

## 2. UPPER CRETACEOUS POLLEN GRAINS FROM EGYPT V.

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### Abstract

Species of the following form-genera are presented in this paper: *Scabradiporites* VARMA et RAWAT 1963, *Oculopollis* PFLUG 1953b, *Semioculopollis* GÓCZÁN, KRUTZSCH et PACLTOVÁ 1967, *Minorpollis* KRUTZSCH 1959, *Triatriopollenites* PFLUG 1953a emend. KEDVES 1982 in KEDVES et RUSSELL, *Myrtaceidites* (COOKSON et PIKE 1954) POTONIÉ 1960, *Retitriporites* (VAN DER HAMMEN 1956) GONZÁLEZ GUZMÁN 1967, *Beaupreaidites* COOKSON 1950 ex COUPER 1953, *Guzmanipollenites* n. fgen., *Scabratiporites* VAN DER HAMMEN 1956, *Syncolporites* VAN DER HAMMEN 1954, 1956 and *Triporopollenites* PFLUG et THOMSON 1953. One n. fgen. and five n. form-species are described.

*Key words:* Palynology, fossil. Brevaxones, Upper Cretaceous, Egypt.

TURMA: *POROSSES* (~*POROSA* NAUMOVA 1937, 1939) POTONIÉ 1960

SUBTURMA: *DIPORINES* (~*DIPORINA* NAUMOVA 1937, 1939)

Form-genus: *Scabradiporites* VARMA et RAWAT 1963

Diporate, scabrate pollen grains.

1. *Scabradiporites* fsp. A  
(Plate 2.1., figs. 1,2)

Description: Amb ellipsoidal. Surface scabrate. The exine is very thin, 0.3-0.4  $\mu\text{m}$  and its layers were not discernible by light microscopy. Pore diameter is 4-5  $\mu\text{m}$ , with an irregular margin.

Diameter: 24  $\mu\text{m}$ .

Occurrence and frequency in the samples investigated from Egypt: Maestrichtian, Nubia Sandstone: Abu Minquar (4-3) infrequent.

2. *Scabradiporites* fsp. B  
(Plate 2.1., figs. 3,4)

Description: Elongated, relatively narrow pollen grain. Surface scabrate. The exine is 0.8-1  $\mu\text{m}$  thick and the three ectexine layers are equal, T/I/F = 1/1/1. Pore diameter is 0.6  $\mu\text{m}$ , and at one aperture an atrium-like structure was observed, probably a result of the preservation.

Diameter: 26  $\mu\text{m}$ .

Occurrence and frequency in the samples investigated from Egypt: Maestrichtian, Nubia Sandstone: Kharga (1-28) infrequent.

SUBTURMA: *TRIPORINES* (~*TRIPORINA* NAUMOVA 1937, 1939)

INFRATURMA: *NORMAPOLLES* PFLUG 1953b

New key for the *Normapolles* taxa was published by BATTEN and CHRISTOPHER (1981).

Form-genus: *Oculopollis* PFLUG 1953b

For the occurrence of this genus in Africa, see the publications of PETROSJANTZ and TROFIMOV (1971); Upper Cretaceous, Sahara and PETROSJANTZ and TROFIMOV (1975) ?Danian - Paleocene, Sahara. The first SEM data on the oculata *Normapolles* was published by KEDVES and RADVÁNSZKI (1975), and a characteristic sculpture was demonstrated by this method. TEM data from HEGEDŰS, KEDVES and PÁRDUZ (1971), MÉDUS (1975, 1977) and KEDVES (1990).

1. *Oculopollis pertinax* (PFLUG 1953a) PFLUG 1953b  
(Plate 2.1., figs. 5,6)

Description: Amb triangular, with convex sides. The apertural area is prominent. Surface granular to finely rugulate. The inter-apertural exine is 1.8-2.2  $\mu\text{m}$  thick. The infratectum is a little thicker than the tectum and the foot layer. The structure is not discernible by optical microscopy, but is probably granular. The radial diameter of the oculi is 13-15  $\mu\text{m}$ . The surface is mostly finely granular. The ectoapertures are relatively long colpi, which usually reach the level of the endoaperture. There is a very narrow vestibulum. The endoapertures are pori about 1.5-2  $\mu\text{m}$  in diameter.

Diameter: 32  $\mu\text{m}$ .

