Population Survey of the Spider Monkey *Ateles geoffroyi* at Tikal, Guatemala

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**ABSTRACT.** Intensive strip census methods were used to estimate population density and age-sex composition of a natural population of the spider monkey *Ateles geoffroyi*, in seasonally dry forest at Tikal, Guatemala. An objective procedure for determining effective strip width is discussed, and various census methods, including direct count and strip census, are evaluated as to merits and disadvantages.

**INTRODUCTION**

Spider monkeys are important subjects for field study because of their unusual social organization and unique form of locomotion. Traditionally they have been classified in four species however HERSHKOVITZ (1972) considers the forms subspecies of a single species *Ateles paniscus*. For present purposes a taxonomic decision is not vital and I treat the four forms of *Ateles* as though they are valid species. Studies of natural populations of *Ateles* include CARPENTER's (1935) early work on *A. geoffroyi* in Panama, DURHAM's (1971, 1975) investigation of *A. paniscus* in Peru, and an excellent study of *A. belzebuth* in Colombia by L. and D. KLEIN (KLEIN, 1971, 1972, 1974; KLEIN & KLEIN, 1975, 1976). More limited amounts of field data are presented by COELHO et al. (1976), EISENBERG and KUEHN (1966), and WAGNER (1956). R. A. MITTERMER is currently studying spider monkeys in Surinam.

Throughout most of the generic range from southern Mexico to southern Brazil, *Ateles* is disappearing from the usual causes of habitat destruction, exploitation for food, export, and local pet trade. Fortunately an adequate sized population of *A. geoffroyi* is protected in lowland Guatemala and in 1975–1976 I conducted a 14-1/2 field study of ecology, locomotion, and social organization at Tikal National Park. In this paper I report on population density and age-sex structure.

Censusing of primates is receiving increasing attention because of the need to obtain, preferably with a reasonable amount of effort, population estimates to be used in planning conservation programs. One method, the strip-census, is strongly advocated by WILSON and WILSON (1975) who believe it is both more rapid and more objective than other methods. I used a form of strip-census based on a procedure of determining strip width that has not been used previously in censusing primates. Following the results of the census I discuss merits and disadvantages of strip-censuses.

**STUDY AREA AND METHODS**

Tikal National Park is a square of 576 km², located in northern Guatemala at an
average elevation of about 225 meters. The park is centered on substantial Maya ruins. Ten incomplete years of rainfall data from 1960–1975 indicate annual precipitation of approximately 1,350 mm, and there is a distinct dry season, usually January to early June. Three plant associations predominate: (1) upland forest in well-drained areas, on ridges and hills, (2) *escobal* in poorly drained depressions, containing trees generally lower than those of upland forest, and (3) *tintal* of broad seasonally inundated depressions where vegetation is low, less than 15 meters in height (SMITHE, 1966). Data of PULESTON (1973) indicate that the three associations occupy about 55%, 29%, and 16% of the park, respectively. Local informants state that spider monkeys are absent from *escobal* and *tintal*. I spent relatively little time in these types of vegetation. I think it unlikely that monkeys utilize *tintal* but believe they may use *escobal* as some trees of upland forest that are preferred food sources are also present in *escobal*.

**Census Methods**

Between June 1975 and May 1976 I conducted strip censuses on foot for a total of 59 hours, during early morning and late afternoon, along 9.4 km of narrow roads and trails. Speed averaged 1.8 km/hr. Most of the census routes are in the central part of the ruins enclosing and meandering through a roughly triangular area of about 150 hectares. One route of 1.5 km begins 1.5 km southeast of the main plaza of the ruins and proceeds southeast. THORINGTON (1972) notes that roads are sometimes located on ridges and this may introduce bias in a strip census, depending on the heterogeneity of the habitat. I doubt the routes I used are biased in this manner because the upland forest of the census includes 3.5% area that might be considered transitional *escobal*, using the 200 meter contour as the criterion, and the routes are in close agreement at 3%. Although the roads had done very little to alter original vegetation, archaeological activities involved some clearing and subsequent development of second growth.

I recorded all contacts with mammals and some birds, using a simple version of methods recommended by EMLEN (1971) and ROBINETTE, LOVELESS, and JONES (1974), according to which the observer records for every sighting the perpendicular distance from the contact to the census route. Strip width is derived from the detection distances by grouping them in frequency classes. The class frequencies are then examined for a distance within which detection appears more or less uniform: naturally one expects detection to drop off with increasing distance from the path of travel but hopefully an initial plateau will be present. When density is calculated only those contacts within that distance are used and the distance is doubled to obtain strip width. The area of the census is simply strip width multiplied by transect length. When more than one species of animal is censused strip width must be determined separately for each species.

**Methods for Age-Sex Composition**

The social organization of *A. geoffroyi* at Tikal appears similar to that of *A. belzebuth* studied in Colombia by KLEIN (1972). All members of a social group are seldom together and individuals associate in temporary "parties" of variable size. The fluid nature of *Ateles* spatial relations creates problems in the determination of