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Some Upper Mesozoic palynomorphs from the Tekai River area, Jerantut, Pahang

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Abstract: A palynological study was carried out on rock succession which is exposed along Sungai Tekai, Jerantut, Pahang. Some fairly well-preserved palynomorphs were identified in a rock succession which is part of the Mangkin Sandstone Formation of the Tembeling Group. Sandstone is the dominant lithology in this area together with siltstone, mudstone, shale and conglomerate of various thicknesses, and interpreted to be deposited in a fluvial enviroment. The observed palynomorphs are assigned to twenty one genera which include the commonly observed genera namely Stereisporites, Biretisporites, Cycadopites, Laevigatosporites and Lycopodiumsporites. The identified palynomorph assemblage from this area is comparable with the Speciosus Assemblage of late Lower Cretaceous age.

Abstrak: Kajian palinologi telah dilakukan terhadap jujukan batuan yang tersingkap di sepanjang Sungai Tekai, Jerantut, Pahang. Beberapa palinomorf yang terawet baik telah dikenal pasti dari jujukan batuan yang merupakan sebahagian daripada Formasi Batu Pasir Mangkin dari Kumpulan Tembeling. Litologi utama di kawasan ini merupakan batu pasir bersama-sama dengan batu lodak, batu lumpur, syal dan konglomerat dalam pelbagai ketebalan, dan ditafsirkan terendap di sekitaran fluvial. Palinomorf yang ditemui dikelaskan kepada dua puluh satu genera merangkumi genera yang biasa ditemui iaitu Stereisporites, Biretisporites, Cycadopites, Laevigatosporites dan Lycopodiumsporites. Himpunan palinomorf yang dikenal pasti dari kawasan kajian menyerupai Himpunan Speciosus yang berusia akhir Kapur Awal..

INTRODUCTION AND GEOLOGICAL SETTING

A geological study was carried out along Sungai Tekai which is located approximately 60 km to the north of Jerantut, Pahang (Figure 1). The main objective of the present study is to interpret the age of the rock sequence by examining new palynological data. In general, this area predominantly consists of sandstone, siltstone, shale, mudstone and conglomerate as part of the Mangkin Sandstone Formation of the Tembeling Group. The sedimentary rocks which are exposed at several localities along the Tekai River area were previously mapped and interpreted to be Jurassic-Cretaceous in age and were interpreted as continental deposits. However, a more precise age of the rock sequence was not determined by previous workers because of the limited data of well-preserved macrofossils. Therefore, palynological data is vital in interpreting a more precise age of the rock.

Several studies on the sedimentological aspects of the Tembeling Group in and around the Tekai River area were conducted by several previous workers such as Scrivenor (1907), Koopmans (1968), Harbury *et al.* (1990), Kamal Roslan Mohamed *et al.* (1991), Mohd Faizal Shahrin (2000) and Saiful Azman Abd Lah (2003). They interpreted that the sedimentary rocks exposed along the Tekai River to be part of the Mangkin Sandstone Formation of Jurassic-Late Cretaceous age. The age of the Mangkin Sandstone Formation was based on the occurrence of the plant fossil *Gleichenoides gagauensis* (Khoo 1983). Furthermore, the occurrence of Jurassic palynomorphs namely *Classopolis classoides* and *Circiculis* sp. was reported from the study area by Harbury *et al.* (1990).

MATERIALS AND METHODS

A total of thirty eight samples of siltstone and fine-grained sandstone were collected from the interbedded sandstone and siltstone facies in the vicinity of the Tekai River (Figure 1), with thirty one samples collected from locality 16 (Figure 2). The rock succession at locality 16 was measured and samples for palynological study were collected systematically. The samples were treated in hydrofluoric acid to dissolve the silica and subsequently oxidised with Schulze solution for 15-30 minutes. The residues were then mounted on glass slides using Canada Balsam as mounting medium. All slides were examined