Occurrence and frequency in the samples investigated from Egypt: Maestrichtian, fm. indet.: Oweina (1) infrequent.

Form-genus: *Semioculopollis* GÓCZÁN, KRUTZSCH et PAČLTOVÁ 1967

The oculi are present on only one side of these pollen grains. This characteristic feature separates it from *Oculopollis* PFLUG 1953b.

1. *Semioculopollis croxtonae* KEDVES 1979  
(Plate 2.1., figs. 7,8)

Description: Amb triangular, with straight or concave sides. Surface granular or finely verrucate. The inter-apertural exine is 2-2.5  $\mu\text{m}$  thick, the infratectum is thicker than the tectum and the foot layer, T/I/F = 1/2-3/1. Structure is not easily discernible by light microscopy, probably granular. The oculus is present on one side, its radial diameter is 8-12  $\mu\text{m}$ . Annulus is 5-6  $\mu\text{m}$  thick, the foot layer is thickened around the endopore, it is a 1.5  $\mu\text{m}$  thick endotumescens.

Diameter: 25  $\mu\text{m}$ .

Occurrence and frequency in the samples investigated from Egypt: Maestrichtian, fm. indet.: Oweina (1) infrequent.

Form-genus: *Minorpollis* KRUTZSCH 1959

Small, triatriate pollen grains, with elongated ecto- and endoapertures.

1. *Minorpollis gallicus* KEDVES 1969  
(Plate 2.1., figs. 9,10)

Description: Amb triangular, with convex sides. Surface scabrate. The exine is 0.3-0.6  $\mu\text{m}$  thick, but its stratification and structure is not discernible by optical microscopy. The annulus is about 0.8  $\mu\text{m}$  thick. The exoaperture is 1-2  $\mu\text{m}$  in diameter.

Diameter: 12  $\mu\text{m}$ .

Occurrence and frequency in the samples investigated from Egypt: Maestrichtian, Nubia Sandstone: Farafra (6-2-1) infrequent.

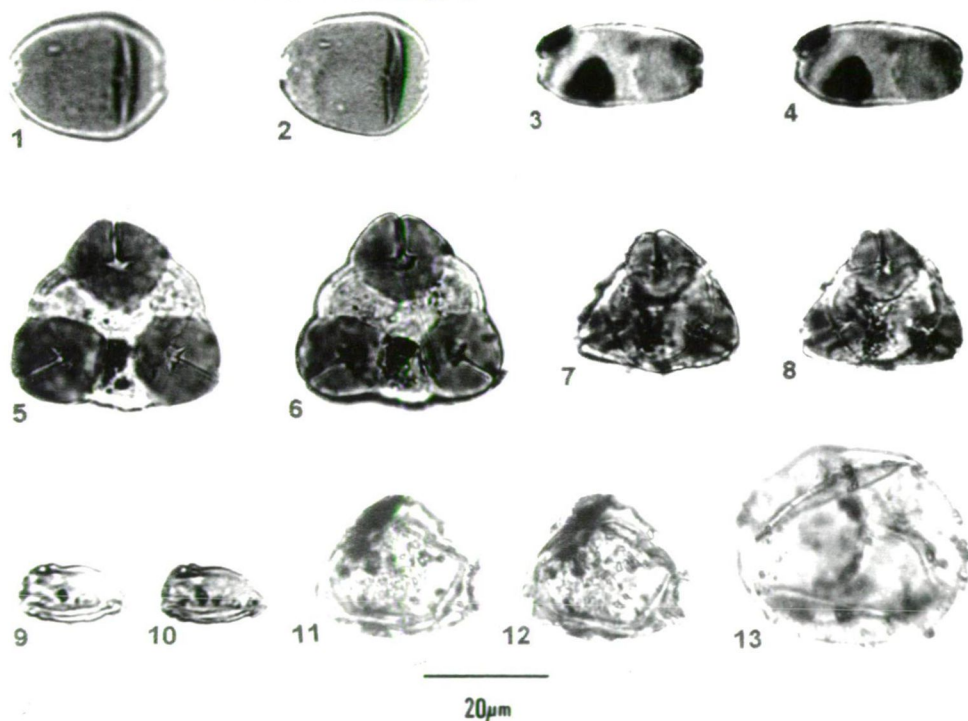


Plate 2.1.

