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Range Extension of the Mediterranean Gecko (*Hemidactylus turcicus*) Along the Northeastern Gulf Coast of the United States

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Short Papers and Notes:**RANGE EXTENSION OF THE
MEDITERRANEAN GECKO
(*Hemidactylus turcicus*) ALONG THE
NORTHEASTERN GULF COAST
OF THE UNITED STATES**

The Mediterranean gecko, *Hemidactylus turcicus* (Linnaeus 1758), is a member of the lizard family Gekkonidae. Primarily a tropical group, geckos are distributed on most continents and major islands of the world (Boulenger 1885, Ditmars 1936). The species is notorious for the ease with which it can be introduced into new areas by human agency (Loveridge 1941, Schmidt and Inger 1957, Hellmich 1962, Mount 1975). Specimens may be transported as eggs in potted plants or as adults in the cargos of ships.

The natural geographic distribution of the Mediterranean gecko in Eurasia and Africa originally extended along the coastal Mediterranean Sea and the Red Sea, south to Somalia, and east to Pakistan (Loveridge 1941). Introduced into the western hemisphere, populations of this gecko became established in Mexico, Cuba, and the Panama Canal Zone (McCoy 1970). The first United States record was at Key West, Florida (Fowler 1915, Mittleman 1950, Stejneger 1922). Additional Florida localities include Miami (Barbour 1936, Carr 1940), Big Pine Key (Duellman and Schwartz 1958), Gainesville (King 1959), and Tallahassee (Means 1990).

The Mediterranean gecko was originally introduced into the southern extreme of Texas at Brownsville (Easterla 1978). Next it was reported from Gonzales, Texas, 121 km from the Gulf of Mexico (Treadwell 1962). From Brownsville, it became established via major transportation routes into Del Rio,

San Antonio, Austin and Houston (Davis 1972). Thereafter, it was reported from Denton (Raun and Gehlbach 1972), then from Langtry and Big Bend (Easterla 1978).

Dundee and Rossman (1989) state that the gecko was in New Orleans, Louisiana as early as 1945; later it was recorded in Lafayette (Conzelman and Thomas 1971). Keiser (1984) reported the establishment of the gecko in Oxford, Mississippi. This population was still extant as of 1985 (personal communication). In Alabama, Mount (1975) reported the establishment of a small breeding population at Eufaula. Additional Alabama records include Auburn, Birmingham and Mobile (Marion and Bosworth 1982, Dundee 1984). Other researchers have reported geckos from Georgia (Bechtel 1983, Mills 1990) and Arkansas (Paulissen and Buchanan 1990).

Although isolated records for the Mediterranean gecko were reported for coastal Alabama and the panhandle of Florida, breeding populations there have not been confirmed. No records were shown from coastal Mississippi by Smith and Brodie (1982). Lohoefer and Altig (1983), however, regarded it as "only a matter of time" until the gecko would become established on the coast of Mississippi. Conant and Collins (1991) now show them along the Mississippi Coast. In the literature, the first report of geckos in Mobile was made by Dundee (1984). Repeated collections of specimens prior to 1980 by the senior author, however, confirm that these geckos were already firmly established in downtown areas of Mobile, Alabama. This study was designed to determine whether or not these lizards might also occur in other coastal cities along the north central Gulf of Mexico from which they had not yet been reported.

METHODS AND MATERIALS

From May to October of 1985, nocturnal collecting trips were systematically conducted within the urban centers of 11 cities in Mississippi (Gulfport, Pascagoula, Hattiesburg), Alabama (Mobile, Fairhope, Foley, Atmore, Dothan) and the panhandle of Florida (Pensacola, Panama City, Ft. Walton Beach) (Figure 1). Although major focus centered on coastal sites, three inland cities were also selected (Hattiesburg, Atmore and Dothan). Collecting and field observation began soon after dark. Using flashlights and beginning at the old, urban centers, we systematically followed streets and alleys while searching the exteriors of buildings and other man-made structures for geckos. Special attention was given to brightly lighted areas that attracted insects. Field observations usually continued into the early morning hours, until the prime habitats had been carefully searched.

