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REMARKS ON AGGLOMERATIONS OF MEGASPORES *MINERISPORITES INSTITUS* MARC.

Uwagi o skupieniach megaspor *Minerisporites institus* Marc.

ABSTRACT. In the paper are presented agglomerations of megaspores *Minerisporites institus* Marc. found in Upper Liassic sediments in Poland. The supposition is expressed that they can be assigned to the *Isoëtaceae*.

INTRODUCTION

While collecting material for the establishing of biostratigraphy of megaspores of Rhaetic and Liassic sediments in Poland I found in the sediments of the Upper Lias in the region of Mosiny, Fore-Sudetic zone a few agglomerations of megaspores which I regard as fragments of sporangia. One of those fragments showing six megaspores identified on the basis of morphological similarity with *Minerisporites institus* Marc., had been presented in the paper of Marcinkiewicz (1971, Pl. 18, fig. 5). The mentioned species *M. institus* Marc. had then been treated as synonym of the species *M. richardsonii* (Murray) Potonié. In addition, in this paper the supposition had been expressed that the megaspores *M. institus* Marc. were formed in sporangia in great numbers. This became the basis of comparison with illustrations in the paper of Harris (1961, Text-fig. 14E, F) representing two megaspore groups of *Triletes phyllicus* Murray (*Paxillitrilites phyllicus* (Murray) Hall et Nicolson 1973) one of which contains 11 megaspores and the other 25 megaspores. According to Harris they may have been formed in cutinized sporangia more similar to sporangia of *Lepidostrobus* than to those of *Selaginella*. As a result, Harris expressed the supposition that megaspores of *P. phyllicus* (Murray) Hall et Nicolson found in groups can be attributed to lepidodendrons or to plants similar to the recent genus *Isoëtes*. Marcinkiewicz guided by the quoted above suggestions of Harris decided that the agglomerations of *Minerisporites institus* Marc. can be linked with *Lepidostrobus*. This is connected with the fact that in megasporangia of *Lepidostrobus* cones were found large numbers of megaspores — up to a hundred or even several hundreds (Abbot 1963; Chaloner 1953a, b; Felix 1954).

Recently Waksmundzka (1982) discussing some species of megaspores found in Lower Cretaceous sediments in Poland, presents among others megaspores which in her treatment belong to the species *Minerisporites richardsonii* (Murray) Potonié. Discussing the botanical affinities of this species the mentioned author

takes into consideration also the relation of the fragment of sporangium illustrated in the paper of Marcinkiewicz (1971) with *Lepidostrobus*, and writes: "As to *M. richardsoni*, however, a fragmentary macrosporangium of unknown shape and size and partially preserved contents, hardly could justify its affiliation to the genus *Lepidostrobus*". In conclusion, Waksmundzka refers to the suggestion of Singh (1964) which is based, as it seems, on earlier opinions of Miner (1935) and Potonié (1956) — and writes "...all *Minerisporites* correspond to family *Selaginellaceae*".

In connection with those opinions it seems reasonable to present the remaining, so far not illustrated agglomerations (Pl. I, II) which show a large number of *Minerisporites institus* Marc. megaspores, and to stress the fact that those spores were not found in separate tetrads but agglomerations which excludes the possibility of linking them with the *Selaginellaceae*. It is interesting to note that Batten (1969, p. 347) found in the British Wealden a "spore mass" of *Minerisporites alius* Batten.

More recent investigations of Melchior (1977) and Sukh-Dev (fide Melchior & Hall 1983) were based on the material of *Isoëtes horridus* (Dawson) Brown, originating from Wannagan Creek (Palaeocene) in North Dakota. They gave interesting results which contributed to better elucidation of the botanical affinity of megaspores from the genus *Minerisporites*. Their main importance is based on the fact that in megasporangia of *Isoëtes horridus* (Dawson) Brown were present numerous megaspores (20—37) which because of their morphological similarity were identified with dispersed megaspores *Minerisporites mirabilis* (Miner) Potonié. In this was provided evidence in favour of the affinity of *M. mirabilis* (Miner) Potonié with the *Isoëtaceae*. There was also confirmed the correctness of the opinion of Hall (1963) about the affinity of the genus *Minerisporites* with the *Isoëtaceae*.

