

SHORT NOTES

**First description of a tent used by *Platyrrhinus helleri*
(Chiroptera: Phyllostomidae)**

JOSE G. TELLO and PAUL M. VELAZCO

Department of Zoology, The Field Museum, Chicago, IL 60605, USA, and Department of Biological Sciences, University of Illinois at Chicago, Chicago, IL 60607, USA; E-mail of JGT: jtello@fmnh.org

Key words: Manu, Peru, roost, tent, *Platyrrhinus helleri*, *Eirmocephala megaphylla*

White-lined fruit bats of the genus *Platyrrhinus* Saussure (Chiroptera: Phyllostomidae) are found from southern Mexico south to southeastern Peru, Bolivia, Paraguay, Uruguay, and southern Brazil, where they live in mature and disturbed lowland rainforest, gardens, clearings and plantations, cloud forest, deciduous forest and Caatinga (Sanborn, 1955; Emmons and Feer, 1999). Ten species are commonly recognized in *Platyrrhinus* (Nowak, 1999), although a recent study has suggested that this number is an underestimate (Velazco, 2002).

Heller's broad-nosed bat, *Platyrrhinus helleri* Peters is the most common and widespread *Platyrrhinus* species (Nowak, 1999). This species ranges from southern Mexico southward to Central America, and South America to Peru, Bolivia, and Amazonian and Central Brazil, and Trinidad (Ferrell and Wilson, 1991).

Platyrrhinus bats roost in caves or tunnels, culverts or under bridges, foliage or under branches, hollow trees, buildings, and under large leaves or palm fronds (Tuttle, 1976; Willig and Hollander, 1987; Ferrell

and Wilson, 1991; Albuja, 1999; Nowak, 1999). Peracchi and Albuquerque (1971) observed smaller groups of *P. lineatus* roosting under leaves of the palm, *Livistona oliviformis* (Arecaceae), and larger groups roosting under *Syagrus picrophylla* (Arecaceae) leaves. Taddei (1973) observed eight individuals roosting beneath a *Dracaena* (Agavaceae) (approximately 3 m in height), and two individuals in a bromeliad (Bromeliaceae) 12 m off the ground. In Trinidad, Goodwin and Greenhall (1961) reported one individual of *P. helleri* roosting in a hollow olivier tree (*Chuncoa obovata*, Combretaceae) in association with *Saccolaryx leptura* Schreber, *Micronycteris megalotis* Gray, *M. minuta* Gervais, and *Carollia perspicillata* Linnaeus. They also reported two individuals roosting under leaves of the carat palm (*Sabal glaucensens*, Arecaceae).

No detailed descriptions of the roosts have ever been published for any *Platyrrhinus* species. In this study we present the first description of the tent of *P. helleri* in an undisturbed lowland wet forest at Cocha Cashu Biological Station (11°54'S,