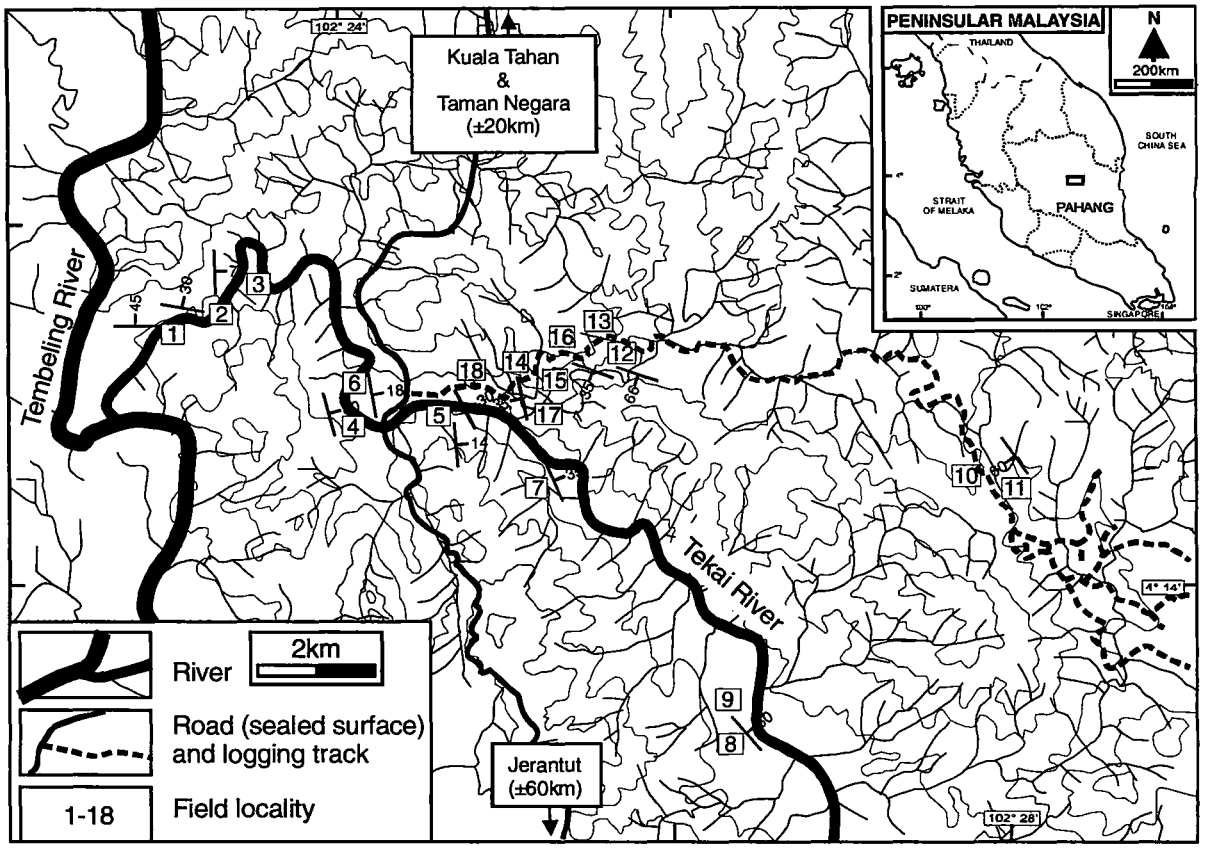

Figure 1: Map showing the study area and field localities.

under transmitted light microscope to identify the presence of palynomorphs and a few selected ones were illustrated (Figure 4).

Results and discussion - the rock sequence

The rock sequence is a typically fining upward sequence that consists of seven sedimentary facies, namely conglomerate facies, predominantly sandstone facies, interbedded medium-grained sandstone and granular sandstone facies, interbedded sandstone and siltstone facies, interbedded medium-grained sandstone and coarse-grained sandstone and mudstone facies, interbedded sandstone, siltstone and shale facies and shale facies.