- 1,2. *Scabradiporites* fsp. A, slide: Abu Minquar-4-3-5; cross-table number: 15.7/109.8.
- 3,4. *Scabradiporites* fsp. B, slide: Kharga-1-28-4; cross-table number: 17.6/119.9.
- 5,6. *Oculopollis pertinax* (PFLUG 1953a) PFLUG 1953b, slide: Oweina-1-1; cross-table number: 9.9/107.2.
- 7,8. *Semioculopollis croxtonae* KEDVES 1979, slide: Oweina-1-1; cross-table number: 4.8/114.8.
- 9,10. *Minorpollis gallicus* KEDVES 1969, slide: Farafra-6-2-1-8; cross-table number: 9.7/105.8.
- 11,12. *Triatriopollenites* cf. *pseudogranulatus* (GLADKOVA 1965) KEDVES 1974, *Myricaceae*, slide: 70-1-7-2-4; cross-table number: 16.4/109.5.
13. *Triatriopollenites grandis* (GLADKOVA 1965) KEDVES 1974, *Myricaceae*, slide: 70-1-7-2-6; cross-table number: 20.3/102.3.

## INFRATURMA: *POSTNORMAPOLLES* PFLUG 1953b

Form-genus: *Triatriipollenites* PFLUG 1953a emend. KEDVES 1982, in KEDVES et RUSSELL

New taxonomical concepts were introduced for this triatriate pollen grains by FREDERIKSEN and CHRISTOPHER (1978) and KEDVES (1982).

### 1. *Triatriipollenites* cf. *pseudogranulatus* (GLADKOVA 1965) KEDVES 1974, *Myricaceae* (Plate 1.1., figs. 11,12)

Description: Amb triangular, with convex sides. Surface punctate-granular. The inter-apertural exine is 1.5-2  $\mu\text{m}$  thick. The infratectal layer is a little thicker than the tectum and the foot layer. Structure is not discernible by optical microscopy, probably granular. The annulus is 2-2.7  $\mu\text{m}$  thick, the ectoaperture 2-3  $\mu\text{m}$  in diameter. The atrium is narrow and long.

Diameter: 26  $\mu\text{m}$ .

Remark: This is a so-called "old *Postnormapolles* type".

Occurrence and frequency in the samples investigated from Egypt: Coniacian-Santonian: Abu Rauwash (70-1-7-2) infrequent.

### 2. *Triatriipollenites grandis* (GLADKOVA 1965) KEDVES 1974, *Myricaceae* (Plate 2.1., fig. 13, plate 2.2., fig. 1)

Description: Amb triangular, with convex sides. Surface punctate or finely granular. The inter-apertural exine is 0.8-1.2  $\mu\text{m}$  thick. The tectum, infratectal layer, and the foot layer are of equal thickness, T/I/F = 1/1/1. The structure is not clearly discernible by optical microscopy, probably granular. The annulus is 1-1.2  $\mu\text{m}$  thick and the atrium is about 2  $\mu\text{m}$  wide. Diameter of the exoapertures is 2-2.5  $\mu\text{m}$ .

Diameter: 37  $\mu\text{m}$ .

Occurrence and frequency in the samples investigated from Egypt: Coniacian-Santonian: Abu Rauwash (70-1-7-2): infrequent.

Form-genus: *Myrtaceidites* (COOKSON et PIKE 1954) POTONIÉ 1960

Triangular, triaperturate pollen grains. Ectoapertures colpi, with arci. In the polar area there is a triangular part, which is surrounded by the arci.

### 1. *Myrtaceidites mesonesus* COOKSON et PIKE 1954, *Myrtaceae*, *Eucalyptus* (Plate 2.2., figs. 2-5)

Description: Amb triangular, with convex sides. Surface finely granulate. The inter-apertural exine is 0.6-0.8  $\mu\text{m}$ . The tectum, infratectum and the foot layer are of equal thickness, T/I/F = 1/1/1. Structure not clearly discernible by optical microscopy. Exoapertures narrow colpi, bordered by 1-2  $\mu\text{m}$  wide arci. There is a tumescens-like thickening in the polar region about 2  $\mu\text{m}$  in thickness. In the polar region there is a triangular area which is surrounded by arci. Endoapertures small atria.

Diameter: 13  $\mu\text{m}$ ; 10-15  $\mu\text{m}$ .

