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Ricciisporites tuberculatus

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(Assereto 1966)

(Kimyai 1975)

(Assereto 1966)

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(Fürsich

(Rad 1986)

et al. 2005)

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(Seyed-Emami et al. 2006, Seyed-Emami

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(Javadi 2006)

,and Wilmsen 2007)

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,(Fürsich et al. 2006)

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(Shekarifard et al.

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in press)

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Playford 1984)

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(Shekarifard et al. 2006)

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(Shekarifard et al. 2007)

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(Shekarifard et al. 2007)

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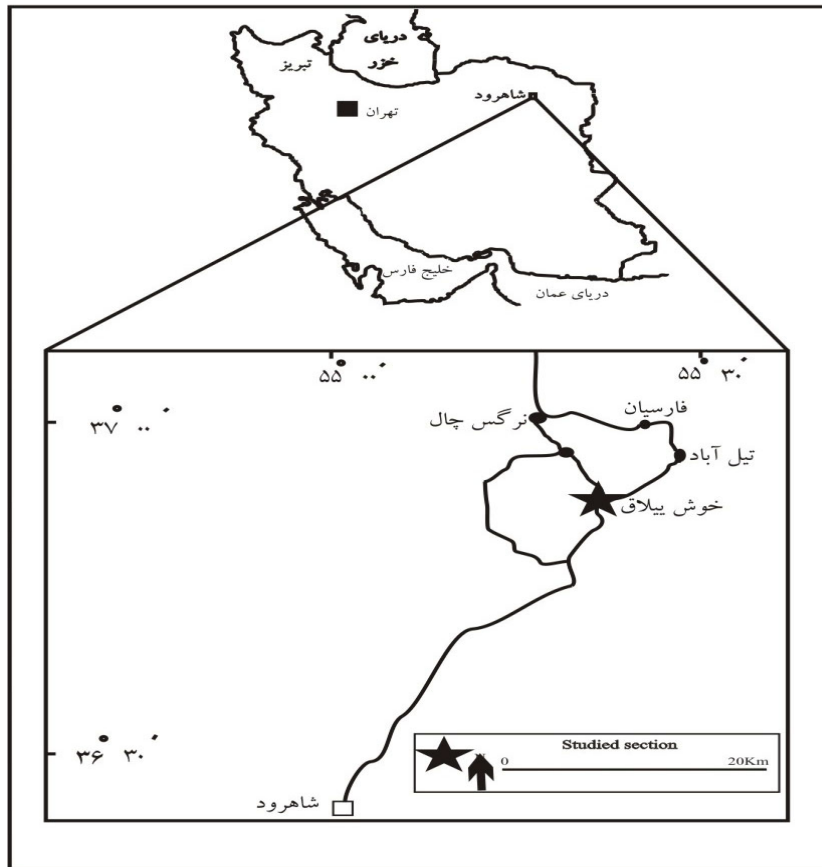
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(Phipps and



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(*spora dispersae*)

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(Playford and Dettmann 1996)

(sporangium)

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(*in situ*)

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(Balme 1995)

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(Matoniaceae)

(Gleicheniaceae)

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(Vakhrameev 1991; Van

Plates 1

Konijnenburg – Van Cittert 2002; Villar deseoane

1999, Tidwell and Ash 1994; Collinson 1996

(Lycopsida)

(Filicopsida)

(

(Bryopsida)

(Cycadopsida)

(Sphenopsida)

:(Lycopsida)

(Plates 1, 2) (Coniferopsida)

(Deng

. 2002)

Limbosporites

:(Bryopsida)

(Barrón et al. 2006)

- *Ricciisporites tuberculatus*

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Filicophyta

(e.g. Lundblad 1954; Balme 1995; Lindström and

(Schizaeaceae)

(Batten

Erlström 2006)

(Dipteridaceae)

(Osmundaceae)

Ricciisporites

et al. 1994)

(Marattiaceae)

(Cyatheaceae)

(Dicksoniaceae)

)
(Filatoff 1975; (Gleicheniaceae
Filatoff and Price 1988; Balme 1995; McKellar
1998)

:(Cycadopsida)

.()

- % %

Ricciisporites

.(Fakhr 1975)

Chasmatosporites

Corollina :(Coniferopsida)

(Tyson
1984; 1993; Mahmoud and Moawad 2000;
.Zavattieri et al. 2008) Fakhr

(Tyson 1984, 1993)

.(1975)

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:(Sphenopsida)

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Equisetum

vitrinite inertinite

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Calamospora

() AOM

Ricciisporites,

Gleicheniidites, Dictyophyllidites, Limbosporites

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(Zavattieri et al. 2008)

(Tyson 1984, 1993)

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(Tyson 1993)

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(Zavattieri et al. 2008)

