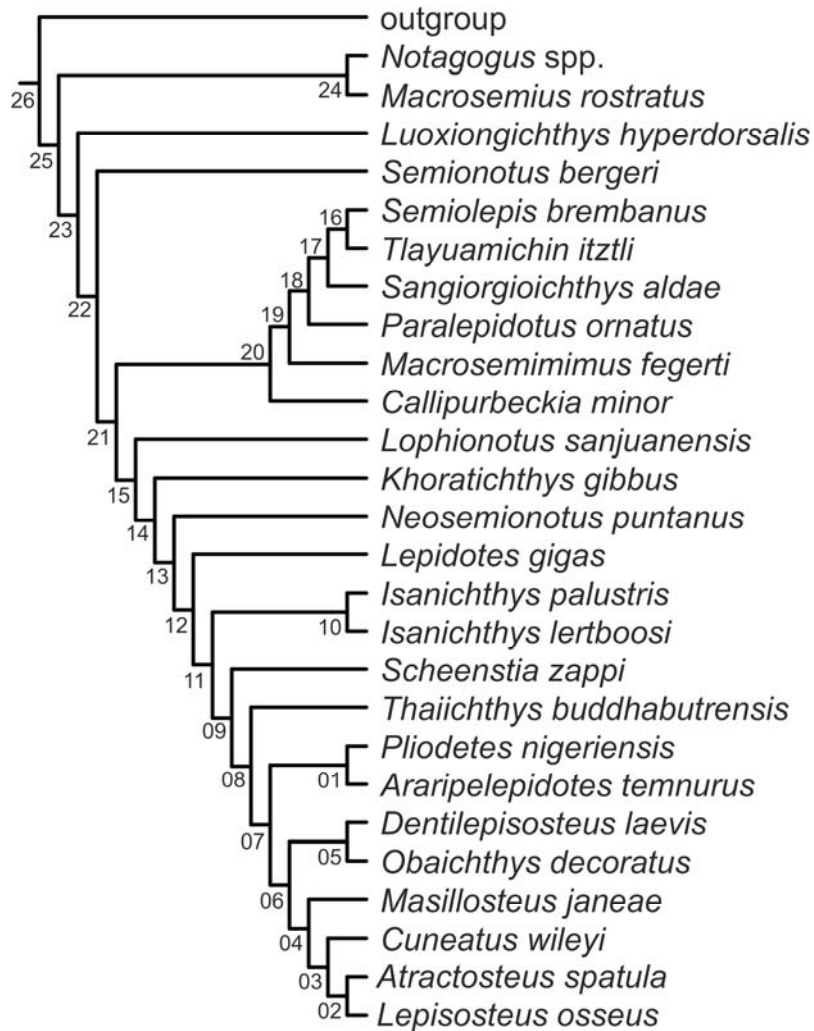


A NEW GINGLYMODI (ACTINOPTERYGII, HOLOSTEI) FROM THE  
LATE JURASSIC – EARLY CRETACEOUS OF THAILAND, WITH  
COMMENTS ON THE EARLY DIVERSIFICATION OF  
LEPISOSTEIFORMES IN SOUTHEAST ASIA

UTHUMPORN DEESRI\*, PRATUENG JINTASAKUL and LIONEL CAVIN

List of synapomorphies for one of the five most parsimonious trees.  
The double arrows indicate unambiguous changes with the ACTRAN optimization. The  
uniquely derived character changes are underlined for the clades discussed in the main text.



\* Corresponding author

node\_26 --> node\_25 (Ginglymodi)

1 0.500 0 --> 1  
7 0.500 0 --> 1  
18 1.000 0 --> 1  
28 0.333 0 --> 2  
32 0.250 0 ==> 1  
34 0.500 1 ==> 0  
40 0.333 0 --> 3  
72 1.000 0 --> 1  
75 1.000 0 ==> 1  
86 1.000 0 --> 1  
87 0.400 0 ==> 1  
94 0.667 2 ==> 1

node\_25 --> node\_23

3 0.333 0 --> 1  
12 0.250 0 ==> 1  
37 0.286 0 --> 1  
65 0.400 0 ==> 1  
84 0.167 0 --> 1  
89 0.400 0 ==> 2  
90 0.600 2 ==> 0  
100 0.286 0 --> 1

