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New pollen taxon *Syncolpraedapollis angolensis* nov. gen. sp. nov.: A noteworthy discovery reported in the preliminary investigation of the latest Eocene-latest Oligocene deposits in the Kwanza Basin, Angola

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ABSTRACT

A palynostratigraphic study of the upper Cunga and lower Quifangondo deposits in the Cabo de São Brás section, Kwanza Basin, Angola, has revealed a new pollen named *Syncolpraedapollis angolensis* nov. gen. sp. nov. This finding was part of a wider survey in the upper Cunga and lower Quifangondo deposits of the Cabo de São Brás section, Kwanza Basin, Angola, covering the latest Eocene to the latest Oligocene.

The novel pollen features unique characteristics, notably a 3-syncolporate structure with well-defined and distinctive pores. The pollen grain is adorned with a free but irregular reticulum with an irregular polygonal mesh. *Syncolpraedapollis angolensis* nov. gen. sp. nov. is sporadically but consistently observed within the latest Eocene-latest Oligocene interval, conspicuously absent in the underlying Eocene sediments (lower Cunga Formation) and occurring infrequently in the latest Oligocene sediments (lower Quifangondo Formation). Thus, it is plausible to infer a limited age range, likely restricted to the latest Eocene-latest Oligocene, as previous studies in the Kwanza Basin have not documented this pollen.

1. Introduction

The Cabo de São Brás section, located in the Kwanza Basin, Angola (Fig. 1), was selected for a palynostratigraphic sampling campaign due to its extensive and well-preserved outcrops of the upper Cunga and lower Quifangondo formations. Moderately preserved marine palynomorph assemblages were documented, along with minor proportions of terrigenous content.

The main goal of this detailed palynological analysis was to date and characterize the flora identified in the latest Eocene-latest Oligocene deposits within this region. During this research, however, a novel species of pollen grain was identified, and its formal description is presented in this paper.

2. Geological setting

The present study focused on the Late Paleogene-Early Neogene marine sequence of the upper Cunga and lower Quifangondo formations, well exposed along the coast in the Cabo de São Brás section, Kwanza Basin (Angola; Fig. 1).

The Onshore Kwanza Basin, located in northwestern Angola, covers an outcrop area of about 25,000 km^2, with sedimentary sequences in deep depocenters reaching or exceeding 4 km in thickness (Brognon and Verrier, 1966). According to Brognon and Verrier (1966), these sedimentary strata were unconformably deposited on a Precambrian basement, characterized by metamorphic and volcano-sedimentary rocks. The Paleogene to Neogene units within the Onshore Kwanza Basin, deposited in marine settings, are represented as follows: i) the Rio Dande Formation (Paleocene), characterized by detrital limestones and sandstones; ii) the Gratidão and Cunga formations (Eocene to Oligocene), composed of sandstones and siltstones, turbidites, and deep-marine deposits; iii) the Quifangondo Formation (latest Oligocene - Miocene), identified by prograding clastic sediments; iv) the Luanda Formation (Late Miocene to Pliocene and Pleistocene), distinguished by a deltaic-continental terrigenous clastic sequence (Brognon and Verrier, 1966; Brownfield and Charpentier, 2006; Hudec and Jackson, 2002; Total-

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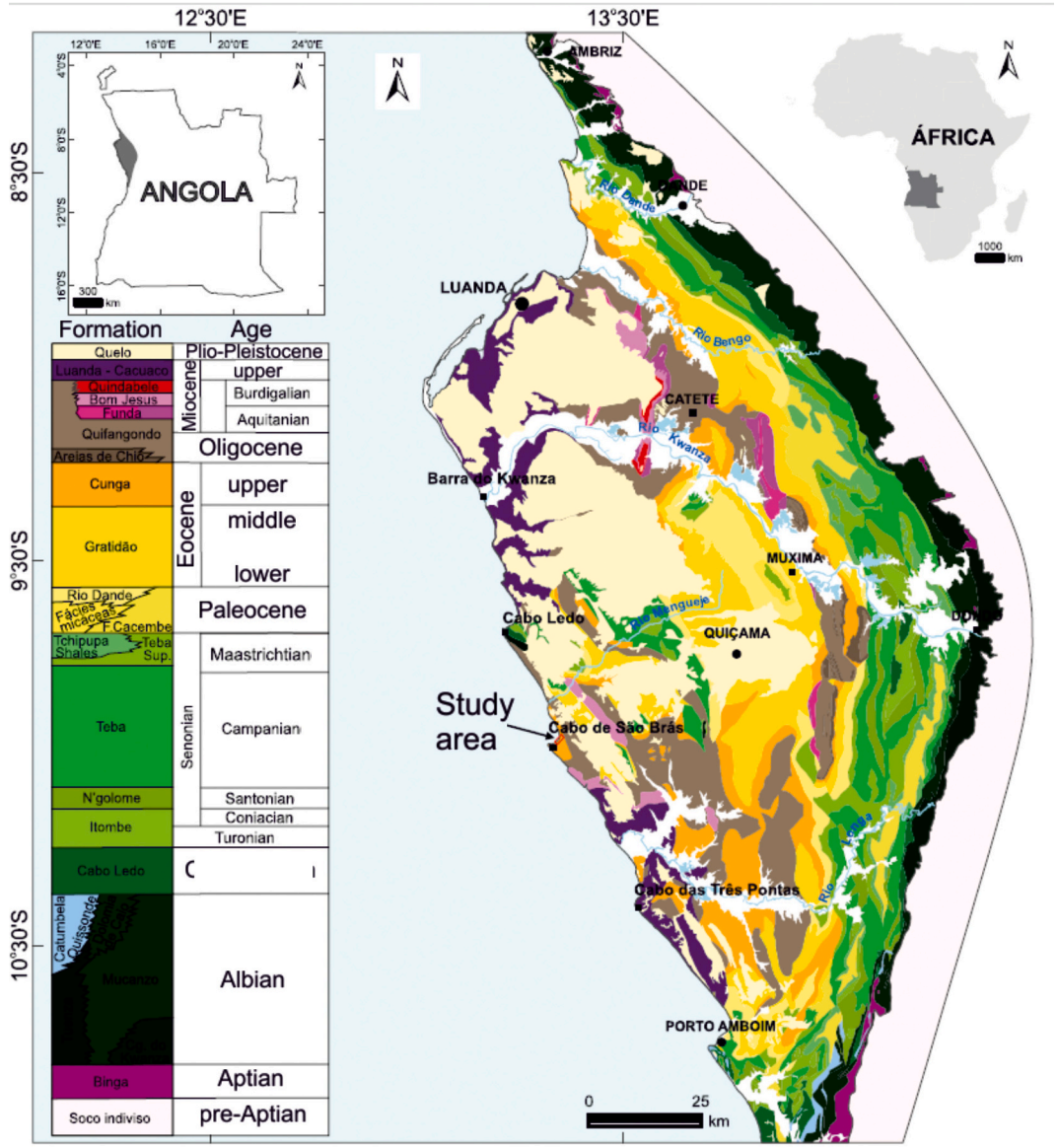

