

Table S1: Temporal distribution of taxa in the phylogenetic analysis with sources.

Taxon	Formation	Age Range	Sources
<i>Hypsilophodon foxii</i>	Wessex Formation	145–125 Ma	1
<i>Lesothosaurus diagnosticus</i>	upper Elliot Formation	190.8–182.7 Ma	2
<i>Stegoceras valdensis</i>	Dinosaur Park Formation	76.354 ± 0.015–75.639 ± 0.025 Ma	3,4
<i>Homalocephale calathocercos</i>	Nemegt Formation	70.6–68 Ma	5,6,7,8
<i>Prenocephale prenes</i>	Nemegt Formation	70.6–68 Ma	5,6,7,8
<i>Yinlong downsi</i>	Shishugou Formation	162.2–159.7 Ma	9
<i>Hualianceratops wucaiwanensis</i>	Shishugou Formation	162.2–159.7 Ma	9
<i>Xuanhuaceratops niei</i>	Houcheng Formation	162.2–138 Ma	10
<i>Chaoyangsaurus youngi</i>	Tuchengzi Formation	152–139 Ma	10
<i>Psittacosaurus xinjiangensis</i>	Tugulu Group	126–100 Ma	11
<i>Psittacosaurus gobiensis</i>	Bayan Gobi Formation	113–100.5 Ma	12
<i>Psittacosaurus major</i>	lowermost Yixian Formation	124–122 Ma	13
<i>Psittacosaurus luijiautunensis</i>	lowermost Yixian Formation	123 Ma	14
<i>Psittacosaurus mongoliensis</i>	Khukhtek Formation	126–113 Ma	13,14
<i>Psittacosaurus sinensis</i>	Doushan Formation	129.4–113 Ma	15,16
<i>Psittacosaurus meileyingensis</i>	Jiufotang Formation	126–113 Ma	17,18
<i>Psittacosaurus sibiricus</i>	Ilek Formation	126–100 Ma	19
<i>Mosaiceratops azumai</i>	Xiaguan Formation	100–89.8 Ma	20
<i>Beg tsi</i>	Ulaanoosh	113–94 Ma	21
<i>Liaoceratops yanzigouensis</i>	Yixian Formation	125.8–125.7 Ma	22
<i>Aquilops americanus</i>	Cloverly Formation	108.5–104 Ma	23
<i>Archaeoceratops yujingziensis</i>	Xinminbao Group	126–113 Ma	24,25
<i>Yamaceratops dornogobiensis</i>	Javhklant Formation	86.3–72.10 Ma	26
<i>Auroraceratops rugosus</i>	Xinminbao Group	126–113 Ma	27
<i>Archaeoceratops oshimai</i>	Xinminbao Group	126–113 Ma	24,25
<i>Cerasinops hodgskissi</i>	Two Medicine Formation	82.419 ± 0.074–75.259 ± 0.027 Ma	28,4
<i>Montanoceratops cerorhynchus</i>	St. Mary River Formation	71.1–69.8 Ma	29
<i>Udanoceratops tschizhovi</i>	Djadochta Formation	76.5–70.5 Ma	5,6,7,8
<i>Prenoceratops pieganensis</i>	Two Medicine Formation	75.259 ± 0.027–74.6 Ma	30,4
<i>Zhuchengceratops inexpectus</i>	Hongtuya Formation	77.3 ± 1.54–73.5 ± 0.3 Ma	31
<i>Leptoceratops gracilis</i>	Scollard Formation	66.9–66.2 Ma	29
<i>Protoceratops hellenikorhinus</i>	Bayan Mandahu Formation	76.5–70.5 Ma	5,6,7,8
<i>Protoceratops andrewsi</i>	Djadochta Formation	76.5–70.5 Ma	5,6,7,8
<i>Protoceratops sp. IGM 100-1246</i>	Djadochta Formation	76.5–70.5 Ma	5,6,7,8
<i>Breviceratops kozlowskii</i>	Barauungoyot Formation	76.5–70.5 Ma	5,6,7,8
<i>Bagaceratops rozhdestvenskyi</i>	Barauungoyot Formation	76.5–70.5 Ma	5,6,7,8
<i>Ajkaceratops kozmai</i>	Csehbánya Formation	86–84 Ma	32
<i>Graciliceratops mongoliensis</i>	Bayan Shireh Formation	95.9–89.6 Ma	33
<i>Turanoceratops tardabilis</i>	Bissekty Formation	92–90 Ma	34
<i>Zuniceratops christopheri</i>	Moreno Hill Formation	92.5–92 Ma	35

Table S1 continued: Temporal distribution of centrosaurine taxa in phylogenetic analysis.

