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MATERNITY NEST OF AN AMAZON RED SQUIRREL IN A BROMELIAD

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ABSTRACT. Animal-plant interactions are important in the life history of many animal and plant species but our knowledge is often limited. We documented a maternity nest of the poorly studied Amazon red squirrel. The nest was located in a bromeliad and contained two young, a male and a female. We measured nest and forest characteristics and also documented a predation attempt on the adult female while we observed the nest and squirrels.

RESUMEN. Nido maternal de una ardilla roja amazónica en una bromelia. Las interacciones entre animales y plantas son importantes en la historia natural de muchas especies de organismos pero nuestro conocimiento es, a menudo, limitado. Documentamos un nido de maternidad de la pobremente estudiada ardilla roja amazónica. El nido estaba localizado en una bromelia y contenía dos crías, un macho y una hembra. Medimos las características del nido y del bosque y también documentamos un intento de depredación de la hembra adulta mientras observábamos el nido y las ardillas.

Key words: Hook-billed Kite. Nesting habits. *Sciurus igniventris*. *Sciurus spadiceus*. Tree squirrel.

Palabras clave: Ardilla arborícola. Gavilán. Hábitos de anidamiento. *Sciurus igniventris*. *Sciurus spadiceus*.

Significance of plant-animal interactions in the Neotropical forests is well appreciated (Janzen, 1977) and of great significance in the development of ecological and evolutionary theory (Tewksbury, 2002). Tree squirrels (Rodentia: Sciuridae) are often implicated as important in Neotropical forests (Janzen, 1977); however, their roles are poorly defined (Koprowski and Nandini, 2008; Thorington et al., 2012).

The greatest diversity of tree squirrels occurs in tropical latitudes (Koprowski and Nandini, 2008) with 19 species found in the neotropics, (Emmons and Feer, 1997; Eisenberg and

Redford, 1999; Thorington et al., 2012) but little information exists about their life history and ecology (Koprowski and Nandini, 2008). The northern Amazon red squirrel (*Sciurus igniventris*; Wagner, 1842) and southern Amazon red squirrel (*Sciurus spadiceus*; Olfers, 1818; Gwinn et al., 2012) are large Neotropical tree squirrels (500-900 g) with a partially sympatric distribution (Emmons and Feer, 1997; Eisenberg and Redford, 1999). Both are considered solitary (Emmons and Feer, 1997) but can forage in groups \leq four individuals (Eason, 2010; pers. obs.). Melanistic forms

are common and the two squirrel species are externally indistinguishable in the field where sympatric (Emmons and Feer, 1997; Eisenberg and Redford, 1999), thus we refer to individuals as Amazon red squirrels, as differentiation was impossible.

Little is known about nesting habits and reproduction of either species. Neotropical tree squirrels are thought to build a round ball of leaves and twigs in a vine or on a branch, or use cavities of trees to nest (Emmons and Feer, 1997) similar to tree squirrels in temperate forests (Steele and Koprowski, 2001; Thorington et al., 2012). Litter size of Neotropical tree squirrels is believed to range between two and five (Emmons and Feer, 1997; Eisenberg and Redford, 1999) but little else is known about the breeding season.

On 9 July 2010 we found an Amazon red squirrel nest within our study area in Tamshiyacu-Tahuayo Reserve in Loreto, Peru (4° 39' S, 73° 26' W). Lowland forests that flood seasonally, also known as igapó, dominate the site (Myster, 2009). We recorded physical characteristics of the nest (height and aspect), and measured characteristics of the nest tree (height, diameter at breast height [DBH], size of the canopy, and condition of tree [live or dead]) as well as habitat characteristics in a 10 m radius circular plot centered on the nest tree (Smith and Mannan, 1994; Edelman and Koprowski, 2005). We determined total number, species, condition, and DBH for all stems \geq 3 cm DBH within the plot to estimate basal area and Shannon-Wiener diversity, and we used a spherical densitometer to estimate canopy cover (Strickler, 1959).

The nest was located in a live 19.2 m tall machimango tree (*Eschweilera* sp.) with a DBH of 42.7 cm. A melanistic female Amazon red squirrel made her nest 3.6 m above ground inside a bromeliad that surrounded the trunk of the tree. The nest inside the bromeliad was constructed of dry leaves, a few sticks, and fibers of the shapaja palm (*Attalea butyracea*) and the entrance faced north (356°). The nest was well concealed within the leaves of the bromeliad, and the entrance to the nest was only observed at close range (< 0.5 m). In Florida, USA, the Big Cypress fox squirrel

(*Sciurus niger avicennia*) is also known to nest in bromeliads (Ditgen et al., 2007) and the exotic Mexican red-bellied squirrel (*Sciurus aureogaster*) introduced to Elliot Key, Florida, is known to use fibers of palm trees as nest material (Brown and McGuire, 1975). The nest contained two young individuals, a male and a female, both also black morphs and thus could not be identified to species. The young individuals had open eyes and a mass of 135 g for the male and 140 g for the female.

The nest tree was located within 10 m of one of the buildings of the Amazonia Expeditions lodge, which is a structure raised \sim 5 m above ground on stilts, and approximately 50 m from the forest edge. The building affected the canopy cover measurement for the habitat plot. The natural canopy cover was 40% but increased to 84% when artificial cover created by the building was added. Very few trees surrounded the nest tree since the area is maintained to prevent trees from falling onto the buildings. Species of trees and vines within the 10 m radius circular plot included bushillo (*Marmaroxylon basijugum*), vino huayo (*Coccoloba* sp.), shiringuilla (*Mabea* sp.), renaquilla (*Clusia* sp.), a dead tree, an unidentified species of vine, and an unidentified species of tree. The mean DBH of trees was 23.8 cm \pm 5.8 (SE, n = 6) and the mean DBH of vines was 9.1 cm \pm 4.2 (SE, n = 3). Basal area was 75.5 cm²/ha and diversity index for trees and vines was 1.75.

The relatively open location of the maternity nest may have contributed to a predation attempt on the lactating female. At 14:00 h on 9 July 2010 the adult female was returning to the nest along the ground in a cleared area at the edge of the forest when a Hook-billed Kite (*Chondrohierax uncinatus*) dove from the sky in an attempt to capture the squirrel. The female Amazon red squirrel emitted a shrill vocalization and sought cover by ground in the forest \sim 20 m distant and remained vocalizing with loud chatters for 10 min. Hook-billed Kites eat snails (Smith and Temple, 1982) and are not known predators of small mammals. The female squirrel returned to the nest \sim 30 min after the predation attempt, apparently unharmed. The female did not appear to have any outward

signs of trauma and moved normally. The female moved beyond the forest edge, traveled along the ground toward the nest, and climbed a nearby tree (~5 m away), crossed onto the branches of the nest tree and entered the nest in the bromeliad.

Nest-site selection and placement is an important aspect of the natural history of a species and important for reproduction (Goodall, 1962; Clark et al., 1983; Benson et al., 2008), but lack of knowledge makes it difficult to decide when trying to protect and manage species. Bromeliads create microhabitats for nesting, reproduction, and food acquisition for many species including arthropods, amphibians, and mammals (Silverstone, 1973; Wittman, 2000; Ditgen et al., 2007). This note further demonstrates the importance and role that bromeliads play in rainforests and in the life history of wildlife.

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