansion of knowledge of these groups of microfossils, in view of their proven value as stratigraphic and palaeoecological indices in marine Jurassic strata.

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Table 1—Known Distribution of Organic Walled Microplankton in the Lower Jurassic of the World

SPECIES	STAGE		Hettangian						Sinemurian												Pliensbachian												Toarcian													
	LOCALITY	Pre—Hettangian Range (World)	England	Jura (Ger.)	Switzerland	Dorset & Yorks	Dorset	Yorks	Denmark	Germany	Dorset	Yorks	Yorks	Dorset	Germany	Dorset	Yorks	Lincs	Dorset	and	Yorks	Germany	Dorset	Yorks	Dorset and	Yorks	Germany	Dorset	Yorks	Dorset	Yorks	Germany	Dorset	and	Yorks	Germany	Dorset	Yorks	Germany	Hungary	Post Toarcian Range (World)				
	ZONE		Planorbis to Levesquei			Planorbis	Liasicus	Angulata		Planorbis to Angulata	Bucklandi	Semicostatum	Bucklandi to Semicostatum	Turneri		Obtusum	Oxynotum	Raricostatum	Turneri to Raricostatum	Jamesoni	Ibex	Davoei	Jamesoni to Davoei	Margaritatus	Spinatum	Margaritatus to Spinatum	Tenuicostatum	Falciferum	Bifrons	Tenuicostatum to Bifrons	Variabilis	Thouarense	Levesquei	Variabilis to Levesquei	Tenuicostatum to Levesquei								
DINOFLAGELLATE TAXA																																												
Dapcodinium priscum Evitt		..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Luehndea spinosa Morg.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Mancodinium semitabulatum Morg.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Maturodinium inornatum Morg.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Membranilarnacia analthei W. Wetzel		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Mendicodinium reticulatum Morg.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Nannoceratopsis gracilis Alberti		..	..	×	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Parcodinia ceratophora Defl.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Polysphaeridium analthei (W. Wetzel)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
P.? caminuspinum (Wall)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
P.? langi (Wall)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Scriniocassis weberi Gocht		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
S. cf. *weberi* of Morg.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Valvacodinium armatum Morg.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
ACRITARCH & TASMANITID TAXA																																												
Baltisphaeridium debilispinum Wall & Downie		×	×	..	..	×	×	×	..	..	×	×	×	×	..	×	×	×	×	×	×	×	..	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
B.eypensis Wall		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
B.infulatum var. *infulatum* Wall		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
var. *microinfulatum* Wall		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
B.micropunctatum Wall		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
"Cantulodinium" protuberatum Wall		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cleistosphaeridium polytrichum (Val.)		..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Crassosphaera concinna Cooks. & Man.		..	..	..	..	..	..	..	..	×	..	..	..	..	×	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
C. hexagonalis Wall		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Gymatiosphaera cf. *areolata* of Wall		..	..	..	..	..	..	..	..	..	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. bleawykensis Wall		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. eupeplos (Val.)		..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. pachytheca Eis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. cf. *pachytheca* of Wall		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. primitiva W. Wetzel		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. radiata W. Wetzel		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. tecta (Thier.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cymatiosphaeropsis stigmata (C. & E.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
C. cf. stigmata of Wall		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Domasia liassica Wall		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Gorgonisphaeridium diversispinosum (Wall)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Granodiscus granulatus Mädler		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Lancettopsis lanceolata Mädler		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
L. cf. *lanceolata* of W. Wetzel		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Leiofusa jurassica Cooks & Eis.		×	..	..	..	..	..	..	..	×	..	..	..	..	×	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
L. spicata Wall		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Leiosphaeridia deflandrei Mädler		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
L. pusilla Mädler		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Metaleufusa arcuata Wall		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. diagonalis Wall		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Micrhystridium arachnoides Val.		..	×	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. bigoti Defl.		..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. deflandrei Val.		×	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Table 1 [contd.]—Known Distribution of Organic Walled Microplankton in the Lower Jurassic of the World