Samples for the palynological study which is described in this paper were collected from the approximately 70m thick of interbedded sandstone and siltstone facies (facies IV) (Figure 2). The rock sequence consists of predominantly of siltstone and cross-bedded medium-grained sandstone, with thicknesses varying from a few centimeters up to several meters and is interpreted to be deposited in a fluvial environment which includes the flood plain and abandoned channels (Sharifah Shahira Wafa, *in prep.*). Sedimentary structures such as parallel and cross beddings and laminations are common in the sandstone layers. Most of the siltstones are light grey to dark grey in colour and they are found to be rich in palynomorphs.

Palynomorph assemblage

Fairly well-preserved palynomorphs were observed in thirty eight samples. Most of the palynomorphs are light to dark brown in colour after oxidation, and some remained indistinguishable due their opacity. The identified palynomorph genera are *Dictyophyllidites* (Couper) Dettmann 1963, *Cyathidites* Couper 1953, *Biretisporites* Dettmann 1963, *Carya* Tokunaga 1958, *Lycopodiumsporites* Thiergart ex Delcourt and Sprumont 1955, *Sphagnumsporites* Wilson and Webster 1946, *Cycadopites* (Wodehouse) Wilson and Webster 1956, *Schizosporis* Cookson and Dettmann 1959, *Classopollis* Burger 1965, *Monosulcite* Cookson ex Couper 1953, *Laevigatosporites* Thomson and Pflug 1953, *Cycadopites* (Wodehouse) Wilson and Webster 1956, *Sigmopollisa* Hedlund 1965, *Dictyotosporites* Cookson & Dettmann 1958, *Stenochlaea, Stereisporites* Pflug 1953 and *Foraminisporis* Krutzsch 1959. Some selected palynomorphs are illustrated in Figure 4.

The palynomorph assemblage is comparable to other Jurassic-Late Cretaceous palynomorph assemblages recorded from various parts of the world by previous workers such as Couper (1953), Dettmann (1963) and Thomson and Pflug (1953). The present palynomorph assemblage is described from locality 16. Palynomorphs obtained from other localities are low in numbers and are poorly-preserved. Statistical study on the palynomorph assemblage at locality 16 reveals that it contains approximately 85% of Cretaceous palynomorph species

