



Canadian Organization for Tropical Education & Rainforest Conservation (COTERC)

Providing leadership in education, research, conservation,
and the educated use of natural resources in the tropics.

RESEARCH ARTICLES

During the past near two decades of its existence, Caño Palma Biological Station has been attracting a wide variety of researchers from across the globe. Beginning with our founder, Marilyn Cole and her Masters thesis from York University, many elements of the lowland wet forest has been examined. Many of these reports are available to the general public and we share data with a number of agencies to help inform conservation management decisions in the area. Many of the research reports can be found on our website: <http://www.coterc.org/resources.html>

Volunteers are needed to help continue collecting data in all of our projects, and our office in Canada also is seeking volunteers to help with research. Have a look at our website for our continuing programs and contact us to learn more.

- Dr. Kimberley A Snarr, Director of Conservation and Research

Research Articles based on data collected at Caño Palma Biological Station and the surrounding area:

Fenton MB, J Rydell, MJ Vonhof, J Eklof, WC Lancaster (1999) Constant-frequency and frequency – modulated components in the echolocation calls of three species of small bats (*Emballonuridae*, *Thyropteridae*, and *Vespertilionidae*). *Canadian Journal of Zoology*. 77(12):1891-1900
[\[http://www.coterc.org/documents/ArticleEmballonuridaeThyropteridaeVespertilionidae1999.pdf\]](http://www.coterc.org/documents/ArticleEmballonuridaeThyropteridaeVespertilionidae1999.pdf)

Riskin DK and MB Fenton (2001) Sticking Ability in Spix's disk-winged bat, *Thyroptera tricolor* (Microchiroptera: *Thyropteridae*). *Canadian Journal of Zoology*. 79:2261-2267
[\[http://www.coterc.org/documents/ArticleThyropteraTricolor2001 \(3\).pdf\]](http://www.coterc.org/documents/ArticleThyropteraTricolor2001 (3).pdf)



Canadian Organization for Tropical Education & Rainforest Conservation (COTERC)

Providing leadership in education, research, conservation,
and the educated use of natural resources in the tropics.

The following is a summary of research articles that are not available publicly, due to publisher copyright issues, but can be found in an academic library. If you require assistance or further information, please contact us.

Vonhof MJ, H Whitehead, and MB Fenton (2004) Analysis of Spix's disk-winged bat associated patterns and roosting home ranges reveal a novel social structure among bats. *Animal Behaviour*. 68(1):507-521

Abstract: Spix's disc-winged bats, *Thyroptera tricolor*, roost in young, rolled leaves of *Heliconia* or *Calathae* plants. In this paper, we examined how the combination of high habitat availability, low occupancy rate and short longevity of these roosts may affect the pattern of interactions among individuals in the population. We regularly censused a 5.69-ha study area in northeastern Costa Rica and examined patterns of association used mark-recapture data. *Thyroptera tricolor* formed behaviourally cohesive social groups of mixed sex, ranging in size from four to 14 individuals. Approximately 85% of dyads maintained associations over time periods of up to 100 days, and 40% of dyads maintained longer-term associations of at least 420 days across sex classes. Individuals within social groups did not always roost together, but they shared a small common roosting home range, which averaged just 0.19 ha. Members of different social groups in one subunit were observed. However, roosting home ranges of adjacent social groups often overlapped (up to 39% of home ranges, and up to 92% of the area of the smaller home range), and home range centres were situated less than 100m apart. Thus, social groups rarely interacted but overlapped in space. The features of this social system are unique among bats and mammals in general, and point to groupings based on kinship or cooperation.

MJ Vonhof and MB Fenton (2004) Roost availability and population size of *Thyroptera tricolor*, a leaf roosting bat, in north-eastern Costa Rica. *Journal of Tropical Ecology*. 20:291-305

