

## Highlights:

- Cane Toads tradeoff rapid dispersal for reproductive frequency
- Lionfish resorting to cannibalism?
- Cane Toads causing trophic cascades?
- Tegus Lizards on the rise in Florida?
- Invasive Species Summit updates

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## Focal Species: Mediterranean Gecko

### Scientific names:

*Hemidactylus turcicus*

### Size:

4 - 5 inches (10–13 cm) long

### Native range:

Southern Europe, Northern Africa



Florida is home to only one native gecko, the Florida Reef Gecko (*Sphaerodactylus notatus*) found in the Keys, but has at least 10 different introduced gecko species,

which were introduced as hitchhikers in cargo or via the pet trade. The Mediterranean Gecko (*Hemidactylus turcicus*) was first documented in Florida in 1910, although at the time the specimen was misidentified as a Tropical House Gecko (*H. mabouia*). Like other members of this introduced genus, the Mediterranean Gecko lacks eyelids and has vertical eye pupils and sticky toepads. Differentiating between species in this genus can be tricky, requiring a [dichotomous key \(link downloads PDF\)](#) and a magnifying lens for examining toepads and arrangement of scales on the underside of the tail or chin. The Mediterranean Gecko, like the Tropical House Gecko, is whitish gray, sometimes with mottled spots and banding on the tail. However, the Mediterranean Gecko has very noticeable bumps in rows on the sides of the back and the sticky toepads on the fourth digit extend all the way to the base of the toe (see figures in key). Geckos of this genus are most commonly found on buildings in, or not far from, urbanized areas where they prey upon native invertebrates and compete with native (and invasive) treefrogs for prey. These nocturnal predators are most commonly seen under outdoor lights at night and hide in crevices by day. Mediterranean Geckos are patchily distributed throughout the southeastern US, including all of Florida. The Mediterranean Gecko was once extremely common throughout South Florida but has been increasingly replaced by the Tropical House Gecko, which is very similar in appearance (see key). Although introduced geckos are widely distributed and abundant, little is known of the extent of their impacts on native species. [Learn More...](#)



## Cane Toad Invasion Tradeoffs

As invasive species spread and increase their range into new territory, the individuals at the invasion front may rapidly evolve to become better dispersers. The best dispersers of a generation--those that move most rapidly--reproduce at the forefront of the new range and, in turn, the best dispersers among their offspring reach the front in the following generation. As a result, evolution occurs rapidly, but not without tradeoffs in terms of other aspects of fitness. Cane Toads in Australia provide a great model for studying these tradeoffs. Cane Toads at the invasion front are known to disperse up to five times faster than toads at the range core, with the rapid dispersers at the forefront developing longer limbs and arthritis. A recent study by Shine Lab researchers found that this increase in dispersive ability comes at the cost of lower reproductive rate, with invasion-front females laying eggs far less frequently than females from older populations. However, lower reproduction does not necessarily mean lower fitness, as differences in predation, cannibalism, prey availability, and parasites may allow high dispersers to achieve similar reproductive success. [Learn More...](#)



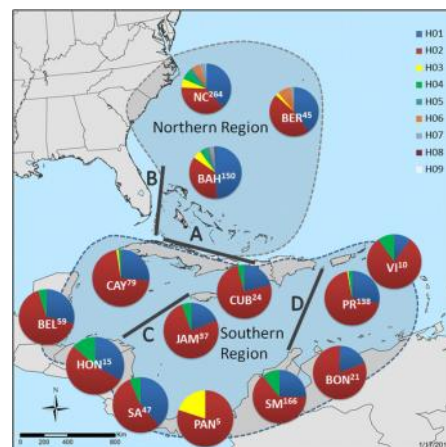
## Cane Toads Shift Predator–Prey Balance

Invasive species not only impact native species directly through competition, predation, or even toxicity, but can also exert indirect impacts. One well-known example of this is 'Invasional Meltdown' – the hypothesis that the presence of one invasive species indirectly benefits another invasive species in some way, creating a mutualism that increases impacts by enabling one or both to thrive. One type of 'Trophic Cascade' occurs when something positively or negatively impacts a top predator, causing top-down effects on the entire ecosystem, and it has been hypothesized that invasive species likely have this type of effect on the ecosystems they invade. A recent study in Australia found that the toxic effects of invasive Cane Toads on several native monitor lizard species is creating just such a cascade effect, reducing numbers of these predators and increasing survival and numbers of the native crimson finch. The effects of this shift in predator-prey balance are not yet well understood but have the potential to be far reaching. [Learn More...](#)



## New Genetic Clues to Lionfish Invasion

In what has been termed the "fastest finfish invasion in history," Red Lionfish (*Pterois volitans*) likely introduced as a result of aquarium dumps, have spread along the Atlantic coast of the US and throughout the Gulf of Mexico and the Caribbean Sea. Previously, scientists believed the invasion was the result of releases in the North, likely in Florida. However, a recent genetic analysis conducted by U.S. Geological Survey researchers found distinct genetic differences between the 'haplotypes' present in the Northern and Southern Regions shown on the map at right (Butterfield et al., *In Press*). This suggests multiple introductions in different areas. They also found breaks between groups within these regions (lines on map) that likely indicate the presence of currents or other barriers to dispersal. [Learn More...](#)



