



## Short Communication

# Twinning in the big fruit-eating bat *Artibeus lituratus* (Chiroptera: Phyllostomidae) from eastern Paraguay

By R. D. STEVENS

Department of Biological Sciences, Texas Tech University, Lubbock, Texas, USA

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Although the litter size of bats is variable and ranges from one to five (HAMILTON and STALLING 1972), multiple embryos in American leaf-nosed bats are rare and have been reported for only a few species. Twinning in the Phyllostomidae was first reported for *Macrotus waterhousii* by COCKRUM (1955) and then by BRADSHAW (1961). BARLOW and TAMSITT (1968) later reported twinning in three additional species: *Glossophaga soricina*, *Erophylla sezekorni*, and *Artibeus jamaicensis*. Herein, I report twinning in *A. lituratus*.

*Artibeus lituratus* is widely distributed geographically, ranging from northern Mexico to northern Argentina (KOOPMAN 1993). This species exhibits considerable geographic variation regarding color, morphology, diet, and reproductive patterns (BAKER et al. 1976, 1977, 1979). WILSON (1979), based on extensive data, suggested that reproductive patterns in this species are geographically variable, ranging from monoestry at the northern limit of its range to bimodal polyestry (THOMAS 1972) and acyclic breeding (TAMSITT and VALDIVIESO 1963, 1965; TAMSITT 1966) in Colombia. Subsequently, WILLIG (1985) demonstrated that *A. lituratus* exhibits seasonal bimodal polyestry in northeastern Brazil. SAZIMA (1989) demonstrated that the timing of reproduc-

tion is dynamic in this species and dependent on weather patterns and primary productivity. Although patterns of reproduction are well documented, no report of twinning in this species currently exists.

Of 864 female *A. lituratus* collected and necropsied in this investigation, I encountered one gravid female containing two embryos. The female was caught on 29 December 1997 at Yaguarete Forests, located approximately 40 kilometers due east of the town of Santa Rosa de Lima in the department of San Pedro in eastern Paraguay (23° 48.50' S, 56° 07.68' W). The twins consisted of one male and one female. Accordingly, they were likely the result of fertilization of two separate ova. They were 11.6 mm and 11.3 mm in length, respectively. Toothwear on the mother was relatively slight and she was post lactating, suggesting that she was relatively young in age but had previously produced offspring.

Several explanations have been put forth to account for the paucity of instances of twinning in the Phyllostomidae. BARLOW and TAMSITT (1968) suggested that differences in litter size between vespertilionid and phyllostomid taxa exist because these groups have evolved in or radiated from areas that differ in seasonality and the length of growing seasons. They suggest

that temperate vespertilionids should have larger litters because they have a protracted period in which to produce offspring, whereas smaller litters are facilitated in tropical phyllostomids by more constant availability of resources. Moreover, phylogenetic as well as mechanical constraints likely maintain the single embryo condition in phyllostomid species. This is supported by the observation that phyllostomid fetuses attain relatively larger size than members from most other families of bats, and multiple embryos likely would cause overly great mechanical and physiological strain on the mother (WIMSATT and TRAPIDO 1952). Finally, TADDEI (1976) suggested that mechanisms operating during ovulation limited the number of ova released from follicles of females of this species. He found that more than one oocyte per ovarian follicle (suggestive of the potential for twinning) was not uncommon yet none of the individuals examined contained more than a single embryo. These observations combine to suggest that twinning is a rare phenomenon that results from accidents during

ovulation or development. Moreover, twinning in the Phyllostomidae likely is a condition that is selected against because of its deleterious effects on the mother. Finally, of the group of Phyllostomid species that exhibit twinning, no phylogenetic or ecological pattern exists regarding which species should exhibit this condition. This suggests that the phenomenon of twinning, although rare, should be expected from any large collection of phyllostomid bats.

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**Authors address:**

RICHARD D. STEVENS, Department of Biological Sciences, Texas Tech University, Lubbock, Texas, 79409-3131, USA (e-mail: [cmrds@ttacs.ttu.edu](mailto:cmrds@ttacs.ttu.edu))

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