1A STAGE	Pre-Hettangian Range (World)				Hettangian						Sinemurian												Pliensbachian										Toarcian												Post Toarcian Range (World)
ZONE		Planorbis to Levesquei			Planorbis	Liasicus	Angulata			Planorbis to Angulata	Bucklandi		Semicostatum		Bucklandi to Semicostatum	Turneri			Obtusum	Oxynotum	Raricostatum	Turneri to Raricostatum	Jamesoni		Ibex	Davoei	Jamesoni to Davoei	Margaritatus		Spinatum		Margaritatus to Spinatum	Tenuicostatum	Falciferum	Bifrons	Tenuicostatum to Bifrons	Variabilis		Thouarense		Levesquei		Variabilis to Levesquei	Tenuicostatum to Levesquei	
SPECIES / LOCALITY		England	Jura (Ger.)	Switzerland	Dorset & Yorks		Dorset	Yorks	Denmark	Germany	Dorset	Yorks		Dorset	Germany	Dorset	Yorks	Lincs	Dorset	and	Yorks	Germany	Dorset	Yorks	Dorset and	Yorks	Germany	Dorset	Yorks	Dorset	Yorks	Germany	Dorset	and	Yorks	Germany	Dorset	Yorks	Dorset	Yorks	Dorset	Yorks	Germany	Hungary	
M. cf. *densispinum* of Wall	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. echinoides Val.	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×
M. exilum Wall	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	×	..	..	..	..	..	..	..	..	..	..	..	×	×	..	..	..
M. filigerum Val.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×
M. intromittum var. *intromittum* Wall	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	×	..	..	..	×	..	..	..	..	×	..	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
var. *transitorium* Wall	..	..	..	..	..	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. lymensis var. *lymensis* Wall	..	×	..	..	×	×	×	×	..	..	×	×	×	×	..	×	×	..	×	×	×	..	×	×	×	×	..	×	×	×	×	..	×	×	×	..	×	×	×	×	×	×	..	..	..
var. *gliscum* Wall	..	×	..	..	×	×	×	×	..	..	×	×	×	×	..	×	×	..	×	×	×	..	×	×	×	×	..	×	×	×	×	..	×	×	×	..	×	×	×	×	×	..	..	..	..
M. minutispinum Wall	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. nannacanthum Defl.	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×
M. polyedricum Val.	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×
M. rarispinum Sarj.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×
M. recurvatum Sarj.	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×
M. variabile Wall	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	×	×	×	..	×	×	..	..	..	..	..	..	..	..	..	..	..	×	×	..	..	..
M. wattonensis Wall	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	×	..	..	..	..	..	..	..	..	..	..	..	×	×	..	..	..
Pleurozonaria distans Mädler	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..
P. diversipora Mädler	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..
P. macropora (Eis.)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..
P. media Mädler	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	×	..	..	..	..	..	..	×	..	×
P. polyporosa Mädler	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..
P. spongiosa Mädler	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..
P. wetzeli Mädler	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..
Pterospermopsis goslarensis Mädler	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	×	..	..
P. helios Sarj.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	×	..	..	..	×	..	..	..	..	..	..	×	..	×
P. cf. *helios* of Wall	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	×	..	..	..	..	..	..	..	..	..	..	..	×	×	..	..	..
Pterosphaeridia intersignata (Thierg.)	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..
P. eisenacki Mädler	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..
P. nodosa Mädler	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..
P. undulata Mädler	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..
Solisphaeridium brevispinosum (Sarj.)	×	×	..	..	×	×	×	×	..	..	×	×	×	×	..	×	×	×	×	×	×	..	×	×	×	×	..	×	×	×	×	..	×	×	×	..	×	×	×	×	×	×	×	..	×
S. delicatum (Wall)	..	..	..	..	..	×	×	×	..	..	..	..	..	..	..	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
S. stimuliferum (Defl.)	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	×
S. cf. *stimuliferum* of W. Wetzel	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..
Tasmanites deflandrei Mädler	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..
T. mourai Sommer	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..
T. newtoni Wall	..	×	..	..	×	×	×	×	..	..	×	×	×	×	..	×	×	×	×	×	×	..	×	×	×	×	..	×	×	×	×	..	×	×	×	..	×	×	×	×	×	×	×	..	..
T. punctatus Newton	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..
T. tardus Eis.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..
Tytthodiscus chondrotus Norem	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..
T. schandelahensis (Thierg.)	..	..	×	×	..	..	..	..	..	×	..	..	..	..	×	..	..	..	..	..	..	×	..	..	..	..	×	..	..	..	..	×	..	..	..	×	..	..	..	..	..	..	×	..	×
subsp. *minor* (Thierg.)	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
subsp. *spinosus* (Thierg.)	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
T. suevicus Eis.	..	..	..	..	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	×	..	..	..
Veryhachium aster Sarj.	..	×	..	..	..	..	..	..	..	..	×	×	×	..	..	×	×	×	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×
V. collectum Wall	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
V. dualispinium Wall	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	×	×	..	..	..	..	..	..	..	..	..	..	..	×	×	..	..	..
V. europaeum Stock. & Will.	..	..	..	..	..	..	..	..	..	..	×	×	×	×	..	..	..	..	..	..	×	..	×	×	×	×	..	×	×	×	×	..	×	×	×	..	..	..	×	×	×	×	..	..	..
f. *nervosum* Wall	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	×	..	×	×	..	..	..	..	..	..	..	..	..	..	..	×	×	..	..	..
V. formosum Stock. & Will.	..	..	..	..	..	..	×	×	..	..	×	×	×	×	..	×	×	..	×	..	..	..	×	×	..	×	..	×	×	..	..	..	×	..	..	..	..	..	..	..	×	×	..	..	..
f. *ancorastrum* Wall	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
V. ? irregulare Jekh.	..	..	..	..	..	..	×	×	..	..	×	×	×	×	..	×	×	..	×	..	×	..	×	×	..	×	..	×	×	..	..	..	×	..	..	..	..	..	×	×	×	×	..	..	..
V. rhomboidium Downie	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
V. cf. *trispinosum* of Wall	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
V. valensii Downie & Sarj.	×	..	..	..	..	..	..	..	..	..	..	×	×	×	..	×	×	..	..	..	..	..	×	×	×	×	×	..	×	×	..	..	×	×	×	..	..	..	×	×	×	×	..	..	×

TABLE 2—Known Distribution of Organic Walled Microplankton in the Middle-Upper Jurassic of the World (Excluding Britain and France)

Species	Pre Callovian Range (World)	Aalenian	Bajocian			Bathonian	Callovian			Oxfordian						Kimmeridgian		Upper Kimmeridgian to Portlandian			Callovian	Oxfordian	Kimmeridgian	U. Kimm. to Port.	Upper Jurassic			U. Jurassic		Post Portlandian Range (World)
Stage																													
Locality		Germany			Hungary	Germany		Poland	Baltic Region	Bulgaria	Germany	Moscow	Switzerland	Poland		Germany	Bulgaria	Poland	Baltic Region	Bulgaria	Moscow	Volga Region	W. Siberia	West. Australia	Papua	Western Australia	Australia	New Zealand	India	Papua	Canada	Israel	Lvov-Volhynie U.S.S.R.	
Zone		Upalinium to Scissum	Murchisonae to Concavum	Sowerbyi	Humphriesianum	Subfurcatum to Parkinsoni	Zigzag to Morrisi	Retrocostatum to Discus	Macrocephalus to Calloviense	Jason to Coronatum	Athleta to Lamberti	Jason to Lamberti	Mariae to Plicatilis	Transversarium to Pseudocordata	Plicatilis to Decipiens	Pseudocordata to Baylei	Cymodoce to Mutabilis	Eudoxus							Macrocephalus to Coronatum	Jason to Cordatum	Cordatum	Cordatum							
DINOFLAGELLATE TAXA																																	
Acanthaulax vemusta (Klem.)	..	..	..	..	..	×	..	..	×	×	×	..	..	..	..	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Adnatosphaeridium aemulum (Defl.) subsp. *integra* Cooks. & Eis.	..	..	..	..	..	..	×	..	..	..	×	..	×	..	×	..	..	..	..	..	..	..	..	×	..	..	..	..	×	..	..	..	..	..
A. caulleryi (Defl.)	..	..	..	..	..	..	×	×	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..
A. filamentosa (Cooks. & Eis.)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
A. pancispinum (Klem.)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
A. ? perforatum (Alberti) [note 5]	..	..	..	..	..	..	×	×	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Amphorula metaelliptica Dod.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..
Apteodinium granulatum Eis.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Areoligera penicillata (Ehr.)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Belodinium dysculum Cooks. & Eis.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..
Broomea ramosa Cooks. & Eis.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..
B. simplex Cooks. & Eis.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..
Canningia reticulata Cooks. & Eis.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cannosphaeropsis nirabilis Cooks. & Eis.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cleistosphaeridium polytrichum (Val.)	..	..	..	..	..	..	×	×	×	×	×	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×
C. varispinosum (Sarj.)	..	..	..	..	..	..	×	×	×	×	×	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cryptoarchaeodinium calcaratum (Defl.)	..	..	..	..	..	..	..	..	..	..	..	..	×	×	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
C. tenidodinium continuum Gocht	..	..	..	..	..	..	..	×	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
C. ornatum (Eis.)	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
C. pachydermum (Defl.)	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
C. aff. *tenellum* of Gocht	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cyclonephelium areolatum Cooks. & Eis.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Dictyophyxis areolata Cooks. & Eis.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Dingodinium jurassicum Cooks. & Eis.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Diplotesta aff. *krutzchi* Vozzh.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Doidyx anaphrissa Sarj. of Horowitz [note D]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Ellipsoidictyum cinctum Klem.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Endoscrinium ceratophorum (Cooks. & Eis.)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
E. galeritum (Defl.) sub sp. *reticulatum* Klem.	..	..	..	..	..	×	×	×	×	×	×	×	..	..	×	×	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
E. luridum (Defl.)	..	..	..	..	..	..	..	..	×	..	..	..	..	..	×	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
E. aff. *oxfordinatum* of Vozzh.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Eodinia pachytheca Eis.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Epiplosphaera arenlata Klem.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
E. bireticulata Klem.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
E. reticulospina Klem.	..	..	..	..	..	..	..	..	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×
Exochosphaeridium pseudhystrichodinium (Defl.)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Gardodinium eisenacki Alberti	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Gonyaulacysta aldorfensis Gocht	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..
G. ambigua (Defl.)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. aculeata (Klem.)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. cladophora (Defl.)	..	..	..	×	×	×	..	..	×	×	×	×	..	..	×	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. confusa (Vozzh.)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. crispa (W. Wetzel)	..	..	..	..	×	..	..	..	..	..	..	..	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. eisenacki (Defl.) subsp. *oligodenta* Cooks. & Eis.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Table 2 [contd.]—Known Distribution of Organic Walled Microplankton in the Middle-Upper Jurassic of the World (Excluding Britain & France)