## Lionfish Cannibalism

Despite efforts to control invasive Lionfish through fishing tournaments and other removal events and promoting harvest for consumption, their numbers continue to increase in the Atlantic, Caribbean, and Gulf of Mexico. In these areas, Lionfish densities may reach five times the density seen in their native habitats in Indonesia, yet scientists have yet to discover what keeps their numbers in check in their native range. Recently, one lobster fisherman in the Florida Keys began noticing a strong decline in the number of shrimp and other small invertebrates captured in his traps, while at the same time noticing an increase in cannibalism among Lionfish. However, studies of stomach contents of Lionfish in the Bahamas and Mexico previously found that cannibalism was relatively rare. Additional research is needed to determine whether Lionfish are such voracious predators that they are being forced to resort to cannibalism and whether cannibalism is increasing. [Learn More...](#)



Photo credit:  
[www.Reef.org/lionfish](http://www.Reef.org/lionfish)

## Tegu Lizards on the Rise in Florida

Argentine Tegu Lizards were first documented in Miami-Dade County near Homestead but have since spread to Collier County and to Hillsborough County, where they are found in rural areas south of Tampa. In 2009, researchers trapping tegus in South Florida caught only 13 lizards. This year, they have captured nearly 500 and have also found two nests, each of which had 27 eggs. The results of trapping and radiotracking studies show that tegus are increasing in number and beginning to spread. Because they are able to survive near-freezing temperatures, tegus have the potential to become invasive throughout much of Florida. A study of tegu gut contents in Miami found that they were eating a variety of amphibians and reptiles; however, they also eat fruits, seeds, eggs, insects, and small mammals and habitat-use studies suggest they may be targeting birds. This is especially concerning in South Florida, where tegus are found only a short distance from a population of endangered Cape Sable Seaside Sparrows. Unfortunately, without good population estimates, it is difficult for scientists to determine what effect, if any, trapping will have on the population. [Learn more...](#)



(Photo: Peter Andrew Bosch, Miami Herald)

## Invasive Fish Control in Banff National Park

Fisheries biologists in Banff National Park in Canada are using a two-pronged approach to protect native Bull and Cutthroat Trout. In some areas of the park, biologists are using electro-fishing to remove introduced Brook, Brown, and Rainbow Trout, which were stocked as sport fish until the mid 1970s. Over the past few years, more than 12,000 introduced trout have been removed from streams in the park. In northern areas of the park, biologists are capturing and relocating the native Bull and Cutthroat Trout to "naturally fishless" areas above waterfalls where they may be able to survive while other conservation efforts are implemented. Regulation of sport fishing and silt and nutrient levels will be necessary to ensure the survival of the native trout species, . [Learn more...](#)



Invasive Brook Trout  
(Wikimedia Commons image)

# Everglades Invasive Species Summit

Biologists from around the state of Florida met in late July for an annual conference on invasive species issues. Presentation topics included Reporting and Outreach, Invasive Plant Operations Updates, Invasive Animal Operations Updates, Invasive Animal Research Updates, and breakout planning sessions and a Python Patrol workshop. Presentations included updates on tegu and python research, biological controls, Giant African Land Snails, New Guinea Flatworms, and updates on innovations, regional assessments, and rapid response. Most of these presentations are available for viewing on the Everglades Cooperative Invasive Species Management website at:

[http://evergladescisma.org/2015\\_Summit/index.cfm](http://evergladescisma.org/2015_Summit/index.cfm)

The Invader Updater is a newsletter focused primarily on providing information on introduced vertebrate animals in Florida and the southeastern U.S. and was first published in Winter 2009. This newsletter is produced by:

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Do you have questions, comments, or suggestions, or want to be added to the mailing list? Email [monicaem@ufl.edu](mailto:monicaem@ufl.edu)



## Related Resources

- ◆ [Mediterranean gecko – Hemidactylus turcicus](#) – Florida Fish and Wildlife Commission: Non-natives
- ◆ [Mediterranean gecko \(Hemidactylus turcicus\)](#) - Savannah River Ecology Laboratory
- ◆ Hudson et al. 2015. [Virgins in the vanguard: low reproductive frequency in invasion-front cane toads](#). Biological Journal of the Linnean Society.
- ◆ [Cane toad has surprise effect on Australian ecosystem](#) - New Scientist
- ◆ Doody et al. *In Press*. Invasive [Toads Shift Predator-prey Densities in Animal Communities by Removing Top Predators](#). Ecology.
- ◆ [Genetics Provides New Clues about Lionfish Invasion](#) - USGS Newsroom
- ◆ Butterfield et al. 2015. [Wide-ranging phylogeographic structure of invasive red lionfish in the Western Atlantic and Greater Caribbean](#). Marine Biology.
- ◆ [This Beautiful but Destructive Fish is Resorting to Cannibalism](#) - National Geographic
- ◆ [Could the next Burmese python be a lizard from South America?](#) - Miami Herald
- ◆ [Invasive fish being pulled from Banff lakes to protect native species](#) - CBC News Calgary
- ◆ [2015 Everglades Invasive Species Summit \(see presentation PDFs\)](#) - ECISMA
- ◆ [FWC Non-native Amnesty Day Events](#) (next scheduled: October 3rd, Gulfarium Marine Adventure Park, Fort Walton Beach)