Fig. 1. Geological map of the studied area (Total and Sonangol, 1987, modified).

Sonangol, 1987).

This research focuses on the upper Cunga and the lower Quifangondo formations. The thickness of the Cunga Formation, approximately 200 m thick (reaching ca. 1000 m near the basin margin) consists of black argillaceous marls rich in microfossils like foraminifera and radiolarians (Brognon and Verrier, 1966; Brownfield and Charpentier, 2006; Graham et al., 1965; Kender et al., 2009; McMillan and Fourie, 1999). It includes interbedded Middle to Late Eocene marls and detrital limestones (Brognon and Verrier, 1966; Brownfield and Charpentier, 2006; D'Argenio et al., 1998; Hudec and Jackson, 2002; Pereira et al., 2021). At the top, the Quifangondo Formation discordantly overlies the Upper, Middle, or Lower Eocene of the Cunga Formation or, in some places, the Campanian of the Teba Formation (Brognon and Verrier, 1966; Brownfield and Charpentier, 2006; Guiraud et al., 2010; Pereira et al., 2021; Serié et al., 2017).

The Quifangondo Formation consists mainly of silty claystones, locally channel-filled sandstones, and turbiditic deposits interbedded with shaly limestones and claystones (Brognon and Verrier, 1966; Brownfield and Charpentier, 2006; Hudec and Jackson, 2002).

The age determination for the Quifangondo Formation, spanning from Late Oligocene to Late Miocene, is supported by both foraminiferal (Brognon and Verrier, 1966; Brownfield and Charpentier, 2006; Graham et al., 1965; Kender et al., 2009; McMillan and Fourie, 1999) and palynological (Pereira et al., 2021; Rodrigues et al., 2021) studies.

3. Materials and methods

A total of sixty-six samples were meticulously collected from marine deposits in the upper Cunga and lower Quifangondo formations for subsequent palynological examination.

At the base of the studied succession, the Cunga Formation consists of alternating black and white layers of marlstones exhibiting significant bioturbation, interspersed with dolomitic limestones. On the other hand, the upper part of the sequence, the Quifangondo Formation, is distinguished by a succession of claystones and silty claystones.

All samples were processed for palynology at the National Laboratory of Energy and Geology (Geological Survey of Portugal). Each rock sample (ca. 100 g) was treated using standard palynological laboratory procedures (e.g., Riding and Warny, 2008; Wood et al., 1996), involving the use of cold HCl (37%) and cold HF (48%) to remove carbonates and silicates, respectively. After acid procedures, all samples were sieved using a nylon sieve (11 μm mesh). The final residues were stained with

Table 1
Pollen measurements for *Syncolpraedapollis angolensis*.

