

Exploring population-level variation in the later Pleistocene Cercopithecids from the Middle Awash study area (Afar Rift, Ethiopia)

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The anatomical and behavioral variation within a population provides the core of evolution by natural selection. Unfortunately, paleoanthropologists rarely have the opportunity to investigate population-level variation because of the scarcity of the paleontological record. Mammalian terrestrial fossils are rare, and fossils of primates even more so. However, there is a unique opportunity to study population-level variation within the primate fossil assemblages recovered from the later Pleistocene deposits at Halibee in the Middle Awash research area in the Afar Region of Ethiopia. In total, 977 non-human primates have been recovered spanning two main time horizons, the Faro Daba beds (ca. 100,000 years ago) and the Chai Baro beds (>158,000 years) of the Dawaitoli Formation [1]. Three taxa have been described within this large assemblage: cf. *Chlorocebus* (n = 328) [2], *Colobus cf. Guereza* (n = 360) [3], and *Papio hamadryas* ssp. (n = 143) [4].

The *Papio hamadryas* ssp. assemblage derives only from the geologically older sediments of Chai Baro. There is considerable overlap in craniodental variation between the Chai Baro assemblage and extant samples of *P. h. cynocephalus*, *P. h. Anubis*, and *P. h. hamadryas*, and therefore it cannot be confidently attributed to a specific sub-species. This pattern of overlapping anatomical variation aligns with genomic studies that reveal hybridization between lineages and the likely existence of ghost populations.

The *Colobus cf. guereza* assemblage derives only from the younger deposits at Faro Daba. The morphologies of these fossils are intermediate between those of the older Asbole *Colobus* sample and extant *Colobus guereza*, with a pattern of sexual dimorphism that matches the living populations. This morphological pattern suggests that the Asbole and Faro Daba *Colobus* may be ancestral to the extant *Colobus guereza* currently known from this same geographic region.

The cf. *Chlorocebus* assemblage derives from both geological strata, and therefore provides a particularly rare opportunity to study variation across three time horizons: >158,000 years ago, ca. 100,000 years ago, and living *Chlorocebus* in the region. The level of anatomical variation in the fossil assemblages can be attributed to one species, but also shows subtle differences between Chai Baro and Faro Daba that may reflect microevolution or non-genetic indicators of behavioral variation.

In addition to the paleontological research, we will report preliminary results of our new dental microwear texture analysis (DMTA) study on these cercopithecoid fossils that is to begin in May of 2024. Microscopic features on dental enamel exhibit different turnover rates, with rapid renewal on occlusal surfaces and long-term accumulation on buccal surfaces [5]. Our DMTA will provide a complementary dataset to the cranial, dental, and postcranial variation used in the taxonomic analyses, providing another window into how population variation in these three cercopithecoids changed over time.

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