Species	Zone	Locality	Stage
G. episoma D.D.S.W.	Pre Callovian Range (World)		
G. filaficola Gocht	Upalinium to Scissum	Germany	Aalenian
G. giga Horowitz	Murchisonae to Concavum	Germany	Aalenian
G. gongylos Sarj.	Sowerbyi	Germany	Bajocian
G. granulata (Klem.)	Humphriesianum	Germany	Bajocian
G. granulogera (Klem.)	Subfurcatum to Parkinsoni	Germany	Bajocian
G. helicoidea Eis. & Cocks. var. *tuberculata* Vozzh.		Hungary	Bajocian
G. jurassica (Defl.) var. *longicornis* Defl	Zigzag to Morrisi	Germany	Bathonian
G. mirabile (Klem.)	Retrocostatum to Discus	Germany	Bathonian
G. nuciformis (Defl.)			
G. parvimargigata (Cooks. & Eis.)			
G. perforans (Cooks. & Eis.)			
G. perforans (Cooks. & Eis.) var. *kunzeiensis* Vozzh.			
G. sarjeanti (Vozzh.) var. *sphaericum* Vozzh.			
G. scarburghensis Sarj.	Macrocephalus to Calloviense	Germany	Callovian
G. scotti (Cooks. & Eis.)	Jason to Coronatum	Germany	Callovian
G. serrata (Cooks. & Eis.)	Athleta to Lamberti	Germany	Callovian
Hrenderia fusciformis (Cooks. & Eis.)	Jason to Lamberti	Poland	Callovian
Hexagonifera surfecta Cooks. & Manum.		Baltic Region	Callovian
Hystrichodinium amphiacanthum Cooks. & Eis.		Bulgaria	Oxfordian
Hystrichosphaeridium anthophorum Cooks. & Eis.		Germany	Oxfordian
H. cf. *complex* of Campb. & Warr. [note B]		Moscow	Oxfordian
H. eastlandi Davey & Williams [note 11]		Switzerland	Oxfordian
H. eoinodes Eis. of Gorka [note 11]	Mariae to Plicatilis	Poland	Oxfordian
H. cf. *ferox* of Campb & Warr. [note B]	Transversarium to Pseudocordata	Poland	Oxfordian
H. mantellii D.D.S.W.	Plicatilis to Decipiens	Germany	Oxfordian
H. pachydermum Cooks. & Eis.	Pseudocordata to Baylei	Germany	Oxfordian
H. pulchrirmum Defl. [note B]	Cymodoce to Mutabilis	Germany	Oxfordian
H. polonicum Gorka	Eudoxus	Germany	Kimmeridgian
H. torynum Cooks. & Eis.		Bulgaria	Kimmeridgian
H. truncigerum (Defl.)		Poland	Kimmeridgian
Imbatodinium imbatodinensis Vozzh.		Baltic Region	Upper Kimmeridgian to Portlandian
I. kondratyevi Vozzh.		Bulgaria	Upper Kimmeridgian to Portlandian
I. verrucosum Vozzh.		Moscow	Upper Kimmeridgian to Portlandian
I. villosum Vozzh.		Volga Region	Upper Kimmeridgian to Portlandian
Kalyptea dicerus Cooks. & Eis.		W. Siberia	Upper Kimmeridgian to Portlandian
K. monoceras Cooks. & Eis.	Macrocephalus to Coronatum	West. Australia	Callovian
Kiosseuxia glabra Cooks. & Manum	Jason to Cardatum	West. Australia	Callovian
Lanterna bulgarica Dod.	Cordatum	Papua	Oxfordian
L. sportula Dod.		Western Australia	Kimmeridgian
L. spinosa Dod.		Western Australia	U. Kimm. to Port.
Leiofusa jurassica Eis.		Australia	Upper Jurassic
Leptodinium arcuatum Klem.		New Zealand	Upper Jurassic
		India	Upper Jurassic
		Papua	Upper Jurassic
		Canada	Upper Jurassic
		Israel	U. Jurassic
		Lvov-Volhynie U.S.S.R.	
	Post Portlandian Range (World)		

Table 2 [contd.]—Known Distribution of Organic Walled Microplankton in the Middle-Upper Jurassic of the World (Excluding Britain & France)