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(Zavattieri et al. 2008)

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() anemophilous

(Tyson 1984)

(Tyson 1993) %

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(bryophyte/pteridophyte)

(Zavattieri et al. 2008)

(Plates 1, 2)

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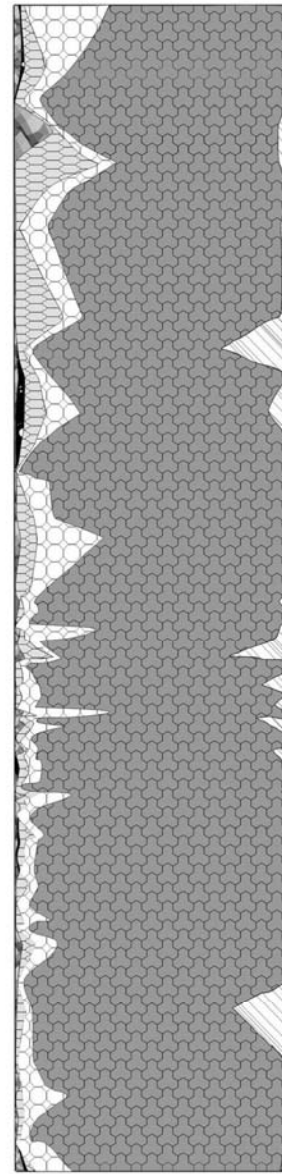
(Tyson 1993)

Woody debris	Phytoclasts	Marine palynomorph	Transparent Aom	Opaque Aom	Pollen Grains	Spore	Sample No.
2.715	79.705	0.7	13.43	2.93	1.46	2.06	1
1.611	88.48	-	9.66	0.009	-	0.24	2
0.5	95.32	-	2.04	2.14	-	-	3
0.69	92.7	0.18	3.5	2.08	-	0.85	4
0.31	81.78	-	14.99	2.92	-	-	5
0.21	88.95	0.18	8.59	0.85	0.06	1.16	6
2.15	91.76	-	5.18	0.91	-	-	7
20.53	73.40	0.4	2.23	3.24	0.1	0.1	8
-	97.45	-	2.16	0.25	0.5	0.2	9
2.68	81.71	0.4	8.18	4.63	0.5	1.9	10
0.5	96.63	-	1.6	1.17	0.1	-	11
2.1	85.93	-	8.85	3.12	-	-	12
0.37	94.3	-	4.98	-	-	0.35	13
0.73	90.51	-	3.9	4.6	0.13	0.13	14
1.75	91.66	-	4.72	0.27	1.1	0.5	15
0.62	91.97	0.2	3.71	3.10	0.4	-	16
1.5	90.22	0.63	4.9	1.7	0.42	0.63	17
2.48	86.85	0.6	3.79	5.81	0.37	0.1	18
0.85	93.33	0.4	4.78	-	0.14	0.5	19
0.2	89.62	-	5.74	2.66	1.68	0.1	20
0.307	85.103	0.1	10.98	3.41	-	0.1	21
2.82	76.73	-	12.18	5.23	1.46	1.58	22
0.01	99.39	-	0.3	0.3	-	-	23
0.14	90.29	0.3	5.7	2.73	0.34	0.5	24
-	-	-	-	-	-	-	25
2.38	87.52	1.5	5.16	3.44	-	-	26
5.48	86.80	-	4.44	3.28	-	-	27
1.67	90.18	1.43	3.24	0.8	1.63	1.02	28
1.63	91.62	0.5	5.23	0.52	-	0.5	29
0.45	95.32	-	1.9	2.33	-	-	30
12.17	68.95	0.2	10.63	4.51	1.18	2.36	31
0.31	92.51	0.07	3.42	3.02	0.07	0.6	32
2.446	73.194	0.2	20.83	0.83	-	2.5	33