The quoted observations justify the similar assumptions as for the botanical affinity of the dispersed spores of *M. institus* Marc. In favour of the possibility to link those megaspores with the *Isoëtaceae* seems to speak the fact that they were found in agglomerations containing 40 or more spores. In the light of the mentioned observations the agglomerations of *M. institus* Marc. megaspores — linked previously by this author with *Lepidostrobus* (*Lepidodendraceae*) — can at present be with a greater probability attributed to the *Isoëtaceae*. In connection however, with the small amount of known data on the representatives of heterosporous lycophytes it cannot be excluded that in the Mesozoic there existed still other groups of plants apart from the *Isoëtaceae* which produced megaspores of the genus *Minerisporites*.

SYSTEMATIC PART

Class *Lycopsida*
Order *Isoëtales*
Family *Isoëtaceae*
Genus *Minerisporites* Potonié, 1956
Minerisporites institus Marcinkiewicz
Pl. II, figs. 2—4

1960 *Minerisporites institus* Marcinkiewicz, Marcinkiewicz, p. 722, Pl. 6, figs. 4, 5.
1965 *Thomsonia phyllicus* (Murray 1939) Stoermer, Wienholz, Pl. 10, fig. 88.
1971 *Minerisporites richardsoni* (Murray) Potonié, Marcinkiewicz, p. 38, Pl. 17, figs. 6, 7, Pl. 18, figs. 1—6.

1980b *Minerisporites institus* Marcinkiewicz, Marcinkiewicz, p. 87, Pl. 22, figs. 5—7.
1982 *Minerisporites institus* Marcinkiewicz: Yang & Sun: Pl. 2, fig. 2.

Description. See Marcinkiewicz (1960, p. 722).

Occurrence. Poland: This species appears in the uppermost part of the Pliensbachian, and is numerous in the brackish — limnic sediments of the Toarcian, DDR: Toarcian ("green series"); China: Lower Jurassic.

Remarks. The species *M. institus* had been described for the first time by Marcinkiewicz (1960) from the sediments of the Toarcian in Poland. In her later work (Marcinkiewicz 1971) it was attributed to the Middle Jurassic species *M. richardsonii* (Murray) Potonié, illustrated in the papers of Murray (1939) and Harris (1961). Certain characters in which the Liassic megaspores differ from Middle Jurassic megaspores were then treated as results of variability inside the species *M. richardsonii* (Murray) Potonié.

In the following paper (1980a, p. 46) the author published the remark that megaspores connected with the Upper Liassic sediments in Poland do not fit after all the species *M. richardsonii* (Murray) Potonié known from the Middle Jurassic Deltaic series of England, because they are larger and in addition they differ in having strongly developed auricles reaching 200 μm. As a result of these differences, this author puts forward the proposition to treat the Liassic megaspores as a separate species, under the previous name *M. institus* Marc. which is done also in the present paper.

Agglomeration of megaspores of *Minerisporites institus* Marc.

Pl. I, figs. 1—3; Pl. II, fig. 1

Material. Five agglomerations of well preserved megaspores (IG 506/93/M., IG 506/112—114/M., IG 506/a—1/M).

Description. Megaspore agglomeration flattened in the shape of an elongated wedge. The largest agglomeration is 2100 μm long and up to 1480 μm wide, it contains 40 or more megaspores. The smallest agglomeration contains six megaspores.

Occurrence. Fore-Sudetic zone, region of Mosiny (bore-hole 126/32, depth 286.5 m), Toarcian.

Remarks. The megaspores occurring in agglomerations are morphologically similar to dispersed megaspores *M. institus* Marc.