node\_23 --> node\_22

9 0.250 0 --> 1  
62 0.143 0 --> 1  
67 0.250 0 --> 1  
95 0.333 1 ==> 0  
103 0.250 0 ==> 1

node\_22 --> node\_21

79 0.200 0 --> 1  
87 0.400 1 ==> 2

node\_21 --> node\_15

11 0.286 0 ==> 1  
20 0.167 0 ==> 1  
40 0.333 3 ==> 2  
43 0.250 0 --> 1  
47 1.000 0 --> 1  
48 0.333 0 --> 1  
54 1.000 0 --> 1

node\_15 --> node\_14

15 0.167 0 --> 1  
21 0.333 0 --> 1  
34 0.500 0 ==> 1  
43 0.250 1 --> 2  
103 0.250 1 ==> 2

node\_14 --> node\_13

13 0.200 1 ==> 0  
32 0.250 1 --> 2  
99 0.400 2 ==> 0

node\_13 --> node\_12

10 0.333 1 ==> 0  
17 0.333 0 ==> 1  
30 0.200 0 ==> 1  
37 0.286 1 ==> 2  
38 0.500 0 ==> 1  
100 0.286 1 --> 0

node\_12 --> node\_11

11 0.286 1 ==> 0  
32 0.250 2 --> 1

node\_11 --> node\_09

15 0.167 1 --> 0  
29 ) 0.500 0 --> 1  
62 0.143 1 --> 0  
77 0.500 0 ==> 1  
90 0.600 0 --> 1

node\_09 --> node\_08

16 0.333 0 ==> 1  
43 0.250 2 ==> 1  
58 0.500 0 --> 1  
66 0.600 0 ==> 4  
71 0.500 0 --> 1

78 0.500 0 --> 1  
80 0.250 1 ==> 2  
node\_08 --> node\_07  
2 0.333 0 --> 1  
11 0.286 0 --> 2  
18 1.000 1 --> 2  
39 0.250 0 --> 1  
48 0.333 1 --> 0  
53 0.667 0 --> 2  
55 1.000 0 --> 1  
65 0.400 1 --> 0  
67 0.250 1 ==> 0  
74 1.000 0 --> 1  
87 0.400 2 ==> 0  
89 0.400 2 ==> 1  
96 0.333 0 ==> 1  
98 0.667 1 ==> 0  
101 0.500 0 --> 1  
103 0.250 2 --> 1  
node\_07 --> node\_01  
9 0.250 1 --> 0  
17 0.333 1 ==> 0  
23 0.250 0 --> 1  
29 0.500 1 --> 0  
61 0.333 0 ==> 2  
68 1.000 1 ==> 2  
node\_01 --> *Araripelepidotes temnurus*  
8 0.222 0 ==> 1  
11 0.286 2 --> 1  
32 0.250 1 ==> 2  
35 0.143 0 ==> 2  
37 0.286 2 ==> 0  
39 0.250 1 --> 0  
45 0.500 0 ==> 1  
52 0.750 1 ==> 0  
66 0.600 4 ==> 3  
90 0.600 1 --> 0  
103 0.250 1 --> 2  
node\_01 --> *Pliodetes nigeriensis*  
42 0.308 0 ==> 2  
80 0.250 2 ==> 1  
100 0.286 0 ==> 1  
node\_07 --> node\_06  
6 1.000 0 ==> 1  
12 0.250 1 ==> 0  
24 1.000 0 ==> 1  
44 0.333 0 --> 2  
46 0.333 0 ==> 1  
58 0.500 1 --> 0  
62 0.143 0 --> 1  
65 0.400 0 --> 2  
71 0.500 1 --> 0  
73 1.000 0 ==> 1  
90 0.600 1 ==> 3  
94 0.667 1 --> 0  
99 0.400 0 ==> 1  
node\_06 --> node\_04  
11 0.286 2 --> 0  
19 1.000 0 ==> 1  
42 0.308 0 ==> 2  
45 0.500 0 ==> 1  
50 1.000 0 --> 1  
57 1.000 0 ==> 1  
58 0.500 0 --> 2  
59 1.000 0 ==> 1  
74 1.000 1 --> 2  
80 0.250 2 ==> 0  
81 0.667 2 ==> 1  
83 1.000 0 ==> 1  
85 1.000 0 --> 1  
101 0.500 1 --> 0