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Woody debris	Phytoclasts	Marine palynomorph	Transparent Aom	Opaque Aom	Pollen Grains	Spore	Sample No.
1.87	61.33	0.4	28.52	1.8	1.69	4.39	34
6.42	86.69	-	6.89	-	-	-	35
0.15	90.23	-	7.01	2.27	0.09	0.28	36
10.31	80.68	-	7.38	1.13	-	0.5	37
0.29	92.60	-	4.22	2.89	-	-	38
-	95.15	0.1	3.08	2.06	-	-	39
0.08	97.09	-	1.38	1.45	-	-	40
2.37	64.05	0.34	18.56	11.28	1.19	2.21	41
4.37	87.82	0.24	4.7	2.07	-	0.8	42
2.97	66.85	-	26.54	1.97	0.25	1.42	43
1.69	93.89	-	4	0.42	-	-	44
1.02	90.14	-	5.41	2.46	0.24	0.73	45
3.93	88.84	-	4.5	0.97	-	1.76	46
0.37	89.28	-	7.85	2.5	-	-	47
0.4	86.90	-	6.9	5.8	-	-	48
1.16	66.62	0.1	24.08	5.74	1.10	1.2	49
-	87.78	-	7.37	6.22	-	0.6	50
19.15	86.19	-	10.56	1.7	-	0.4	51
-	98.58	0.05	0.86	0.4	-	0.3	52
0.23	90.77	2.74	1.37	4.71	0.09	0.09	53
7.62	68.52	3.04	12.56	7.7	0.06	0.5	54
6.07	85.09	2.87	5.62	4.96	0.26	0.78	55
25.05	69.04	-	2.6	2.7	0.61	-	56
2.47	72.95	-	6.96	17.62	-	-	57
-	-	-	-	-	-	-	58
1.44	85.13	-	10.55	1.19	0.5	1.19	59
0.01	80	-	8.88	11.11	-	-	60
3.86	59.61	-	7.69	28.84	-	-	61
3.87	79.69	-	2.34	0.02	0.16	13.92	62
0.01	90.82	-	5.24	3.93	-	-	63
0.65	77.16	0.6	10.49	8.02	1.85	1.24	64
-	-	-	-	-	-	-	65
1.39	62.52	0.67	32.94	0.84	0.84	0.8	66
2.51	64.67	-	30.84	-	0.49	1.49	67

Time Unit	Rock Unit	Thickness (meter)	Sample No	Lithology
Jurassic	Farsan Fm.	0	0	
	Middle (Dogger)	1280.3	67	
Early (Liassic)	Shemshak Formation	1150.3	65	
		887.8	60	
Late Triassic	Rhaetian	922	57	
		890.3	54	
		797.9	50	
		574.1	47	
		537	42	
		510.2	37	
		238.8	31	
		121.6	28	
		88.4	24	
			21	
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	8			
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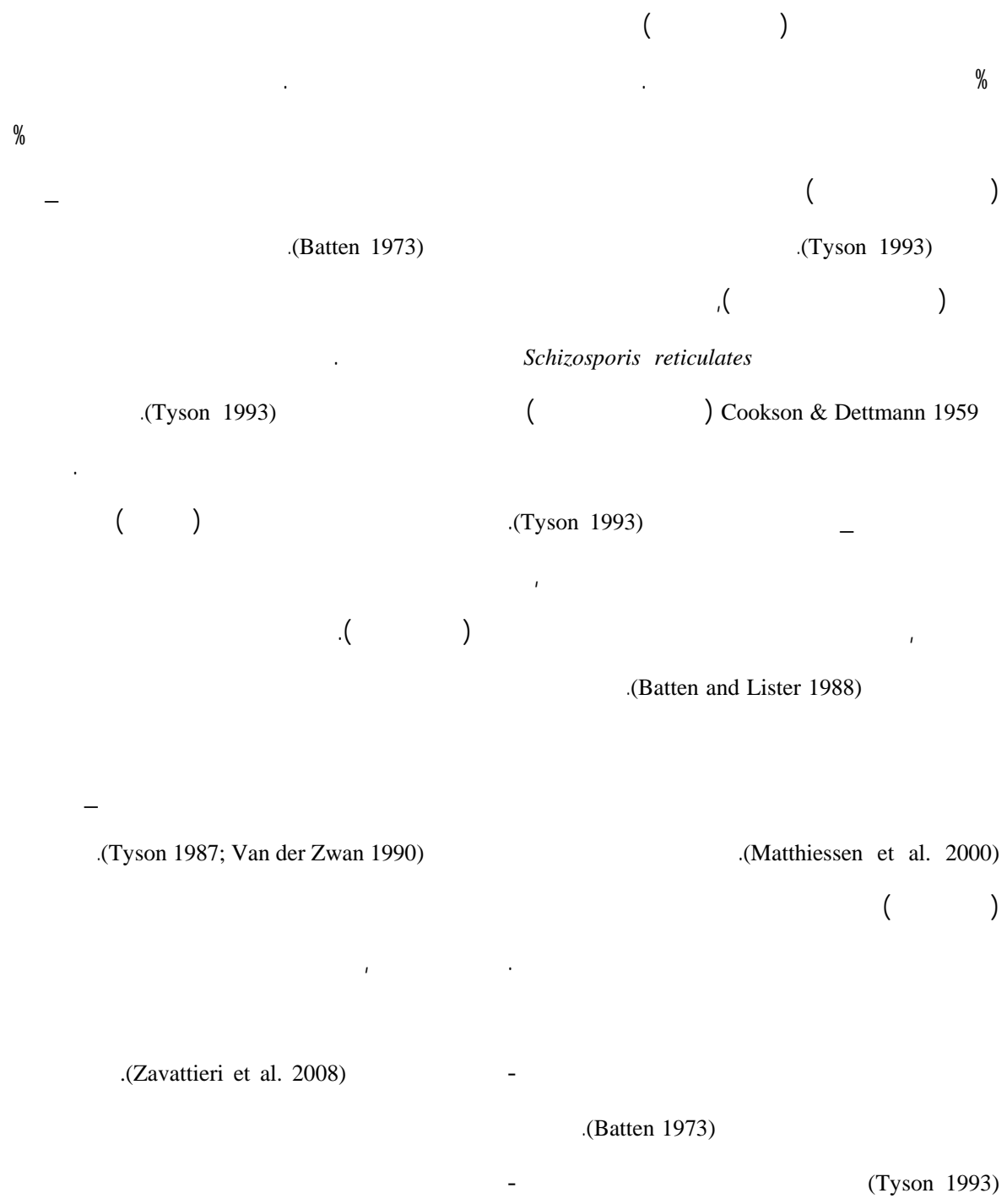
LEGEND

