THE MADAGASCAR GIANT DAY GECKO, *PHELSUMA MADAGASCARIENSIS GRANDIS* GRAY 1870 (SAURIA: GEKKONIDAE): A NEW ESTABLISHED SPECIES IN FLORIDA

KENNETH L. KRYSKO[1], A. NICHOLE HOOPER[2], AND COLEMAN M. SHEEHY III[1]

[1]Florida Museum of Natural History, Division of Herpetology, P.O. Box 117800, University of Florida, Gainesville, FL 32611
[2]College of Veterinary Medicine, Campus Box 100125, University of Florida, Gainesville, FL 32610

ABSTRACT: *During recent surveys between March and August 2002, we found established populations of the Madagascar giant day gecko (*Phelsuma madagascariensis grandis*) in the Florida Keys, Monroe County. We recorded 29 individuals on Little Torch Key and three individuals on Grassy Key. Additional records were obtained from Grassy Key, Big Pine Key, and Plantation Key. Both genders and all size classes were recorded on each island illustrating that this species is presently established as an element of Florida's introduced herpetofauna. Population monitoring, documentation of ecological impacts on Florida's native flora and fauna, and/or eradication efforts should be conducted.*

Key Words: *Phelsuma madagascariensis grandis*, Madagascar, Gecko, Lizard, Introduced, Reptile, Florida Keys

FLORIDA HAS the largest number of non-native amphibian and reptile species in the United States (Butterfield et al., 1997). Its diverse habitats and suitable climates from the subtropical southern peninsula and Florida Keys north to the subtemperate panhandle have facilitated exotics in becoming established and expanding their ranges. While conducting surveys in the southern peninsula and Florida Keys over the last decade, we have uncovered numerous geographic distributional records, misidentified species, and new exotic species with established populations (Krysko and Decker, 1996; Reppas et al., 1999; Krysko et al., 2000; Krysko and King, 2002; Townsend et al., 2002; Krysko et al., 2003). Herein, we report four established populations of the Madagascar giant day gecko, *Phelsuma madagascariensis grandis* Gray 1870, in the Florida Keys, Monroe County.

METHODS—Records of *Phelsuma madagascariensis grandis* are based on captures and observations during six survey days in the Florida Keys in 2002: 3 March; 3, 5, 7–8 May; and 8 August. Additional records were acquired based on observations by colleagues. Because this gecko species is diurnal (Henkel and Schmidt, 2000), searches were conducted during the daytime. Dorsal patterns are unique for each individual, and an attempt was made to photograph, estimate total length (TL), and note location of each individual for identification purposes. Only individuals that could be distinguished from others were counted in our overall total. We divided size classes into six categories based on estimated TL, including <8 cm (hatchling), 8–11 cm, 12–16 cm, 17–20 cm, and >20 cm (adult). Gender was distinguished in

TABLE 1. Estimated size classes and UF voucher specimens and photographs of Madagascar giant day geckos (*Phelsuma madagascariensis grandis*) we recorded in 2002 on Little Torch Key and Grassy Key, Monroe County, Florida. Note that adults are >20 cm TL, and individuals with no UF # were neither photographed nor collected.

Date	N	<8 cm	8–11 cm	12–16 cm	17–20 cm	Adult ♀	Adult ♂
Little Torch Key							
3 Mar	9		130736–37		No #	131554, No #	130735, 131553, 131555, 133942
5 May	8		132483, 132485		No #	132486, 132488–89	132484, 132487
7 May	1					No #	
8 May	6	133938	132492	132493, No #	132490		132491
8 Aug	5	133832	133939	133940		133943	133941
Grassy Key							
3 May	3					132482, No #	132481

adults by the noticeable presence or absence of endolymphatic chalk sacs, which are used for calcium metabolism and egg shell formation in females (Tytle, 1992). Captures were made by hand, and voucher specimens and photographs were deposited in the Florida Museum of Natural History (FLMNH), University of Florida (UF collection).

RESULTS—We recorded 32 *Phelsuma madagascariensis grandis* on Little Torch Key and Grassy Key. Numerous individuals were also recorded on Grassy Key (McCleary, 2002), Big Pine Key (Decker, 2002; pers. obs.) and Plantation Key (Kavney, 2002).