Specimen	Sample	Formation	Photos	Plate	Microscope Coordinates	England Finder	Pollen breadth (μm)	Pollen central body (μm)	Pollen Exine (μm)	Pore breadth (μm)	Pore height (μm)	Lumina (μm)	Muri (μm)
Praedapollis angolensis	CB15_s1	Cunga	172–173	Plate II, fig. 12	950/162	F42–2	34.35	25.79	3.50	5.90	5.18	2.42	0.60
Praedapollis angolensis	CB15_s2	Cunga	80–81	–	1021/407	O30	29.69	25.57	2.41	4.78	4.19	3.77	0.68
Praedapollis angolensis	CB16_s4	Cunga	06–08	–	1065/336	O29	31.41	26.88	2.71	3.77	3.64	4.19	0.81
Praedapollis angolensis	CB21_s3	Cunga	44–45	Plate I, fig. 12	1013/266	O28–4	40.14	32.09	4.50	4.66	3.92	4.82	0.81
Praedapollis angolensis	CB23_s2	Cunga	04–05	Plate II, fig. 5	985/124	E27	35.24	28.30	4.92	5.17	3.95	4.88	0.72
Praedapollis angolensis	CB25_s1	Cunga	07–08	Plate II, fig. 6	1109/259	O28–4	36.16	28.89	4.71	6.51	5.05	5.47	0.47
Praedapollis angolensis	CB25_s1	Cunga	01–02	Plate II, fig. 9	969/297	E29–3	27.25	24.29	2.52	4.19	3.88	3.05	0.63
Praedapollis angolensis	CB34_s2	Cunga	39–42	–	1063/197	O28	29.86	24.60	2.71	4.36	4.00	2.31	0.55
Praedapollis angolensis	CB34_s4	Cunga	20–23	Plate II, fig. 10	988/296	E29	32.11	28.68	1.05	4.33	3.36	4.19	0.91
Praedapollis angolensis	CB34_s5	Cunga	28–30	–	945/331	F29–2	30.08	26.13	1.19	5.57	5.50	2.41	0.50
Praedapollis angolensis	CB38_s4	Cunga	21–22	Plate II, fig. 7	982/341	E29	28.00	26.84	1.19	7.00	5.09	4.35	0.58
Praedapollis angolensis	CB39_s1	Cunga	114–115	Plate I, fig. 8	1022/319	O29	23.26	22.83	1.14	4.54	3.23	3.64	0.73
Praedapollis angolensis	CB39_s1	Cunga	78–79	–	1082/414	O30	29.58	25.56	2.55	4.76	4.14	3.71	0.71
Praedapollis angolensis	CB39_s2	Cunga	23–26	–	980/288	E29–3	23.81	21.48	1.39	2.26	3.55	3.35	0.58
Praedapollis angolensis	CB42_s1	Cunga	24–25	–	1015/385	O30–3	24.38	23.34	1.04	4.34	3.91	3.50	0.61
Praedapollis angolensis	CB42_s1	Cunga	70–72	Plate I, fig. 11	950/229	F28–2	25.33	22.13	1.10	2.88	2.68	2.77	0.69
Praedapollis angolensis	CB46_s1	Cunga	22–23	Plate II, fig. 8	986/396	E30	31.44	26.86	3.14	4.67	2.58	4.57	0.79
Praedapollis angolensis	CB48_s1	Cunga	29–31	Plate I, fig. 7	1105/405	O30	29.27	25.13	3.00	2.57	2.61	3.94	0.73
Praedapollis angolensis	CB49_s1	Cunga	30–31	Plate I, fig. 6	1114/350	O29–4	32.71	24.94	3.02	4.97	4.43	3.66	0.49
Praedapollis angolensis	CB51_s1	Cunga	16–17	Plate II, fig. 1	1435/92	O35	39.70	35.52	2.10	5.22	5.03	4.80	0.86
Praedapollis angolensis	CB53_s1	Cunga	221–222	Plate II, fig. 3	1040/102	O27	40.39	35.16	2.23	5.63	3.76	5.58	0.94
Praedapollis angolensis	CB55_s1	Cunga	05–06	Plate I, fig. 1	1350/141	O27	39.87	31.27	3.33	6.34	5.05	3.31	0.57
Praedapollis angolensis	CB56_s1	Cunga	20–23	Plate I, fig. 4	1295/195	O28	33.77	30.39	2.35	4.05	3.94	4.52	0.78
Praedapollis angolensis	CB59_s1	Quifangondo	06–07	Plate I, fig. 10	1008/508	O31	36.88	29.23	2.38	3.85	4.46	4.74	0.84
Praedapollis angolensis	CB61_s1	Quifangondo	01–02	Plate I, fig. 3	1435/140	O27	38.67	31.76	4.53	5.56	3.52	5.68	0.94
Praedapollis angolensis	CB62_s1	Quifangondo	07–08	Plate I, fig. 2	1385/182	O28–1	39.82	33.54	2.68	6.10	4.55	6.67	0.80

(*continued on next page*)

Table 1 (*continued*)

Specimen	Sample	Formation	Photos	Plate	Microscope Coordinates	England Finder	Pollen breadth (µm)	Pollen central body (µm)	Pollen Exine (µm)	Pore breadth (µm)	Pore height (µm)	Lumina (µm)	Muri (µm)
Praedapollis angolensis	CB62_s1	Quifangondo	18–19	Plate II, fig. 4	1255/150	O27	33.54	30.39	2.68	5.55	4.93	4.72	0.82
Praedapollis angolensis	CB63_s1	Quifangondo	30–35	Plate I, fig. 5	1295/25	O28	38.25	34.58	2.63	5.53	4.27	4.74	0.83
Praedapollis angolensis	CB63_s1	Quifangondo	50–54	Plate I, fig. 9	1250/149	O27	36.34	32.34	2.31	4.33	3.27	2.80	0.60
Praedapollis angolensis	CB63_s1	Quifangondo	24–27	Plate II, fig. 2	1325/180	O28–1	38.94	33.54	2.84	6.45	4.46	6.29	0.73
Praedapollis angolensis	CB63_s1	Quifangondo	46–49	Plate II, fig. 11	1250/232	O28	41.20	36.95	2.83	7.55	5.22	5.24	0.74
					AVERAGE		33.27	28.55	2.60	4.95	4.11	4.20	0.71
					VALUE_MIN		23.26	21.48	1.04	2.26	2.58	2.31	0.47
					VALUE_MAX		41.20	36.95	4.92	7.55	5.50	6.67	0.94