- Laterite
- Silty Shale
- Argillaceous Sandstone
- Sandstone
- Conglomerate
- Limestone
- Shale
- Coal
- Unconformity
- Marine Palynomorph
- Miospores
- Woody debris
- Phytoclast
- Dark Aom
- Transparent Aom



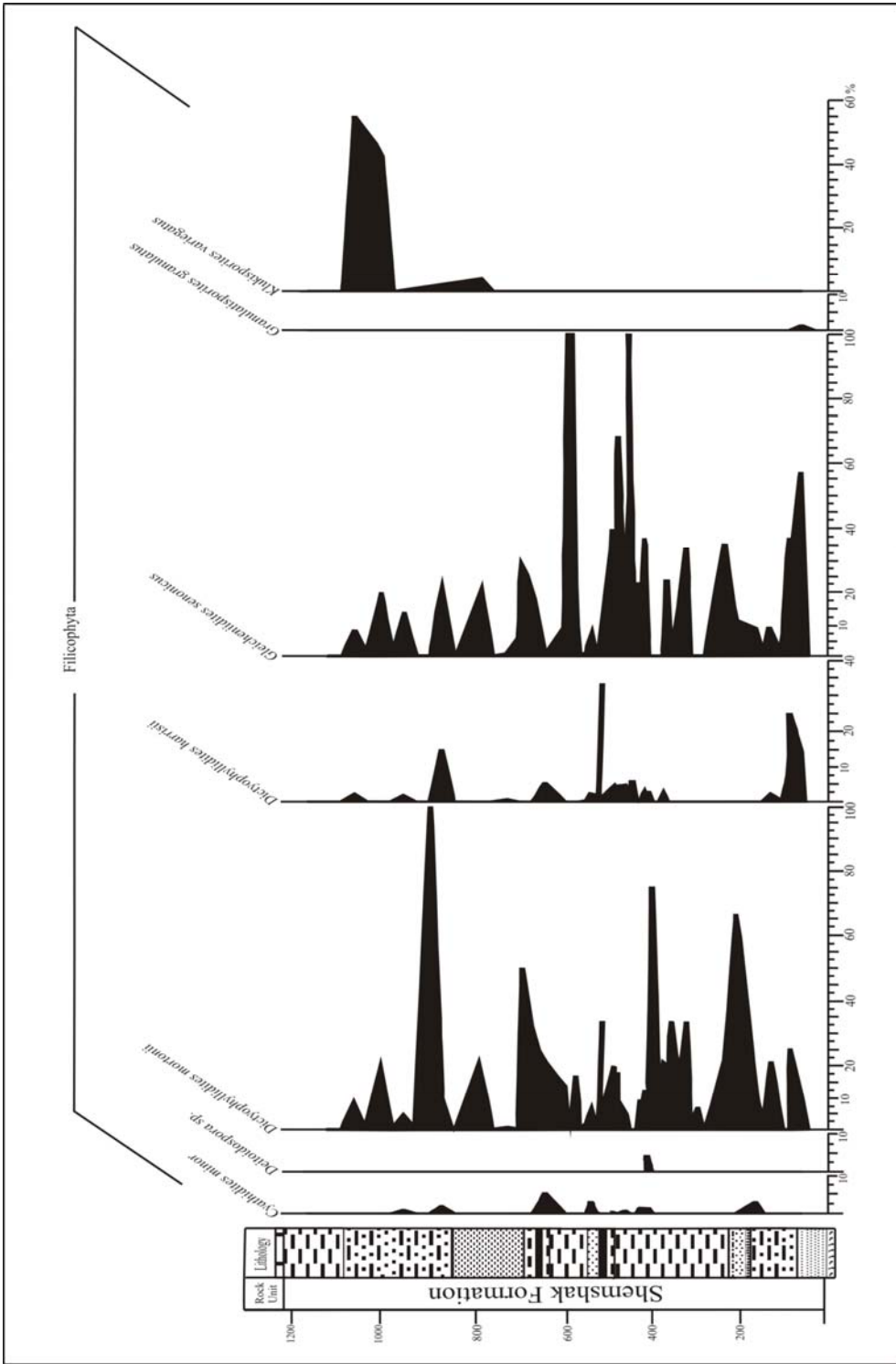
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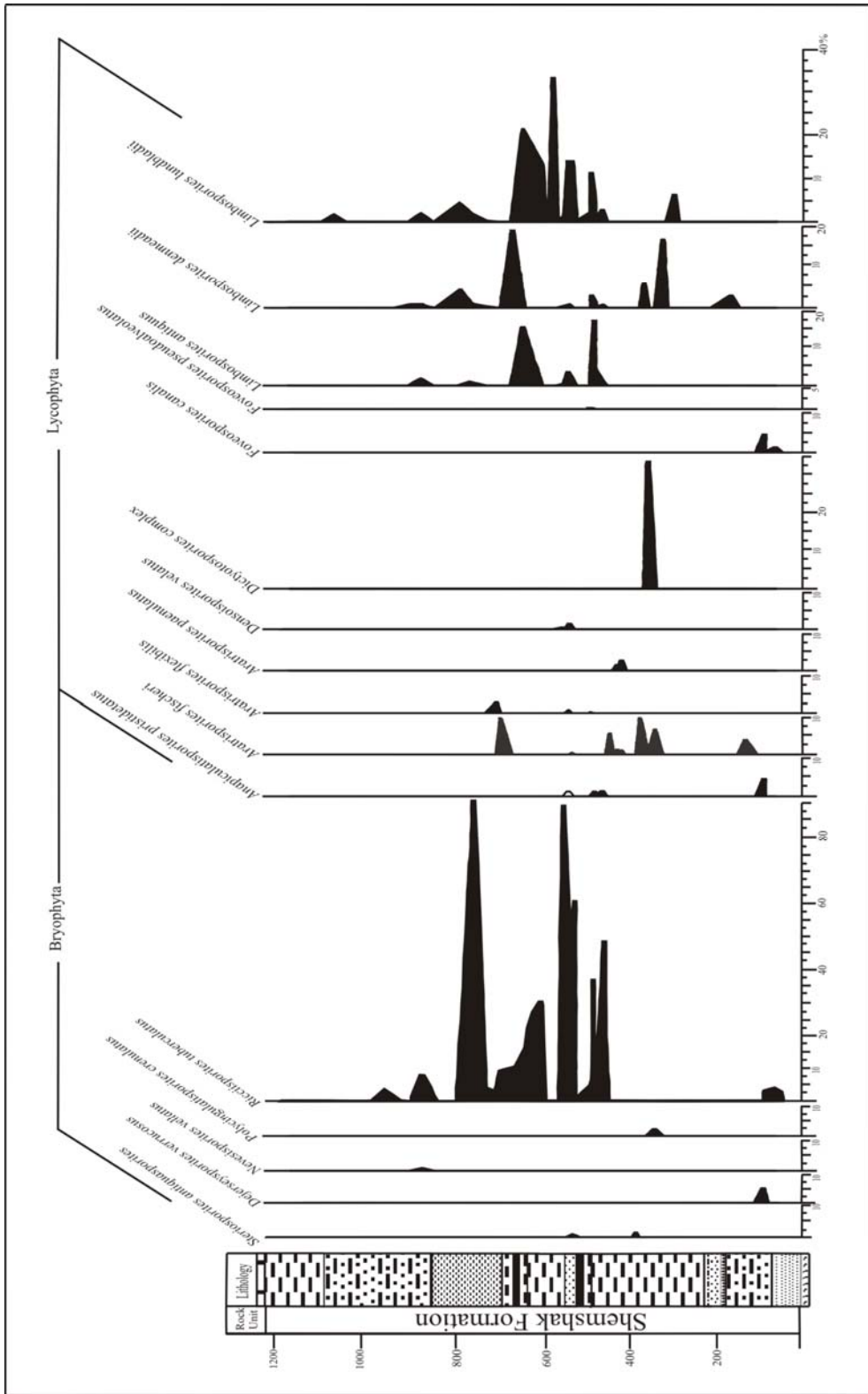