Representative specimens were captured and removed as a sample of the respective populations. Because we did not want to deplete the populations sampled, we intended to remove ca. 12 specimens from each site visited. Geckos were refrigerated within a few hours of capture and immediately frozen upon return to Mobile. Field records were made of each lizard's location, substrate, posture, and time of capture. We tried several techniques to capture the geckos: rubber-band shooting, water guns, hand capture, insect nets, and dart guns. Hand capture proved to be the most effective collecting technique. All specimens were measured in the laboratory after being preserved in 10% formalin. They were then dissected, sexed, then placed in the Vertebrate Natural History collection of the University of South Alabama.

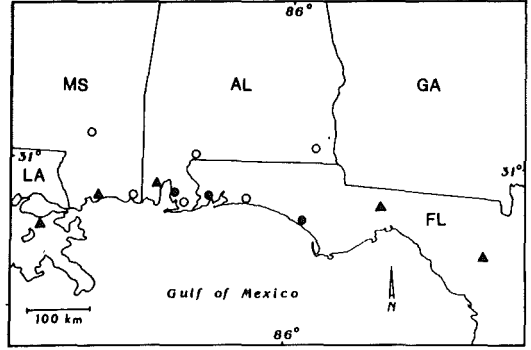


Figure 1. Distribution of the Mediterranean gecko (*Hemidactylus turcicus*) along the north-central gulf coast of the United States. Triangles indicate previous locality records. Darkened circles represent new locality records documented in this study. Open circles represent cities examined in this study where no geckos were found. Cities indicated (from left to right) include New Orleans, LA; Hattiesburg, MS; Gulfport, MS; Pascagoula, MS; Mobile, AL; Fairhope, AL; Foley, AL; Atmore, AL; Pensacola, FL; Ft. Walton Beach, FL; Panama City, FL; Dothan, AL; Tallahassee, FL; and Gainesville, FL.

RESULTS

Seventy-one specimens were collected from five cities from May to October, 1985 (Table 1). Most observations of geckos were conducted between 2200 and 2400 hours. The actual collection time in the field per trip ranged from 75 to 153 minutes ($\bar{X} = 135$). Specimens were collected on all types of human constructs. Although geckos were occasionally captured on wood or metal buildings, they occurred most frequently (75%) on masonry structures (stone, brick, stucco). Both juveniles and adults were represented in most collections. Snout-vent lengths ranged from 24 to 57 mm ($\bar{X} = 45.6$). Seven gravid females were collected in Mobile during May and June. The proportions of males within the various collections ranged from 0% to 80% ($\bar{X} = 52\%$; Table 1). Among the five cities where geckos were found, the capture rates of lizards observed ranged from 42 to 50% ($\bar{X} = 47\%$). Overall values for all five cities indicate a mean of 9.7

Table 1. Specimens of the Mediterranean gecko encountered during nocturnal collecting trips in urban centers along the northeastern Gulf of Mexico (May to October, 1985).

Location	County	Number of Specimens		Size (SVL in mm)	Sex (M/F)
		Collected	Observed/Hr.		
Gulfport, MS	Harrison	10	6.8	26-55	4/1
Pascagoula, MS	Jackson	0	0	...	...
Hattiesburg, MS	Forrest	0	0	...	...
Mobile, AL	Mobile	32*	11.1	24-57	14/14
Fairhope, AL	Baldwin	12	17.9	35-57	6/6
Foley, AL	Baldwin	0	0	...	...
Atmore, AL	Escambia	0	0	...	...
Dothan, AL	Houston	0	0	...	...
Pensacola, FL	Escambia	15	11.3	24-56	3/8
Panama City, FL	Bay	2**	1.6	55	0/1
Ft. Walton Beach, FL	Okaloosa	0	0
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*Sample includes 7 gravid females collected in May and June.

**One juvenile specimen escaped.

geckos observed/hr and a mean of 4.3 geckos collected/hr. A catch per unit effort (CPE) can be expressed in terms of geckos caught/hr (Fairhope, AL = 7.8; Pensacola, FL = 5.0; Mobile, AL = 4.6; Gulfport, MS = 3.2; Panama City, FL = 1.6). These data represent the combined efforts of two collectors. The numbers of observations per hour (Table 1) probably reflect a crude estimate of gecko densities among cities.