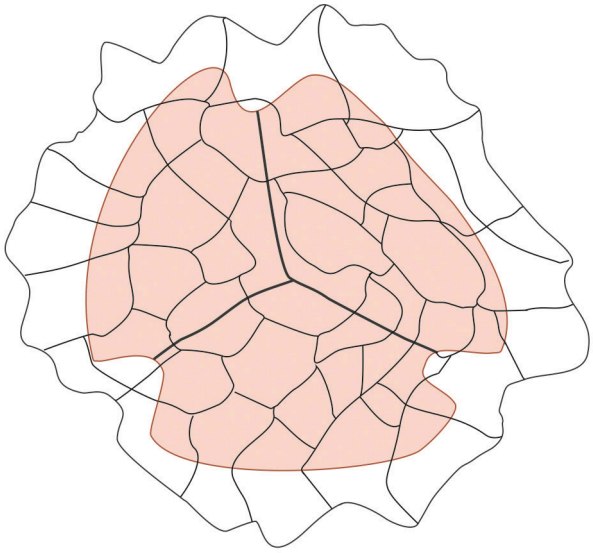

Fig. 2. Schematic drawing of *Syncolpraedapollis angolensis;* scale bar = 10 µm.

biological red stain (safranin-O), to enhance the contrast in the samples, and mounted on microscope slides using Entelan®, a commercial resin-based mounting medium. The microscope study was conducted using a Nikon eclipse Ci microscope and a BX40 Olympus, with specimen photos and measurements performed utilizing the Nikon Eclipse NIS-Elements D imaging software.

4. Eocene–Oligocene biostratigraphy, paleoenvironments and paleoclimate interpretation

The analysis of sixty-six samples yielded productive results for thirty-six, revealing dinocysts, sporomorphs, algae, foraminiferal test linings, and fungal remains, as detailed in Pereira et al. (2024, *in press*). This integrated analysis of palynostratigraphy and organic facies from the Cunga and Quifangondo formations in the Cabo de São Brás section of the Kwanza Basin, Angola, has provided new insights into the region's stratigraphy. Contrary to earlier studies suggesting a significant Oligocene stratigraphic gap, this data indicates a continuous sedimentary sequence from the late Eocene to the latest Oligocene.

Firstly, dinocyst age assignments have clarified the chronological framework: the Cunga Formation spans from the late Priabonian to Chattian, while the Quifangondo Formation is dated to the latest Chattian. This continuous palynological record refutes the previously assumed Oligocene gap.

Secondly, this analysis of depositional environments shows that the Cunga Formation was deposited in an outer neritic to oceanic setting, whereas the Quifangondo Formation represents an inner to outer marine neritic environment.

Lastly, preliminary paleoclimatic data suggest notable climatic changes during the Eocene–Oligocene transition. The late Priabonian experienced warmer conditions, likely influenced by the late Eocene greenhouse effect, while during the Rupelian a cooling phase linked to the Rupelian icehouse effect took place. During the Chattian, there was a return to warmer conditions.

5. Age and correlation of the new *Syncolpraedapollis angolensis* nov. gen. sp. nov. pollen grain

This newly studied section of Cabo de São Brás presents a well-exposed outcrop that allows a thorough examination of the Cunga Formation and the base of the Quifangondo Formation. The analysis reveals a novel pollen occurrence, specifically *Syncolpraedapollis angolensis* nov. gen. sp. nov., as documented in the systematic chapter. Although dinocysts dominate the studied assemblages and pollen grains are rare and sporadic, *Syncolpraedapollis angolensis* nov. gen. sp. nov. consistently appears throughout the Late Eocene to Late Oligocene sequence.

In samples taken from the pre-Oligocene (sample numbers CB1 to CB14, Fig. 3), the latest Priabonian age is determined by the presence of species such as *Diphyes colligerum, Schematophora* cf. *speciosa, Glaphyrocysta semitecta*, *Deflandrea heterophlycta, Rhombodinium draco,* and *Rhombodinium porosum* (Pereira et al. 2024 *in press*). *Syncolpraedapollis angolensis* nov. gen. sp. nov. is rarely found in samples CB15 and CB16. The Oligocene age attributed to the Cunga Formation (from sample numbers CB16 to CB56) relies on several Oligocene key dinocysts, such as *Distatodinium* cf. *biffii*, *Chiropteridium* spp., *Hystrichokolpoma* cf. *pseudooceanicum*, *Hystrichosphaeropsis obscura*, *Phthanoperidinium amoenum*, *Phthanoperidinium comatum*, *Samlandia chlamydophora,* and *Phelodinium africanum* (Pereira et al. 2024 *in press*). During the Oligocene, there is a relative increase in the abundance of *Syncolpraedapollis angolensis* nov. gen. sp. nov. However, by the late Oligocene (Quifangondo Formation, sample numbers CB59 to CB66; Fig. 3), this pollen grain becomes less frequent.