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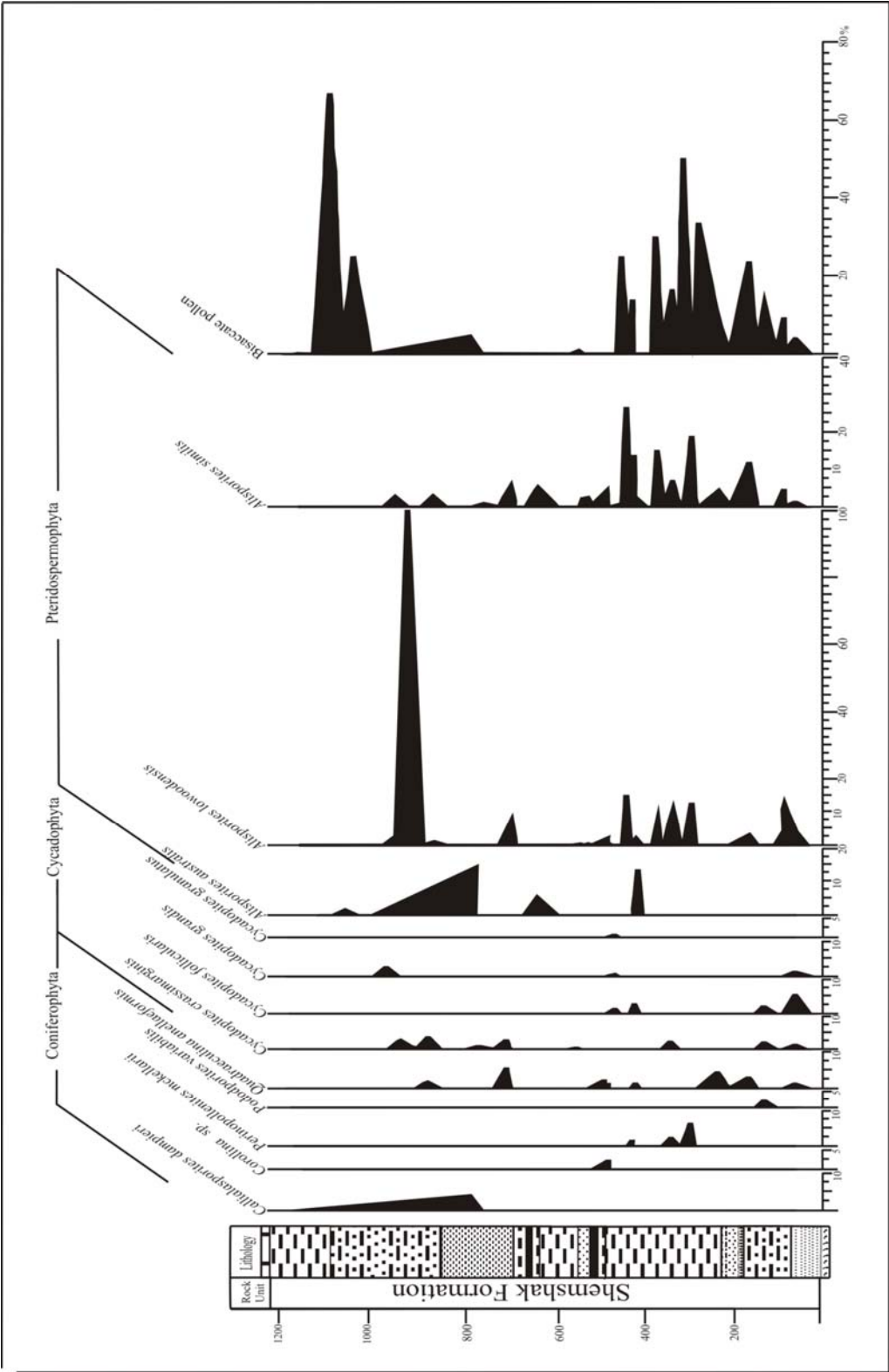
(Van der Zwan 1990; .
Tyson 1995)
) AOM
Ricciisporites () AOM ()
(Schulz 1967) *tuberculatus* %
(Lindström and Erlström 2006) —
Cerebropollenites macrovrrucosus (Tyson 1987, 1989, 1993)
(Schulz 2006) 1967; Lindström and Erlström
Klukisporites variegatus
(Achilles et al. 1984)
(Ashraf 1977)
(Filatoff 1975; McKellar (Tyson
(Couper — 1998) 1987; Van der Zwan 1990; Boulter and Riddick
— 1958; Lam and Porter 1977) () .1986)
(Vigran and Thusu 1975) (*Corollina Ricciisporites*)
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Filicophyta

