

ELECTRONIC APPENDIX

This is the Electronic Appendix to the article
**Redescription of *Drepanopterus pentlandicus* Laurie 1892, the earliest
known mycteropoid (Chelicerata: Eurypterida) from the early Silurian
(Llandovery) of the Pentland Hills, Scotland**

by

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Comprising the morphological character list and character matrix used in the
phylogenetic analysis

Character list

1. Antero median carapace protrusion: absent (0); present (1).
2. Carapace anterior: rounded (0); angular (1).
3. Denticulate anterior margin of carapace: absent (0); present (1).
4. Carapace marginal rim broad: absent (0); present (1).
5. Carapace marginal rim with striate ornament: absent (0); present (1).
6. Row of pustules along inside of marginal rim: absent (0); present (1).
7. Lateral carapace margin: continuous (0); stepped (1).
8. Deep carapace with pleural margins curving ventrally: absent (0); present (1).
9. Lateral regions of posterior carapace margins overlapping first opisthosomal tergite:
absent (0); present (1).
10. Morphology of genal carapace regions overlapping first opisthosomal tergite: small
(0); drawn out into posterolateral lobes (1).
11. Carapace position of greatest width: posterior third (0); median third (1).
12. Prosoma quadrate: absent (0); present (1).
13. Carapace vaulted: absent (0); present (1).
14. Median ridge between lateral eyes: absent (0); present (1).
15. Carapace ornament of large lunate scales surrounding and pointing away from the
central area and eyes: absent (0); present (1).
16. Circular plateau ornamentation anterior to median ridge: absent (0); present (1).
17. Position of median eyes on carapace: median third (0); anterior third (1).
18. Ocellar area: absent (0); present (1).

19. Lateral eye shape: crescentic (0); expanded (1).
20. Palpebral lobe: absent (0); circular (1); reniform (2).
21. Lateral eyes converging and placed anteriorly on carapace: absent (0); present (1).
22. Annular cuticular thickening surrounding lateral eyes: absent (0); present (1).
23. Shape of annular cuticular thickening: oval (0); circular (1).
24. Orbital ridges: absent (0); present (1).
25. Median ridge reduced: absent (0); present (1).
26. Transverse suture on ventral plates: absent (0); present (1).
27. Transverse suture curving back at midline: absent (0); present (1).
28. Groove running across doublure: absent (0); present (1).
29. Suture on ventral plates: epistoma absent (0); epistoma present (1).
30. Rostral field: absent (0); present (1).
31. Ventral plates widen anteriorly: absent (0); present (1).
32. Appendage III: spiniferous with paired spines (0); spiniferous with single spines (1).
33. Pairs of spines per podomere on prosomal appendage III: one pair (0); two or more pairs (1).
34. Prosomal appendage IV: spiniferous (0); non spiniferous (1).
35. Pairs of spines per podomere on prosomal appendage IV: one pair (0); two or more pairs (1).
36. Spines on prosomal appendage IV: moveable spines (0); both moveable and fixed spines (1); fixed spines (2).
37. Blade like structures on podomeres of anterior appendages: absent (0); present (1).
38. Blades enlarged and longer than podomere length: absent (0); present (1).

39. Rachis: absent (0); present (1).
40. Coxal laden: absent (0); present (1).
41. Prosomal appendage V: spiniferous (0); non spiniferous (1).
42. Spines on prosomal appendage V reduced: absent (0); present (1).
43. Prosomal appendage VI: walking leg (0); swimming leg (1).
44. Appendage VI reaching to pretelson: absent (0); present (1).
45. Shape of proximal podomere of appendage VI narrow: $L/W \leq 2.0$ (0); expanded $L/W > 2.0$ (1).
46. Podomere VI-5: half the width of VI-4 (0); equal width of VI-4 (1).
47. Distal podomere margin of VI-6 modified: absent (0); present (1).
48. Ear on coxa VI: absent (0); present (1).
49. Appendage VI showing lateral serrations: absent (0); present (1).
50. Podomere 7a on sixth prosomal appendage: absent (0); present (1).
51. Width of VI-7a: narrow [less than 50% of width of VI-7] (0); wide [more than 50%] (1).
52. Shape of VI-7a: oval (0); triangular (1).
53. Longitudinal grooves on podomeres: absent (0); present (1).
54. Podomeres ridged: absent (0); present (1).
55. Podomeres thicken distally: absent (0); present (1).
56. Cleft metastoma: absent (0); present (1).
57. Anterior margin of metastoma: notch absent (0); notch present (1).
58. Posterior margin of metastoma: rounded (0); flattened or recurved (1).
59. Metasoma: bulky (0); gracile (1).

