

Meded. Rijks Geo

Enclosure 2 — Selected spore ranges and the Carboniferous system in Western

Comments on Systematics

(The following brief notes are supplied to the range chart)

- Hytriosporites* spp. MCGREGOR 1966, *rosapora capillata* DOLBY & NEVES 1970, and bifurcate appendages. The youngest (Namur Basin).
- Auroraspora byalina* (NAUMOVA) STREEL previously assigned to *Endosporites* (E.).
- Hymenozonotriletes cassicus* HIGGS. This species must not be confused with and has a thicker exoexine bearing surface. *Hymenozonotriletes lepidophytus* could be considered a senior synonym of *Rugospora flexuosa* (JUSCH) STREEL in the group of spores as *Hymenozonotriletes* STREEL 1971 and HIGGS 1975 (where New York State previously studied by them have referred to this species as *Trachytriletes* material to *Trachytriletes* (ex *Camptotriletes*).
- Rugospora flexuosa* (JUSCH) STREEL in the group of spores as *Hymenozonotriletes* STREEL 1971 and HIGGS 1975 (where New York State previously studied by them have referred to this species as *Trachytriletes* material to *Trachytriletes* (ex *Camptotriletes*).
- Grandispora cornuta* HIGGS 1975. The significance by STREEL in B.B.S.T., 1974.
- Spelaotriletes lepidophytus* (KEDO) STREEL. Representatives of this species bear sparse small proximal surface. Coni are considered. This species in the present work including GOLUBZOV 1971 and *tener* KEDO 1966 varieties *macroreticulatus* KEDO 1974 being considered a synonym of *Endosporites*.
- Vallatisporites pusillites* (KEDO) DOLBY to the currently held opinions of western sparse spinose and often bifurcate elements numerous minute spinose elements. The *pusillites* KEDO 1957 which would refer to QUEBARD.
- Corbulispora* sp. - The majority of the *cancellata* (WALTZ) BHARADWAJ & V. frequently impossible.
- Hymenozonotriletes explanatus* (LUBER) 1941, tab. 1, fig. 4 has a different density KEDO 1963, tab. 6, where figs. 144 are whose size and density is more comparable.
- Rastriackia corynoides* SULLIVAN 1968. synonym of *R. corynoides* if it is accepted and the specimen figured on the dome elements and a trilete mark extending to the margin.
- Lophozonotriletes malevkansis* KEDO (LUBER) KEDO 1957 on the basis of the graphic ranges of the two taxa are quite different.
- Lycospora subtriquetra* (LUBER) POTOMI probable synonym of *L. rotunda* BHARADWAJ & WILHE & BLESS 1974 as *Triquitrites venosus*.
- Potonieisporites* spp. *P. getriaensis* B. in the Haaksbergen borehole in the Netherlands in the Stephanian and Autunian.

	DEVONIAN			Tournaisian			DINANTIAN			Viséan			Namurian			SILESIAN	
	Fa 2a	Fa 2b	Fa 2c	Tn 1a	Tn 1b	Tn 2	Tn 3	V 1-2	V 3	A	B	C	A	B			
Hystriospores spp. (1)																	
Auroraspora hyalina (2)																	
Grandispora gracilis																	
Rugospora versabilis																	
Retusotriletes incohnatus																	
Auroraspora macra																	
Densospores spp.																	
Hymenozonitriletes cassicus (3)																	
Rugospora hexuosa (4)																	
Grandispora cornuta (5)																	
Raistrickia variabilis																	
Spelaotriletes lepidophytus (6)																	
Vallatisporites pustillites (7)																	
Grandispora echnata																	
Corbulispora spp. (8)																	
Hymenozonitriletes explanatus (9)																	
Raistrickia corynoides (10)																	
Lophozonitriletes malawensis (11)																	
Vallatisporites verrucosus																	
Verrucosporites nitidus																	
Lophozonitriletes cristifer																	
Dibolisporites distinctus																	
Vallatisporites vallatus																	
Raistrickia clavata																	
Spelaotriletes pretiosus																	
Crassispora trychera																	
Schopffites claviger																	
Convolutispora circumvallata																	
Lycospora spp.																	
Perothites tessellatus																	
Crassispora aculeata																	
Schulzospora spp.																	
Raistrickia nigra																	
Triparitites spp.																	
Spelaotriletes arenaceus																	
Rotaspora spp.																	
Triquitrites spp.																	
Grandispora spinosa																	
Savitrspores nux																	
Bellisporites spp.																	
Cingulizonates cf. capistratus																	
Punctatisporites sinuatus																	
Crassispora kosankei																	
Fiorinites spp.																	
Cirratiradites saturni																	
Stenozonitriletes triangulus																	
Krauselisporites ornatus																	
Lycospora subtriquetra (12)																	
Laevigatosporites spp.																	
Grumosporites varioreticulatus-maculatus																	
Raistrickia fulva																	
Reticulatisporites reticulatus																	
Dicyotriletes bireticulatus																	
Cingulizonates loricatus																	
Vestispora costata-cancellata																	
Radizzonates aligerens																	
Punctatisporites spp.																	
Westiphanensisporites irregularis (13)																	
Disacclites non striatiti																	
Microreticulatisporites nobilis																	
Fiorinites junior																	
Vestispora tenastata																	
Torisporea spp.																	
Disacclites str.																	
Lundbladisporea																	
Potonielispores																	
Late																	
Spinospor																	
Polymer																	
Savitrsp.																	