Lycophyta, Bryophyta

Coniferophyta

Cycadophyta

Sphenophyta

Ricciisporites

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Plate 1

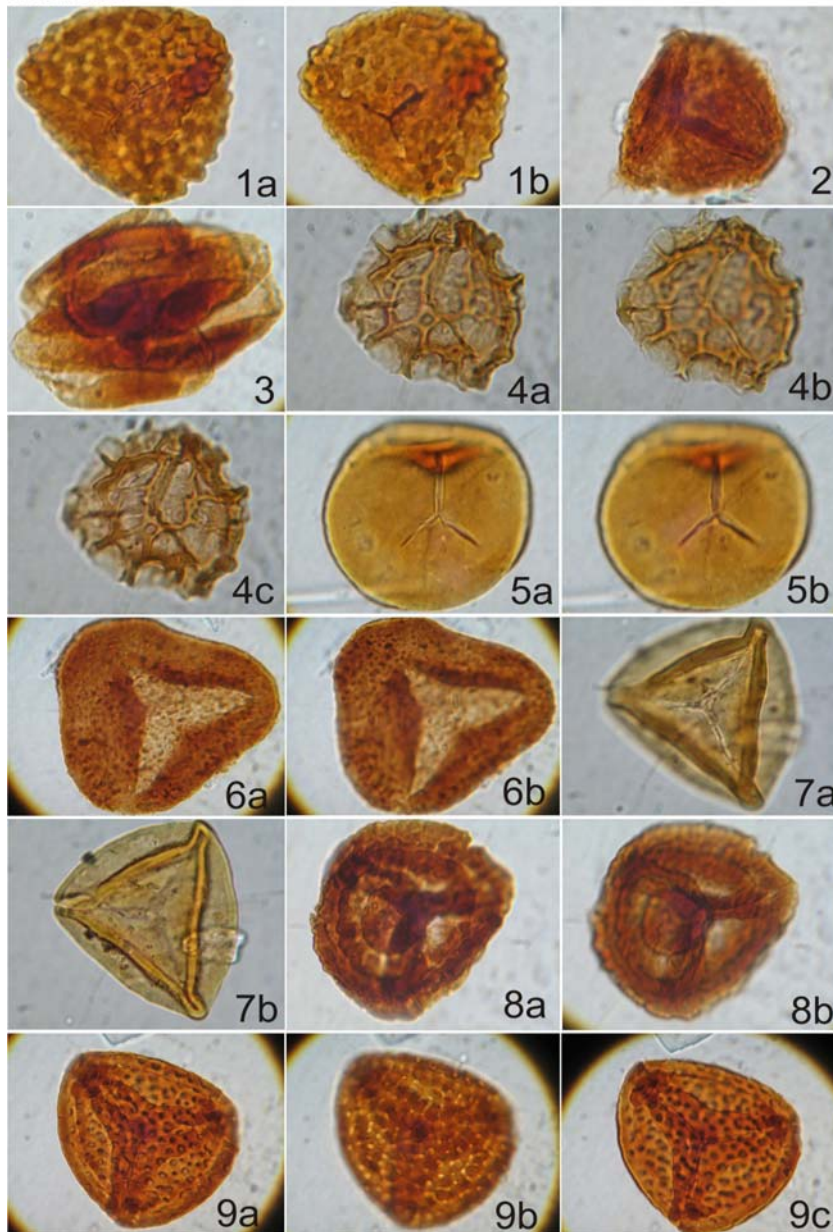


Plate 1

Fig. 1: *Klukisporites variegatus* Couper, 1958, 1a, Proximal focus x1000. 1b, Distal focus x1000, slide 66/1. Fig. 2: *Foveosporites pseudoalveolatus* (Couper) McKellar, 1998, Proximal focus x1000, slide 34/1. Fig. 3: *Ricciisporites tuberculatus* Lundblad, 1954, Proximal focus x600, slide 34/1. Fig. 4: *Retitriletes clavatooides* (Couper) Döring, Krutzsch, Mai & Schulz, 1963, 4a, 4c, Distal foci x1000, 4b, Proximal focus x1000, slide 41/2. Fig. 5: *Todisporites major* Couper, 1958, 5a, Proximal focus x1000. 5b, Distal focus x1000, slide 66/2. Fig. 6: *Concavissimisporites punctatus* (Delcourt & Sprumont) Brenner, 1963, 6a, Proximal focus x1000. 6b, Distal focus x1000, slide 26/1. Fig. 7: *Dictyophyllidites mortonii* (de Jersey) Playford & Dettmann, 1965, 7a, Proximal focus x1000. 7b, Distal focus x1000, slide 66/2. Fig. 8: *Polycingulatisporites crenulatus* Playford & Dettmann emend. McKellar, 1974, 8a, Distal focus x1000. 8b, Proximal focus x1000, slide 16/1. Fig. 9: *Foveosporites canalis* Balme, 1957, 9a, Proximal focus x1000. 9b, Median focus x1000. 9c, Distal focus x1000, slide 1/1.