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102 0.500 0 ==> 1
node_04 --> node_03
13 0.200 0 ==> 1
41 0.333 0 --> 1
44 0.333 2 --> 0
49 1.000 0 ==> 1
76 ( 0.600 0 ==> 3
node_03 --> node_02
4 0.500 0 ==> 1
8 0.222 0 ==> 2
20 0.167 1 ==> 0
28 0.333 2 ==> 1
33 1.000 0 ==> 1
62 0.143 1 --> 0
64 0.200 0 ==> 1
66 0.600 4 ==> 1
node_02 --> Atractosteus spatula
44 0.333 0 --> 2
node_02 --> Lepisosteus osseus
43 0.250 1 ==> 2
48 0.333 0 --> 1
node_03 --> Cuneatus wileyi
48 0.333 0 ==> 2
61 0.333 0 ==> 1
node_04 --> Masillosteus janeae
56 0.286 0 ==> 1
61 0.333 0 ==> 2
66 0.600 4 ==> 0
67 0.250 0 ==> 1
103 0.250 1 --> 2
node_06 --> node_05
4 0.500 0 ==> 1
5 1.000 0 ==> 1
8 0.222 0 ==> 2
22 1.000 0 ==> 1
28 0.333 2 --> 0
40 0.333 2 --> 3
43 0.250 1 --> 0
48 0.333 0 --> 1
84 0.167 1 ==> 0
node_05 --> Dentilepisosteus laevis
13 0.200 0 ==> 1
20 0.167 1 ==> 0
23 0.250 0 ==> 1
35 0.143 0 ==> 2
node_05 --> Obaichthys decoratus
17 0.333 1 ==> 0
26 1.000 0 ==> 1
43 0.250 0 --> 2
62 0.143 1 --> 0
node_06 --> Thaiichthys buddhabutrensis
8 0.222 0 ==> 1
28 0.333 2 ==> 0
35 0.143 0 ==> 2
37 0.286 2 ==> 1
84 0.167 1 ==> 0
node_09 --> Scheenstia zappi
7 0.500 1 ==> 2
9 0.250 1 ==> 0
30 0.200 1 ==> 0
41 0.333 0 ==> 1
56 0.286 0 ==> 2
79 0.200 1 ==> 0
82 0.500 0 ==> 1
88 0.333 0 ==> 1
97 0.250 1 ==> 0
node_11 --> node_39
39 0.250 0 ==> 1
56 0.286 0 --> 1
84 0.167 1 --> 0
89 0.400 2 --> 0

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node\_10 --> *Isanichthys lertboosi*  
8 0.222 0 ==> 1  
32 0.250 1 --> 2  
61 0.333 0 ==> 2

node\_10 --> *Isanichthys palustris*  
13 0.200 0 ==> 1  
42 0.308 0 ==> 2  
64 0.200 0 ==> 1  
89 0.400 0 --> 1

node\_12 --> *Lepidotes gigas*  
3 0.333 1 ==> 0  
20 0.167 1 ==> 0  
21 0.333 1 --> 0  
36 0.333 1 ==> 0  
42 0.308 0 ==> 2  
79 0.200 1 ==> 0  
102 0.500 0 ==> 1

node\_13 --> *Neosemionotus puntanus*  
2 0.333 0 ==> 1  
43 0.250 2 --> 0  
44 0.333 0 ==> 2  
64 0.200 0 ==> 1  
80 0.250 1 ==> 2

node\_14 --> *Khoratichthys gibbus*  
78 0.500 0 ==> 1  
100 0.286 1 ==> 2

node\_15 --> *Lophionotus sanjuanensis*  
35 0.143 0 ==> 2  
38 0.500 0 ==> 1  
42 0.308 0 ==> 1  
79 0.200 1 --> 0  
80 0.250 1 ==> 2  
82 0.500 0 ==> 1

node\_21 --> node\_49 (*Callipurbeckiidae*)  
12 0.250 1 ==> 0  
23 0.250 0 --> 1  
28 0.333 2 --> 0  
37 0.286 1 --> 0  
41 0.333 0 --> 1  
42 0.308 0 ==> 4  
51 0.500 0 --> 1  
56 0.286 0 ==> 1

