

Obama's Border Shame By Joe Klein / America's Comeback By Roger Altman

# TIME

# SPACE INVADERS

From Russian beetles to giant African snails, the world is under assault—and it's costing billions

**BY BRYAN WALSH**



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## GLOBAL SWARMING

The aliens are already here. Some 50,000 alien species have invaded the U.S.—and thanks to increasing global trade and the effects of climate change, that number will keep rising. Many invasive species can find a niche in a new environment without wreaking that much ecological havoc, and some have even proved beneficial. But there are other plants and animals that seem determined to displace as many native species as they can while causing considerable economic damage along the way.

SOURCES: USDA; USFWS; USGS; NOAA; NWP; THE NATURE CONSERVANCY; INSTITUTE FOR THE STUDY OF INVASIVE SPECIES; TEXAS PARKS AND WILDLIFE FOUNDATION; JOURNAL OF FORESTRY; ANDERSON ECONOMIC GROUP

industry. It doesn't help that the silver Asian carp have a habit of leaping out of the water when startled by a boat motor, turning themselves into piscine projectiles that can clobber unwary fishermen.

The carp invasion has officials in the Great Lakes region so concerned that they are considering an Army Corps of Engineers plan—one that would potentially cost up to \$18 billion—to essentially close the century-old Chicago Canal, cutting off the Great Lakes from the Mississippi River system. (Supporters of the plan have disputed the price tag.) Even so, it might be too late. Lodge and others have found genetic evidence that some Asian carp are already present in the lakes, although it's not clear yet whether they are numerous enough to establish themselves.

The reality is that we already live in a deeply invaded world. Look out your window and you'll see alien species everywhere. Kolbert writes that “almost all the grasses in American lawns come from somewhere else, including Kentucky bluegrass.” More than a quarter of the plants in Vermont and more than a third in Massachusetts come from outside those states. Baseball and apple pie might be American—unless the pies are made from Fuji apples, which were developed in Japan—but honeybees are not. (The scientific name—*Apis mellifera*, or European honeybee—is a giveaway.) More than 50 years ago, British ecologist Charles Elton, widely considered the founder of invasion biology, warned that “we are living in a period of the world's history when the mingling of thousands of kinds of organisms from different parts of the world is setting up terrific dislocations in nature.”

There's another name for that “terrific dislocation”: Florida.

### The Mixing Bowl

INVASIVE PLANTS AND ANIMALS HAVE flocked to Florida for some of the same reasons that more than 600 people a day move there: the sunny climate, the plenti-

ful land and a generally welcoming attitude toward newcomers. And like many of the new human arrivals, invasive wildlife often enter the state through the sprawling hub of Miami International Airport, which ranks first in the U.S. in international freight shipments and live-animal traffic, with about 3,000 live-wildlife shipments every month. While border-control officials check cargo for invasive species, the sheer number of alien species entering Florida on any given day—and a climate that seems designed to turbocharge the growth of anything living—tilts the odds in the species' favor. “We are ground zero

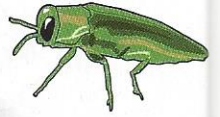
### EMERALD ASH BORER

**Origin** Asia and eastern Russia

**Invaded territory** Much of the Midwest and parts of the Northeast

**How it arrived** Accidentally carried into the U.S. in wood-packing material from Asia

**Threats** In its larval stage, the insect bores holes in trees, eventually killing them; more than 8 billion ash trees are at risk



### SNAKEHEAD FISH

**Origin** Africa and Asia

**Invaded territory** California, Virginia, Florida, Hawaii, Maine, Maryland, Massachusetts, Rhode Island

**How it arrived** Introduced by fish importers

**Threats** As a top-line predator, it competes with native fish for food and habitat



### CUBAN TREE FROG

**Origin** Caribbean

**Invaded territory** Hawaii and Florida

**How it arrived** Likely arrived as a hitchhiker on seagoing ships

**Threats** The largest tree frog in the U.S., it eats native frogs and lizards wherever it invades

for the impacts of invasive species,” says Doria Gordon, director of conservation science for the Florida chapter of the Nature Conservancy (TNC). “And our invaders are very good at finding new habitats.”

Often those habitats are in or around the Everglades, that vast “river of grass” that covers much of South Florida. Half of the original Everglades has been developed for farming or housing, and the sprawling wetland has been carved up by more than 1,400 miles (2,250 km) of canals and levees that divert water for South Florida's 5.8 million people. That mix of suburbs and wilderness makes the Everglades an invasive

## ZEBRA MUSSEL

**Origin** Southern Russia

**Invaded territory** The Great Lakes and rivers throughout North America

**How it arrived** Carried to the Great Lakes in the ballast water used by ocean-going ships, the mussels spread beyond the Great Lakes by attaching themselves to the bottoms of boats as they moved from river to river

**Threats** It outcompetes native species for food and can grow so rapidly that it clogs water-intake pipes for power plants and other facilities; large power plants spend some \$800,000 a year to monitor and control it



## ASIAN CARP

**Origin** Southeast Asia

**Invaded territory** Mississippi, Missouri and Illinois river systems, up to Chicago and possibly into the Great Lakes

**How it arrived** Imported in the 1960s and '70s by fish farmers, it escaped via flooding and proliferated throughout the rivers of the Midwest

**Threats** The Asian carp is a voracious filter feeder and will compete with native marine life for food, costing the region \$200 million a year. One variety, the silver carp, leaps into the air when it hears a motor, threatening boaters



## ASIAN LONG-HORNED BEETLE

**Origin** Eastern China, Japan and Korea

**Invaded territory** Northeastern U.S.

**How it arrived** Spread from Asia in wood used in packing material

**Threats** Larvae tunnel into trees as they develop, damaging them when they exit as adults; over time, infestations can kill trees directly or make them vulnerable to other threats