Plate2

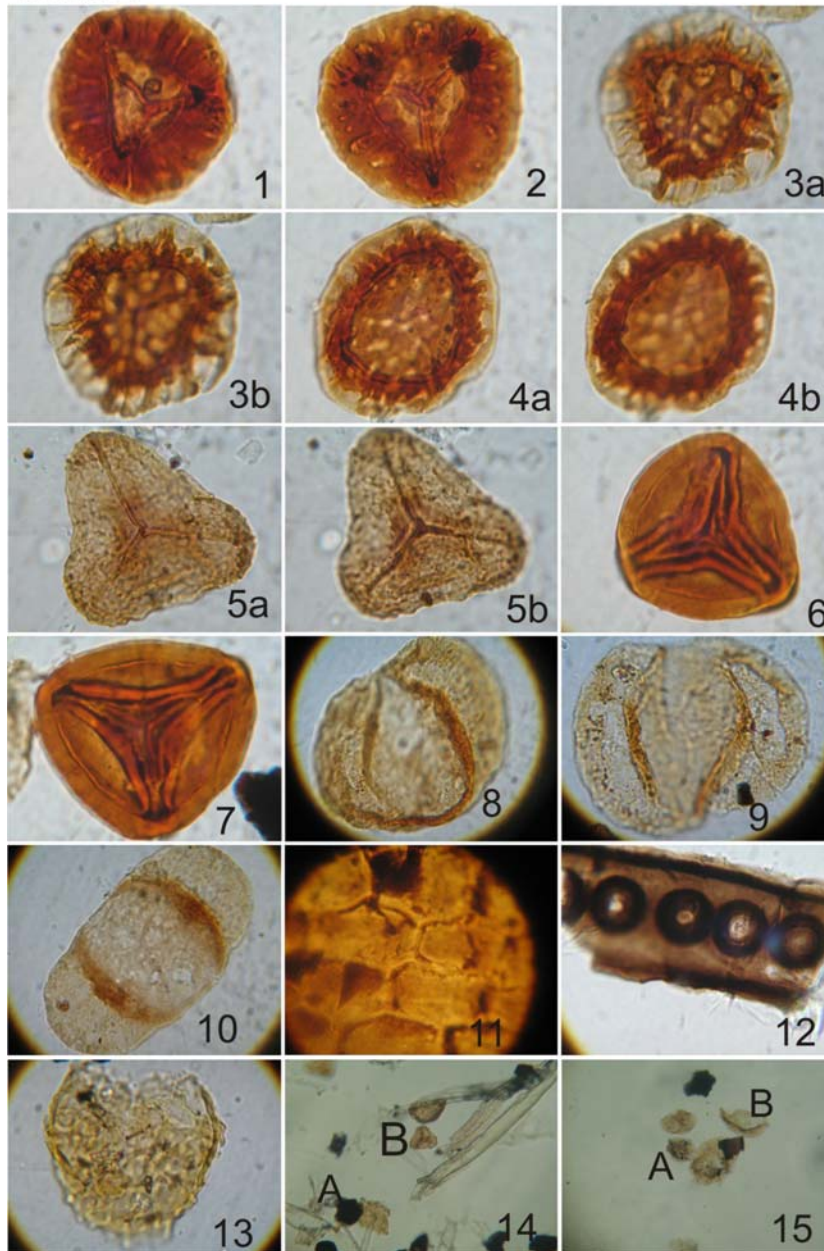


Plate 2

Figs. 1, 2: *Limbosporites denmeadii* (de Jersey) de Jersey & Raine, 1990: Proximal foci x1000, slide 34/1. Fig. 3: *Limbosporites lundbladii* Nilsson, 1958, 3a, Proximal focus x1000. 3b, Distal focus x1000, slide 34/1. Fig. 4: *Limbosporites antiquus* (de Jersey, 1964) de Jersey & Raine, 1990, 4a, Proximal focus x1000. 4b, Distal focus x1000, slide 34/1. Fig. 5: *Trachysporites infirmus* (Balme) McKellar, 1998, 5a, Proximal focus x1000. 5b, Distal focus x1000, slide 26/1. Figs. 6, 7: *Gleicheniidites senonicus* Ross emend. Skarby, 1964, Proximal foci x1000, slide 34/2. Figs. 8, 9: *Sulcosaccispora lata* de Jersey & Hamilton 1967, x1000, slide 41/1, 59/1 respectively. Fig. 10: *Alisporites similis* (Balme) Dettmann, 1963, x1000, slide 11/1. Fig. 11: Woody debris, x1000, slide 13/1. Fig. 12: Plant tissue x1000, slide 54/1. Fig. 13: Dinoflagellate cyst, x1000, slide 66/1. Fig. 14: (A) Phytoclasts, (B) Palynomorph, x160, slide 31/1. Fig. 15: opaque (A) and transparent (B) Aom, x160, slide 34/1.