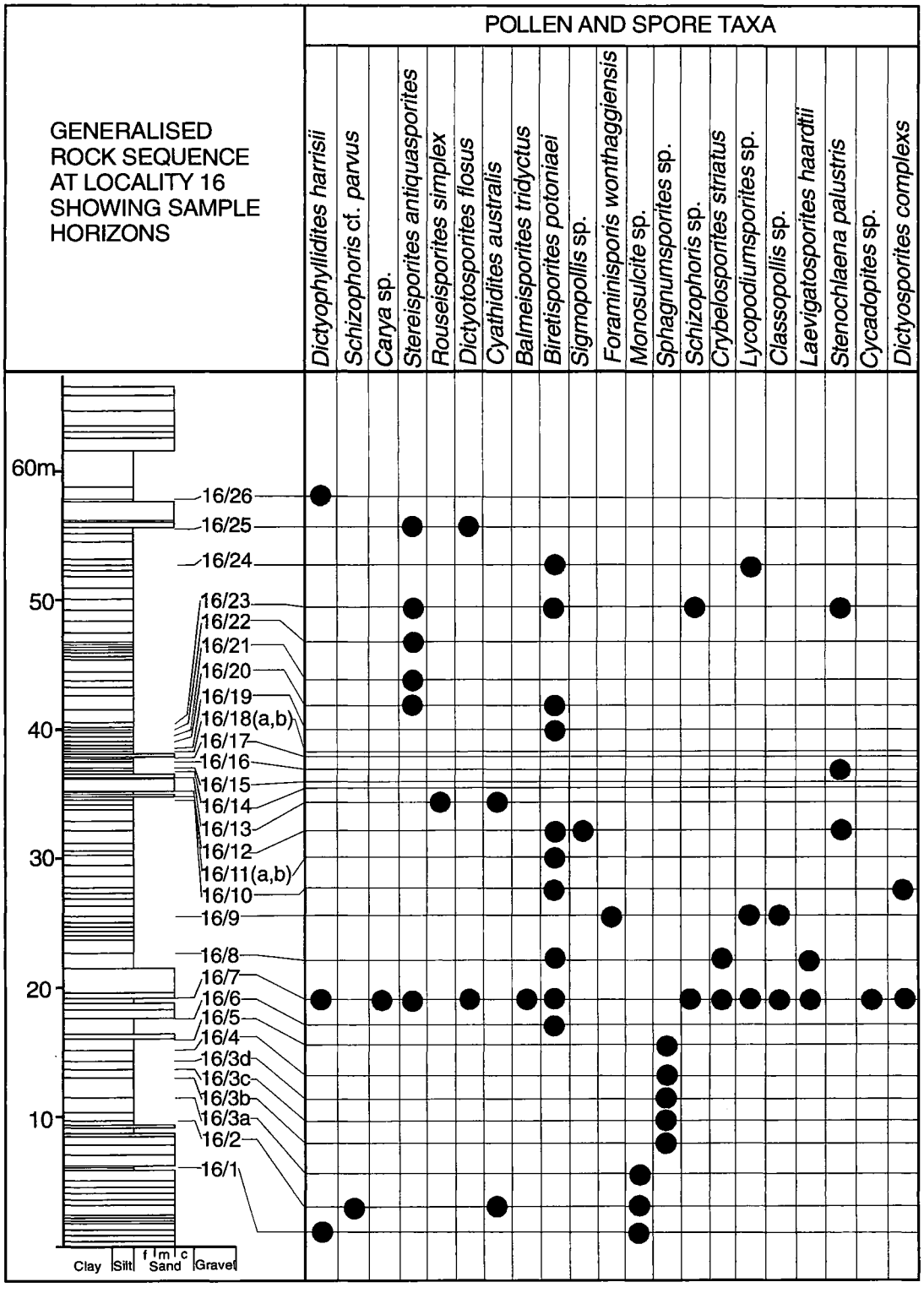

Figure 2: The studied rock sequence and the distribution of palynomorphs in samples at locality 16.