60. Paired tubercles on opisthosomal tergites 2-5: absent (0); present (1).
61. Pustular ornamentation: absent (0); present (1).
62. Acicular scales on opisthosoma: absent (0); present (1).
63. Row of large tongue-shaped scales on posterior margin of opisthosomal segments:
absent (0); present (1).
64. Opisthosoma narrower than carapace: absent (0); present (1).
65. Marginal rim on opisthosoma: absent (0); present (1).
66. First tergite with narrow posterior margin: absent (0); present (1).
67. Positive opisthosomal differentiation of third order first segment: absent (0);
present (1).
68. Positive opisthosomal differentiation of third order second segment: absent (0);
present (1).
69. Second tergite developed into round macrotergite: absent (0); present (1).
70. Preabdominal epimera: absent (0); present (1).
71. Caudal postabdomen: absent (0); present (1).
72. Lateral pleurae: absent (0); present (1).
73. Pretelson elongated: absent (0); present (1).
74. Pretelson postlaterally expanded: absent (0); present (1).
75. Dorsal pretelson lobes: absent (0); present (1).
76. Telson shortened: absent (0); present (1).
77. Telson elongate: absent (0); present (1).
78. Dorsal median keel on telson: absent (0); present (1).
79. Paired broad rounded ventral keels on telson: absent (0); present (1).

80. Telson serrated: absent (0); present (1).

Character matrix

Taxon	10	20	30	40	50	60	70									
<i>Weinbergina opitzi</i>	00000	0010-	00000	00000	00-00	0000-	00000	00-00	00001	10000	--000	---00	00000	00001	00000	00000
<i>Alkenopterus brevitelson</i>	00010	0000-	00000	00000	00-00	?????	?????	??0?	1-00?	10?00	--010	???10	00000	00000	10000	10000
<i>Brachyoptera pentagonalis</i>	01000	0000-	100?0	?0100	10-00	11011	??1-	-??0?	1-000	00000	--010	???1?	00?00	0??0?	?????	0?0?0
<i>Brachyopterus stubblefieldi</i>	00000	0000-	10000	0?100	00-00	?????	?1-00	00-0?	1-00?	00?00	--000	0?000	00000	00000	00000	00000
<i>Ctenopterus cestrotus</i>	00100	0000-	00000	01?01	00-00	??011	?0101	20-0?	1-01?	10?00	--000	??000	01000	00001	?0???	010?0
<i>Cyrtoctenus wittebergensis</i>	10000	00111	00000	00001	01110	?????	??000	1111?	??000	1?00?	??101	??000	00100	00000	00010	00010
<i>Drepanopterus abonensis</i>	00011	10010	000?0	00002	01000	1000-	1001-	-1000	1-000	10000	--101	11-01	10000	00000	00000	00100
<i>Stoermeropterus conicus</i>	00000	0000-	00000	0?000	00-00	0-010	01000	20-00	1-001	10101	01000	01000	00000	00000	00100	00000
<i>Drepanopterus pentlandicus</i>	00010	00010	00000	0?000	01000	??0??	??1-	-10?0	1-000	10000	--101	11-01	10000	00100	00000	00100
<i>Hallipterus excelsior</i>	01000	1000-	00011	10?00	01010	10011	?????	?0-?0	?????	?????	?????	?????	00???	?????	?????	?????
<i>Hardieopterus macrophthalmus</i>	00000	0000-	00011	0?000	00-00	1000-	1????	??0?	00000	10?00	--001	01100	10101	00000	01001	00?0?
<i>Hibbertopterus scouleri</i>	00000	00111	00010	00001	01101	??0??	1?000	11101	1-00?	10000	--001	11-00	00100	00000	00000	00010
<i>Kiaeropterus cyclophthalmus</i>	00000	0000-	?0000	00100	10-00	?????	?????	??0?	1-00?	?0?0?	--010	???10	00000	00000	00???	??0?
<i>Kokomopterus longicaudatus</i>	00000	0000-	000?0	??000	00-??	??0??	10000	00-0?	0100?	10010	--001	01100	00101	00000	00000	00000
<i>Lamontopterus knoxae</i>	00000	0000-	000??	?????	?????	?????	?????	??0?	0100?	10?00	--001	??000	00?01	00000	00000	00000