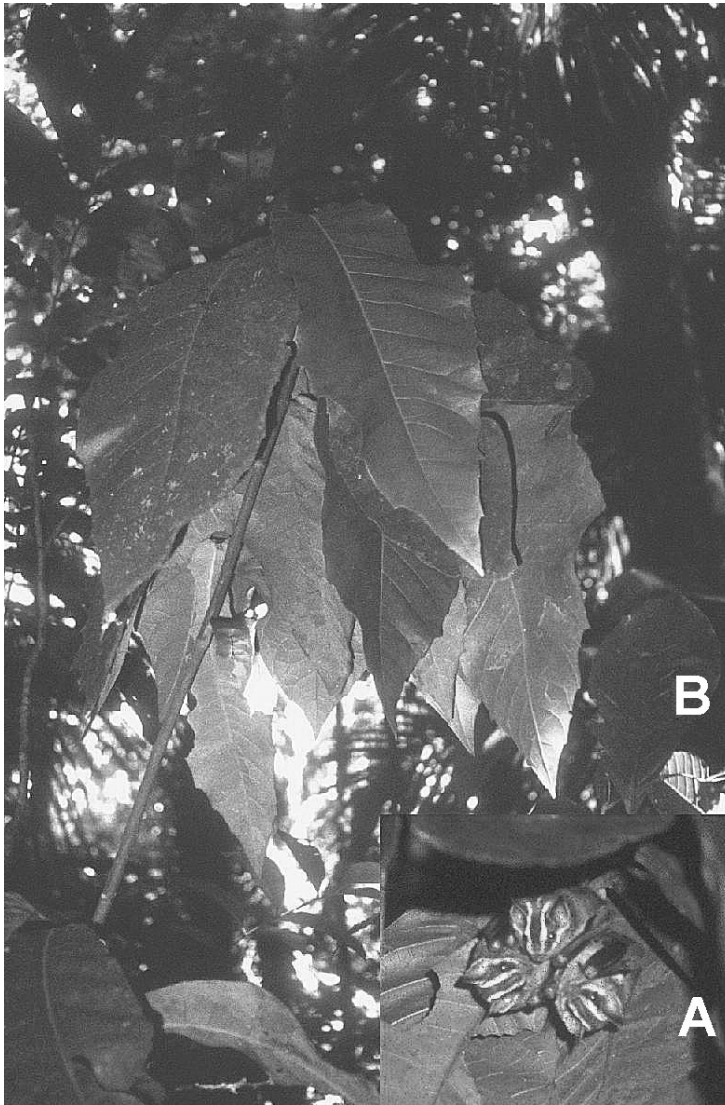


Fig. 1. (A) Three adult males of *Platyrhinus helleri* roosting in the tent. (B) Conical tent of *P. helleri* in an *Eirmocephala megaphylla* shrub

71°18'W), elevation ca. 400 m, Manu National Park, Department of Madre de Dios, southeastern Peru. Mean temperature at the station is 23° to 24°C, and rainfall averages about 2000 mm annually (Terborgh *et al.*, 1990). Rainfall is concentrated during a 5-mo rainy season extending from late November to early May. On average, less than 100 mm of rain falls monthly during the dry season. More complete descriptions

of the area and its ecology are presented by Terborgh (1983), Foster *et al.* (1986), and Gentry and Terborgh (1990).

Bat tent observations were made from 12 August to 16 September 1994 during a study on diurnal vertebrates using *Ficus* spp. (Moraceae) at Cocha Cashu. On 12 August 1994, JGT found three adult males of *P. helleri* roosting (Fig. 1A) in a tent of *Eirmocephala megaphylla* (Asteraceae:

Vernoniaeae). The bats were captured, weighed (13.5, 14.0, and 15.5 g), and then released. The shrub was located in Terra firme forest near a fruiting *Ficus pertusa* sensu lato tree. On 12 August two tents were found in the same plant, but only one of them was being used by bats as a diurnal roosting place. That tent was used by these bats for at least 35 days, when the observations ended. A third tent was built on 15 August in an adjacent shrub of the same species approximately 10 m from the previous one. These observations strongly suggest that *P. helleri* was the actual tent builder.

The tent architecture was 'conical', as described by Kunz *et al.* (1994; see Fig. 1B). The tents were formed by the leaves drooping downward after severe damage to the midrib caused by the bats chewing on it; the fallen tip forms a conical-shaped enclosure under which the bats roost. Bats severed the midrib near the base of the petiole (approximately 3 cm), and no damage was observed on the leaf surface. The main tent was located at the tip of one of the stems of the 2.40 m-height *Eirmocephala* shrub. This tent was formed by 15 leaves that formed the sides of the tent, with the following dimensions (in cm): roost height = 240, tent length = 49, diameter of tent entrance = 49. The second tent, located in the same shrub, was formed by 11 leaves, with the following dimensions (in cm): roost height = 195, tent length = 50, diameter of tent entrance = 37.5. The third tent, located in a 2.44 m-height *Eirmocephala* shrub, was formed by 12 leaves, with the following dimensions (in cm): roost height = 244, tent length = 50, diameter of tent entrance = 23.2.

This study constitutes the first description of the tent of *P. helleri*. It also constitutes the first record of phyllostomid bats using a plant species in the family Compositae. Among Microchiroptera, only the

phyllostomid bat *Uroderma bilobatum* Peters is known to construct conical tents (Kunz *et al.*, 1994). Convergently, conical tents have also been reported for the Megachiropteran bat, *Cynopterus brachyotis* Müller (Kunz *et al.*, 1994). The general architecture of conical tents among these three species does not differ greatly, which may be explained by the overall similarities in leaf shape (elliptical) and leaf distribution (radial and alternate) of the plants used by them to build their tents. At least 15 species of phyllostomid bats have been reported to modify leaves of plants to construct tents as roosts (Kunz *et al.*, 1994). With the exception of one species, the Carollinae bat *Rhinophylla pumilio* Peters, all the reported species belong to the subfamily Stenodermatinae (Kunz *et al.*, 1994). Kunz *et al.* (1994) assignment of *R. pumilio* as a tent-maker was based on Charles-Dominique (1993) report on tent-use by this species. However, Charles-Dominique (1993) concluded that *R. pumilio* might not be the tent-builder, but rather using tents already built by other species of bats. Occupancy of tent roosts built by other species might not be infrequent, as has been reported by Simmons and Voss (1998) who found individuals of *R. pumilio* using tents previously occupied by *Ectophylla macconnellii* Thomas. This finding suggests that tent building in Microchiroptera has evolved only once in the Phyllostomidae (in the subfamily Stenodermatinae) and not twice as previously thought.