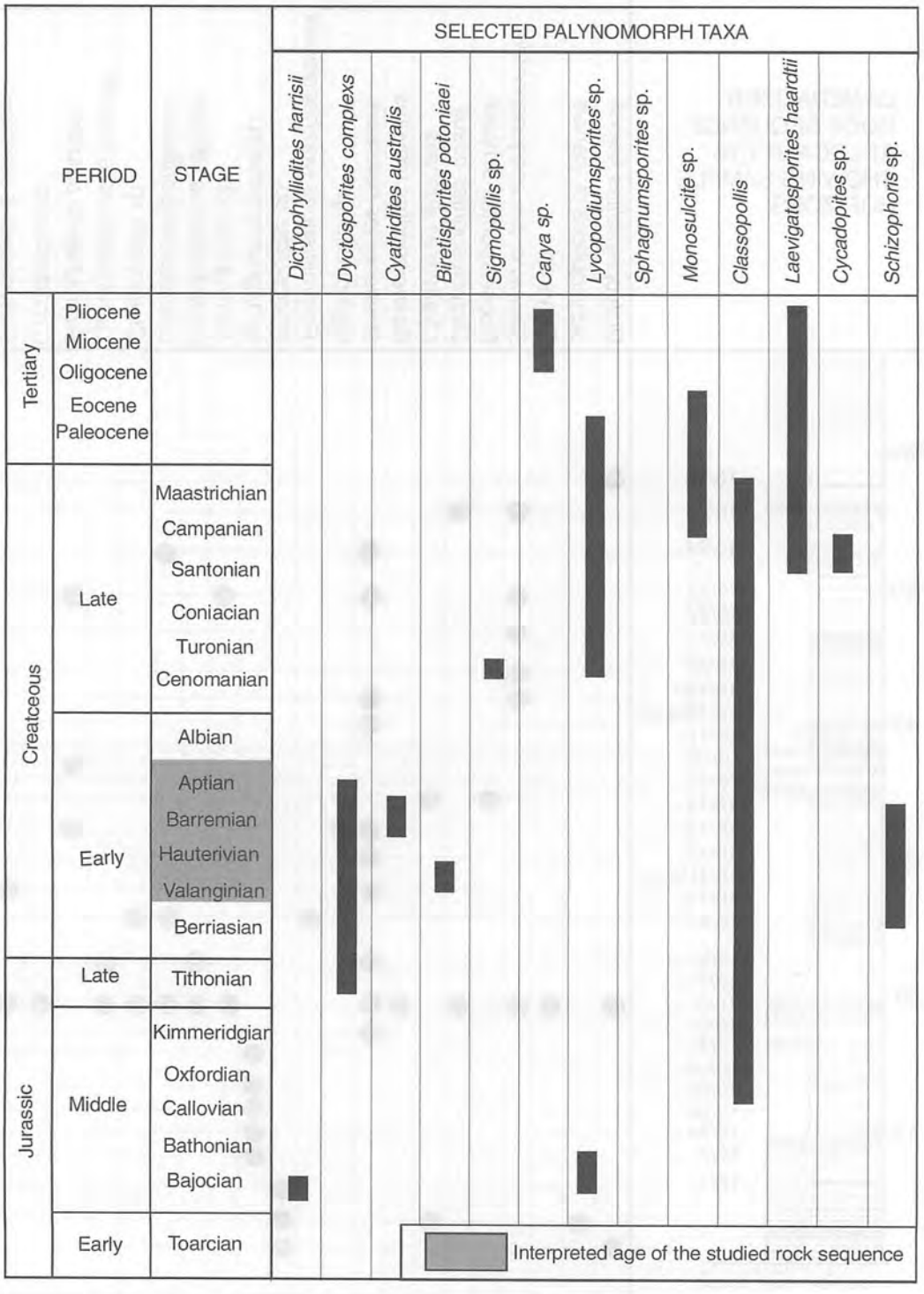

Figure 3: The stratigraphic range chart of some selected Mesozoic palynomorphs and interpreted age of the studied rock sequence.