Previously, no records of this pollen have been reported in the

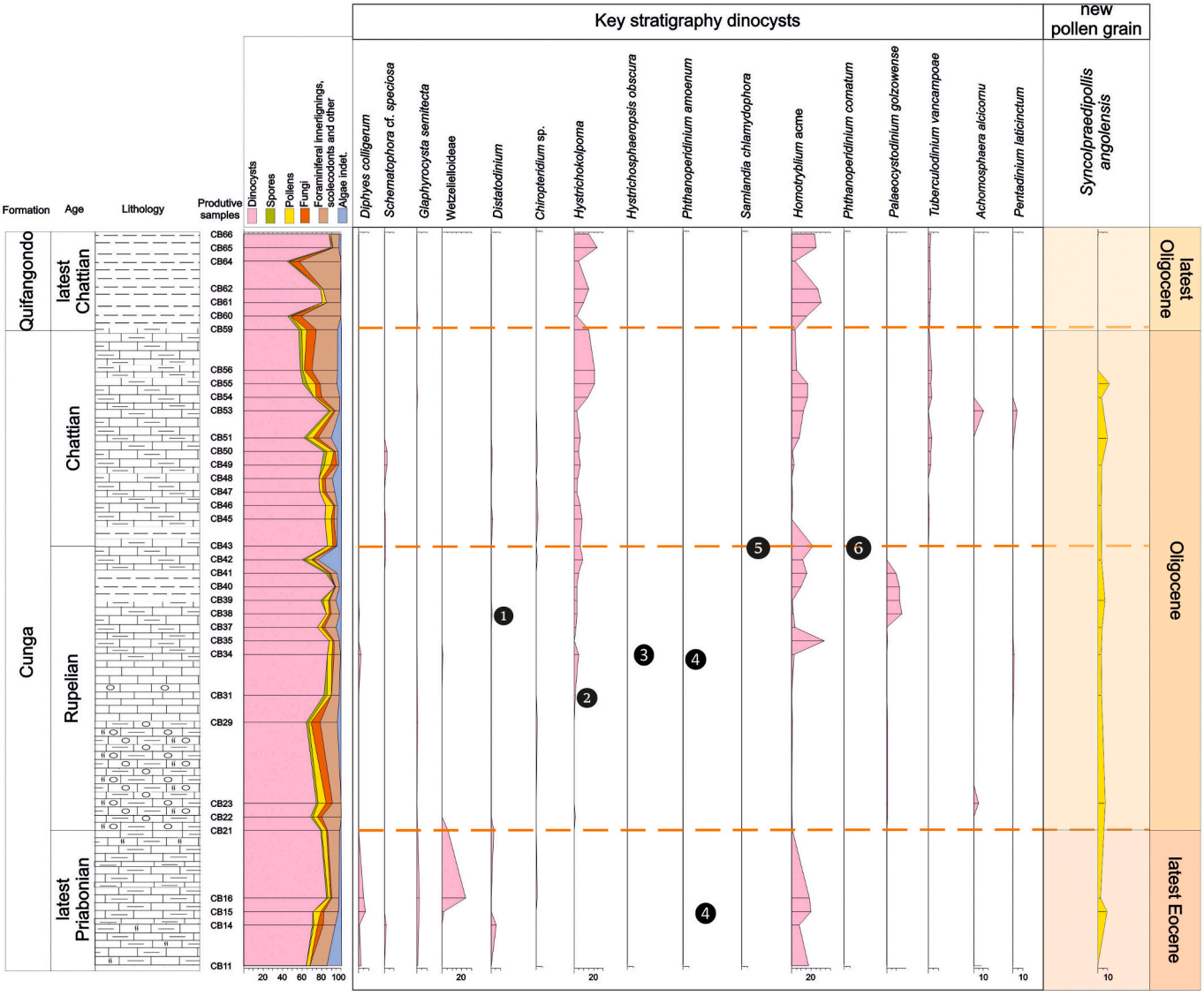

Fig. 3. Overview distribution of main palynomorph groups along the Cabo de São Brás section (%) and key stratigraphic dinocysts distribution (%) – correlation with *Syncolpraedapollis angolensis*, pollen distribution and age. Numbers reflect the rare or single occurrences of 1 – *Distatodinium* cf. *biffii;* 2 – *Hystrichokolpoma* cf. "*pseudooceanicum*"; 3 – *Hystrichosphaeropsis obscura*; 4 – *Phthanoperidinium amoenum*; 5 – *Samlandia chlamydophora*; 6 – *Phthanoperidinium comatum*.

Kwanza Basin, despite extensive palynostratigraphic studies of the upper Cunga and lower Quifangondo formations (e.g., Cascales-Minaña et al., 2019; Catenda and Morais, 2021; Mulanda, 2020; Pereira et al., 2021; C. Rodrigues et al., 2017; Rodrigues et al., 2021; Steeman et al., 2020; Willumsen et al., 2005, 2014). Therefore, the newly discovered data on the occurrence of *Syncolpraedapollis angolensis* nov. gen. sp. nov. in well-documented latest Eocene–Oligocene strata is a significant addition to the palynostratigraphic record of the Kwanza Basin in Angola.

6. Systematic paleontology

In this section a detailed description and visual representation of a novel pollen species is given, based on the observation of thirty specimens. Measurements are presented in the format of minimum (mean) maximum and are compiled in Table 1. Types are systematically located using the England Finder (EF) system. The presented stratigraphic range is specifically associated with the studied section. All slides containing specimens of the new pollen grain species are archived in the slide collection of the National Energy and Geology Laboratory (LNEG - Rua da Amieira, 4465–965, S. Mamede de Infesta, Portugal).