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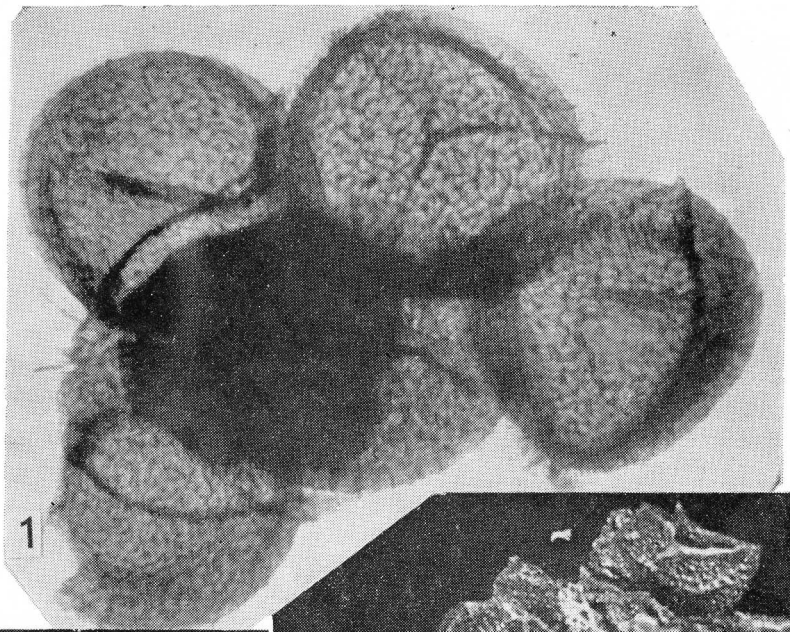
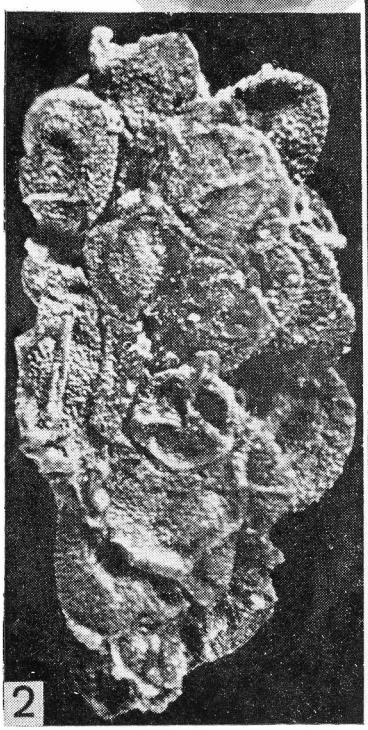
PLATE

Plate I

Minerisporites institus Marc.
Bore-hole 126/32, 286.5 m

1. Megaspore agglomeration in transmitted light, × 70
2, 3. Megaspore agglomeration in reflected light, × 50





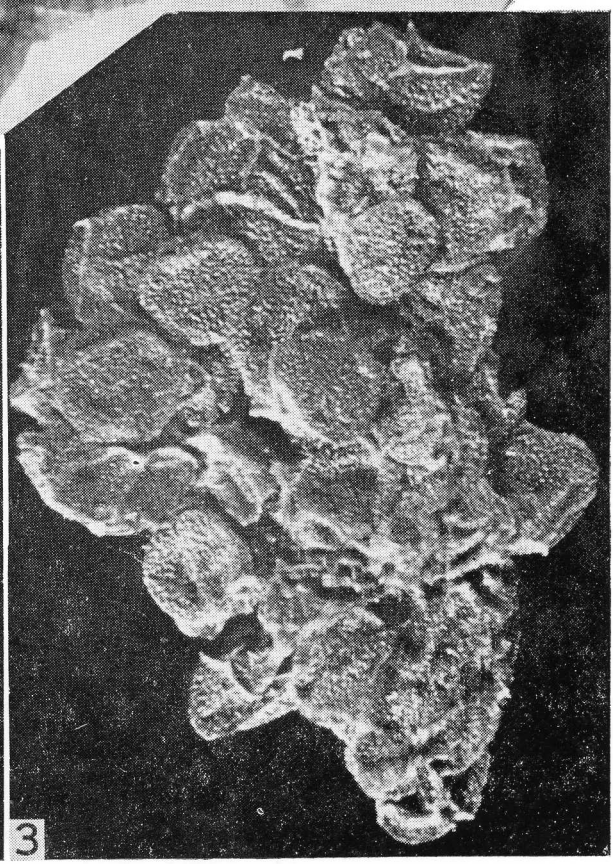


Plate II

Minerisporites institus Marc.

1. Megaspore agglomeration in reflected light, bore-hole 126/32, 286.5 m, × 50
2. Megaspore in SEM, bore-hole Gorzów Wielkopolski IG 1, 774,1 m, × 120
3. Megaspore in reflected light, bore-hole Gorzów Wielkopolski IG 1, 774,1 m, × 100
4. Megaspore in SEM, bore-hole Gorzów Wielkopolski IG 1, 782,9 m, × 100