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Echimyopus dasypus Fain *et al.* (Acari: Astigmatina: Echimyopodidae) from a nine-banded armadillo, *Dasypus novemcinctus* L. (Mammalia: Dasypodidae), in Florida, USA

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Abstract

We collected parasitic deutonymphs of *Echimyopus dasypus* Fain *et al.* from a wild-caught nine-banded armadillo, *Dasypus novemcinctus* L., for the first time within the United States of America, although this mite was previously found in England on armadillos imported from Florida. The new specimens came from a free-ranging animal captured in Hendry County, Florida, in 2004.

Key words: Deutonymph, hypopus, mange, *Blomia*, new distribution data, *Amblyomma auricularium*

The astigmatine mite family Echimyopodidae (five genera, 31 species) is associated mostly with rodents and marsupials in Australia, South America, and North America (OConnor 2009). Many echimyopodid species are known from only their deutonymphal stages (hypopi), which live as subcutaneous or endofollicular parasites of their mammalian hosts, but presumedly, the free-living stages habitually live as detritivores in mammal nests (OConnor 1982). Free-living life stages are described for only a few species in three of the genera, i.e., *Marmosopus* Fain & Lukoschus, *Echimyopus* Fain, and *Blomia* Oudemans, the latter of which have no known deutonymphs and no demonstrated parasitic connections (Mariana *et al.* 1996). Alone in the family, the seven currently recognized *Blomia* species are widely known primarily as synanthropic house dust and stored food mites (Colloff 2009).

At least two species of *Blomia* are documented from the USA (Banks 1917, Fain *et al.* 1977, Fernandez-Caldas *et al.* 1990), but to date, members of only one of the parasitic echimyopodid genera, *Echimyopus*, have been found there. Whitaker *et al.* (1976) first found deutonymphal *E. nyctomys* Fain (later reidentified as *E. orphanus* Fain & Philips by Whitaker *et al.* (2007)) on eastern gray, *Sciurus carolinensis* Gmelin, and fox squirrels, *S. niger* L., in Indiana. Fain and Philips (1977) described deutonymphs of *E. orphanus* from the nest of an eastern screech owl, *Megascops asio* (L.), in New York (Philips & Dindal 1990), but at the time, they surmised that the mites came from an unknown rodent host. Later, Fain and Philips (1981) used additional mites from the same owl nest to describe the protonymph, tritonymph, and adult female of *E. orphanus* and clarify the status of this taxon as a senior synonym of *Blomia angustivulva* Fain & Philips. A second purported US *Echimyopus* species record came only by indirect inference involving the collection of *E. dasypus* deutonymphs in England from eight of 20 newly imported nine-banded armadillos, *D. novemcinctus*, that originated in Florida (locality unspecified) (Baskerville & Francis 1981). Also, Forrester (1992) cited unpublished observations of two mangy armadillos (of 130 examined) in Alachua County, Florida, with no demonstrable mites. In the present report, we document *E. dasypus* from a wild-caught armadillo at a specified locality in Florida.

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As part of a long-term, extensive surveillance effort looking for exotic parasites on wildlife species in the southeastern US and Caribbean region (Hansen *et al*. 2007, Mertins *et al*. 2009, Corn *et al*. 2009, 2011), we periodically encounter and examine nine-banded armadillos. On 4 May 2004, we collected ectoparasites (NVSL Accession Number 317368) from an adult male armadillo in the Okaloacoochee State Forest, Hendry County, Florida, USA. The parasites were preserved in a labeled vial of 70% isopropyl alcohol by field personnel of the Southeastern Cooperative Wildlife Disease Study (SCWDS), and later, they were sorted and identified at the US Department of Agriculture, Animal and Plant Health Inspection Service, National Veterinary Services Laboratories in Ames, Iowa, USA. The most evident, larger parasites on the host animal were 23 adult armadillo ticks, *Amblyomma auricularium* (Conil), but the collection vial also contained 24 relatively minute (~200 µm) mites identified as deutonymphs of *E. dasypus* by comparison with the original description (Fain *et al*. 1973). Neither field notes nor personal recollections provide any pertinent information on the health and physical condition of the infested host armadillo. In both of the previous known occurrences of *E. dasypus* (Fain *et al.* 1973, Baskerville & Francis 1981), infested armadillos showed dry, crumbly mange over extensive ventral areas of their necks, thoraces, and abdomens, and each individual mite was attached to the host epidermis within the lacuna of a separate, gall-like cyst in these areas.

Armadillos may not be native residents of the USA, although by the early 1850s, they were present in the southern tip of Texas, probably having crossed the Rio Grande from Mexico (Lever 1985). Through their ongoing dispersal movements, their US range has since expanded northwards and eastwards from South Texas to encompass most of the Southeast south of 38 degrees north latitude (Taulman & Robbins 1996, Hofmann 2005). However, the first armadillos in peninsular Florida were deliberately introduced, beginning during World War I (Bailey 1924, Lever 1985), although they evidently did not establish viable feral populations until about 1924 in Brevard County, after releases from a private zoo in Titusville (Taulman & Robbins 1996). By direct implication, *E. dasypus*—a species-specific associate of nine-banded armadillos—is likewise not a native resident of Florida or the USA, entering on either naturally dispersing or actively introduced host animals.

The type specimens for *E. dasypus* came from two armadillos at two different localities in the Republic of Panama (Fain *et al*. 1973), but until our collection in Hendry County, Florida, those were the only documented, detailed distribution records for this mite. The exact origins in Florida of the armadillos and their associated *E. dasypus* found by Baskerville and Francis (1981) in England are unknown. We do, however, suspect that this mite may be a widespread, though possibly uncommon, associate of *D. novemcinctus* throughout Florida and in the rest of its New World geographic range.

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