Occurrence and frequency in the samples investigated from Egypt: Maestrichtian, Nubia Sandstone: Farafra (6-2-1) infrequent, Abu Minquar (4-3) infrequent, Kharga (1-28) common.

Form-genus: *Retitriporites* (VAN DER HAMMEN 1956) GONZÁLEZ GUZMÁN 1967

Triporate pollen grains, with reticulate sculpture. Until this time, this kind of *angiosperm* pollen grain is not so common in the Upper Cretaceous spore-pollen assemblages.

1. Cf. *Retitriporites* fsp.  
(Plate 2.2., figs. 6,7)

Description: Amb triangular, with slightly convex sides. Surface reticulate. The lumina of the reticulum are 0.6-1.2  $\mu\text{m}$  in size. In the apertural region there is a zone with a smooth surface about 4-5  $\mu\text{m}$  in width. The inter-apertural exine is 0.4-0.5  $\mu\text{m}$  thick. The exo- and endoapertures are pori, about 2-2.5  $\mu\text{m}$  in diameter.

Diameter: 21  $\mu\text{m}$ .

Occurrence and frequency in the samples investigated from Egypt: Maestrichtian, Nubia Sandstone: Farafra (6-2-1) infrequent.

ANTETURMA: *VARIGERMINATES* POTONIÉ 1970  
TURMA: *PLICATES* NAUMOVA 1937, 1939  
SUBTURMA: *TRIPTYCHES* NAUMOVA 1937, 1939  
INFRATURMA: *ISOTRICOLPATI* POTONIÉ 1970

Form-genus: *Beaupreaidites* COOKSON 1950 ex COUPER 1953 emend. MARTIN 1973

MARTIN (1973), MARTIN and HARRIS (1974), MILDENHALL (1978), and DETTMANN and JARZEN (1988, 1996) re-examined in detail the taxonomic problems of this form-genus. The pollen grains of this genus are triangular in polar view, surface sculptured, the exoapertures are short furrows.

1. *Beaupreaidites mildenhallii* n. fsp. subfsp. *mildenhallii*  
(Plate 2.2., figs. 8,9)

Diagnosis: Amb triangular, with slightly convex sides. Surface reticulate. The mesh of the reticulum is 0.4-0.8  $\mu\text{m}$ , and usually becomes smaller in the polar region. Muri width about 0.4  $\mu\text{m}$ . The inter-apertural exine is about 1.5  $\mu\text{m}$  thick. The infratectum and the foot layer is thicker than the tectum, T/I/F = 1/2/2. Structure intrabaculate. The exine becomes thinner in the apertural region and is about 0.8  $\mu\text{m}$  in thickness near the apertures. The apertures are short 4-6  $\mu\text{m}$ , but consists of relatively large colpi (2-4  $\mu\text{m}$ ).

Diameter: 27  $\mu\text{m}$ ; 25-32  $\mu\text{m}$ .

Holotype: Plate 2.2., figs. 8,9, slide: Farafra-6-2-2-1; cross-table number: 11.6/109.4.

Locus typicus: Farafra, Maestrichtian, Nubia Sandstone.

Stratum typicum: clayey brown coal.

Derivatio nominis: In honour of Dr. D.C. MILDENHALL.

Differential diagnosis: The smaller size separates this taxon from *B. elegansiformis* COOKSON 1950. Moreover, based on the documentation of COOKSON (1950) the mesh

of the reticulum is smaller than in our new species, and the colpi of *B. elegansiformis* COOKSON 1950 are longer.

Botanical affinity: *Proteaceae*.

Occurrence and frequency in the samples investigated from Egypt: Maestrichtian, Nubia Sandstone: Farafra (6-2-1) infrequent, Farafra (6-2-1) infrequent, Farafra (11) infrequent.

2. *Beaupreaidites mildenhallii* n. fsp. subfsp. *minor* n. subfsp.

(Plate 2.2., figs. 10,11)

Diagnosis: Amb triangular, with straight or mildly convex sides. Surface finely reticulate. The mesh of the reticulum is about 0.4  $\mu\text{m}$ , with muri about 0.2-0.3  $\mu\text{m}$  wide. The size of the ornamentation is the same on the different parts of the pollen grains. The exine is 2-3  $\mu\text{m}$  thick and the foot layer is relatively thick, T/I/F = 1/1.5/5. Structure intrabaculate. The exine is 1.5-2  $\mu\text{m}$  thick around the apertures. The furrows are short; 3-4  $\mu\text{m}$  and are about 0.5  $\mu\text{m}$  wide.