Species	Zone	Locality	Stage
L. clathratum (Cooks & Eis.)	Pre Callovian Range (World)		
L. eumorphum (Cooks. & Eis.)	Upalinium to Scissum	Germany	Aalenian
L. millioudi (Sarj.)	Murchisonae to Concavum	Germany	Aalenian
L. mirabile Klem.	Sowerbyi	Germany	Bajocian
L. regale Gocht	Humphriesianum	Germany	Bajocian
L. subtile Klem. subsp. *pectinigerum* Gocht	Subfurcatum to Parkinsoni	Germany	Bajocian
Lithodinia jurassica Eis.		Hungary	
Meiourogonyaulax bulloidea (Cooks. & Eis.)	Zigzag to Morrisi	Germany	Bathonian
M. caytonensis (Sarj.)	Retrocostatum to Discus	Germany	Bathonian
M. cristulata (Sarj.)		Germany	Callovian
M. decophlata (W. Wetz.)	Macrocephalus to Calloviense	Germany	Callovian
M. superornata (W. Wetz.)	Jason to Coronatum	Germany	Callovian
Microdinium ornatum Cooks. & Eis.	Athleta to Lamberti	Germany	Callovian
Nannoceratopsis gracilis Alberti	Jason to Lamberti	Poland	Callovian
N. pelucida Deft.		Baltic Region	Callovian
Netyetron jurassica (Alberti)		Bulgaria	Oxfordian
Occisucysta evitt (Dod.)		Germany	Oxfordian
Odontochitina operculata (O. Wetz.)		Moscow	Oxfordian
Oligosphaeridium anthophorum (Cooks. & Eis.)		Switzerland	Oxfordian
O. dictyophorum (Cooks. & Eis.)	Marise to Plicatilis	Germany	Oxfordian
Omatia montgomeryi (Cooks. & Eis.)	Transversarium to Pseudocordata	Poland	Oxfordian
Palaeohystrichidium infriquens Gorka [note 111]	Plicatilis to Decipiens	Germany	Oxfordian
Parodinia ophetia Cooks. & Eis.	Pseudocordata to Baylei	Germany	Oxfordian
P. cf. *ophetia* of Vozzh.	Cymodoce to Mutabilis	Germany	Oxfordian
P. ceratophora Deft.	Eudoxus	Germany	Kimmeridgian
P. prolongata Sarj.		Bulgaria	Kimmeridgian
Phoberocysta neocomica (Gocht) [note 1]		Poland	Kimmeridgian
Polystaphenophoras speciosa (Alberti) [note 4]		Baltic Region	Upper Kimmeridgian to Portlandian
P. paracatalhus Sarj.		Bulgaria	Upper Kimmeridgian to Portlandian
Prolixosphaeridium bastiaeatum Dod.		Moscow	Upper Kimmeridgian to Portlandian
P. maxispinosum (Klem.)		Volga Region	Upper Kimmeridgian to Portlandian
Psalgeonyaulax apalata (Cooks. & Eis.)		W. Siberia	Upper Kimmeridgian to Portlandian
Pyxidiella pandora (Cooks. & Eis.)	Macrocephalus to Coronatum	West. Australia	Callovian
Scrinocassis weberi Gocht	Jason to Cordatum	West. Australia	Callovian
S. cf. *weberi* of Monf.	Cordatum	Papua	Oxfordian
Scriniodinium crystallinum (Deft.)		Western Australia	Kimmeridgian
S. dictyotum (Cooks. & Eis.)		Western Australia	U. Kimm. to Port.
S. playfordi Cooks. & Eis.		Australia	Upper Jurassic
Systematophora areolata Klem.		New Zealand	Upper Jurassic
S. fasciculigera Klem.		India	Upper Jurassic
S. obifera Klem.		Papua	Upper Jurassic
Taeniophora tuncliptea Klem.		Canada	Upper Jurassic
Tenua capitata (Cooks. & Eis.)		Israel	U. Jurassic
T. pilosa (Uhr.)		Lvov-Volhynie U.S.S.R.	
Tetraphaera vara Gorka [note 111]	Post Portlandian Range (World)		
Trichodinium castanea (Deft.)			
?T. rhombicidalis (Gorka)			

Table 2 [contd.]—Known Distribution of Organic Walled Microplankton in the Middle-Upper Jurassic of the World (Excluding Britain & France)

Species	Pre Callovian Range (World)	Aalonian	Bajocian			Bathonian	Callovian				Oxfordian							Kimmeridgian		Upper Kimmeridgian to Portlandian			Callovian	Oxfordian	Kimmeridgian	U. Kimm. to Port.	Upper Jurassic				U. Jurassic		Post Portlandian Range (World)
Stage																																	
Locality		Germany			Hungary		Germany			Poland	Baltic Region	Bulgaria	Germany	Moscow	Switzerland	Poland			Germany	Bulgaria	Poland	Baltic Region	Bulgaria	Moscow	Volga Region	W. Siberia	West. Australia	Papua	Western Australia	Australia	New Zealand	India	Papua	Canada	Israel	Lvov-Volhynie U.S.S.R.	
Zone		Upalintum to Scisum	Murchisonae to Concavum	Sowerbyi	Humphriesianum	Subfurcatum to Parkinsoni	Zigzag to Morrisi	Retrocostatum to Discus	Macrocephalus to Callovionse	Jason to Coronatum	Athleta to Lamberti	Jason to Lamberti					Mariae to Plicatilis	Transversarium to Pseudocordata	Plicatilis to Decipiens	Pseudocordata to Baylei	Cymodoce to Mutabilis	Eudoxus							Macrocephalus to Coronatum	Jason to Cordatum	Cordatum								
Tubotuberella rhombiformis Vozzh.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..
T. sphaerocephalus Vozzh.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..
Valensiella ampulla Gocht	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
V. ovula (Defl)	..	..	..	×	×	×	..	×	×	×	×	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
V. vermiculata Gocht	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Verrucosphaera lukoviensis Gorka	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Wanaea clathrata Cooks. & Eis.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..
W. digitata Cooks. & Eis.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
W. spectabilis (Cooks. & Eis.)	..	..	..	..	..	..	×	..	×	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Xenicodinium densispinosum Klem.	..	..	..	..	..	×	..	×	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
ACRITARCH & TASMANITID TAXA																																		
Alisum parvum Gorka	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
A. magnum Gorka	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Baltisphaeridium aculigerum Klem.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
B. inusitatum Klem.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
B. cf. *neptuni* of Campb. & Warr. [note B]	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	×	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..
B. pattei (Val.)	..	..	..	..	×	×	×	×	×	×	×	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
B. cf. *striatoconus* of Gorka	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Chlamydophorella membranoides Vozzh.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Crassosphaera concinna Cooks. & Manum	×	×	×	×	×	×	×	×	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cymatiosphaera pachytheca Eis.	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
C. parva Sarj.	..	×	×	..	..	..	..	×	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
C. radiata Wetzel	×	..	×	×	×	×	..	×	×	×	×	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Dictyochora ovalis Gorka	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..
Dictyosphaeridinm deflandrei W. Wetzel	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Leiosphaeridinm pusilla Mädler	..	×	×	×	×	×	..	×	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
L. similis Cooks. & Eis.	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Micrhystridium ambiguum Defl.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. deflandrei Val.	×	×	×	×	..	×	..	×	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. cf. *deflandrei* of Camb. & Warr. [note B]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..
M. fragile Defl.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	×	..	..	..	..	..
M. pyramidispinum Dod.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..
M. rarispinosum Sarj.	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. roquesi Val.	..	×	×	×	..	×	..	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..
Palaeostomocystis cylindrica Cooks. & Eis.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
P. sinuosa Cooks. & Eis.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pterospermopsis helios Sarj.	×	×	×	..	..	..	..	×	×	×	×	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
P. barbarae Gorka	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tasmanites tardus Eis.	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tytthodiscusschandelahensis (Thierg.)	×	×	×	×	×	×	..	×	×	×	×	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
T. suevicus Eis.	×	×	×	..	..	×	..	×	×	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Veryhachium hyalodermum (Cooks.)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Table 3—Known Distribution of Organic Walled Microplankton in the Upper Jurassic of Great Britain