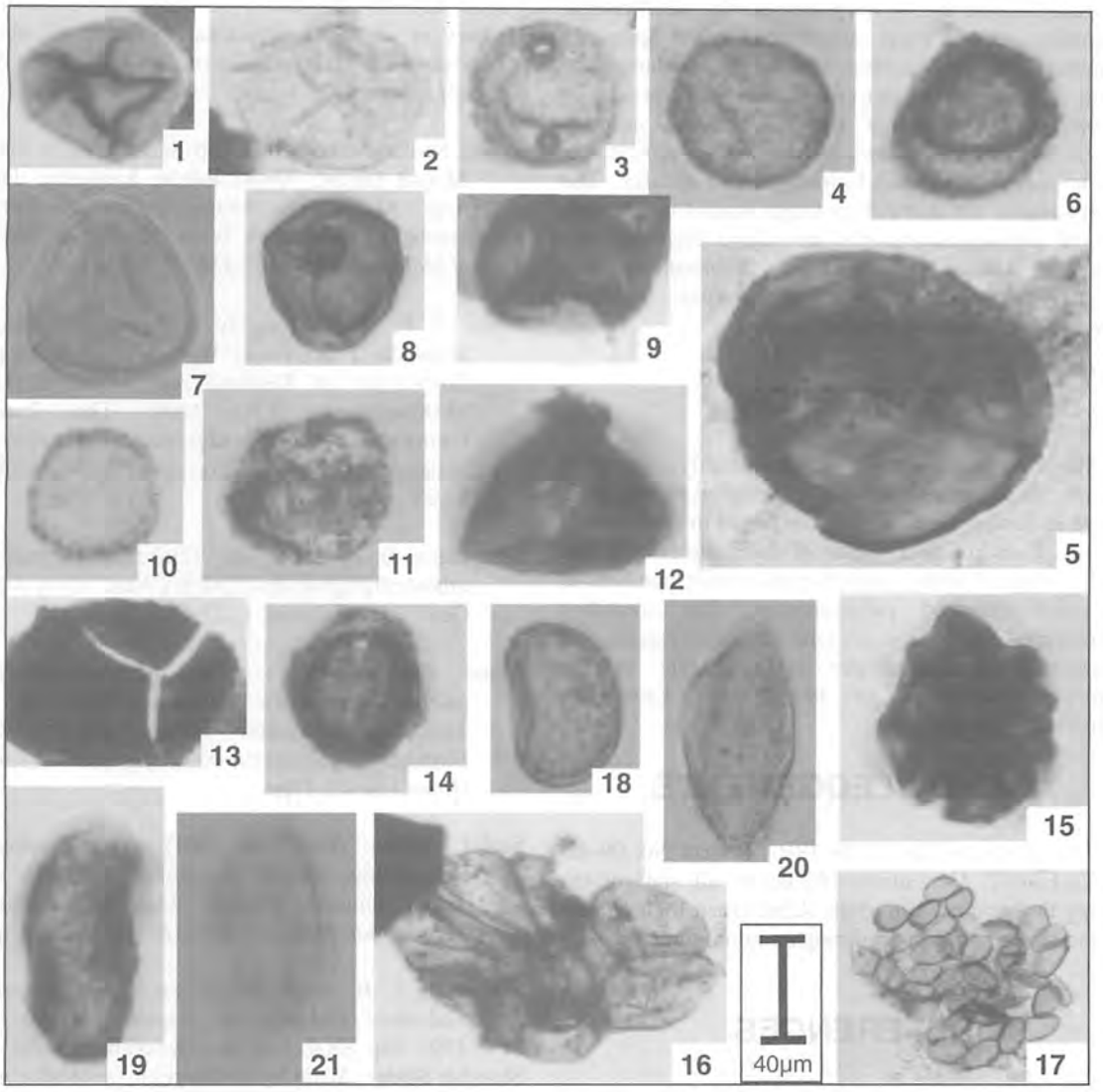

Figure 4: Illustration of some palynomorphs indentified in the present study (All photographs taken under transmitted light microscope).

1. *Dictyophyllidites harrisii* Couper 1958
2. *Dictyotosporites complexs* Couper 1958
3. *Carya* sp. Tokunaga 1958
4. *Stereisporites antiquasporites* Wilson & Webster
5. *Rouseisporites simplex* Cookson & Dettmann
6. *Dyctyotosporites flosus* sp. nov.
7. *Cyathidites australis* Couper 1953
8. *Balmeisporites tridyctus* Cookson & Dettmann
9. *Biretisporites potoniaei* Delcourt & Sprumont
10. *Sigmopollis* sp.
11. Foraminisporis wonthaggiensis (Cookson & Dettmann)
12. *Monosulcite* sp. Cookson ex Couper 1953
13. *Sphagnumsporites* sp. Wilson & Webster 1946
14. *Crybelosporites striatus* Cookson & Dettmann
15. *Lycopodiumsporites* sp. Thiergart ex Delcourt and Sprumont 1955
16. *Classopollis* sp.
17. *Laevigatosporites haardtii* Thomson & Pflug 1953
18. *Stenochlaena palustris*
19. *Cycadopites* sp. (Wodehouse) Wilson & Webster 1956
20. *Schizophoris* cf. *parvus* Cookson & Dettmann 1959
21. *Schizophoris* sp.Cookson &Dettmann