Dermanura Gervais and *Uroderma* Peters, two genera close related to *Platyrrhinus*, are known to build up to seven different types of tents (Kunz *et al.*, 1994), and it may be that, *Platyrrhinus* has the same ability to build different tent types as these other genera. Further studies searching for roosting sites in this, and other species, are necessary to understand roosting site preferences and roosting behavior in general.

ACKNOWLEDGEMENTS

Thanks to the Instituto Nacional de Recursos Naturales (INRENA) for facilitating JGT permits to work in Manu National Park. JGT's fieldwork was possible thanks to grants from the International Center of Tropical Ecology at the University of Missouri-St. Louis (UMSL) and World Wildlife Fund through J. Terborgh. Thanks to P. Nuñez and J. Pruski for assistance with plant identification. We also thank B. D. Patterson, E. Davion and D. Willard for useful comments on improving this manuscript. J. Blake, B. Loiselle, J. Perez, S. Brugada, and E. Joern supplied support and hospitality to JGT during his years at UMSL.

LITERATURE CITED

- ALBUJA, L. 1999. Murciélagos del Ecuador. Escuela Politécnica Nacional, Quito, ii + 288 pp.
- CHARLES-DOMINIQUE, P. 1993. Tent-use by the bat *Rhinophylla pumilio* (Phyllostomidae: Carollinae) in French Guiana. *Biotropica* 25: 111–116.
- EMMONS, L. H., and F. FEER. 1999. Neotropical Rainforest mammals: a field guide. University of Chicago Press, Chicago, xvi + 307 pp.
- FERREL, C. S., and D. E. WILSON. 1991. *Platyrrhinus helleri*. *Mammalian Species*, 373: 1–5.
- FOSTER, R., J. ARCE, and T. S. WACHTER. 1986. Dispersal and sequential plant communities in Amazonian Peru flood plain. Pp. 357–370, in *Frugivores and seed dispersal* (A. ESTRADA and T. H. FLEMING, eds.). Dr. W. Junk Publishers, Dordrecht, The Netherlands, xiii + 392 pp.
- GENTRY, A. H., and J. TERBORGH. 1990. Composition and dynamics of the Cocha Cashu 'mature' flood plain forest. Pp. 542–564, in *Four Neotropical rainforests* (A. H. GENTRY, ed.). Yale University Press, New Haven, xiii + 627 pp.
- GOODWIN, G. G., and A. M. GREENHALL. 1961. A review of the bats of Trinidad and Tobago. *Bulletin of the American Museum of Natural History*, 122: 187–302.
- KUNZ, T. M., M. S. FUJITA, A. P. BROOKE, and G. F. MCCracken. 1994. Convergence in tent architecture and tent-making behavior among Neotropical and Paleotropical bats. *Journal of Mammalian Evolution*, 2: 57–78.
- NOWAK, R. M. 1999. *Walker's Mammals of the World*, 6th edition, Vol. 1. The John Hopkins University Press, Baltimore, 836 pp.
- PERACCHI, A. L., and S. T. DE ALBUQUERQUE. 1971. Lista provisoria dos quirópteros dos estados do Rio de Janeiro e Guanabara, Brasil (Mammalia, Chiroptera). *Revista Brasileira de Biologia*, 31: 405–413.
- SANBORN, C. C. 1955. Remarks on the bats of the genus *Vampyrops*. *Fieldiana (Zoology)*, 37: 403–413.
- SIMMONS, N. B., and R. S. VOSS. 1998. The mammals of Paracou, French Guiana: a Neotropical lowland rainforest fauna. Part I. Bats. *Bulletin of the American Museum of Natural History*, 237: 1–219.
- TADDEI, V. A. 1973. *Phyllostomidae da Região Noroeste do Estado de São Paulo*. Ph.D. Thesis, Universidade Estadual Paulista de São José do Rio Preto, São Paulo, 249 pp.
- TERBORGH, J. 1983. *Five new world primates*. Princeton University Press, Princeton, 260 pp.
- TERBORGH, J., S. ROBINSON, T. PARKER III, C. MUNN, and N. PIERPONT. 1990. Structure and organization of an Amazonian forest bird community. *Ecological Monographs*, 60: 213–238.
- TUTTLE, M. D. 1976. Collecting techniques. Pp. 71–88, in *Biology of bats of the New World family Phyllostomidae*. Part I (R. J. BAKER, J. K. JONES, JR., and D. C. CARTER, eds.). Special Publications, The Museum, Texas Tech University, 10: 1–218.
- VELAZCO, P. M. 2002. Análisis filogenético del género *Platyrrhinus* (Chiroptera: Phyllostomidae). M.Sci. Thesis, Universidad Nacional Mayor de San Marcos, Lima, xii + 129 pp.
- WILLIG, M. R., and R. R. HOLLANDER. 1987. *Vampyrops lineatus*. *Mammalian Species*, 275: 1–4.

Received 06 January 2003, accepted 30 April 2003