QUANTIFYING THE ACTIVITY OF CAPTIVE ASIAN ELEPHANTS THROUGH THE USE OF A TRI-AXIAL ACCELEROMETER, GPS, AND BEHAVIORAL OBSERVATION

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ABSTRACT

Quantifying activity levels and specific behaviors in captive Asian elephants (*Elephas maximus*) has proven challenging and yet is important for managing these animals in zoos. Wild elephants spend a large portion of their day foraging; while in captivity, this activity is significantly decreased. To reduce the development of health risks such as obesity and the formation of undesirable behaviors, new methods to quantify activity are needed. A tri-axial accelerometer may be a useful tool for quantifying elephant activity and differentiating between specific behaviors. Two separate trials with four Asian elephants at the Fort Worth Zoo in Fort Worth, Texas, were completed using a tri-axial accelerometer, behavioral observation, and GPS in order to validate the accelerometer as a tool for quantification of behavior in Asian elephants. The data can additionally be used to develop a daily activity budget for the elephants from 1100 and to 1600 hours. GPS data was found to have a +/- 12 % error when compared to measured distances and velocity (m/s). Accelerometer results showed distinct patterns for standing, steady walk, and fast walk. These patterns combined with behavioral observations and GPS were used to extrapolate overall elephant activity, time spent sedentary, time spent walking at a steady pace, and time spent walking at a fast pace.