Diameter: 21  $\mu\text{m}$ ; 19-25  $\mu\text{m}$ .

Subfsp. type: Plate 2.2., figs. 10,11, slide: Farafra-6-2-2-1; cross-table number: 15.3/108.9.

Locus typicus: Farafra, Maestrichtian, Nubia Sandstone.

Stratum typicum: clayey brown coal.

Derivatio nominis: From its small size.

Differential diagnosis: The smaller size separates this subfsp. from *M. mildenhallii* subfsp. *mildenhallii*.

Botanical affinity: *Proteaceae*.

Occurrence and frequency in the samples investigated from Egypt: Maestrichtian, Nubia Sandstone: Farafra (6-2-2), infrequent, Farafra (6-2-1) infrequent.

3. Cf. *Beaupreaidites* fsp.

(Plate 2.2., figs. 12,13)

Description: Amb triangular, with convex sides. Surface reticulate. The mesh of the reticulum is 1.5-2  $\mu\text{m}$  and the muri width is 0.5  $\mu\text{m}$ . The exine is about 2  $\mu\text{m}$  thick with the foot layer being the thickest, T/I/F = 1/1.5/3. The apertures are short furrows, 6-8  $\mu\text{m}$  long and 1-2  $\mu\text{m}$  wide. There are 1.5  $\mu\text{m}$  exinous thickenings around the apertures.

Diameter: 19  $\mu\text{m}$ .

Occurrence and frequency in the samples investigated from Egypt: Maestrichtian, Nubia Sandstone: Kharga (1-28) infrequent.

Form-genus: *Guzmanipollenites* n. fgen.

Fgen.-type: *Guzmanipollenites cretaceus* n. fsp.

(Plate 2.2., figs. 14-19)

Diagnosis: Triangular, triaperturate pollen grains. Exoapertures short furrows, endoapertures pori, with an annulus in the apertural region. Ornamentation verrucate, the sculptural elements are characteristic.

Form-genus type: Plate 2.2., figs. 14,15, slide: Farafra-6-2-2-4; cross-table number: 6.2/114.7.

Locus typicus: Farafra, Maestrichtian, Nubia Sandstone.