Between 3 March–8 August 2002, we recorded 29 *P. m. grandis* consisting of both genders and all age classes on Little Torch Key (24°39.944'N, 81°23.411'W) (Table 1). Individuals were frequently seen on white mangrove (*Laguncularia racemosa*) and buttonwood (*Conocarpus erectus*) trees, buildings, and bird cages bordering mangrove-lined estuaries.

On 3 May 2002, we recorded two adult females and one adult male on the confluence of a gumbo limbo tree (*Bursera simaruba*) and telephone post in the parking lot of the Dolphin Marine Research Center on Grassy Key (24°46.260'N, 80°56.433'W) (Table 1). Additionally, on 14 June 2002 four juveniles (6 cm, 7.5 cm, two 9 cm TL) were observed in the shade of bushes and trees on these premises (McCleary, 2002). These individuals were not collected.

In August 2001, three individuals were observed on buildings and wooden fences near Cunningham Lane just N of U.S. 1 on Big Pine Key (24°40.250'N, 81°21.336'W) (Decker, 2002). We verified one of these individuals as an adult female. The other two individuals were not collected. Another adult was observed basking on a utility pole at the junction of U.S. 1 and Wilder Road (Kavney, 2002). We have also observed numerous individuals being sold in a local pet store that were reportedly collected locally.

In September 2002, eight newborns to adults of both genders were collected and numerous others were observed near the Indian Mound on Plantation Key (24°59.270'N, 80°33.021'W) (Kavney, 2002).

DISCUSSION—*Phelsuma madagascariensis grandis* was first reported from Hollywood, Broward County (Bartlett and Bartlett, 1999). These geckos were released or had escaped from a nearby reptile importer in the early 1990s, but never represented an established population. No voucher specimens were ever taken and no individuals were seen after numerous surveys of the area (Decker, 2002). We know of other intentional releases of this species in Miami-Dade County, but these individuals are not known to be reproducing. The closest population we identified (Grassy Key) exists ca. 240 km SW of the Broward County report, and our data provide evidence of the first verified established populations of *P. m. grandis* in the United States.

The population of *Phelsuma madagascariensis grandis* on Little Torch Key appears to have originated from a single introduction. This species was likely introduced onto this island by an exotic animal hobbyist as geckos were frequently seen on buildings and exotic bird cages. *Phelsuma m. grandis* on Big Pine Key appears to have originated from a single source. A resident of the island released this species in certain areas for subsequent harvesting (Decker, 2002) as their offspring are collected and sold for resale at a local pet store. *Phelsuma m. grandis* on Grassy Key and Plantation Key were introduced onto both islands independently by different local residents.

Phelsuma madagascariensis grandis feeds primarily on nectar and arthropods (Demeter, 1976; Tytle, 1992), but congeners have also been documented feeding on *Hemidactylus* geckos (García and Vences, 2002). The tropical house gecko (*Hemidactylus mabouia*) was first reported introduced on Crawl Key (Lawson et al., 1991), and presently this species is probably the most abundant terrestrial vertebrate in the Florida Keys and may prove to be a food source for *P. m. grandis*. On 7 May 2002, an adult *P. m. grandis* was observed feeding on insects up until ca. 30 min after dark, upon which the gecko retreated into a crack on a wooden building on Little Torch Key. Some individuals on Little Torch Key were seen in the same vicinity on every survey day, suggesting that this species might be territorial like other *Phelsuma* species (McKeown, 1993). *Phelsuma m. grandis* have been known to live for > 20 years in captivity (McKeown, 1993). Tytle (1992) reported a captive female ovipositing 27 eggs in one year, and during a nine-year span one captive female produced 68 clutches consisting of 120 eggs (Krysko, pers. obs.). This species is a non-gluer (i.e., oviposited eggs are not affixed to a substrate) (Osadnik, 1984), and its eggs are usually oviposited in pairs (Demeter, 1976; Osadnik, 1984; Tytle, 1992) within crevices, between strong leaves, or in the ground (Osadnik, 1984). Longevity, high fecundity, and abundance of prey are factors likely to facilitate population increases and range expansion of *P. m. grandis* in the Florida Keys. Population monitoring, documentation of ecological impacts on Florida's native flora and fauna, and/or eradication efforts should be conducted.