with some Jurassic and Tertiary species. The palynomorph assemblage shows a great resemblance to the *Speciosus* Assemblage of late Lower Cretaceous (Valanginian-Aptian) (Figure 3). The most common species present in the *Speciosus* Assemblage are *Stereisporites antiquesporites, Biretisporites potoniaei, Lycopodiumsporites* spp., *Dictyotosporites flosus* and *Crybelosporites striatus* . The present samples are also rich in fungal spores which were identified as *Pluricellaesporites apiculatus, Hypoxylonites brazosensis, Monoporisporites rigens,* Monosulcate ascopore, *Acrostalagmus* sp., *Fungal sclerotia,, Sphaerosidaceae* and *Dicellites infrascabratus.*

CONCLUSION

The rock sequence of predominantly sandstone, siltstone, shale, mudstone and conglomerate which is exposed in Sungai Tekai area is interpreted to be deposited in a fluvial environment. Some of the samples collected for palynological study yielded considerable numbers of fairly well-preserved palynomorphs. The identified palynomorph assemblage contains common species of *Stereisporites antiquasporites* is assignable to the *Speciosus* Assemblage of late Lower Cretaceous (Valanginian-Aptian) age.

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REFERENCES

Couper, R. A. 1953. Upper Mesozoic and Cainozoic spores and pollen grains from New Zealand. *Bull. New Zealand Geol. Surv. Palaeont.* **22**, 77pp.

Couper, R. A. 1958. British Mesozoic microspores and pollen grains, a systematic and stratigraphic study. *Palaeontographica* **103 B**, 75-179.

Dettmann, M. E. 1963. Upper Mesozoic microfloras from southeastern Australia. *Proc. Royal Soc. Victoria,* **77**, 148pp.

Harbury *et al.* 1990. Structural evolution of Mesozoic Peninsular Malaysia. *Journal of Geological Society of London.* **147**:11-25.

Kamal Roslan Mohamed, Uyop Said, Ibrahim Abdullah, Ahmad Jantan, Abdul Rahim Samsudin dan Che Aziz Ali, 1991. Stratigrafi batuan Kumpulan Tembeling di Lembah Tekai. *Newsletter Geol. Soc. of Malaysia.* **17(3)**,155-156.

Khoo, H. P. 1983. Mesozoic stratigraphy in Peninsular Malaysia. *Proceedings Workshop on Stratigraphic Correlation of Thailand and Malaysia.* 1, 370-383Koopmans, B.N. 1968. The Tembeling Formation – A Litostratigraphic Description (West Malaysia). *Geological Society of Malaysia Bulletin* **1** : 23 – 43.

Koopmans, B. N. 1968. The Tembeling Formation – a lithostratigraphic description (West Malaysia). Bull. Geol. Soc. Malaysia. **1**, 23-43.

Mohd Faizal Shahrin, 2000. Sedimentologi dan paleontology utara kawasan Kampung Kuala Tembeling, Jerantut, Pahang Darul Makmur. *Unpublished Universiti Kebangsaan Malaysia B.Sc. (Hons.) thesis.* 47pp.

Saiful Azman Abd Lah. 2003. Sedimentologi dan Paleontologi Batuan Jura-Kapur di Sekitar Sungai Tekai, Jerantut, Pahang. *Unpublished Universiti Kebangsaan Malaysia B.Sc. (Hons.) thesis.* 64pp.

Scrivenor, J. B. 1907. *Geologists report of progress, Federated Malay States, September 1903-January 1907,* 44p. Kuala Lumpur: Government Press.

Sharifah Shahira Wafa Syed Khairulmunir Wafa (*in prep.*). Kajian sedimentologi dan paleontologi di sekitar Sungai Tekai, Jerantut Pahang. *Tesis Sm.Sn. (Kep.) Universiti Kebangsaan Malaysia.*

Thomson, P. W. and Pflug, H. 1953. Pollen und Sporen des Mitteleuropäischen Tertiärs. Palaeontographica **B94**. 1-138.

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