Zone of maximum presence

 Zone of reduced and discontinuous presence

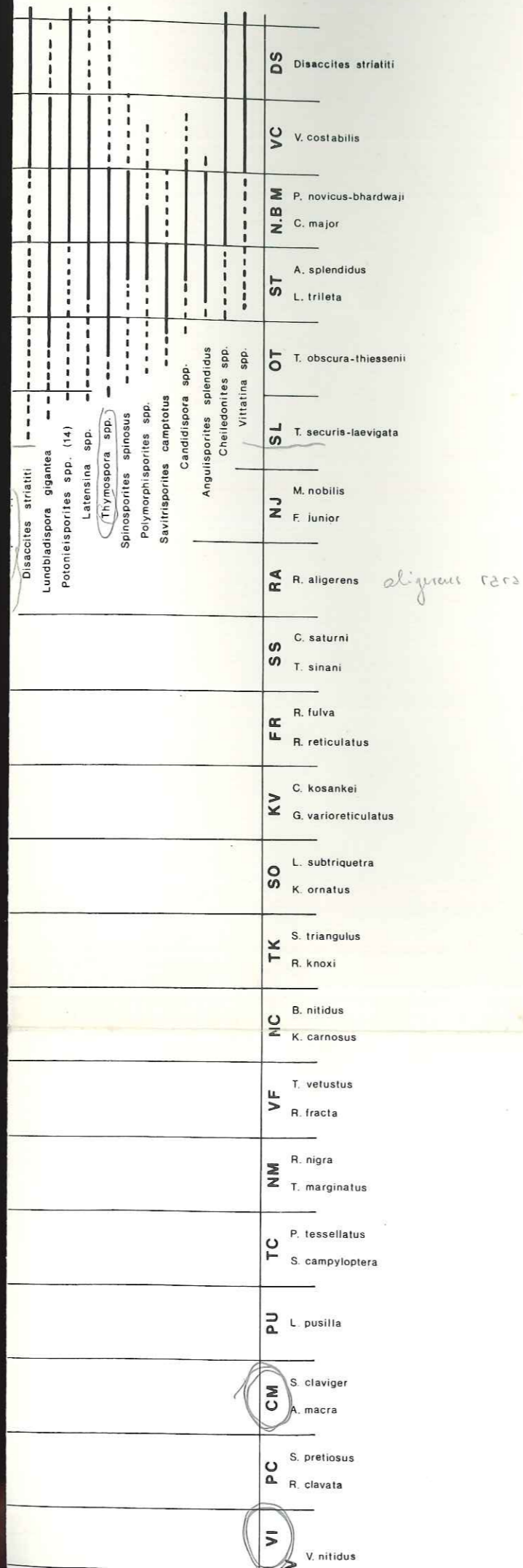
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Enclosure the

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Meded. Rijks Geol. Dienst, Vol. 29

Enclosure 2 — Selected spore ranges and spore zonation of the Carboniferous system in Western Europe



Comments on Systematics

(The following brief notes are supplied to clarify the taxonomic interpretations of certain species listed on the range chart)