SPECIES	STAGE	Pre—Callovian Range (World)	Callovian				Oxfordian								Kimmeridgian																				Portl.	Post Jurassic Range (World)
	LOCALITY		N. Yorks.		Dorset		N. Yorks.	Dorset	N. Yorks.	S. Yorks.	Dorset	N. Yorks.	Dorset	N. Yorks.	Cambs.	Dorset	Skye	Skye	Surrey	Dorset	Surrey	Dorset	Surrey	Dorset	Surrey	Dorset	Surrey	Dorset	Surrey	Dorset	Surrey	Dorset	Norfolk	Surrey	Dorset	Surrey	Oxfords.	Dorset	Surrey	Dorset	
	ZONE		Macrocephalus	Calloviense	Jason	Coronatum to Lamberti	Mariae	Cordatum			Plicatilis			Transversarium to Pseudocordata	Baylei		Cymodoce	Mutabilis	Eudoxus		Autissiodorensis		Elegans	Scitulus		Wheatleyensis		Hudlestoni	Pectinatus		Pallasioides	Rotunda				
DINOFLAGELLATE TAXA																																				
Acanthaulax acanthosphaera (Sarj.)		..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
A. patiuros (Sarj.)		..	..	..	..	..	..	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
A. venusta (Klem.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Adnatosphaeridium aemulum (Defl.)		..	..	..	..	..	×	×	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
A. caulleryi (Defl.)		×	..	×	..	×	×	×	×	×	×	×	..	×	..	..	..	..	..	..	..	..	..	..	×	..	×	..	..	×	..	..	..	..	..	..	..	×
A. filamentosa (Cooks. & Eis.)		..	×	..	×	..	×	×	×	×	×	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..
A. paucispina (Klem.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	×	×	..	..	..	..	..	..	..	..
Apteodinium granulatum Eis.		..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..
A. cf. *maculatum* of Gitmez & Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	×	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..
Belodinium dysculum Cooks. & Eis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Chytroeisphaera chytroeides Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
C. hyalina (Defl.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	×	..	×	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..
C. mantelli Gitmez & Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	×	..	×	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..
C. pococki Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	×	..	×	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..
Cleistosphaeridium ehrenbergi (Defl.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	×	..	×	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..
C. lumectum (Sarj.)		..	..	..	..	..	..	..	..	..	..	..	..	×	..	×	..	×	..	×	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..
C. polyacanthum Gitmez.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
C. polytrichum (Val.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
C. tribuliferum (Sarj.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cryptarchaeodinium calcaratum (Defl.)		..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	×	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	×	..	..	..
C. cf. *calcaratum* of Downie		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hystrichosphaeridium costatum Davey & Williams		×	..	..	..	..	..	×	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×
Ctenidodinium ornatum Defl.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Dichadogonyaulax pannea (Norris)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
D. schizoblata (Norris)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Dictyopyxis areolata Cooks. & Eis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
D. cf. *reticulata* of Gitmez & Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Egmontodinium polyplacophorum Gitmez & Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Endoscrinium cf. *campanula* of Gitmez & Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
E. galeritum (Defl.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
E. luridum (Defl.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
E. oxfordianum (Sarj.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
E. subvallare (Sarj.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Epiplosphaera reticulospinosa (Klem.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Fromea warlinghamensis Gitmez & Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Gonyaulacysta aculeata (Klem.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. ambigua (Defl.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. angulosa Gitmez		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. cauda Gitmez		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. cladophora (Defl.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. dangeardi Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. culmula (Norris)*		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. ehrenbergi Gitmez		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. eisenacki (Defl.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. cf. *eisenacki* of Gitmez & Sarj.		×	..	..	..	..	×	..	..	×	..	×	..	×	×	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..
G. cf. *giuseppei* of Gitmez & Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. globata Gitmez & Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. gongylos Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. granulata (Klem.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. granuligera (Klem.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

*nomen nudum *Dichadogonyanlax culmula* (Norris)

Table 3 [contd.]—Known Distribution of Organic Walled Microplankton in the Upper Jurassic of Great Britain

3B	STAGE		Callovian				Oxfordian								Kimmeridgian																				Portl.	
	LOCALITY		N. Yorks.		Dorset		N. Yorks.	Dorset	N. Yorks.	S. Yorks.	Dorset	N. Yorks.	Dorset	N. Yorks.	Cambs.	Dorset	Skye	Skye	Surrey	Dorset	Surrey	Dorset	Surrey	Dorset	Surrey	Dorset	Surrey	Dorset	Surrey	Dorset	Norfolk	Surrey	Dorset	Surrey	Oxfords.	Dorset	Surrey	Dorset	
SPECIES	ZONE	Pre-Callovian Range (World)	Macrocephalus	Calloviense	Jason	Coronatum to Lamberti	Mariae	Cordatum			Plicatilis		Transversarium to Pseudocordata		Baylei		Cymodoce	Mutabilis	Eudoxus	Autissiodor.	Elegans		Scitulus		Wheatleyensis		Hudlestoni	Pectinatus		Pallasioides	Rotunda			Post Jurassic Range (World)	
G. cf. *helicoidea* of Gitmez																																				
G. hyaloderma (Defl.)																																				
G. jurassica (Defl.)																																				
var. *longicornis* (Defl.)																																				
G. longicarnis (Downie)																																				
G. cf. *mamillifera* of Gitmez																																				
G. nuciformis (Defl.)																																				
G. pachyderma (Defl.)																																				
G. perforans (Cooks. & Eis.)																																				
G. scarburghensis Sarj.																																				
G. serrata (Cooks. & Eis.)																																				
G. systremmatos Gitmez & Sarj.																																				
?G. transparens (Sarj.)																																				
Heslertonia pellucida Gitmez & Sarj.																																				
Hexagonifera jurassica Gitmez & Sarj.																																				
Histiophora cf. *ornata* of Gitmez & Sarj.																																				
Hystrichogonyaulax nealei Sarj.																																				
Hystrichosphaeridium petilum Gitmez & Sarj.																																				
Imbatodinium antennatum Gitmez & Sarj.																																				
I. cf. *villosum* of Gitmez																																				
Leptodinium aceras (Eis.)																																				
L. arcuatum (Klem.)																																				
L. amabilis (Defl.)																																				
L. cf. *crassinervum* of Gitmez & Sarj.																																				
L. egemenii Gitmez & Sarj.																																				
L. eumorphum (Cooks. & Eis.)																																				
L. freakei (Sarj.)																																				
L. mosaicum (Downie)																																				
L. cf. *subtile* of Gitmez & Sarj.																																				
Meiourogonyaulax caytonensis (Sarj.)																																				
?M. cristulata (Sarj.)																																				
M. dicryptos Gitmez & Sarj.																																				
M. pila Gitmez & Sarj.																																				
M. staffinensis Gitmez.																																				
Muderongia simplex Alberti																																				
Nannoceratopsis pellucida Defl.																																				
Netrelytron parum Gitmez & Sarj.																																				
N. stegastum Sarj.																																				
Occisucysta balios Gitmez																																				
O. monoheuriskos Gitmez & Sarj.																																				
Oligosphaeridium pulcherrimum (Defl. & Cooks.)																																				
Palaeohystrichophora infusorioides (Defl.)																																				
P. spinosissima (Defl.)																																				
Pareodinia ceratophora Defl.																																				
var. *pachyceras* Sarj.																																				
P. nuda (Downie)																																				
P. prolongata Sarj.																																				
Parvocavatus tuberosus Gitmez																																				
Pluriarcalium osmingtonense Sarj.																																				
Polysphaeridium deflandrei (Val.)																																				
Polystephanephorus calathus (Sarj.)																																				
P. paracalathus (Sarj.)																																				

