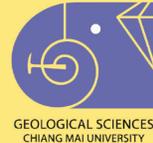


Micromorphology of Theropod Dinosaur Teeth from Khok Kruat Formation, Nakhon Ratchasima and Ubon Ratchathani Provinces



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ABSTRACT

This study aims to study the diversity of theropod tooth fossil micromorphology discovered in the Khok Kruat Formation of Nakhon Ratchasima and Ubon Ratchathani Provinces. These findings date back to the early Cretaceous period, approximately from the Aptian to the Albian stages. The microstructures of teeth provide insights into the living and feeding behaviors of dinosaurs. The study methods focused on the comparative study of morphological and micromorphological characteristics of theropod teeth, examining 20 fossils. They are categorized into two main types: 1) Ziphodont type, which consists of three blade-shaped teeth that are flat, narrow, and have saw-like serrations and braided enamel texture. These were classified into the Allosaurus theropod group. All samples were from Nakhon Ratchasima Province; and 2) Conodont type, which consists of 17 pieces of conical teeth, with multiple ridges on the side of the tooth and no serrations. The enamel texture of these types is smooth. The fossils were classified into the Spinosaurus theropod group, which was present in both locations. The ziphodont type is better suited for slicing, cutting, and tearing larger meats, while the conodont type is ideal for holding and piercing through meats before swallowing, a characteristic of piscivores. The study indicates that the Khok Kruat Formation once provided diverse food and water sources for theropod dinosaurs while revealing a better understanding of the living and feeding behaviors during the Cretaceous Period.

Geological Settings

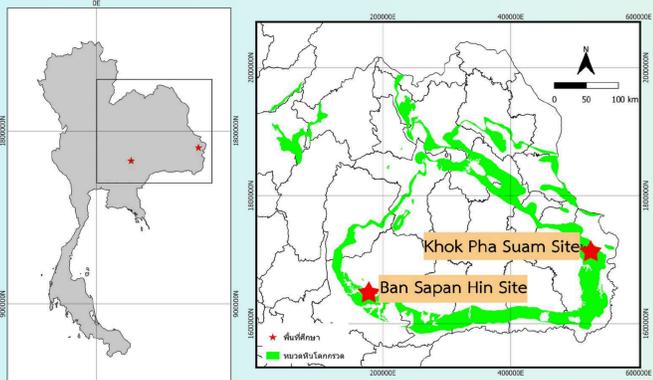


Fig 1. Location of Ban Sapan Hin Site, Nakhon Ratchasima Province, and Khok Pha Suam Site, Ubon Ratchathani Province.

Khok Kruat Formation: Sandstone and siltstone, reddish brown and purplish brown, thin to thick bedded, with rock salt, potash, gypsum, and anhydrite

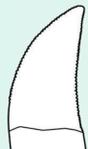
Objectives

- To study the diversity of theropod tooth fossil micromorphology in the Khok Kruat Formation from Nakhon Ratchasima and Ubon Ratchathani Provinces.
- To interpret the living behavior and feeding behavior of theropods in the Khok Kruat Formation, Nakhon Ratchasima and Ubon Ratchathani Provinces.

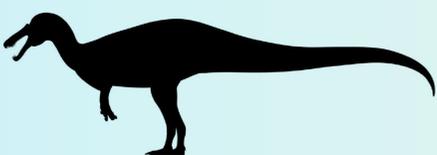
Discussion and Conclusion

Fossil samples were categorized into two main types:

1) Ziphodont type, which consists of 3 pieces of blade-shaped teeth that are flat, narrow, and have saw-like serrations and braided enamel texture. Which is suitable for tearing and slicing large meat. Therefore, it can be inferred that this group of dinosaurs often hunted and ate the remains of creatures living on land. These were classified into the Allosaurus theropod group. All samples were from Nakhon Ratchasima Province.

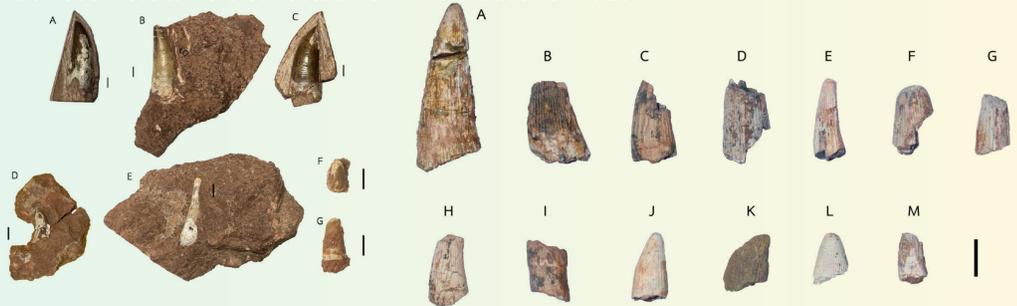


2) Conodont type, which consists of 17 pieces of conical teeth, with multiple ridges on the side of the tooth and no serrations. The enamel texture of these types is smooth, which is suitable for gripping prey such as fish. Therefore, it can be indicated that dinosaurs with conical teeth lived near water sources such as river plains or swamps. The fossils were classified into the Spinosaurus theropod group, which was present in both locations.

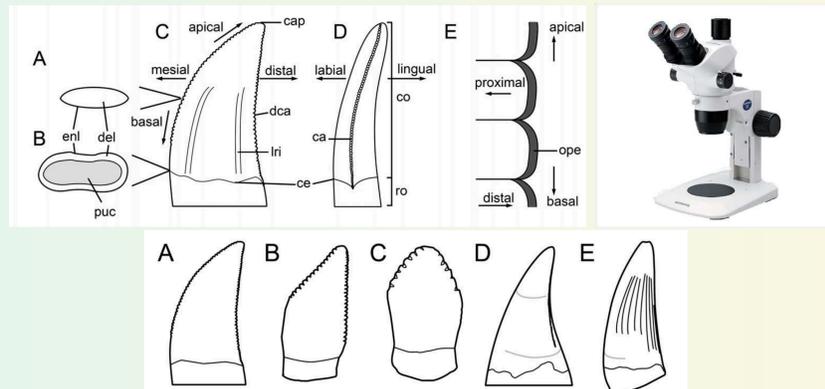


Methodology

- 20 Teeth fossils were collected from Khok Kruat Formation.



- Fossil measurements, morphological and micromorphological studies were conducted followed Hendrickx et al. (2015).



Results



Scale 1 mm.

Fig. 2 Tooth fossil from Nakhon Ratchasima Province with braided enamel texture, saw-like serrations with denticle density per mm = 3 in mesial and distal carinae. Abbreviation: de (Denticle), ent (Enamel texture)



Fig. 3 Tooth fossil from Nakhon Ratchasima Province with smooth enamel texture, multiple ridges on the side of the tooth, and no serrations. Abbreviation: flu (Flute).

Fig. 4 Tooth fossils from Ubon Ratchathani Province with multiple ridges on the side of the tooth and no serrations. Abbreviation: flu (Flute).

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