

New dinosaur from Utah's red rocks

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Mark Loewen, paleontologist with the Utah Museum of Natural History at the University of Utah, displays the new dinosaur species, *Seitaad ruessi*, which is derived from the Navajo word, “Seit’aad,” a sand-desert monster from the Navajo (Diné) creation legend that swallowed its victims in sand dunes. The skeleton of Seitaad had been 'swallowed' in a fossilized sand dune when it was discovered. Credit: Utah Museum of Natural History, University of Utah.

(PhysOrg.com) -- Utah's red rocks - world-famous attractions at numerous national parks, monuments and state parks - have yielded a rare skeleton of a new species of plant-eating dinosaur that lived 185 million years ago and may have been buried alive by a collapsing sand

dune. The discovery confirms the widespread success of sauropodomorph dinosaurs during the Early Jurassic Period.

Until now, Utah's red rocks were known only for a few scattered bones and dinosaur footprints. However, discovery of a remarkably preserved partial skeleton is being published in the March 24 edition of *PLoS ONE*, the online open-access journal produced by the Public Library of Science.

The study was conducted by Joseph Sertich, a former University of Utah master's student and current Stony Brook University Ph.D. student, and Mark Loewen, a paleontologist at the Utah Museum of Natural History and instructor in the Department of Geology and Geophysics at the University of Utah.

The new dinosaur species is named *Seitaad ruessi* (SAY-eet-AWD ROO-ess-EYE), which is derived from the Navajo word, "Seit'aad," a sand-desert monster from the Navajo (Diné) creation legend that swallowed its victims in sand dunes (the skeleton of Seitaad had been "swallowed" in a fossilized sand dune when it was discovered); and Ruess, after the artist, poet, naturalist and explorer Everett Ruess who mysteriously disappeared in the red rock country of southern Utah in 1934 at age 20.

Seitaad ruessi is part of a group of dinosaurs known as sauropodomorphs. Sauropodomorphs were distributed across the globe during the Early Jurassic, when all of the continents were still together in the supercontinent named Pangaea. Millions of years later, sauropodomorphs evolved into gigantic sauropods, long-necked plant eaters whose fossils are well known from elsewhere in Utah, including Dinosaur National Monument.

A Dinosaur Buried by the Dunes

The skeleton of *Seitaad* was discovered protruding from the multicolored cliffs of Navajo Sandstone in 2004 by local historian and artist, Joe Pachak, while hiking in the Comb Ridge area near Bluff, Utah. His discovery, located just below an ancestral Puebloan (Anasazi) cliff-dwelling, was subsequently reported to the federal Bureau of Land Management (BLM) and the Utah Museum of Natural History. Museum paleontologists and crews excavated and collected the specimen in 2005.



The discovery of the new plant-eating dinosaur was just below an ancestral Puebloan (Anasazi) cliff-dwelling called Eagles Nest in the Comb Ridge area near Bluff, Utah. Credit: Utah Museum of Natural History, University of Utah.

The beautifully preserved specimen includes most bones of the skeleton, except for the head, and parts of the neck and tail. *Seitaad* was found in fossilized sand dunes that were part of a vast desert that covered the region nearly 185 million years ago during the Jurassic Period. Research suggests that the animal was buried in a suddenly collapsing sand dune that engulfed the remains and stood them on their head. The missing parts of the skeleton were lost to erosion over the past thousand years, but were almost certainly visible when Native Americans lived on the

cliff just above the skeleton.

In life, the animal would have stood about 3 to 4 feet (about 1 meter) tall at the hips and was 10 to 15 feet (3 to 4.5 meters) long. It would have weighed approximately 150 to 200 pounds (70 to 90 kilograms), and could walk on two or four legs. Like its later gigantic relatives, *Seitaad* most likely ate plants.

Early sauropodomorphs, including *Seitaad*, had long necks and tails with small heads and leaf-shaped teeth, suggesting that they were specialized for an herbivorous (plant-eating) diet. These same traits were carried on in their much larger descendants, the sauropods. "Although *Seitaad* was preserved in a sand dune, this ancient desert must have included wetter areas with enough plants to support these smaller dinosaurs and other animals," said Sertich. "Just like in deserts today, life would have been difficult in Utah's ancient 'sand sea.'"



This is the fossil of the new dinosaur species *Seitaad ruessi*. Credit: Utah Museum of Natural History, University of Utah.

According to Loewen, "We know from geologic evidence that seasonal

rainstorms like today's summer monsoons provided much of the moisture in this sand sea, filling ponds and other low spots between the sand dunes."