TABLE 3 [contd.]—Known Distribution of Organic Walled Microplankton in the Upper Jurassic of Great Britain

SPECIES	ZONE	Pre-Callovian Range (World)	Callovian				Oxfordian								Kimmeridgian																				Portl.	Post Jurassic Range (World)
	LOCALITY		N. Yorks.		Dorset		N. Yorks.	Dorset	N. Yorks.	S. Yorks.	Dorset	N. Yorks.	Dorset	N. Yorks.	Cambs.	Dorset	Skye	Skye	Surrey	Dorset	Surrey	Dorset	Surrey	Dorset	Surrey	Dorset	Surrey	Dorset	Surrey	Dorset	Norfolk	Surrey	Dorset	Surrey	Oxfords.	Dorset	Surrey	Dorset	
			Macrocephalus	Calloviense	Jason	Coronatum to Lamberti	Mariae	Cordatum			Plicatilis			Transversarium to Pseudocordata	Baylei		Cymodoce	Mutabilis	Eudoxus		Autissiodor.		Elegans		Scitulus		Wheatleyensis			Hudlestoni	Pectinatus		Pallasioides		Rotunda			
P. sarjeantii Gitmez		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..
Prolixosphaeridium cf. *deirense* of Gitmez		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
P. granulosum (Defl.)		..	..	..	..	..	..	..	..	..	..	..	..	×	×	×	×	×	×	..	..	..	..	×	..	..	..	..	..	×	..	×	..	×	..	..	..	×
P. parvispinum (Defl.)		..	..	..	..	..	..	..	..	×	..	..	..	..	×	×	×	×	×	..	..	..	..	..	..	..	..	..	..	×	..	×	..	×	..	×	..	×
Psaligonyaulax apaleta (Cooks. & Eis.)		..	..	..	..	..	..	..	..	..	..	..	..	..	×	×	×	×	..	..	..	..	..	..	..	..	..	..	..	×	..	×	..	×	..	×	..	..
Scriniodinium bicuneatum (Defl.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	×	×	..	..	..	..	..	..	..	×	..	..	..	×	..	×	..	×	..	×	..	..
S. ceratophorum (Cooks. & Eis.)		..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
S. crystallinum (Defl.)		..	..	..	..	..	..	..	×	×	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
S. dictyotum Cooks. & Eis.		..	..	..	..	..	×	..	..	×	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
sub sp. *osmingtonense* Gitmez		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
sub sp. *papillatum* Gitmez		..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
sub sp. *pyrum* Gitmez		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
S. hyalodermum (Defl.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..
S. playfordi Cooks. & Eis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
S. subvallare Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Sirmiodinium grossi Alberti		..	..	..	..	..	..	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×
Spiniferites ramosus (Ehr.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Stephanelytron caytonense Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
S. redcliffense Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
S. scarburghense Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
S. cf. *scarburghense* of Gitmez & Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Surculosphaeridium cribrotubiferum (Sarj.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
S. vestitum (Defl.)		×	..	..	..	..	×	×	×	×	×	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Systematophora areolata Klem.		..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
S. orbifera Klem.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
S. ovata Gitmez		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
S. valensi Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Taeniophora iunctispina Klem.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tenua capitata (Cooks. & Eis.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
T. cf. *capitata* of Gitmez.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
T. echinata Gitmez & Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
T. hystrix Eis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
T. pilosa (Ehr.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
T. vioulti Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
T. villersense Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Vulensiella ovula Defl.		×	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Wanaea fimbriata Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
ACRITARCH & TASMANITID TAXA																																					
Aurosphaera calloviensis Sarj.		..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Baltisphaeridium downiei Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	×	..	..	..	×	..	..	..	..	..	..
B. inusitatum Klem.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	×	..	×	..	..	..	×	..	..	..	..	..	..
Chlamydophorella wallala Cooks. & Eis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cymatiosphaera areolata (Defl.)		..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
C. parva Sarj.		..	..	..	..	..	..	..	×	×	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
C. teichophera Sarj.		..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Palaestomocystis sinuosa Cooks. & Eis.		..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pterospermopsis australiensis Cooks. & Defl.		..	..	..	..	..	..	..	..	..	..	..	..	..	×	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	×
P. harti Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
P. helios Sarj.		×	..	..	..	..	..	..	..	×	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×
Solisphaeridium brevispinosum (Sarj.)		..	×	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Table 3 [contd.]—Known Distribution of Organic Walled Microplankton in The Upper Jurassic of Great Britain

3D	STAGE	Pre-Callovian Range (World)	Callovian				Oxfordian								Kimmeridgian																				Portl.	Post Jurassic Range (World)
	LOCALITY		N. Yorks.		Dorset		N. Yorks.	Dorset	N. Yorks.	S. Yorks.		Dorset	N. Yorks.	Dorset	N. Yorks.	Cambs.	Skye	Skye	Dorset	Surrey	Dorset	Surrey	Dorset	Surrey	Dorset	Surrey	Dorset	Surrey	Dorset	Surrey	Dorset	Norfolk	Surrey	Dorset	Surrey	Oxfords.	Dorset	Surrey	Dorset	
SPECIES	ZONE		Macrocephalus	Calloviense	Jason	Coronatum to Lamberti	Mariae	Cordatum			Plicatilis		Transversarium to Pseudocordata			Baylei		Cymodoce	Mutabilis	Eudoxus	Autissiodor.		Elegans		Scitulus		Wheatleyensis		Hudle-toni	Pectinatus		Pallasioides	Rotunda			
S. claviculorum (Defl.)		..	×	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
S. stimuliferum (Defl.)		..	×	..	..	..	×	..	..	..	..	..	..	..	..	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Staplinium cistum Gitmez.		×	×	..	×	..	×	..	..	×	..	..	..	..	..	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Leiosphaeridia similis Cooks. & Eis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Micrhystridium ambiguum Defl.		..	×	..	×	..	..	..	..	×	..	..	..	..	..	×	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. crassimuratum Sarj.		..	×	..	×	..	..	×	..	×	..	..	..	..	..	×	×	×	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. deflandrei Val.		×	×	..	×	..	..	×	..	×	..	..	..	..	..	×	×	×	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. fragile Defl.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. inconspicuum (Defl.)		×	×	..	×	..	×	×	..	×	..	..	..	..	..	×	×	×	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. cf. inconspicuum of Sarj.		×	×	..	×	..	×	×	..	×	..	..	..	..	..	×	×	×	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. cf. mendax of Sarj.		×	×	..	×	..	×	×	..	×	..	..	..	..	..	×	×	×	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. piliferum Defl.		×	×	..	×	..	×	×	..	×	..	..	..	..	..	×	×	×	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. cf. piveteaui of. Sarj.		×	×	..	×	..	×	×	..	×	..	..	..	..	..	×	×	×	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. polyedricum Val.		×	×	..	×	..	×	×	..	×	..	..	..	..	..	×	×	×	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. rarispinum Sarj.		×	×	..	×	..	×	×	..	×	..	..	..	..	..	×	×	×	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. recurvatum Val.		×	×	..	×	..	×	×	..	×	..	..	..	..	..	×	×	×	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. rhopalicum Sarj.		×	×	..	×	..	×	×	..	×	..	..	..	..	..	×	×	×	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. sydus Val.		×	×	..	×	..	×	×	..	×	..	..	..	..	..	×	×	×	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Veryhachium aster Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
V. hyalodermum (Cooks.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
V. tetraxis (Sarj.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
V. valensii (Downie & Sarj.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Table 4—Known Distribution of Organic Walled Microplankton in the Middle-Upper Jurassic of France