- Hystricosporites* spp. MCGREGOR 1960 - includes typical representatives of *Hystricosporites* and *Ancyrospora capillata* DOLBY & NEVES 1970, i.e. spores with a central body bearing an ornament of multifurcate and bifurcate appendages. The youngest occurrence is known in the upper part of the PL zone in Tn 1 b (Namur Basin).
- Auroraspora hyalina* (NAUMOVA) STREEL in B.B.S.T., 1974. Concept of species expanded to accommodate forms previously assigned to *Endosporites* (*E. minutus* HOFFMEISTER, STAPLIN & MALLOY) and *Discernisporites*.
- Hymenozonotriletes cassicus* HIGGS 1975 (synonym of *Spelaotriletes* sp. A. STREEL in B.B.S.T., 1974). This species must not be confused with *S. lepidophytus* (KEDO) STREEL in B.B.S.T., 1974, which is smaller and has a thicker exoexine bearing small sparse coni on the reticulum [see HIGGS 1975, p. 399, for discussion]. *Hymenozonotriletes lepidophytus* KEDO var. *macroreticulatus* KEDO 1974, tab. 1, fig. 5, not fig. 4, could be considered a senior synonym of *H. cassicus*.
- Rugospora flexuosa* (JUSCH) STREEL in B.B.S.T., 1974. Western palynologists have frequently referred to this group of spores as *Hymenozonotriletes famenensis* KEDO 1967 [see NEVES & DOLBY 1967, PAPROTH & STREEL 1971 and HIGGS 1975 (where the species is erroneously credited to NAUMOVA)]. In material from New York State previously studied by RICHARDSON (in TSCHUDY & SCOTT 1969), KEDO & GOLUBCOV 1971 have referred to this species as *Trachytriletes flexuosus* JUSCH. KEDO 1974 b subsequently reassigned this material to *Trachytriletes* (ex *Camptotriletes*) *radiatus* (JUSCH) KEDO 1974 b.
- Grandisporea cornuta* HIGGS 1975. This species was distinguished by HIGGS 1975 from *G. uncatata* (HACQUEBARD) PLAYFORD 1971, chiefly by its larger overall diameter, a feature considered to be of little significance by STREEL in B.B.S.T., 1974.
- Spelaotriletes lepidophytus* (KEDO) STREEL in B.B.S.T., 1974. Western palynologists consider that representatives of this species bear sparse small coni on the reticulum which appears to be restricted to the distal surface. Russian palynologists however consider the reticulum to be present but less discernible on the proximal surface. Coni are considered discernible only in the variety *cassis* UMNNOVA 1971. The concept of this species in the present work includes this variety as well as varieties *minor* KEDO, in KEDO and GOLUBCOV 1971 and *tener* KEDO 1963, both of which were differentiated by their smaller size. However varieties *macroreticulatus* KEDO 1974 a (see 3) and *admirandus* KEDO 1974 a are not included (the latter being considered a synonym of *Endosporites* sp. in BALME & HASSELL 1962).
- Vallatisporites pusillites* (KEDO) DOLBY & NEVES 1970. The concept of this species applied here conforms to the currently held opinions of western palynologists that a taxon bearing an ornament of relatively large sparse spinose and often bifurcate elements must be separated from taxa bearing ornaments of verrucae, grana and numerous minute spinose elements. This does not agree with original vague concept of *Hymenozonotriletes pusillites* KEDO 1957 which would readily accommodate *V. vallatus* HACQUEBARD and *V. verrucosus* HACQUEBARD.
- Corbulispora* sp. - The majority of the specimens observed are very dark making distinction between *C. cancellata* (WALTZ) BHARADWAJ & VENKATACHALA 1961 and *C. subalveolaris* (LUBER) SULLIVAN 1964 frequently impossible.
- Hymenozonotriletes explanatus* (LUBER) KEDO 1963. *Zonotriletes explanatus* LUBER in LUBER & WALTZ 1941, tab. 1, fig. 4 has a different density of ornament to that present on the specimens illustrated by KEDO 1963, tab. 6, where figs. 144 and 147 possess folds in the exine, width of the zona and an ornament whose size and density is more comparable with the material illustrated by western palynologists.
- Raistrickia corynoides* SULLIVAN 1968. *Acanthotriletes sphaerites* KEDO 1963 could be considered the senior synonym of *R. corynoides* if it is accepted that some of the specimens figured by KEDO 1963 (tab. 3, fig. 58 and the specimen figured on the dominant species chart) has an ornament of short and variably shaped elements and a trilete mark extending $\frac{3}{4}$ of the spore radius.
- Lophozonotriletes malevkensis* KEDO 1957. *L. malevkensis* is distinguished from *L. rarituberculatus* (LUBER) KEDO 1957 on the basis of the relatively broad, laevigate cingulum of the latter species; the stratigraphic ranges of the two taxa are quite different, at least in the British Isles.
- Lycospora subtriquetra* (LUBER) POTONIE & KREMP 1956. SOMERS 1972 suggested *L. subtriquetra* was a probable synonym of *L. rotunda* BHARADWAJ 1957.
- Westphalensisporites irregularis* ALPERN 1959. This species has been referred to by GREBE 1971 and VAN WIJHE & BLESS 1974 as *Triquitrites velensis* (BHARADWAJ 1957).
- Potonieisporites* spp. *P. gelriaensis* BLESS, LOBOZIAK & STREEL is present in the Upper Westphalian C in the Haaksbergen borehole in the Netherlands. *P. novicus* and *P. bhardwajii* occur as characteristic species in the Stephanian and Autunian.