DISCUSSION

Carr (1940) described the habitat of the Mediterranean gecko as "edificarian." Indeed, specimens were not observed on naturally-occurring vegetation. Occasionally positioned upside-down, specimens were more frequently observed on vertical walls than on horizontal surfaces. Lizards often remained near some kind of cover (cracks, crevices, drain pipes, vents, signs, awnings), and they were quick to take refuge when disturbed. Although found on almost all types of construction materials (brick, stucco, plaster, wood, and even aluminum), they occurred most often on rougher substrates that were illuminated by incandescent bulbs.

Darkened alleys with occasional incandescent lights were usually more productive habitats than completely illuminated store fronts.

The buildings heavily populated by geckos were those having spaces, vents or cracks. These openings provided access to crawl spaces, basements, or spaces between walls where the lizards might hide and over-winter. On numerous occasions, juveniles and adults have been observed in the basement of the First Baptist Church of Mobile during the winter months. Some of them undoubtedly remain active year-round. Vents within building walls allow easy access to outside (feeding) surfaces and provide routes of retreat from predators.

In cities where geckos were not observed, spiders and insects were much more conspicuous. Although we did not quantify their occurrences, spiders, roaches and crickets were much more frequently cited in our field notes from Pascagoula, Hattiesburg, Dothan and Foley — cities where geckos were not observed (Table 1). Large populations of geckos should impact significantly upon the natural arthropod fauna. Another manuscript on the analysis of gecko stomach contents is now in preparation.

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Geckos did not aggregate near fluorescent lights, or near the bright orange, sodium-vapor lamps common in many cities. Apparently, these kinds of lights do not strongly attract the insects on which geckos feed. Although most geckos (89%) were commonly found near incandescent lights, a few (4%) were observed on areas of buildings that were not illuminated. After feeding on insects in lighted areas, the secretive geckos may well retreat to the relative protection of darkness. In several instances, the distribution of larger (presumably dominant) individuals at regularly-spaced intervals suggests that the species may be territorial. Specimens maintained in terraria in the laboratory, however, were tolerant of crowding (our data).

The absence of specimens from some of the sampling sites is not necessarily a confirmation that the species is not present. Even extensive searching may fail to disclose the presence of small or recently established populations. We did not observe geckos in Pascagoula, Mississippi, but we were unable to gain access to a prime habitat (a shipyard), where they were most likely to have occurred.

Mediterranean geckos were probably common in Mobile for many years before they were reported in the scientific literature. They have been observed there intermittently by the senior author since 1977. Numerous collecting trips in downtown Mobile in 1984 and 1985 revealed that breeding populations of geckos occurred on eight different buildings within a 128 square block area (exceeding 2.6 km²). These locations may represent relatively isolated breeding populations that were independently established over the years. We hope to conduct electrophoretic studies to assess the genetic variability within these presumed isolated populations.

One must assume that the Medi-

terranean gecko is continually being reintroduced into the major ports of the world from tropical exporting centers. Most of these introductions probably are unsuccessful (Mount 1975), particularly in temperate regions. Their secretive, cryptic habits and small size contribute to the ease with which these lizards can be inadvertently transported by human activity. Crates and cargo holds of ships doubtlessly house a variety of invertebrate organisms that accommodate the food requirements of these opportunistic insectivores. Furthermore, the geckos can probably survive fasting for a month or longer. In time, the geographic distribution of the Mediterranean gecko may well become truly cosmopolitan in warm, coastal areas.

SUMMARY

The Mediterranean gecko is an introduced species of tropical lizard which recently has become well-established in peninsular Florida and the southern extremes of Texas and Louisiana. The literature includes only one record for the species from coastal Alabama and one from the Florida panhandle. Over the past fifteen years, however, Mediterranean geckos have been frequently observed in urban Mobile, where they became established in some of the larger, older, downtown buildings. During this study, nocturnal collecting trips in 11 major coastal cities revealed breeding populations in Gulfport, MS; Fairhope, AL; Mobile, AL; Pensacola, FL and Panama City, FL. Seventy-one specimens were collected from May to October, 1985, including seven gravid females (May-June). No specimens were observed during collecting trips to six other coastal-plains cities within the tri-state region. Geckos appear to be restricted primarily to the major port cities. Their geographic distribution, however, extends discon-

tinuously along the entire Gulf coast from Texas to Florida, and is expanding rapidly.

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