<i>Laurieipterus elegans</i>	00100	0100-	00000	01001	00-00	11011	10101	20-0?	1-0?0	10000	--000	001?0	00000	00000	?????	01?00	
<i>Megarachne servinei</i>	11000	0000-	00010	00002	010?0	?????	???1-	-1101	1-0??	??0??	??101	?????	0?000	1111?	?????	?????	
<i>Moselopterus ancylotelson</i>	01000	0000-	00000	0?000	00-00	??10-	01000	20-00	1-001	10101	00000	01000	00000	00000	00000	10?00	
<i>Mycterops mathieui</i>	110?0	?000-	000?0	???02	01000	?????	?????	?????	?????	?????	?????	?????	0???0	011??	???0?	?????	
<i>Pagea sturrocki</i>	01000	0100-	111?0	???01	00-10	1000-	11101	20-0?	1-01?	10000	--000	00100	0101?	00000	00110	00100	
<i>Parastylonurus ornatus</i>	00000	0000-	00000	0?000	00-00	1000-	10000	00-00	1-010	10000	--000	01100	00000	00000	00110	00100	
<i>Rhenopterus diensti</i>	00000	0000-	00000	00000	00-00	1010-	11-1-	-0-00	1-000	10000	--010	01010	11000	00000	10000	10100	
<i>Stylonurella spinipes</i>	01000	0100-	01000	0?001	00-00	1000-	1?110	00-00	1-010	10000	--000	???00	00010	00000	00????	?????	
<i>Stylonurus powriensis</i>	00000	0000-	01010	0?001	00-10	?????	?????	?????	1-01?	10?00	--000	???00	01000	00000	00000	01100	
<i>Tarsopterella scotica</i>	01000	0000-	00011	1?000	00-10	?????	?????	?????	?????	?????	?????	???01	???00	00100	00000	01001	000?0
<i>Vinetopterus struvei</i>	00000	0000-	00000	00000	00-00	??0??	?????	???0?	??001	10?01	10?0?	???00	00?00	00000	00010	10?00	
<i>Woodwardopterus scabrosus</i>	00000	0000-	000?0	???0?	0????	?????	???1-	-110?	1-00?	10?00	--101	???0?	00000	01110	00?0?	00?10	
<i>Eurypterus remipes</i>	00000	00010	00000	00010	00-00	0-00-	00000	00-00	1-101	11101	11000	01000	00000	00000	00010	00001	
<i>Hughmilleria socialis</i>	00000	0000-	00000	00010	00-00	0-010	00000	00-00	00101	11101	11000	01000	00000	00000	00000	00000	
<i>Onychopterella augusti</i>	00000	0000-	00000	0?0?0	00-0?	??0??	0??00	00-00	1-101	10101	01000	???00	00000	00000	000?0	00?00	
<i>Pagea plotnicki</i>	01000	0100-	11010	0?001	00-10	?????	?11??	?0-0?	1-0??	10?0?	??000	???00	01010	00000	00111	0????	
<i>Leiopterella tetliei</i>	0000?	0000-	100??	?????	?????	1010-	1??10	0??0?	1-0?0	1000?	??010	010??	0??10	?000?	?????	?????	
<i>Pagea symondsii</i>	01000	0100-	11110	0?001	00-10	??00-	1????	?????	?????	1????	?????	?????	0?0??	?????	?????	?????	

<i>Drepanopterus odontospathus</i>	00011	000??	000?0	0?002	01000	?????	?????	?????	?????	?????	?????	??1???	1????	?????	?????	00101
<i>Campylocephalus oculatus</i>	00000	00111	10010	00002	01001	?????	?????	?????	?????	?????	?????	?????	0????	?????	?????	?????
<i>Hastimima whitei</i>	?????	?????	?????	?????	?????	?????	?????	?????	?????	??0??	?????	?????	000?0	11??0	?????	00011