Kingdom: PLANTAE Haeckel 1866
Phylum: SPERMATOPHYTA
Class: MAGNOLIOPSIDA Cronquist et al. 1996
Order: UNDETERMINED
Genus: **Syncolpraedapollis** gen. nov
Derivation of name: Combine "Syncolporate" and "*Praedapollis*".
Type-species: *Syncolpraedapollis angolensis* sp. nov.
Diagnosis: Syncolporate. Well-defined pores. Reticulum is separated from the nexine, enveloping the main body of the grain like a mesh bag.
Species: *Syncolpraedapollis angolensis* nov. gen. sp. nov. (Fig. 2; Plate II).
Derivation of name: "*angolensis*" refers to the type locality in Angola.
Type locality: Cabo de São Brás section (Kwanza Basin, Angola) – located 6 km north from Cabo de São Brás locality (coordinates UTM: 33L, 316889.95E, 8903054.21S)
Type level: Upper Cunga and lower Quifangondo formations (from the outcrop base ca. 6 m to the 24 m at the top).
Holotype: Plate I, fig. 1, sample CB55, slide s1.
Paratype: Plate I, fig. 3, sample CB61, slide s1.
Repository: National Energy and Geology Laboratory (Geological Survey of Portugal).

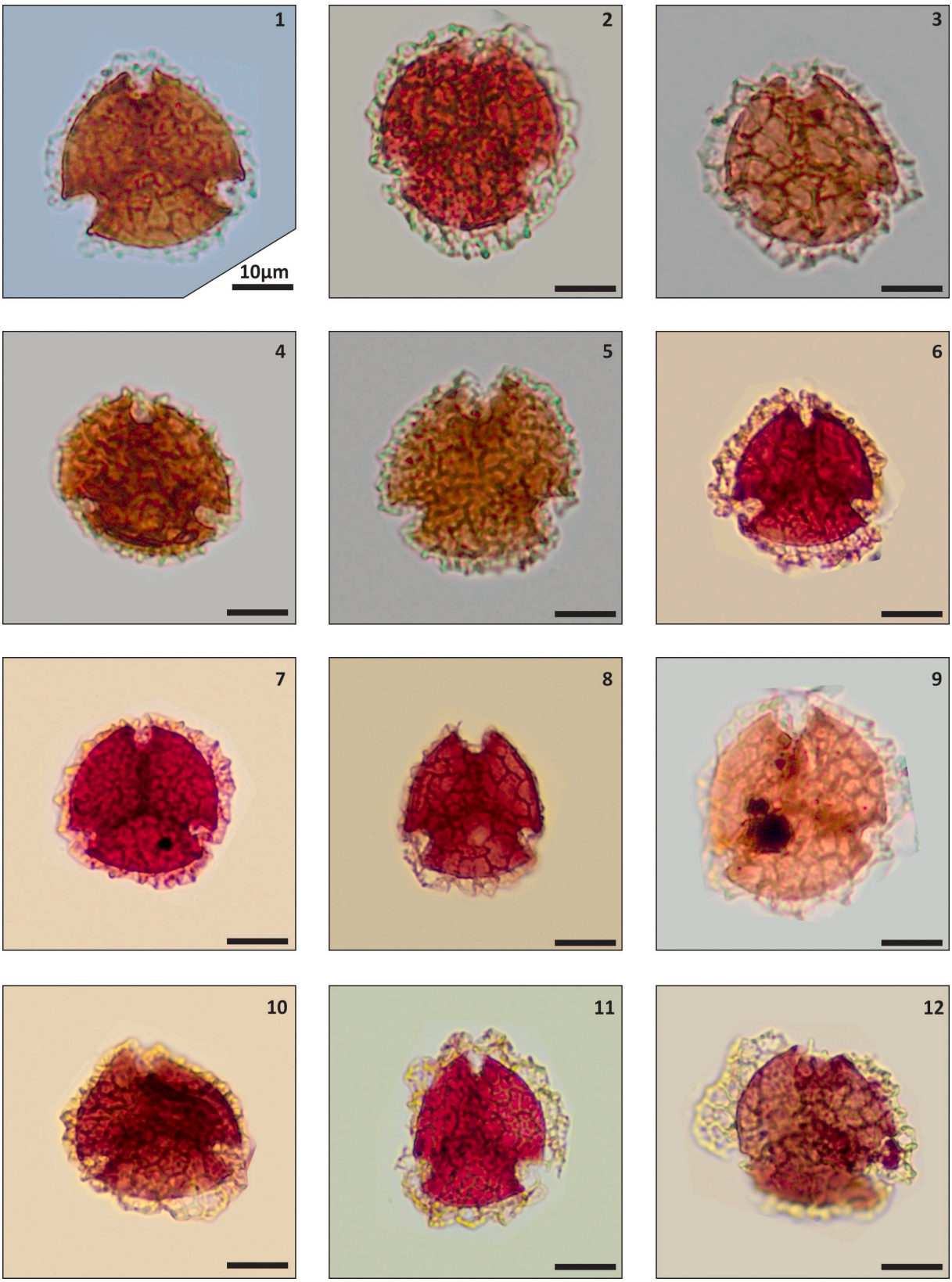

Plate I. Selected taxa recovered in the Cabo de São Brás section. The species name is followed by formation, sample code_slide number, archive image number, and England Finder (EF) microscope coordinates. **1 – 12.** *Syncolpraedapollis angolensis*. **1.** *Holotype*; Cunga Formation, CB55_s1, 05-06, EF O27. **2.** Quifangondo Formation, CB62_s1, 07-08, EF O28-1. *Paratype* **3.** Quifangondo Formation, CB61_s1, 01-02, EF O27. **4.