

Table S1

Fossil taxon	Taxon in phylogeny	Notes
CASTLE GARDENS		taxon list after Smith (2009), Smith and Gauthier (2013)
<i>Suzanniwana patriciana</i>	<i>Suzanniwana patriciana</i>	
<i>Anolbanolis banalis</i>	<i>Anolbanolis banalis</i>	
Iguanid CG	<i>Paranolis</i> LevelO	only in taxon-inclusion experiment (see text); otherwise excluded due to poor preservation (small jaw fragment and possible squamosal only)
<i>Palepidophyma paradisa</i>	<i>Palepidophyma paradisa</i>	
Palaeoxantusia sp. CG	Palaeoxantusia CG	
<i>Anniealexandria gansi</i>	<i>Anniealexandria gansi</i>	
<i>Apodosauricus thermophilus</i>	<i>Apodosauricus thermophilus</i>	
cf. Eodiploglossus sp. CG	Eodiploglossus CG	
Gerrhonotine CG	Gerrhonotine CG	
Proxestops sp. CG	<i>Proxestops</i> CG	
Glyptosaurine CG	Glyptosaurine CG	
<i>Gaultia silvaticus</i>	<i>Gaultia silvaticus</i>	
<i>Entomophontes incrustatus</i>	<i>Entomophontes incrustatus</i>	
cf. Saniwa sp. CG-1		excluded due to poor preservation (small jaw fragments only)
Saniwa sp. CG-2	<i>Saniwa ensidens</i>	apomorphic upturned margins of parietal table put this taxon close to or identical to Bridgerian <i>Saniwa ensidens</i>
cf. Provaranosaurus sp. CG		excluded due to poor preservation (small jaw fragments only)
OH! LOCALITY		taxon list after Gauthier (1982), Smith and Gauthier (2013)
Suzanniwana sp.	<i>Suzanniwana</i> LevelO	
Anolbanolis sp.	<i>Anolbanolis</i> LevelO	
Paranolis sp.	<i>Paranolis</i> LevelO	
Parasauromalus sp.	<i>Parasauromalus</i> LevelO	
Tinosaurus sp.	<i>Tinosaurus</i> LevelO	
<i>Palaeoxantusia amara</i>	<i>Palaeoxantusia amara</i>	
<i>Scincoideus grassator</i>	<i>Scincoideus grassator</i>	
cf. Jepsibaena sp.		excluded due to poor preservation (vertebra only at this locality, not identifiable in isolation)
<i>Apodosauriscus minutus</i>	<i>Apodosauriscus minutus</i>	
<i>Eodiploglossus borealis</i>	<i>Eodiploglossus borealis</i>	
Gerrhonotine indet.	Gerrhonotine LevelO	
<i>Xestops savagei</i>	<i>Xestops savagei</i>	
Glyptosaurine sp. A	Glyptosaurine BCa	
Glyptosaurine sp. B	Glyptosaurine BCb	
<i>Entomophontes incrustatus</i>	<i>Entomophontes incrustatus</i>	
<i>Provaranosaurus fatuus</i>	<i>Provaranosaurus fatuus</i>	
MEDICINE POLE HILLS		taxon list after Smith (2006, 2011, 2013)
<i>Sauropithecoides charisticus</i>	<i>Sauropithecoides charisticus</i>	
<i>Queironius praelapsus</i>	<i>Queironius praelapsus</i>	
<i>Oreithya oaklandi</i>	<i>Oreithya oaklandi</i>	
<i>Tuberculacerta pearsoni</i>	<i>Tuberculacerta pearsoni</i>	
Cypressaurus sp. MPH	<i>Cypressaurus</i> sp.	ongoing work puts it very close or identical to AMNH F:AM 11400, which was identified as “ <i>Aciprion</i> ” in Gauthier et al. (2012); we tentatively regard the taxon in the Gauthier et al. phylogeny as <i>Cypressaurus</i> sp.
Tinosaurus sp. MPH	<i>Tinosaurus</i> MPH	
<i>Palaeoxantusia borealis</i>	<i>Palaeoxantusia borealis</i>	we tentatively regard “ <i>Palaeoxantusia</i> sp.” in Gauthier et al. (2012) as representing <i>Palaeoxantusia borealis</i>

Fossil taxon	Taxon in phylogeny	Notes
cf. <i>Spathorhynchus</i> sp. MPH	<i>Spathorhynchus natronicus</i>	apomorphic large size and plesiomorphic dentary tooth count put this taxon close to <i>Spathorhynchus</i> ; we tentatively regard it as identical to <i>S. natronicus</i> of Longrich et al. (2015)
cf. <i>Rhineura</i> sp. MPH	<i>Protorhineura hatcheri</i>	tooth count and symphyseal morphology put this taxon close to <i>Protorhineura</i> ; we tentatively regard it as identical to <i>P. hatcheri</i> of Longrich et al. (2015)
cf. <i>Peltosaurus</i> sp. MPH	<i>Peltosaurus granulosus</i>	overall similarity and geologic age put this taxon close to <i>Peltosaurus</i> ; we regard it as identical to <i>Peltosaurus granulosus</i> in Gauthier et al. (2012)
<i>Helodermoides</i> sp. MPH	<i>Helodermoides tuberculatus</i>	apomorphic osteoderm shape and partial closure of the supratemporal fenestra by the parietal put it in <i>Helodermoides</i> ; we regard it as identical to <i>Helodermoides tuberculatus</i> in Gauthier et al. (2012)
Annielline MPH	Annielline MPH	
Diploglossine MPH	Diploglossine MPH	
Gerrhonotine MPH	Gerrhonotine MPH	
<i>Saniwa edura</i>	<i>Saniwa edura</i>	apomorphic rugosities of parietal table put the Chadronian population from the AMNH studied by Gauthier et al. (2012) close to this taxon; we scored it on the basis of published CT scans of these
<i>Coniophis</i> sp.		excluded due to poor preservation (a few vertebral fragments only)
<i>Calamagras weigeli</i>	<i>Calamagras weigeli</i>	
<i>Ogmophis compactus</i>	<i>Ogmophis compactus</i>	
Colubrid indet.		excluded due to poor preservation (a few vertebral fragments only)