An ornithischian dinosaur tooth from the Lower Cretaceous Okurodani Formation (Tetori Group), Japan

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Introduction

The Tetori Group (Middle Jurassic to Lower Cretaceous) exposed in the Shokawa area of Gifu Prefecture, Japan, is known as a terrestrial vertebrate fossil site. This area has yielded over 1000 microvertebrates, including choristoderes, *Shokawa iki* (Evans and Manabe, 1999a; Matsumoto et al., 2002); a lizard, *Sakurasaurus shokawensis* (Evans and Manabe, 1999b); theropod teeth; iguanodontian teeth (Hasegawa et al., 1995); a pterosaur (Unwin et al., 1996); and fishes and turtles (e.g., Evans et al., 1998).

Vertebrate remains have also been reported from other Tetori Group sites in the Fukui, Ishikawa, and Toyama prefectures (e.g., Manabe et al., 2000; Kobayashi and Azuma, 2003). Ornithischian dinosaurs are common from these sites: iguanodontian dinosaurs, including *Fukuisaurus tetoriensis*, from the Kitadani Formation, Fukui Prefecture (Kobayashi and Azuma, 2003; Shibata, 2009); a partial skull of the cerapod dinosaur *Albalophosaurus yamaguchiorum*; and iguanodontian teeth from the Kuwajima Formation, Ishikawa Prefecture (e.g., Ohashi and Barrett, 2009).

In 1988, an isolated dinosaur tooth (SBEG 007) was found from a float matrix that was considered to come from an outcrop of the Okurodani Formation exposed along the Ogamigo River in the Shokawa area of Takayama City, Gifu Prefecture, central Japan (Hasegawa et al., 1990). SBEG 007 was tentatively identified as a hypsilophodontid dinosaur because of the presence of a cingulum (Hasegawa et al., 1990). According to recent studies (e.g., Butler et al., 2008), this feature is not diagnostic of hypsilophodonts, but is a synapomorphy of Ornithischia (Parker et al., 2005).

This study demonstrates that SBEG 007 represents an unidentified ornithischian that differs from other ornithischian dinosaurs previously reported in the Tetori Group. SBEG 007 suggests that the ornithischian dinosaurs of the Tetori Group are more diverse than previously thought.

Geological Setting

The Tetori Group is distributed mainly in Fukui, Gifu, Ishikawa, and Toyama prefectures and is divided into three subgroups: Kuzuryu, Itoshiro, and Akaiwa subgroups in ascending order (e.g., Maeda, 1961). The Itoshiro Subgroup is further subdivided into the Otaniyama, Okurodani, and Ama godani formations in the Shokawa area. The Okurodani Formation, at the Ogamigo River in the Shokawa area (Figure 1), consists mainly of alternating beds of fine-grained sandstone, mudstone, and coarse-grained sandstone. This formation has been dated to Neocomian (Berriasian–Hauterivian) age on the basis of its invertebrate fossils and igneous rocks (e.g., Hasegawa et al., 1995; Kusuhashi et al., 2002). A recent study using U-Pb ages of zircon crystals dated the tuff bed of this formation as 117.5 ± 0.7 Ma, indicating a Barremian to Aptian age for the Okurodani Formation (Kusuhashi et al., 2006).

Systematic Paleontology

Superorder Dinosauria Owen, 1842
Order Ornithischia Seeley, 1887
Ornithischia indet.

Material.—SBEG 007, an isolated maxillary tooth.
Locality.—Ogamigo River, Shokawa, Takayama City, Gifu Prefecture, Japan (Figure 1A).
Repository.—Shokawa Branch Office, Takayama City Board of Education, Gifu Prefecture (SBEG), Japan.
Horizon.—The Okurodani Formation, Lower Cretaceous of the Tetori Group (Barremian to Aptian).