** Cunga Formation, CB56_s1, 20-23, EF O28. **5.** Quifangondo Formation, CB63_s1, 30-35, EF O28. **6.** Cunga Formation, CB49_s1, 30-31, EF O29-4. **7.** Cunga Formation, CB48_s1, 29-31, EF O29-4. **8.** Cunga Formation, CB39_s1, 114-115, EF O29. **9.** Quifangondo Formation, CB63_s1, 50-54, EF O27. **10.** Quifangondo Formation, CB59_s1, 06-07, EF O31 EF. **11.** Cunga Formation, CB42_s1, 70-72, EF F28-2. **12.** Cunga Formation, CB21_s1, 44-45, EF O28-4.

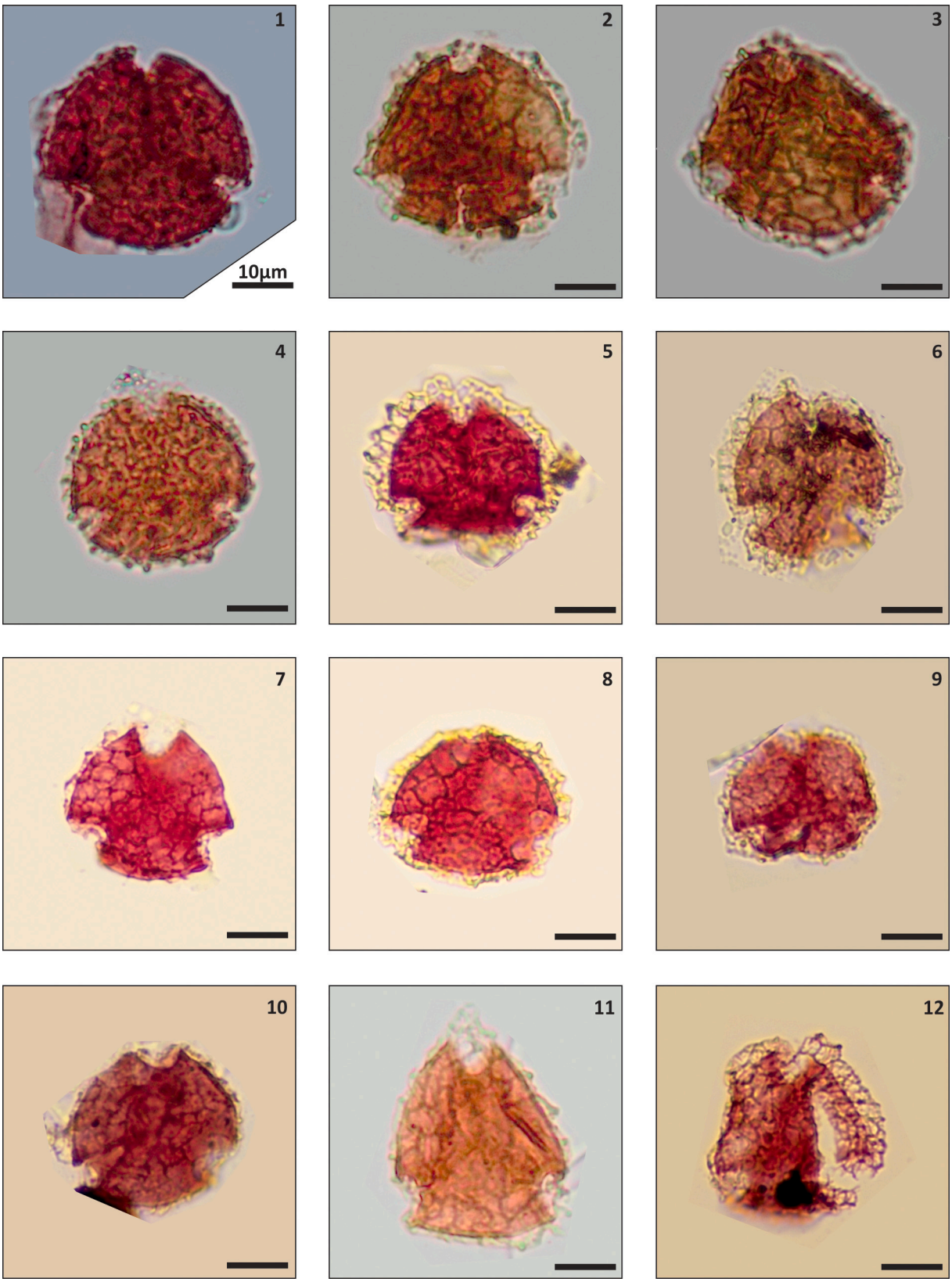

Plate II. Selected taxa recovered in the Cabo de São Brás section. The species name is followed by formation, sample code_slide number, archive image number, and England Finder (EF) microscope coordinates. **1 – 12.** *Syncolpraedapollis angolensis* **1.** Cunga Formation, CB51_s1 sample, photos 16-17, EF O35. **2.** Quifangondo Formation, CB63_s1 sample, photos 24-27, EF O28-1. **3.** Cunga Formation, CB53_s1 sample, 221-222, EF O27. **4.** Quifangondo Formation, CB62_s1 sample, 18-19, EF O27. **5.** Cunga Formation, CB23_s2 sample, 4-5, EF E27. **6.** Cunga Formation, CB25_s1 sample, 7-8, EF O28-4. **7.** Cunga Formation, CB38_s4 sample, 21-22, EF E29. **8.** Cunga Formation, CB46_s1 sample, 22-23, EF E30. **9.** Cunga Formation, CB25_s1 sample, 1-2, EF E29-3. **10.** Cunga Formation, CB34_s4 sample, 20-23, EF E29. **11.** Quifangondo Formation, CB63_s1 sample, 46-49, EF O28. **12.** Cunga Formation, CB15_s1 sample, 172-173, EF F42-2.