node\_20 --> *Callipurbeckia minor*  
32 0.250 1 ==> 2  
77 0.500 0 ==> 1  
84 0.167 1 --> 0  
103 0.250 1 ==> 2

node\_20 --> node\_19  
15 0.167 0 --> 1  
61 0.333 0 ==> 2  
81 0.667 2 --> 1  
94 0.667 1 ==> 0  
97 0.250 1 ==> 0  
100 0.286 1 --> 0

node\_19 --> *Macrosemimimus fegeri*  
8 0.222 0 ==> 2  
11 0.286 0 ==> 1  
14 1.000 0 ==> 1  
21 0.333 0 ==> 2  
30 0.200 0 ==> 1  
36 0.333 1 ==> 0  
89 0.400 2 ==> 0

node\_19 --> node\_18  
42 0.308 4 ==> 1  
76 0.600 0 --> 1  
87 0.400 2 --> 1  
99 0.400 2 --> 0

node\_18 --> *Paralepidotus ornatus*  
2 0.333 0 ==> 1  
16 0.333 0 ==> 1  
20 0.167 0 ==> 1

56 0.286 1 ==> 2  
 76 0.600 1 --> 2  
 90 0.600 0 ==> 1  
 95 0.333 0 ==> 1  
 node\_18 --> node\_17  
 7 0.500 1 ==> 0  
 35 0.143 0 --> 2  
 65 0.400 1 ==> 0  
 67 0.250 1 ==> 0  
 100 0.286 0 --> 1  
 node\_17 --> *Sangiorioichthys aldae*  
 15 0.167 1 --> 0  
 32 0.250 1 ==> 2  
 37 0.286 0 ==> 1  
 40 0.333 3 ==> 2  
 42 0.308 1 ==> 2  
 43 0.250 0 ==> 2  
 56 0.286 1 ==> 0  
 103 0.250 1 ==> 0  
 node\_17 --> node\_16  
 8 0.222 0 ==> 2  
 9 0.250 1 ==> 0  
 21 0.333 0 ==> 1  
 46 0.333 0 ==> 1  
 84 0.167 1 --> 0  
 node\_16 --> *Semiolepis bremanus*  
 6 0.333 2 ==> 0  
 76 0.600 1 --> 0  
 80 0.250 1 ==> 2  
 97 0.250 0 ==> 1  
 node\_16 --> *Tlayuamichin itzli*  
 30 0.200 0 ==> 1  
 35 0.143 2 --> 0  
 42 0.308 1 ==> 0  
 87 0.400 1 --> 2  
 99 0.400 0 --> 2  
 103 0.250 1 ==> 2  
 node\_22 --> *Semionotus bergeri*  
 32 0.250 1 ==> 2  
 37 0.286 1 ==> 2  
 42 0.308 0 ==> 2  
 65 0.400 1 ==> 2  
 66 0.600 0 ==> 4  
 100 0.286 1 --> 2  
 node\_23 --> *Luoxiongichthys hyperdorsalis*  
 10 0.333 1 ==> 0  
 53 0.667 0 ==> 1  
 63 0.500 0 ==> 1  
 64 0.200 0 ==> 1  
 99 0.400 2 ==> 0  
 node\_25 --> node\_24  
 8 0.222 0 ==> 2  
 1 0.286 0 ==> 1  
 16 0.333 0 ==> 1  
 21 0.333 0 ==> 2  
 42 0.308 0 --> 3  
 46 0.333 0 ==> 1  
 51 0.500 0 --> 1  
 52 0.750 1 ==> 2  
 79 0.200 0 ==> 1  
 80 0.250 1 ==> 2  
 88 0.333 0 --> 1  
 98 0.667 1 ==> 0  
 node\_24 --> *Macrosemius rostratus*  
 40 0.333 3 --> 0  
 56 0.286 0 ==> 1  
 96 0.333 0 ==> 1  
 node\_24 --> *Notagogus* spp.  
 15 0.167 0 ==> 1  
 44 0.333 0 ==> 1  
 97 0.250 1 ==> 0