New fossil rove beetle is a first in Africa

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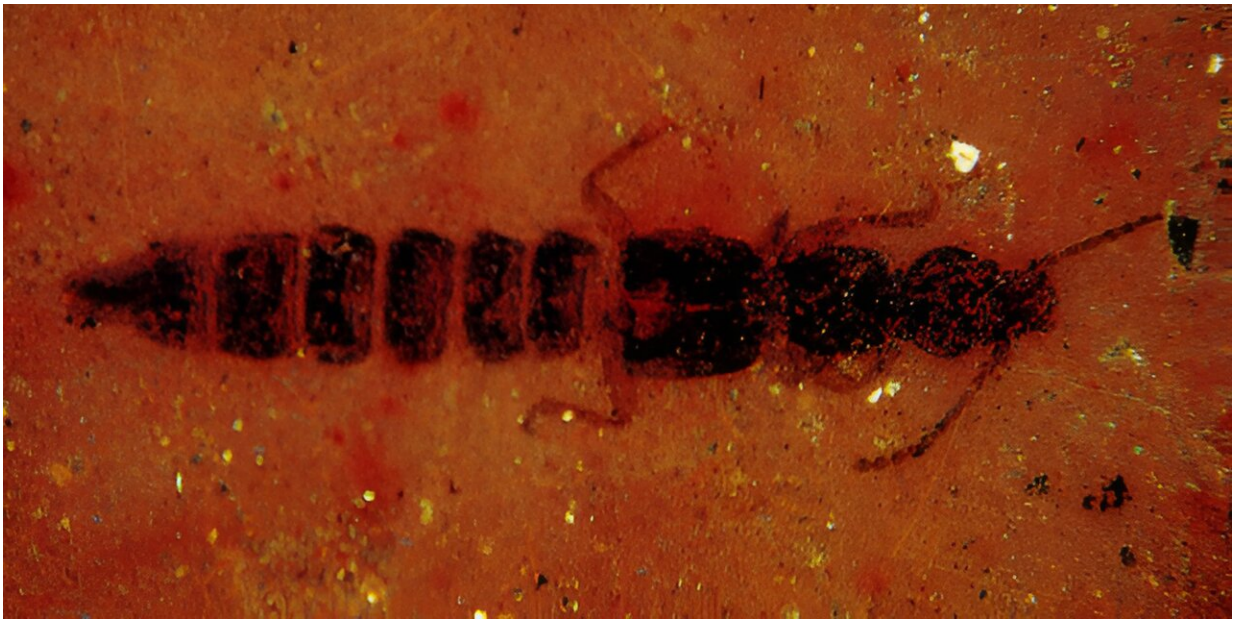

Credit: Wits University

In the heart of Botswana, a discovery at the Orapa Diamond Mine has unveiled a fossil that sheds light on the evolutionary history of beetles.

This particular specimen is part of the staphylinid rove beetles, dating back to the Cretaceous period, around 90 million years ago. The new research, published in the *Journal of Entomological Science*, describes the new species, Paleothius mckayi, and extends the geographical and temporal boundaries of our understanding of these ancient creatures.

The finding, spearheaded by Genus postdoctoral fellow, Dr. Sandiso Mnguni and his team, marks the first recorded fossil of a staphylinine rove beetle in Africa and notably, in the Southern Hemisphere. This region of Botswana, known for its rich deposits of Cretaceous age, has become a pivotal site for understanding the biodiversity of the past, revealing a world where these beetles roamed alongside dinosaurs.

Paleothius mckayi is named in honor of Dr. Ian James McKay, a notable figure in the field of paleoentomology, who significantly contributed to the training of the leading author, Dr. Mnguni, as a paleoentomologist.

This species, unearthed from lacustrine sediments (deposits that accumulate in lake environments), showcases a symmetrical and elongated body, an elongated head, and notably long antennae, among other distinctive features. Its sharp, scissor-like mouthparts suggest a predatory lifestyle, actively hunting prey within the leaf litter surrounding a crater lake that once existed in this region.

Rove beetles, in general, are recognized for their highly mobile lifestyle and versatile habitat preferences, ranging from soil and leaf litter to water margins and even animal nests. The staphylinine group exemplifies this adaptability, with species found in an array of environments around the world.

These beetles play critical roles in controlling pest populations, breaking down organic matter, and contributing to nutrient cycling within their ecosystems. The preservation of this newly described fossil, as a flattened imprint, provides a direct window into the widespread distribution of staphylinine rove beetles during the Cretaceous period.

Until now, similar fossils have been found in diverse locations such as China, Russia, Myanmar, and England, but the addition of Botswana to this list highlights the Orapa Diamond Mine as a crucial Cretaceous

deposit in Africa with a rich biota, encompassing various groups of plants and insects.

This discovery tells us that these types of beetles were not just present but thriving alongside dinosaurs, and they haven't changed much over millions of years. This idea, that some creatures evolve very slowly, supports what scientists call "punctuated evolution"—the notion that evolution can happen in bursts following long periods of little change.

Moreover, this beetle shares some family traits with another group of beetles, suggesting these groups have been related since the Jurassic period, even longer ago. This beetle is a clue into the long, intricate history of life on Earth, showing us how interconnected and unchanged some life forms have been over the ages and highlights the success of rove beetles in adapting to various environments without significant changes to their morphology.

The intricate process of describing a new species from such fossils hours of detailed morphological analyses under both polarized and unpolarized light, allowing researchers to observe and interpret the specimen's features meticulously. This painstaking work often requires repeated examinations to identify unique characteristics that justify the classification of a new species.

Dr. Mnguni comments, "The more you look at the specimen, the better you'll get at understanding it. You might notice details you missed before, which helps you describe it better."

The discovery of Paleothius mckayi enriches our knowledge of the biodiversity, biogeography, and evolution of staphylinine rove beetles during the Cretaceous This research not only honors the legacy of Dr. McKay but also paves the way for future discoveries in the Orapa Diamond Mine.

"There are more fossil rove beetles that will be described from the same deposit by the same authors in the near future, and there are also many fossil insects belonging in other groups that also await description," Dr. Mnguni notes. This promise of future research highlights the untapped potential of the Orapa deposits in enriching our understanding of Cretaceous ecosystems and the evolutionary trajectories of insect life on Earth.

More information: Sandiso Mnguni et al, Paleothius mckayi sp. n.: A New Species of Staphylininae (Arthropoda: Insecta: Coleoptera: Staphylinidae) from Orapa in Botswana1, *Journal of Entomological Science* (2024). DOI: 10.18474/JES23-53

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