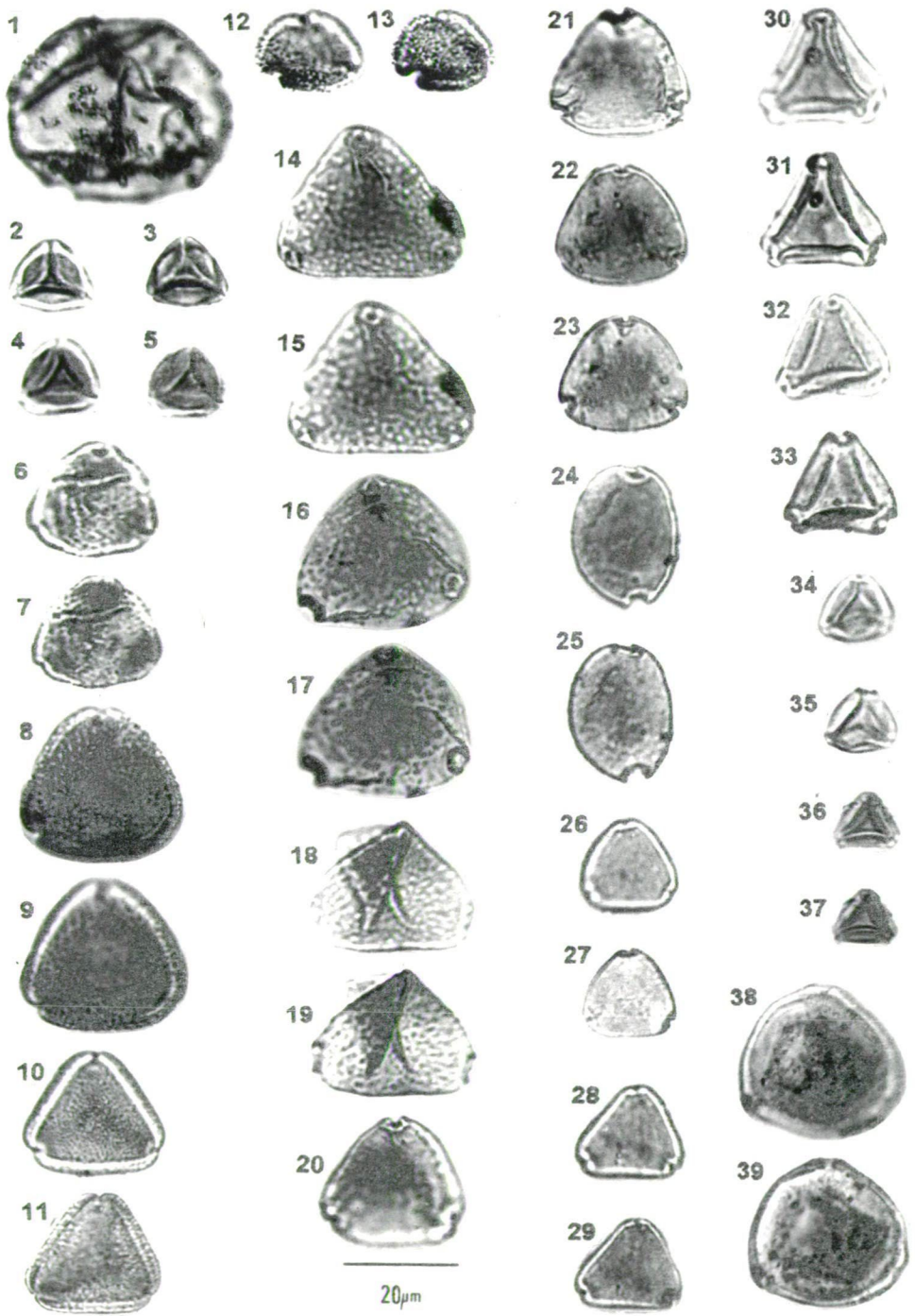


Plate 2.2.

Plate 2.2.

1. *Triatripollenites grandis* (GLADKOVA 1965) KEDVES 1974, *Myricaceae*, slide: 70-1-7-2-6; cross-table number: 20.3/102.3.
- 2,3. *Myrtaceidites mesonesus* COOKSON et PIKE 1954, *Myrtaceae*, *Eucalyptus*, slide: Abu Minquar-4-3-1; cross-table number: 20.4/107.8.
- 4,5. *Myrtaceidites mesonesus* COOKSON et PIKE 1954, *Myrtaceae*, *Eucalyptus*, slide: Abu Minquar-4-3-2; cross-table number: 12.6/109.8.
- 6,7. Cf. *Retitriporites* fsp., slide: Farafra-6-2-1-8; cross-table number: 20.1/109.9.
- 8,9. *Beaupreaidites mildenhallii* n. fsp.; subfsp. *mildenhallii*, *Proteaceae*, slide: Farafra-6-2-2-1; cross-table number: 11.6/109.4.
- 10,11. *Beaupreaidites mildenhallii* n. fsp. subfsp. *minor* n. subfsp., *Proteaceae*, slide: Farafra-6-2-2-1; cross-table number: 15.3/108.9.
- 12,13. Cf. *Beaupreaidites* fsp., slide: Kharga-1-28-3; cross-table number: 13.7/119.8.
- 14,15. *Guzmanipollenites cretaceus* n. fgen. et fsp., slide: Farafra-6-2-2-4; cross-table number: 6.2/114.7.
- 16,17. *Guzmanipollenites cretaceus* n. fgen. et fsp., slide: Farafra-6-2-2-11; cross-table number: 14.2/106.4.
- 18,19. *Guzmanipollenites cretaceus* n. fgen. et fsp., slide: Farafra-6-2-2-9; cross-table number: 6.1/103.1.
- 20,21. *Scabratriporites druggii* n. fsp., slide: Farafra-6-2-2-1; cross-table number: 20.2/109.3.
- 22,23. *Scabratriporites druggii* n. fsp., slide: Farafra-6-2-1-3; cross-table number: 9.8/115.8.
- 24,25. *Scabratriporites druggii* n. fsp., slide: Farafra-6-2-2-5; cross-table number: 14.2/103.6.
- 26,27. *Scabratriporites simpliformis* VAN HOEKEN-KLINKENBERG 1966, slide: Farafra-6-2-2-1; cross-table number: 16.4/103.3.
- 28,29. *Scabratriporites simpliformis* VAN HOEKEN-KLINKENBERG 1966, slide: Farafra-6-2-2-1; cross-table number: 6.8/107.9.
- 30,31. *Syncolporites jardinei* n. fsp., slide: Farafra-6-2-2-8; cross-table number: 9.1/113.4.
- 32,33. *Syncolporites jardinei* n. fsp., slide: Farafra-6-2-2-4; cross-table number: 3.6/116.1.
- 34,35. *Syncolporites minor* n. fsp., slide: Farafra-6-2-2-10; cross-table number: 14.7/104.6.
- 36,37. *Syncolporites minor* n. fsp., slide: Farafra-6-2-2-12; cross-table number: 11.3/105.8.
- 38,39. *Triporopollenites nointelensis* KEDVES 1970, *Corylaceae*, slide: 70-1-7-1-1; cross-table number: 15.4/109.9.