Taxon	Formation	Age Range	Sources
<i>Diabloceratops eatoni</i>	Wahweap Formation	81.42-81.01 Ma (81.27 + 0.36 -0.5)	36
<i>Machairoceratops cronusi</i>	Wahweap Formation	80.68-79.26 Ma (80.06 + 0.62 -0.8)	36
<i>Menebeoceratops sealeyi</i>	Menefee Formation	81-78.5 Ma	37,38,39
<i>Yehuecauhceratops mudei</i>	Aguja Formation	80.0-76.28 ± 0.06 Ma	40,41,42
<i>Xenoceratops foremostensis</i>	Foremost Formation	79.5-78.6 Ma	43,4,44
<i>Crittendenceratops krzyzanowskii</i>	Fort Crittenden Formation	83-77 Ma	47,48,49
<i>Nasutoceratops titusi</i>	Kaiparowits Formation	76.394 ± 0 .040 -75.609 ± 0.015 Ma	50,4
<i>Avaceratops lammersi</i> type	Judith River Formation	78.594 +- 0.024 - 76.24 +- 0.18	51,46,4
<i>Avaceratops</i> sp. MOR 692	Judith River Formation	75.8-75.4 Ma	46,41
<i>Avaceratops</i> sp. CMN 8804	Oldman Formation	76.470 + 0.14/ - 0.084 - 75.8 Ma	52,41,4
<i>Lokiceratops rangiformis</i>	Judith River Formation	78.08 + 0.3 - 0.9 Ma	4
<i>Albertaceratops nesmoi</i>	Oldman Formation	78.28 + 0.2 - 0.9 Ma	4
<i>Medusaceratops lokii</i>	Judith River Formation	78.18 + 0.2 - 0.9 Ma	4
<i>Wendiceratops pinhornensis</i>	Oldman Formation	78.08 + 0.3 - 0.9 Ma	53,4
<i>Sinoceratops zhuchengensis</i>	Hongtuya Formation	77.3 ± 1.54-73.5 ± 0.3 Ma	31
<i>Coronosaurus brinkmani</i>	Oldman Formation	77.5-76.354 ± 0.057 Ma	54,50,55,4
<i>Spinops sternbergorum</i>	Oldman Formation	76.717 ± 0.020-76.354 ± 0.057 Ma	56,4
<i>Centrosaurus apertus</i>	Dinosaur Park Formation	76.470 + 0.14/ - 0.084 - 75.8 Ma	3,4
<i>Styracosaurus albertensis</i>	Dinosaur Park Formation	75.8 -75.3 Ma	3,57,4
<i>Styracosaurus ovatus</i>	Two Medicine Formation	78.2-75.259 ± 0.027 Ma	58,59,4
<i>Stellasaurus anceps</i>	Two Medicine Formation	78.2-75.259 ± 0.027 Ma	58,59,4
<i>Einiosaurus procurvicornis</i>	Two Medicine Formation	75.259 ± 0.027 Ma	53,51,4
<i>Iddesleigh pachyrhinosaurs</i>	Dinosaur Park Formation	75.25-75.22 Ma	61,57,4
<i>Achelosaurus horneri</i>	Two Medicine Formation	75.259 ± 0.027-74.6 Ma	53,51,4
<i>Pachyrhinosaurs lakustai</i>	Wapiti Formation	73.73 ± 0.25-71.89 ± 0.14 Ma	62,29
<i>Pachyrhinosaurs perotorum</i>	Prince Creek Formation	73.4-70.0 ± 0.2 Ma	63,64,55
<i>Pachyrhinosaurs canadensis</i>	Horseshoe Canyon Formation	72.7-71.8 Ma	29
CPC 279	Cerro Del Pueblo Fm.	73.63-72.74 Ma	70,71,55

Table S1 concluded: Temporal distribution of chasmosaurine taxa in phylogenetic analysis.

Taxon	Formation	Age Range	Sources
<i>Mercuriceratops gemini</i>	Judith River and Dinosaur Park fms.	76.470 + 0.14/- 0.084 - 76.354 ± 0.057 Ma	57,4
<i>Regaliceratops peterhewsi</i>	Horseshoe Canyon Formation	68.8-68.5 Ma	65,29
<i>Kosmoceratops richardsoni</i>	Kaiparowits Formation	76.394 ± 0 .040 -75.609 ± 0.015 Ma	50,4
<i>Vagaceratops irvinensis</i>	Dinosaur Park Formation	75.3-75.2 Ma	3,4
<i>Spiclypeus shipporum</i>	Judith River Formation	76.329 ± 0.035-76	66,46,44
<i>Chasmosaurus belli</i>	Dinosaur Park Formation	76.05-75.55 Ma	3,57,4
<i>Mojoceratops kaiseni</i>	Dinosaur Park Formation	76.2-76.1	3,57,4
<i>Agujaceratops mavericus</i>	Aguja Formation	80.0-76.28 ± 0.06 Ma	40,41,42
<i>Agujaceratops mariscalensis</i>	Aguja Formation	80.0-76.28 ± 0.06 Ma	40,41,42
<i>Chasmosaurus russelli</i>	Dinosaur Park Formation	75.1 -74.45	3,4
<i>Utahceratops gettyi</i>	Kaiparowits Formation	76.394 ± 0.040 -75.609 ± 0.015 Ma	50,4
<i>Pentaceratops sternbergii</i>	Fruitland Kirtland Formation	75.5 -75.166 ± 0.014 Ma	67,55,68,4
<i>Anchiceratops ornatus</i>	Horseshoe Canyon Fm.	72.2-70.6 Ma	29
<i>Arrhinoceratops brachyops</i>	Horseshoe Canyon Fm.	71.8-70.5 Ma	29
<i>Eotriceratops xerinsularis</i>	Horseshoe Canyon Fm.	68.9-68.7 Ma	29
<i>Torosaurus latus</i>	Hell Creek Formation	66.9-66.0 Ma	55
<i>Torosaurus utahensis</i>	North Horn Formation	66.9-66.0 Ma	55
<i>Triceratops horridus</i>	Hell Creek Formation	66.5-66.0 Ma	69,55
<i>Triceratops prorsus</i>	Hell Creek Formation	66.9-66.5 Ma	69,55

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