The closest relatives of *Seitaad* are known from similar-aged rocks in South America and southern Africa. Other, less complete, fossils from northern Arizona hinted at the presence of sauropodomorphs like *Seitaad*, but none were complete enough to understand exactly what species was living in the American Southwest. The discovery of *Seitaad* confirms that this group of dinosaurs was extremely widespread and successful during the Early Jurassic, approximately 175 million to 200 million years ago.

Although the Navajo Sandstone is exposed all over Utah and Arizona, fossils are extremely rare and we have not yet learned much about the animals that lived in this giant desert. Other animals that lived in the Navajo Sandstone were all relatively small animals, including a carnivorous dinosaur, crocodile relatives and proto-mammals called tritylodonts. Even though *Seitaad* was quite small, it was likely the largest herbivore during this time period in southern Utah. "This new find suggests that there may be more dinosaurs yet to be discovered in these rocks," said Sertich.

Fact Sheet:

- *Seitaad* is the first dinosaur discovered from the Navajo Sandstone of Utah and one of the oldest known dinosaurs from Utah.
- *Seitaad* is one of the first sauropodomorphs from North America during this time period.
- *Seitaad* is closely related to other similar-aged dinosaurs from southern South America and southern Africa from a time when these continents

were still attached as part of the supercontinent called Pangaea.

- Seitaad was likely buried in a collapsing sand dune.

The Dinosaur's Name: Seitaad ruessi

- Seitaad is derived from Seit'aad, a sand-desert monster from the Navajo (Diné) creation legend that swallowed its victims in sand dunes. The skeleton of Seitaad had been 'swallowed' in a fossilized sand dune. The Navajo Sandstone, the rock unit the fossil was discovered in, represents the remains of a huge sand dune desert as large as the modern Sahara Desert.

- ruessi is derived from Everett Ruess, famous young artist, poet, historian, and explorer who disappeared in southern Utah in 1934. Ruess is celebrated for his love of the region, its people, and for his free-spirited and adventurous lifestyle.

- The name Seitaad ruessi is pronounced SAY-eet-AWD ROO-ess-EYE.

Size

- Seitaad stood an estimated 3 to 4 feet (about 1 meter) tall at the hips and was 10 to 15 feet (3 to 4.5 meters) long (with a body size of a sheep, but with a very long neck and tail). Seitaad would have weighed about 150 to 200 pounds (70 to 90 kilograms).

Relationships

- Seitaad is a sauropodomorph, often called a "prosauropod" or "sauropod precursor," and was most likely an herbivore.

- (Seitaad is closely related to the giant sauropod dinosaurs that appeared later in the Jurassic, such as Diplodocus, Apatosaurus, and Brachiosaurus. These giants are known from younger rocks elsewhere in Utah.
- A sauropodomorph is a type of herbivorous dinosaur with a long neck and tail, with members known from nearly the entire history of the dinosaurs.

Anatomy

- Seitaad could stand on all four legs or rise up and walk on two legs.
- Seitaad would have had a fairly long neck and tail based on what we know about its close relatives.
- Seitaad had a large curved claw on its "thumb" although it is unclear what its function would have been on a small herbivorous dinosaur.

Age and Geography

- Seitaad is from the Early Jurassic, which spanned from approximately 175 million to 200 million years ago.
- Seitaad was excavated from the Navajo Sandstone of Comb Ridge just northwest of Bluff, Utah. These rocks are thought to be between 183 and 190 million years old.
- During the Jurassic, the continents began to separate from a single landmass named Pangaea.
- The Navajo Sandstone is a rock unit that covers major portions of

Utah, northern Arizona and western Colorado. It is the primary rock unit exposed in many national parks and monuments on the Colorado Plateau.

- The presence of Seitaad in North America is consistent with the widespread distribution of sauropodomorphs during the Early Jurassic.

Discovery

- Seitaad was discovered in 2004 on federal land administered by the Bureau of Land Management by artist and historian Joe Pachak while hiking in one of the canyons on Comb Ridge.
- Seitaad is permanently housed in the collections of the Utah Museum of Natural History in Salt Lake City.
- Seitaad was preserved in a sandstone cliff wall that required several days to remove by Utah Museum of Natural History field crews.
- Seitaad was found at the base of a 500-foot cliff wall directly below an ancestral Puebloan (Anasazi) cliff dwelling. Comb Ridge is famous for its many cliff dwellings and other signs of past occupants.

Other

- Seitaad is known from a single skeleton found in life position but missing the skull, neck and tail.
- The fossil record of sauropodomorph dinosaurs from North America is poorly known, so the discovery of Seitaad fills a significant gap in our knowledge.

The Study DOES NOT say that...

- Seitaad is the oldest dinosaur from Utah.
- Seitaad is the direct ancestor of sauropod dinosaurs (more like a close relative).
- Seitaad was found near Everett Ruess, whose body has not been found.

Provided by University of Utah

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