ACTA PALAEONTOLOGICA POLONICA

Re-evaluating hypertragulid diversity in the John Day basin, Oregon, USA

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Acta Palaeontologica Polonica 69 (3), 2024: 411-423 doi:10.4202/app.01119.2023

Despite their relative abundance, members of the family Hypertragulidae (Artiodactyla, Mammalia) have proved a conundrum regarding species diversity in the Turtle Cove Member (Oligocene) of the John Day Formation, located in central and eastern Oregon. Three species and two separate genera are described in the area, but previous research lacks statistical support for this level of variation. We use coefficients of variation (V) on measurements of dentition and astragali of hypertragulid specimens designated *Hypertragulus hesperius, Hypertragulus minutus*, and *Nanotragulus planiceps* as a metric for determining whether there were multiple species present in the population. Asymptotic and modified signed-likelihood ratio V equality tests show that V values of anterior-posterior molar length and transverse molar width vary significantly when comparing single species of modern ecological analogs (*Muntiacus muntjak, Muntiacus reevesi*, and *Tragulus javanicus*) to groupings of a combined population. However, the V equality tests on dental and postcranial measurements yield almost no significant results when comparing variation in the extinct John Day hypertragulids to an extant population comprised of a single species. Similar comparisons between astragali measurements of hypertragulids and *T. javanicus* express no significant difference in the level of variation from the combined population to a modern single species. The low level of variation in the hypertragulids and the lack of differentiation between dental characters of individuals does not statistically support the hypothesis that there were multiple species present in the population, suggesting either that cryptic species may be present but impossible to identify without soft tissue remains, or there may have been taxonomic over-splitting of a single hypertragulid species in the John Day region.

Key words: Mammalia, Artiodactyla, Hypertragulidae, morphometrics, dental morphology, astragalus, coefficient of variation, John Day Formation.

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