SPECIES	STAGE	Pre Bajocian Range (World)	M. Jurassic	Bajocian	Bathonian	U. Bathonian L. Callovian	Callovian	Oxfordian	Kimmeridgian													U. Jurassic	Portlandian	Post Jurassic Range (World)
	LOCALITY		Aquitaine	N. W. France		Not Localised	Normandy		Boulonnais	Normandy	Pas de Calais	Crussol (Rhone)	Normandy	Lorraine	Crussol (Rhone)	Jura	Pas de Calais	Crussol (Rhone)		Boulonnais		Jura	Jura	Aquitaine		
	ZONE						Calloviense	Lamberti	Mariae	Cordatum	Baylei				Cymodoce			Mutabilis	Eudoxus to Autissiodorensis	Elegans	Scitulus to Hudlestoni	Pectinatus	Pallasioides	Rotunda			
DINOFLAGELLATE TAXA																										
Acanthaulax acanthosphaera (Sarj.)			×																							
A. paliuros (Sarj.)																										
A. venusta (Klem.)				×																						
Adnatosphaeridium aemulum (Defl.)					×																					
A. caulleryi (Defl.)						×																				
A. paucispinum Klem.																										
Apteodinium granulatum Eis.																										
A. cf. *maculatum* of Gitmez & Sarj.																										
Chytroeisphaeridia chytroeides Sarj.																										
C. cf. *chytroeides* of Sarj.																										
C. mantellii Gitmez & Sarj.																										
C. pocockii Sarj.																										
Cleistosphaeridium ehrenbergi (Defl.)																										
C. multifurcatum (Defl.)																										
C. polytrichum (Val.)																										
C. tribuliferum (Sarj.)																										
Hystrichosphaeridium costatum Davey & Williams																										
Gyptarchaeodinium calcaratum (Defl.)																										
Glenidodinium combazi Dupin																										
G. ornatum (Defl.)																										
G. tenellum (Defl.)																										
Dictyopxis areolata Cooks & Eis.																										
D. reticulata (Val.)																										
D. cf. *reticulata* of Gitmez & Sarj.																										
Endoscrinium cf. *campanula* of Gitmez																										
E. galaritum (Defl.)																										
E. luridum (Defl.)																										
E. oxfordianum (Sarj.)																										
Epiplosphaera reticulospina Klem.																										
Gonyaula ysta aculeata (Klem.)																										
G. ambigua (Defl.)																										
G. angulosa Gitmez																										
G. cauda Gitmez																										
G. eladophora (Defl.)																										
G. cornigera (Val.)																										
G. dangeardi Sarj.																										
G. dictyophora (Defl.)																										
G. ehrenbergi Gitmez																										
G. eisenacki (Defl.)																										
G. of. *eisenacki* of Gitmez & Sarj.																										
G. cf. *giuseppei* of Gitmez & Sarj.																										
G. gongylos Sarj.																										
G. gottisi Dupin																										
G. granulata (Klem.)																										
G. granuligera (Klem.)																										
G. cf. *helicoidea* of Gitmez																										
G. hyaloderma (Defl.)																										
G. hyalodermopsis (Cooks. & Eis.)																										

Table 4 [contd.]—Known Distribution of Organic Walled Microplankton in the Middle-Upper Jurassic of France

SPECIES	STAGE	Pre Bajocian Range (World)	M. Jurassic	Bajocian	Bathonian	U. Bathonian L. Callovian	Callovian		Oxfordian		Kimmeridgian																U. Jurassic	Portlandian	Post Jurassic Range (World)
	LOCALITY		Aquitaine	N.W.France		Not Localised	Normandy				Boulonnais	Normandy	Pas de Calais	Crussol (Rohne)	Normandy	Lorraine	Crussol (Rhone)	Jura	Pas de Calais	Crussol (Rhone)		Boulonnais		Jura		Jura	Aquitaine		
	ZONE						Calloviense	Lamberti	Mariae	Cordatum	Baylei				Cymodoce			Mutabilis		Eudoxus to Autissiodorensis	Elegans	Scitulus to Hudlestoni		Pectinatus	Pallasioides	Rotunda			
G. jurassica (Defl.)		..	..	..	×	..	×	×	×	×	×	×	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..
var. *longicornis* (Defl.)		..	..	..	..	..	..	..	..	..	×	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. longicornis Downie		..	..	..	..	..	..	..	..	..	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..
G. mamillifera (Defl.)		..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..
G. cf. *mamillifera* of Gitmez		..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..
G. nannotrix (Defl.)		..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..
G. nuciformis (Defl.)		..	×	..	..	..	..	..	×	..	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. orthoceras (Eis.)		..	×	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. scarburghensis Sarj.		..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. serrata Cooks. & Eis.)		..	..	..	..	..	..	..	..	..	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. systremmatos Gitmez & Sarj.		..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Heslertonia pellucida Gitmez & Sarj.		..	..	..	..	..	..	..	..	..	×	×	×	..	×	×	..	×	×	..	..	..	..	..	..	..	..	..	..
Hexagonifera jurassica Gitmez & Sarj.		..	..	..	..	..	..	..	..	..	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Histiophora cf. *ornata* of Gitmez & Sarj.		..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hystrichogonyaulax nealei (Sarj.)		..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
H. cf. *nealei* of Sarj.		..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hystrichosphaeridium cornigerum Defl.		..	×	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
H. petilum Gitmez & Sarj.		..	..	..	..	..	..	..	..	..	×	×	×	..	×	..	..	×	..	..	..	..	..	..	..	..	..	..	..
Imbatodinium antennatum Vozz.		..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Leptodinium amabilis (Defl.)		..	..	..	..	..	..	..	..	..	×	×	×	×	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..
L. arcuatum Klem.		..	..	..	..	..	..	..	..	..	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
L. clathratum (Cooks. & Eis.)		..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
L. crassinervum (Defl.)		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
L. egemenii Gitmez & Sarj.		..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
L. hyalodermum Defl.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
L. cf. *subtile* of Gitmez		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Lithodinia jurassica Cooks. & Eis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Meiourogonyautax deflandrei Val.		..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. dicryptos Gitmez & Sarj.		..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. rioulti Sarj.		..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. staffinensis Gitmez		..	..	..	..	..	..	..	..	..	×	×	..	..	..	..	..	×	..	..	..	..	×	..	..	..	..	..	..
Mederongia simplex Alberti		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Nannoceratopsis pellucida Defl.		..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
N. spiculata Stover		..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Netrelytron parum Gitmez & Sarj.		..	..	..	..	..	..	..	..	..	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
N. stegastum Sarj.		..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Occisucysta balios Gitmez		..	..	..	..	..	..	..	..	..	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Oligosphaeridium pulcherrimum		..	..	..	..	..	..	..	..	..	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Palaeohystrichophora spinosissima (Defl.)		..	×	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pareodinia ceratophora Defl.		×	..	×	..	..	×	×	×	×	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
P. prolongata Sarj.		..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Parvocavatus tuberosus Gitmez		..	..	..	..	..	..	..	..	..	×	..	×	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..
Polysphaeridium paulina e(Val.)		..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Polystephanephorus paracalathus (Sarj.)		..	..	..	..	..	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
P. sarjeantii Gitmez		..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Prolixosphaeridium granulosum (Defl.)		..	..	..	..	..	..	..	..	..	×	×	×	..	×	×	..	×	×	..	..	..	..	..	..	..	..	..	..
Psaligonyaulax apaleta (Cooks. & Eis.)		..	..	..	..	..	..	..	..	..	×	×	×	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..
Pyxidiella scrobiculata Cooks. & Eis.		..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Scriniodinium crystallinum (Defl.)		..	..	..	..	..	..	..	×	×	×	×	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Table 4 [contd.]—Known Distribution of Organic Walled Microplankton in the Middle-Upper Jurassic of France

