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SUPERSONIC SAUROPODS? TAIL DYNAMICS IN THE DIPLODOCIDS

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Computer models of the tail of *Apatosaurus louisae* show it could reach supersonic velocities, producing a noise analogous to the "crack" of a bullwhip. Similarity in tail structure suggests this was feasible for other diplodocids, and possibly for unrelated sauropods like *Mamenchisaurus* and the dicraeosaurids. Lengthening of caudal vertebrae centra between positions 18 and 25 is consistent with adaptation to the stresses generated by such tail motion, as is ossification of vertebrae via diffuse idiopathic skeletal hyperostosis (DISH), which occurs in the same region in about half the specimens. The noise produced may have been used for defense, communication, intraspecific rivalry, or courtship, in which case supersonic "cracking" may have been a sexually dimorphic feature. Comparisons with the club-bearing tails of the sauropods *Shunosaurus lii* and *Omeisaurus tianfuensis* show the diplodocid whiplash tail was not well adapted as a direct-impact weapon, bringing the tail-as-weapon hypothesis into doubt.