Table 2
Comparative Analysis of *Syncolpraedapollis angolensis* and *Praedapollis* species.

Species	Authors	Distinctive character	Pollen breadth (µm)	Exine sculpture	Nexine diameter (µm)	Reticulum brochi	Lumen size	Muri (µm)	Geographic occurences	Age range
Praedapollis africanus	Boltenhagen and Salard-Cheboldaeff, 1973	Triporate	54–63	Cylindrical baculae, rounded on top	86	heterobrochate	irregular lumens: large size (8–16 µm), smaller lumens (2–3 µm).	1.5–2.5	Cameroon, Nigeria, Sudan, Togo, Mali, Gabon Congo	Late Cretaceous to early Miocene
Praedapollis flexibilis	Legoux, 1978	Tricolpate	43–53	Smooth and thin	38	Homobrochate	3 (7–8) 10 µm	1.0–1.5	Nigeria, Ivory Coast, Benin, Tunisia	Early Oligocene to late Miocene
Praedapollis protudentiporatus	Legoux, 1978	Triporate	34–40	Smooth and thin	28–31	Homobrochate	4–7 µm	1.1–1.5	Nigeria	Early Miocene
Syncolpraedipollis angolensis	Gen. nov. sp. nov.	Syncolporate	23–41	Smooth and thin	26–46	Heterobrochate	4–7 µm	0.7–0.9	Angola	Latest Eocene–Oligocene

Diagnosis: Amb substantially triangular. Syncolporate. Small to mid-sized (23–41 µm), with well-defined pores. Nexine smooth. The reticulum is separated from the nexine, enveloping the main body of the grain like a mesh bag.

Description: Monad, radial, isopolar, amb subtriangular with sides curved, and angles rounded in equatorial view, and amb mostly circular in polar view. 3-syncolporate. Colpi broad, with well-defined equatorial apertures, and accompanied by narrow costae colpi.

The sculpture forms a free net, coarsely reticulated, heterobrochate, with lumina ca. 4 µm, and muri ca. 0.5 µm wide. The walls of the reticulum are flexuous and free around the smooth nexine; free-standing columellae.

Occurrence: Across Cabo de São Brás section (latest Eocene-latest Oligocene age), but especially common in the Oligocene sediments from Cunga Formation.

Botanical affinities: Unknown.

Dimensions: Pollen breadth 23 (33) 41 µm; central body 22 (29) 37 µm; pore breadth 5 (2) 8 µm; pore height 4 (3) 6 µm; reticulum 3 (1) 5 µm; lumina 2.3 (4) 6.7 µm; muri 0.7 (0.5) 0.9 µm (measurements are based on 31 specimens; Table 1).

Comparisons: *Syncolpraedapollis angolensis* is distinct among tricolporate pollen grains due to its distinctive, large, free reticulum and the unique arrangement and size of its syncolporate form. Unlike other genera similar to it, such as the varieties of *Praedapollis*, *Syncolpraedapollis angolensis* is the only syncolporate form. It also differs from its counterparts in several ways: *Praedapollis africanus* is triporate, but it might sometimes inaperturate, *Praedapollis flexibilis* is tricolpate, and *Praedapollis protrudentiporatus* is triporate (Table 2).

Regarding size, all grains fall within the small to medium range, averaging 32–60 µm.

S. angolensis, however, exhibits a relatively smaller size within this group, measuring 23 (32) 41 µm. Most species share the characteristic of a smooth and thin exine, except for *Praedapollis africanus*, which displays robust ornamentation in the form of bacula and/or spines.

7. Conclusions

A palynological investigation conducted in the Cabo de São Brás sequence (Kwanza Basin, Angola) unveiled the upper Cunga and lower Quifangondo formations, pinpointing ages ranging from the latest Eocene to the latest Oligocene.

In addition to these findings, the study identified a novel pollen grain species named *Syncolpraedapollis angolensis*. This new genus and species, characterized by unique 3-syncolporate isolated grains with well-defined pores in small to medium size range (average range 32–60 µm) and exhibits an irregular polygonal reticulum. Despite its unique features, *Syncolpraedapollis angolensis* shares certain key characteristics with previously described *Praedapollis* species (*P. africanus, P. flexibilis,* and *P. protudentiporatus*), including a spherical to triangular shape, three-apertures, and a free and flexible reticulum.

Given these morphological attributes and its apparent exclusive occurrence in the upper Cunga and lower Quifangondo formations, the new pollen taxon is dated to the latest Eocene-latest Oligocene ages. This study highlights the importance for detailed palynological analysis in the Kwanza Basin to refine the biostratigraphic framework and enhance understanding of the paleoenvironmental and paleoclimatic evolution of the region.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.revpalbo.2024.105178.

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