Abstract: Estimates of roosting habitat availability and population size using unbiased sampling regimes are completely lacking for any bat species. The use of conspicuous and accessible roosts in the developing, rolled leaves of *Heliconia* and *Calathae* plants by *Thyroptera tricolor* (Spix's disc-winged bat) provided an ideal opportunity to address this need. To assess roost availability and population size, the number of occupied and unoccupied leaves and bats in known areas in an area of lowland rain forest in north-eastern Costa Rica were quantified in 1998-99. A high density of leaves was available on any given day (mean: 43 leaves ha⁻¹), but the density of roost leaves was low (mean: 2.5 leaves ha⁻¹), corresponding with a low occupancy rate of 5.7 or 12% based on different methods of estimation. Developing leaves were available for 8-16h in the preferred size range of leaves used by *T. tricolor*, and a maximum of 28-60 h, depending on the plant species. Using closed-population mark-recapture models, the 5.69-ha study area supported 261 individuals over a 4-mo period in 1998, corresponding to a density of 43 bats ha⁻¹. These results have important implications for the results of studies on bat community structure and rarity, and for the behaviour and ecology of *T. tricolor*.



Canadian Organization for Tropical Education & Rainforest Conservation (COTERC)

Providing leadership in education, research, conservation,
and the educated use of natural resources in the tropics.

Vonhof, MJ, CS Davis, C Strobeck, and MB Fenton (2001) Characterization of microsatellite loci in Spix's disk-winged bats (*Thyroptera tricolor*). *Molecular Ecology Notes*. 1:73-75

Abstract: We describe the development of 11 microsatellite loci for Spix's disk-winged bats, *Thyroptera tricolor*. Microsatellite markers were located using standard methodology, and tested on a population of 40 animals from Tortuguero, Costa Rica. These 11 loci had 2-18 alleles per locus, and, with the exception of two loci (TT4 and TT17), had observed and expected heterozygosities of greater than 70%. Cross-species amplification was largely limited to another member of the same family, but several loci amplified polymorphic product in species from three other families.

Dechmann D, K Safi, and MJ Vonhof (2006) Matching morphology and diet in the disc-winged bat *Thyroptera tricolor* (Chiroptera). *Journal of Mammology*. 87(5)1013-1019

Abstract: The dietary niche and morphological adaptations of a species should be highly correlated. However, conflicting selective pressures may make predications about diet difficult without additional knowledge of a species' life history. We tested the reliability of predicating a bat's diet from its wing morphology using data for Spix's disc-winged bat (*Thyroptera tricolor*). The species has been predicated to all within either the aerial hawking or gleaning forage group. We compared the results of a theoretical (canonical discriminant function analysis of morphology) and an applied (analysis of droppings) method of diet determination. Our results place *T. tricolor* in the gleaning function group with a 77% probability according to morphology. Correspondingly, a large proportion of the diverse diet consisted of non-flying prey, such as spiders, insect larvae, and other silent prey, which should be difficult to detect using echolocation. Although some flying prey were taken, it is clear that *T. tricolor* regularly gleans prey from surfaces, indicating that for this species, morphology is a useful indicator of diet. However, the breadth of the diet; the high proportion of jumping spiders, leafhoppers, and insect larvae; and the extremely small size of prey were unique features of the diet that could not be predicted from morphology alone. Thus, although comparative statistical methods and the analysis of wing morphology may be helpful to predict the general ecological niche, only detailed investigations of the life history may yield the detail needed for understanding the link between morphology and ecology of individual species.

Vonhof, MJ (2001) Habitat availability, population size, and the composition, stability, and genetic structure of social groups of Spix's disk-winged bat, *Thyroptera tricolor* PhD Dissertation. Supervisor, MB Fenton, York University, Toronto, Canada

Pape, T, D Dechmann, and MJ Vonhof (2002) A new species of *Sarcophartiopsis* Hall (Diptera: Sarcophagidae) living in roosts of Spix's disk-winged bat *Thyroptera tricolor* Spix (Chiroptera) in Costa Rica. *Journal of Natural History*. 36:991-998

Abstract: *Sarcophartiopsis thyropteronthos* sp. n. is described from Costa Rica. All specimens were bred from faeces taken from young, tubular leaves of musoid plants (genera *Heliconia* and *Calathea*) used as roosts by Spix's disk-winged bat *Thyroptera tricolor* Spix. Larvae were observed in practically all roosts suggesting a highly specialized association.

Last updated: January 19, 2010

P.O. Box 335, Pickering, Ontario, L1V 2R6, Canada
phone: (905) 831-8809 • fax: (905) 831-4203
email: info@coterc.org • <http://www.coterc.org>