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Stratum typicum: clayey brown coal.

Derivatio nominis: In honour of Dr. A. E. GONZÁLEZ GUZMÁN.

Differential diagnosis: The characteristic verrucate sculpture separates this taxon from *Annutriporites* GONZÁLES GUZMÁN 1967, the exoapertures (short colpi) from *Cranwellipollis* MARTIN et HARRIS 1974.

1. *Guzmanipollenites cretaceus* n. fsp.  
(Plate 2.2., figs. 14-19)

Diagnosis: Amb triangular, with straight or slightly convex sides. Surface verrucate. The basal diameter of the structural elements is 0.8-1.5  $\mu\text{m}$ . The exine is very thin, about 0.2  $\mu\text{m}$  and the fine structure is not discernible by optical microscopy. Furrows 4-5  $\mu\text{m}$  long and the annulus is 1-1.5  $\mu\text{m}$  wide.

Diameter: 33  $\mu\text{m}$ ; 22-38  $\mu\text{m}$ .

Holotype, locus typicus, stratum typicum see at the fgen. type.

Derivatio nominis: From the Cretaceous age.

Differential diagnosis: There are several similarities with *Echitriporites trianguliformis* VAN HOEKEN-KLINKENBERG 1964 (Upper Cretaceous, Nigeria and GONZÁLEZ GUZMÁN, 1967, Paleocene, Columbia). A re-examination of the original material of Nigeria is desirable.



Occurrence and frequency in the samples investigated from Egypt: Maestrichtian, Nubia Sandstone: Farafra (6-2-2) infrequent, Farafra (6-2-1) common, Farafra (11) infrequent.

Form-genus: *Scabratrporites* VAN DER HAMMEN 1956

1. *Scabratrporites druggii* n. fsp.

(Plate 2.2., figs. 20-25, 24,25 diporate form)

Diagnosis: Amb triangular, with mildly convex sides. Surface finely scabrate. The inter-apertural exine is 0.2  $\mu\text{m}$  thick. The exine stratification and the structure are not discernible by optical microscopy. Furrows 6-10  $\mu\text{m}$  long, and 1-2  $\mu\text{m}$  wide. The annulus is 1-1.5  $\mu\text{m}$  wide.

Diameter: 23  $\mu\text{m}$ ; 20-25  $\mu\text{m}$ .

Holotype: Plate 2.2., figs. 20,21, slide: Farafra-6-2-2-1; cross-table number: 20.2/109.3.

Locus typicus: Farafra, Maestrichtian, Nubia Sandstone.

Stratum typicum: clayey brown coal.

Derivatio nominis: In memoriam of Dr. W. S. DRUGG excellent investigator of the Cretaceous and Lower Tertiary sporomorphs.

Differential diagnosis: *Triporopollenites marcaensis* DRUGG 1967 (Maestrichtian; M. - Danian transition, California, U.S.A.) has a sometimes faintly scrobiculate surface. The surface of the germinal region of *Scabratrporites samoilovichii* BOLTENHAGEN 1976 is finely echinate.

Occurrence and frequency in the samples investigated from Egypt: Lower Campanian: Duwi infrequent; Maestrichtian, Nubia Sandstone: Farafra (6-2-2) common, Farafra (6-2-1) infrequent, Farafra (11) common, Duwi Range (100) infrequent.

