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Short Note

Presence of Guayaquil squirrels on the central coast of Peru: an apparent introduction

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The Guayaquil squirrel (*Sciurus stramineus*; Eydoux and Souleyet 1841) is a large tree squirrel (approx. 500 g) for which little ecological information exists on status and distribution (Emmons and Feer 1997, Eisenberg and Redford 1999). The historic range stretched from extreme northwest Peru to southwest Ecuador in the area surrounding the Gulf of Guayaquil (Figure 1). Guayaquil squirrels range south along the Andean slope to south Cajamarca, approximately 565 km northeast of Lima, and reach 2000 m in elevation (Emmons and Feer 1997, Eisenberg and Redford 1999, Wilson and Reeder 2005). This tree squirrel can be found in mature and secondary forest as well as coffee plantations within humid montane forests, highlands and coastal deserts (Emmons and Feer 1997, Pacheco et al. 2009).

In May 2009 we confirmed the presence of Guayaquil squirrels in Lima, Peru, at least 500 km south of its most southern historical range apparently representing the second introduction of tree squirrels in South America (Guichón and Doncaster 2008). We found Guayaquil squirrels in and around the Parque de las Leyendas Zoo (Figure 1), 10 km east of Plaza Mayor in downtown Lima; squirrels could move freely and were not captive specimens in the zoological park. The dorsum and tail were black and heavily frosted with white providing a pale gray appearance, the rump was washed with orange, the neck behind the ears was pure white, ears and feet were black, and the ventrum was gray. This coloration pattern is similar to the one described for individuals present in Peru and highlands of southern Ecuador (Emmons and Feer 1997). Individuals observed in the Parque de las Leyendas Zoo were traveling in large trees found within the zoo and were opportunistically feeding on the diet fed to captive animals such as fruit and vegetables present in animal enclosures. Guayaquil squirrels have been present in Lima for at least 35 years; one of us (O.R.) recalls observing squirrels when visiting the Parque de las Leyendas Zoo as long ago as 1975. Guayaquil squirrels have also been documented in parks of different districts of Lima, to include Surco, San Isidro, San Miguel, and Chaclacayo, as well as Parque de las Leyendas Zoo, and green areas within the Pontificia Universidad Católica del Peru (Figure 1). Guayaquil squirrels are illegally sold within Lima and have either escaped captivity or were intentionally released (Ponce 2009), which suggests the possibility of multiple introductions in different areas of Lima. This squirrel has adapted well to the city and the population has expanded owing to: (1) large parks with many mature trees, representing patches of forest; (2) favorable climate with temperatures that do not fluctuate much during the year (Ponce 2009); and (3) dependable food sources from trees and human sources.

Guayaquil squirrels are usually found in trees or running on power and telephone cables to cross busy roads, and are bold and interact with people. Squirrels are known to enter houses and approach students sitting on university lawns to steal food (Ponce 2009). In Lima they are not vectors of disease but do prey on bird nests (Ponce 2009). No other tree squirrels are native to Lima and so the immediate threat of an introduced competitor does not exist; however, the potential exists for the introduced species to spread to the Andes and rainforest where seven native species are found as near as 180 km from Lima. A sighting approximately 14 km outside the city limits in the Chaclacayo district located in the foothills east of Lima represents the most distant movement (Figure 1).

Several species of tree squirrels are invasive in other parts of the world (Palmer et al. 2007), and can have major impacts on native species, and significant economic costs (Bertolino 2009). Introductions of <10 individual tree squirrels are frequently successful and small populations can persist for extended periods of time in areas with appropriate quality habitat (Wood et al. 2007). Such populations have the potential for rapid expansion after extended periods of restrained growth (Guichón and Doncaster 2008). Often, little is known about the natural history and ecology of these species. In fact, we know very little about most tropical and neotropical squirrels (Koprowski and Nandini 2008). It is

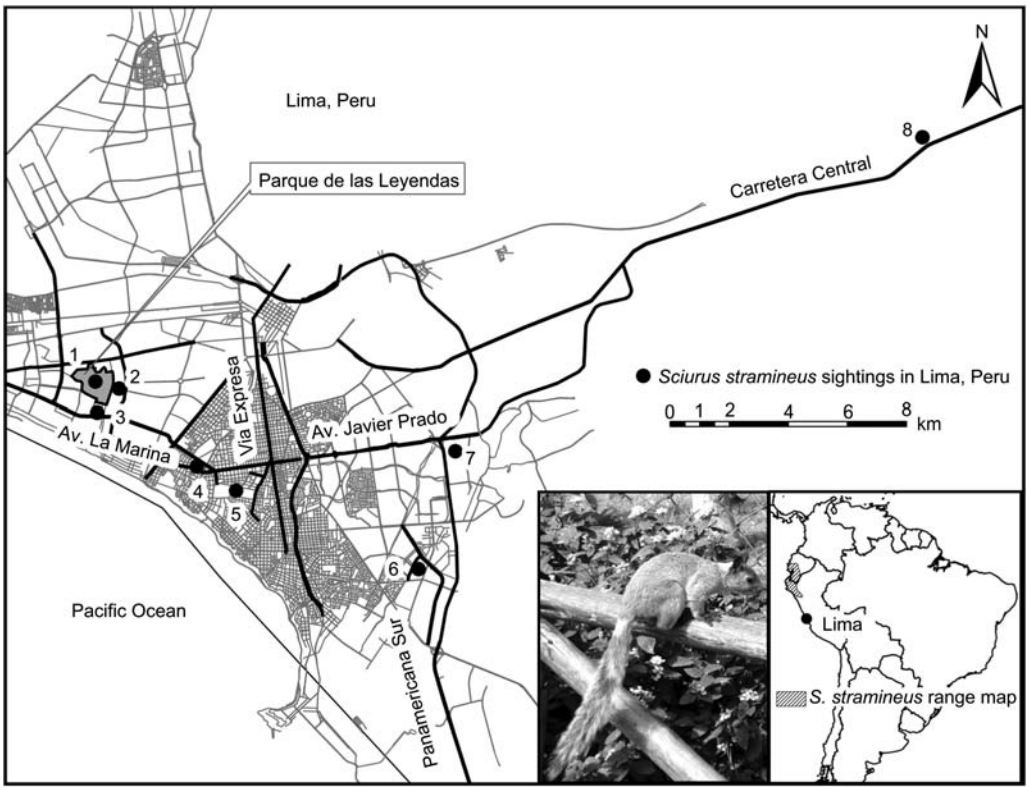

Figure 1 Sightings of *Sciurus stramineus* in Lima, Peru includes eight different sites: (1) El Parque de las Leyendas, (2) Pontificia Universidad Católica del Peru, (3) Avenida La Marina with Avenida Escardo, (4) Avenida Pershing with Avenida Javier Prado Oeste, (5) Avenida Camino Real around Lima Golf Club, (6) Parque de la Amistad, (7) Hipódromo de Monterrico, and (8) Centro de Entrenamiento Andino del Ejercito (CEANDES) in Chaclacayo.

imperative to understand and investigate the ecology of Guayaquil squirrel to make informed conservation and management decisions regarding this species and the possible effects that it can have on endemic species and the urban environment that they now inhabit.

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