

MEASURES OF POSTURAL AND LOCOMOTOR PERFORMANCE IN WILD  
ATELINE PRIMATES: A COMPARATIVE ANALYSIS OF *ALOUATTA SENICULUS*,  
*LAGOTHRIX POEPPIGII*, AND *ATELES BELZEBUTH*

(Order No. )

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ABSTRACT

Locomotor adaptations, including novel gait patterns, diverse locomotor modes and divergent morphological specializations, have long been recognized as central characteristics of the Order Primates. New World atelines (*Alouatta*, *Lagothrix*, *Ateles* and *Brachyteles* species) exemplify this diversity, exhibiting a spectrum of positional behaviors. This comparative analysis of *Alouatta seniculus*, *Lagothrix poeppigii*, and *Ateles belzebuth* reveals significant differences in the relative versatility of their locomotor repertoires and in the performance of categorically similar locomotor modes. Locomotor frequency data were integrated with a frame-by-frame analysis of canopy-level video. These data were collected on sympatric populations during multiple field seasons (November 2002 – January 2006) in the lowland, Amazonian rainforest of northeastern

Ecuador. Frequencies and mean durations were statistically compared using resampling methods.

Frequency data analysis indicates that *Alouatta seniculus*, *Lagothrix poeppigii* and *Ateles belzebuth* each have unique aspects to their positional profiles that are particularly relevant in the contexts of gap crossings and traveling on small supports. *Alouatta's* arboreal locomotion is cautious and relatively restricted in repertoire, limited primarily to quadrupedalism, ascent/descent, clambering and bridging/hoisting. In contrast, *Ateles* and *Lagothrix* both incorporate suspensory activities. *Lagothrix* is behaviorally intermediate and significantly different from both *Alouatta* and *Ateles* in some orthograde/suspensory and quadrupedal behaviors, but they also overlap a great deal with both *Alouatta* and *Ateles*.

Analysis of video collected in the wild expands findings based on the frequency data. Differences in temporal gait characteristics suggest that *Lagothrix* and *Ateles* exhibit different capacities for efficient forelimb suspension. These results support findings from lab-based studies of their suspensory locomotion but also highlight differences that may only be revealed when subjects respond to the challenges of their natural environment.

Overall, *Ateles* exhibits greater locomotor versatility in terms of breadth of locomotor repertoire, capacity to incorporate atypical hindlimb steps, and their tendency to transition rapidly between kinematically distinct locomotor modes. In contrast, *Alouatta's* locomotor regimen is relatively limited while *Lagothrix* had a tendency to be

intermediate between the comparably more specialized *Alouatta* and *Ateles*. Studies, such as this, which examine performance differences in the wild, are relevant to understanding the emergence of novel positional behaviors.