2. *Scabratrporites simpliformis* VAN HOEKEN-KLINKENBERG 1966

(Plate 2.2., figs. 26-29)

Diagnosis: Amb triangular, with slightly convex or straight sides. Surface scabrate. The inter-apertural exine is 0.6-0.8  $\mu\text{m}$  thick. The tectum, infratectal layer, and the foot layer are of equal thickness, T/I/F = 1/1/1. The fine structure of the infratectal layer is not discernible by optical microscopy. The furrows are of 6-8  $\mu\text{m}$  long, and are narrow. The annulus is 0.8-1.1  $\mu\text{m}$  in width.

Diameter: 11.5  $\mu\text{m}$ ; 10-18  $\mu\text{m}$ .

Occurrence and frequency in the samples investigated from Egypt: Maestrichtian, Nubia Sandstone: Farafra (6-2-2) infrequent, Farafra (6-2-1) infrequent.

Form-genus: *Syncolporites* VAN DER HAMMEN 1954, 1956

1. *Syncolporites jardinei* n. fsp.

(Plate 2.2., figs. 30-33)

Diagnosis: Amb triangular, with straight or mildly convex sides. Surface smooth or scabrate. The inter-apertural exine is 0.2-0.3  $\mu\text{m}$  thick. Its stratification and structure are not discernible by optical microscopy. The furrows are 3-4  $\mu\text{m}$  long, and the annulus is

1-1.3  $\mu\text{m}$  in thickness. There are very characteristic plicae located between the apertural area.

Diameter: 20  $\mu\text{m}$ ; 16-24  $\mu\text{m}$ .

Holotype: Plate 2.2., figs. 30,31, slide: Farafra-6-2-2-8; cross-table number: 9.1/113.4.

Locus typicus: Farafra, Maestrichtian, Nubia Sandstone.

Stratum typicum: clayey brown coal.

Derivatio nominis: In honour of Dr. S. JARDINÉ.

Differential diagnosis: The characteristic plicae separates this taxon from *S. incomptus* VAN HOEKEN-KLINKENBERG 1964.

Occurrence and frequency in the samples investigated from Egypt: Maestrichtian, Nubia Sandstone: Farafra (6-2-2) common, Farafra (6-2-1) infrequent, Farafra (11) infrequent.

2. *Syncolporites minor* n. fsp.

(Plate 2.2., figs. 34-37)

Diagnosis: Amb triangular, with slightly convex sides. Surface finely scabrate. The inter-apertural exine is 0.3  $\mu\text{m}$  thick. Its stratification and structure are not discernible by optical microscopy. The furrows are 4-6  $\mu\text{m}$  long, and the annulus is 0.5-0.8  $\mu\text{m}$  in thickness. Usually there are characteristic plicae between the apertures.

Diameter: 12  $\mu\text{m}$ ; 9-13  $\mu\text{m}$ .

Holotype. Plate 2.2., figs. 34,35, slide: Farafra-6-2-2-10; cross-table number: 14.7/104.6.

Locus typicus: Farafra, Maestrichtian, Nubia Sandstone.

Stratum typicum: clayey brown coal.

Derivatio nominis: From its smaller size.

Differential diagnosis: The smaller size and the outline of the apertural area distinguishes this taxon from *S. minutus* VAN HOEKEN-KLINKENBERG 1964.

Occurrence and frequency in the samples investigated from Egypt: Maestrichtian, Nubia Sandstone: Farafra (6-2-2) common.

Form-genus: *Triporopollenites* PFLUG et THOMSON 1953

Triporate pollen grains, surface smooth or faintly sculptured.

1. *Triporopollenites nointelensis* KEDVES 1970, *Corylaceae*

(Plate 2.2., figs. 38,39)

Description: Amb triangular, with concave sides. Surface granular to finely rugulate. The inter-apertural exine is 1.5-1.8  $\mu\text{m}$  thick. The tectum, infratectum, and the foot layer are equal. The structure is not clearly discernible by optical microscopy but is probably granular. The annulus is 1.5-2  $\mu\text{m}$  thick and the diameter of the pore is 1-1.5  $\mu\text{m}$ .

Diameter: 27  $\mu\text{m}$ .

Occurrence and frequency in the samples investigated from Egypt: Coniacian-Santonian: Abu Rauwash (70-1-7-1) common.

To be continued

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