ACKNOWLEDGMENTS—We would like to thank Sean W. Morey (FLMNH) for field assistance; Frank and Susan Morey for accommodations in the lower Florida Keys; John N. Decker, Jim Kavney, Sean O'Donnell, Ryan J. R. McCleary, and Bob Ehrig for *Phelsuma* information in the Florida Keys.

LITERATURE CITED

BARTLETT, R. D. AND P. P. BARTLETT. 1999. A Field Guide to Florida Reptiles and Amphibians. Gulf Publishing Co., Houston, TX. 280 pp.

BUTTERFIELD, B. P., W. E. MESHAKA, JR., AND C. GUYER. 1997. Nonindigenous amphibians and reptiles. Pp. 123–138. *In*: SIMBERLOFF D., D. C. SCHMITZ, AND T. C. BROWN (eds.). Strangers in Paradise. Impact and Management of Nonindigenous Species in Florida. Island Press, Covelo, CA.

DECKER, J. N. 2002. 2503 NW 23 St #156, Boynton Beach, FL. Pers. Comm.

DEMETER, B. J. 1976. Observations on the care, breeding and behaviour of the giant day gecko *Phelsuma madagascariensis* at the National Zoological Park, Washington. International Zoo Yearbook 16: 130–133.

GARCÍA, G. AND M. VENCES. 2002. *Phelsuma madagascariensis kochi* (Madagascar day gecko). Diet. Herpetol. Rev. 33: 53–54.

HENKEL, F. W. AND W. SCHMIDT. 2000. Amphibians and Reptiles of Madagascar and the Mascarine, Seychelles, and Comoro Islands. Krieger Publishing Co., Malabar, FL. 316 pp.

KAVNEY, J. 2002. P.O. Box 1597, Islamorada, FL. Pers. Comm.

KRYSKO, K. L. AND J. N. DECKER. 1996. *Tantilla oolitica* (Rim Rock Crowned Snake). Geographic distribution. Herpetol. Rev. 27: 215.

———, ———, AND A. T. REPPAS. 2000. *Ramphotyphlops braminus* (Brahminy blind snake). Geographic distribution. Herpetol. Rev. 31: 256.

——— AND F. W. KING. 2002. The ocellated gecko (*Sphaerodactylus argus argus*) in the Florida Keys: An apparent case of an extirpated non-native species. Caribbean Journal of Science 38(1–2): 139–140.

———, ———, K. M. ENGE, AND A. T. REPPAS. 2003. Distribution of the Introduced Black Spiny-tailed Iguana (*Ctenosaura similis*) on the Southwestern Coast of Florida. Florida Scient. 66(3): 74–79.

LAWSON, R., P. G. FRANK, AND D. L. MARTIN. 1991. A gecko new to the United States herpetofauna, with notes on geckos of the Florida Keys. Herpetol. Rev. 22: 11–12.

MCCLEARY, R. J. R. 2002. Department of Zoology, University of Florida, Gainesville, FL. Pers. Comm.

MCKEOWN, S. 1993. The General Care and Maintenance of Day Geckos. Advanced Vivarium Systems, Lakeside, CA. 143 pp.

OSADNIK, G. 1984. An investigation of egg laying in *Phelsuma* (Reptilia: Sauria: Gekkonidae). Amphibia-Reptilia 5(1984): 125–134.

REPPAS, A. T., K. L. KRYSKO, C. L. SONBERG, AND R. H. ROBINS. 1999. *Anolis distichus* (Bark Anole). Geographic distribution. Herpetol. Rev. 30:51.

TOWNSEND, J. H., K. L. KRYSKO, A. T. REPPAS, AND C. M. SHEEHY III. 2002. Noteworthy records of introduced reptiles and amphibians from Florida, USA. Herpetol. Rev. 33: 75.

TYTLE, T. 1992. Day geckos: *Phelsuma* The captive maintenance and propagation of day geckos. Vivarium 2: 15–19, 29.

Florida Scient. 66(3): 222–225. 2003
Accepted: December 31, 2002