

Fossilised moa poo paints a picture of the past

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Two moa coprolites in situ during excavation of the Borland Burn Rock Bivouac, South Island, New Zealand. Credit: Wood et al.



Knowledge of the diets of New Zealand's extinct moa (Aves: Dinornithiformes) comes from careful analysis of moa coprolites (fossilized poop) and gizzard contents. Moa coprolites and gizzard contents can be dissected and analyzed under the microscope or using DNA identification techniques to decipher what the birds ate. The contents can also be screened to see what seeds the birds may have dispersed.

Most of what we currently know about moa diet is heavily biased towards just three species in the South Island (South Island giant moa, upland moa and heavy-footed moa), which represent about 90% of all identified coprolites and gizzard content samples. By comparison, the diets of the other six moa species are poorly known.

In the study, published in the journal *Quaternary Science Reviews*, researchers from Manaaki Whenua—Landcare Research discuss their recent discovery and analyzes of a new coprolite deposit in Fiordland National Park. Using DNA analysis and known moa species distributions, they attributed the deposit to the little bush moa (Anomalopteryx didiformis), a small-to medium-sized moa species (50 to 90 cm tall, weighing 26 to 64 kg) that formerly occurred in lowland closed-canopy forests throughout New Zealand.

Lead researcher Dr. Jamie Wood said this rock shelter deposit is scientifically very important "as it is the southernmost site from which moa coprolites have been recovered, with the longest documented timespan of <u>coprolite</u> accumulation (~2200 years) preserved within a sediment horizon in a single place. Until now, only five little bush moa coprolites have previously been identified, all from central Otago."





Fossilised moa poo paints a picture of the past. Credit: CC0

Dr. Wood said "pollen and plant DNA from the coprolites, as well as associated plant macrofossils, show that the deposit spans a period when the forest canopy was transitioning from conifers (dominated by miro, matai, totara and mountain toatoa from the Podocarpaceae family) to silver beech (Lophozonia menziesii) dominance about 6800 to 4600 years ago."

DNA, pollen and leaf cuticle fragments of the red mistletoe (Peraxilla tetrapetala), a species usually associated with silver beech, were also found in the little bush moa coprolites. The nutritious leaves of this mistletoe are highly palatable and today are also sought out by the introduced possum (Trichosurus vulpecula) and browsing mammals such as deer.



The little bush moa coprolites contained very few seeds compared with other analyzed moa coprolites. Co-author Dr. Janet Wilmshurst said "this observation was interesting because it contrasts with what we know about other moa species which played an important role dispersing tiny seeds (

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