STAGE		Pre Bajocian Range (World)	M. Jurassic	Bajocian	Bathonian	U. Bathonian L. Callovian	Callovian		Oxfordian		Kimmeridgian																	U. Jurassic	Portlandian	Post Jurassic Range (World)
LOCALITY			Aquitaine	N.W.France		Not Localised	Normandy				Boulonnais	Normandy	Pas de Calais	Crussol (Rhone)	Normandy	Lorraine	Crussol (Rhone)	Jura	Pas de Calais	Crussol (Rhone)			Boulonnais		Jura		Jura	Aquitaine		
ZONE							Calloviense	Lamberti	Mariae	Cordatum	Baylei				Cymodoce			Mutabilis			Eudoxus to Autissiodorensis	Elegans	Scitulus to Hudlestoni	Pectinatus	Pallasioides	Rotunda			
SPECIES																														
S. dictyotum Cooks. & Eis.		..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
subsp. *bapillatum* Gitmez		..	..	..	..	..	..	..	..	..	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
subsp. *pyrum* Gitmez		..	..	..	..	..	..	..	..	..	×	..	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
S. cf. *galeritum* of Gitmez		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
S. luridum (Defl.)		..	×	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
S. playfordi Cooks. & Eis.		..	..	..	..	..	..	..	..	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Stephanelytron caytonense Sarj.		..	..	..	..	..	..	..	..	..	×	..	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
S. redcliffense Sarj.		..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
S. scarburghense Sarj.		..	..	..	..	..	..	..	..	..	×	..	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Surculosphaeridium cribrotubiferum (Sarj.)		..	..	..	×	..	..	..	..	..	×	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
S. vestitum (Defl.)		..	..	..	..	×	..	..	..	..	×	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Systematophora areolata Klem.		..	..	..	..	..	..	×	×	×	×	×	×	×	×	×	×	..	×	×	..	..	..	..	..	..	..	..	..	..
S. cf. *areolata* of Sarj.		..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
S. orbifera Klem.		..	×	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..
Taeniophora iunctispina Klem.		..	..	..	..	..	..	..	..	..	×	×	×	×	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tenua capitata (Cooks. & Eis.)		..	..	..	..	..	..	..	..	..	×	..	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
T. echinata Gitmez & Sarj.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..
T. hystrix Eis.		..	×	..	..	..	..	..	×	×	×	×	×	×	..	×	..	..	×	..	..	..	..	..	×	..	..	×	..	..
T. pilosa (Ehr.)		..	..	..	..	..	..	..	..	..	×	..	..	..	×	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..
T. rioulti Sarj.		..	..	..	..	..	..	×	×	×	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..
T. verrucosa Sarj.		..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
T. villersense Sarj.		..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Valensiella ovula (Defl.)		..	..	..	×	..	×	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Wanaea digitata Cooks. & Eis.		..	..	..	..	..	..	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
W. fimbriata Sarj.		..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
ACRITARCH & TASMANITID TAXA																														
Baltisphaeridium inusitatum Klem.		..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
B. pattei (Val.)		..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cymatiosphaera areolata (Defl.)		×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
C. dictyophora (Val.)		×	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
C. eupeplos (Val.)		..	..	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
C. exilissima (Defl.)		..	..	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
C. placophora (Val.)		..	..	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Leiosphaeridia wenlockia Downie (note D)		×	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Leiosphaeridia communis (Naumova) [note D]		×	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Micrhystridium ambiguum Defl.		..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. arachnoides Val.		×	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. bigoti Defl.		×	..	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. biornatum Defl.		..	..	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. castaninum Val.		..	..	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. cometes Val.		..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
? M. crassimuratum Sarj.		..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. deflandrei Val.		×	..	..	×	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. densispinum Val.		..	..	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. echinoides Val.		×	..	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. filigerum Val.		×	..	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. fragile Val.		..	..	×	×	×	×	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
M. inconspicuum (Defl.)		..	..	×	×	×	×	×	×	×	×	×	×	×	×	×	×	..	×	×	..	..	..	..	..	..	..	×	..	×

Table 4 [contd.]—Known Distribution of Organic Walled Microplankton in the Middle-Upper Jurassic of France

SPECIES	ZONE	LOCALITY	STAGE	
M. lagynophorum Val.	Pre Bajocian Range (World)			
M. leptolirix Val.		Aquitaine	N. Jurassic	
M. lucasi Val.		N. W. France	Bajocian	
M. mastigophorum Val.				
M. nannacanthum Val.			Bathonian	
M. pieteaui Val.		Not Localised	U. Bathonian L. Callovian	
M. cf. *pieteaui* of Sarj.	Calloviense	Normandy	Callovian	
M. polyedricum Val.	Lamberti			
M. rarisphinum Sarj.	Mariae		Oxfordian	
M. recurvatum Val.	Cordatum			
M. rhopalicum Sarj.	Baylei	Boulonnais	Kimmeridgian	
M. roquesi Val.		Normandy		
M. sculospinum Val.		Pas de Calais		
M. sydus Val.		Crussol (Rhone)		
M. tenuissimum Val.	Cymodoce	Normandy		
M. variabile Val.		Lorraine		
Palaeostomocystis sphaerica (Defl.)		Crussol (Rhone)		
Pterospermopsis australiensis Cooks. & Defl.	Mutabilis	Jura		
P. hartii Sarj.		Pas de Calais		
P. helios Sarj.		Crussol (Rhone)		
Solisphaeridium brevispinosum (Sarj.)	Eudoxus to Autissiodorensis			
S. clavicularum (Defl.)	Elegans			
S. stimuliferum (Defl.)	Scitulus to Hudlestoni	Boulonnais		
Staplinium cistum Gitmez	Pectinatus			
Veryhachium aster Sarj.	Pallasioides	Jura		
V. valensii Downie & Sarj	Rotunda			
		Jura		
		Aquitaine	U. Jurassic	
			Portlandian	
	Post Jurassic Range (World)			