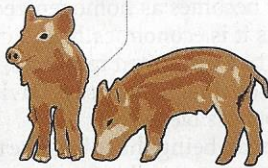
## FERAL HOG

**Origin** Eurasia

**Invaded territory** Texas, California, Florida, Oklahoma and throughout the South

**How it arrived** Introduced in the 1930s and released into the wild for hunting, the hog bred with existing pigs to create a feral subspecies that has proliferated in recent years

**Threats** It tears out native vegetation and can trample crops while sometimes preying on native wildlife. It causes \$1.5 billion in damage-and-control costs annually



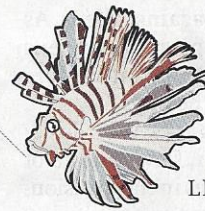
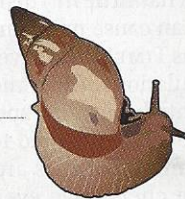
## GIANT AFRICAN SNAIL

**Origin** East Africa

**Invaded territory** Florida

**How it arrived** May have hitched a ride aboard passenger luggage into Miami or been brought in as pets

**Threats** It can grow up to 8 in. (20 cm) long, eat more than 500 kinds of plants and consume a range of materials—including stucco. It also carries a parasite that can cause meningitis in humans



## LIONFISH

**Origin** Indo-Pacific Ocean

**Invaded territory** Atlantic coastal waters, North Carolina to Florida

**How it arrived** Likely brought over in aquarium trade before being discarded

**Threats** A tireless predator and rapid breeder, it is capable of wiping out native species around coral reefs

free-for-all. In the South Dade Wetlands, a small slice of protected territory about 25 miles (40 km) south of Miami, TNC's Roberto Torres shows me thickets of Brazilian pepper trees thronging the sides of a canal. The pepper trees are beautiful, which is why they were imported as ornamentals from South America in the mid-1800s, but they've come to dominate more than 700,000 acres (280,000 hectares) of Florida, producing a dense canopy that shades out competitors. It's one of dozens of invasive plants infesting the Everglades. "These plants outcompete natives and create a monoculture of simpler species where

there was once diversity," says Torres. "What kept them in check in their home territory isn't here."

And that leaves human beings. Florida has spent hundreds of millions of dollars trying to control invasives, work augmented by the efforts of ordinary people, like those who volunteer for the Python Patrol. Begun in 2008 when a python was discovered snacking on endangered Key Largo wood rats, the Python Patrol program has taught hundreds of Floridians to identify invasive snakes and lizards and capture them. It's not easy work; pythons are ambush predators, waiting out their

prey in hiding, and even experts will usually miss 99 pythons for every one they can see in the wild. But training a vast legion of people to spot and capture the pythons is just about the only way to control their numbers. Not that anyone has any idea exactly how many Burmese pythons are established in Florida. "There might be 4,000, and there might be hundreds of thousands," says Cheryl Millett, a TNC biologist who helped run the Python Patrol before it was transferred to the Florida Fish and Wildlife Conservation Commission. "Either way, there's more than there should be."

Burmese pythons  
can climb trees and  
get the drop on prey



## Invasions in the Anthropocene

INVASION BIOLOGY HAS BECOME A SPRAWLING discipline with its own journals, academic centers and graduate programs. But you can boil it all down to this dictum: the origin of species matters. Just because a plant or animal is alien doesn't automatically mean it will become a dangerous invasive, but all else being equal, it's best for nature if species stay at home—and it's worth spending billions of dollars worldwide to prosecute a war against aliens. As the influential landscape architect Jens Jensen wrote in 1939, "No plant is more refined than that which belongs."

To which Mark Davis asks: Who decided what belongs? In 2011, Davis and 18 of his colleagues made waves in the invasion-biology world when they co-wrote an essay in *Nature* that argued that conservationists should place less emphasis on the origins of a species than on how it acted in its habitat, wherever that might be.

They pointed to alien species like the tamarisk shrub, a drought-resistant plant from Africa and Eurasia that was introduced to the American West in the mid-19th century and eventually condemned as a water-stealing "alien invader," becoming the object of a 70-year, multimillion-dollar eradication project. Yet it's not clear that tamarisks use water at a higher rate than natives, and the plants provide nesting habitat for the endangered southwestern willow flycatcher.

The distinction between native and alien species is often arbitrary. To Davis and his colleagues, the "terrific dislocation" that biologists like Charles Elton decried is simply a fact of a globalized, human-dominated planet and is neither good nor bad. "It's just not feasible in the current world to try to garden nature," says Davis. "There is no wilderness, no place that hasn't been touched by humans."

The *Nature* article resulted in a swift backlash in the field, including an objection later printed in the journal that was signed by 141 conservation biolo-

gists. "It's like climate change: 99% of experts will say this is a huge problem that's getting worse," says Daniel Simberloff, a conservation biologist at the University of Tennessee. "And then there's a small fraction who are skeptical."

In truth, though, Davis and his fellow renegades aren't as far out as they seem. They don't deny that some existing invasive species—like the emerald ash borer, an insect that has destroyed millions of U.S. trees—are worth fighting or that we should try to prevent invasions in the first place. But they're right to argue that nativeness in and of itself has little intrinsic value. Native species can cause problems just as alien ones can, as *TIME*'s 2013 cover story on the rising populations of deer and other wildlife highlighted, and alien species can sometimes be better adapted to their new habitats than native ones are. (In recent years some chefs have even begun to specialize in invasive species, serving up Asian carp as "Kentucky tuna" and offering lionfish sushi.) "Natives," wrote the evolutionary biologist Stephen Jay Gould in 1998, "are only those organisms that first happened to gain and keep a footing."

But even though the spread of invasives can actually lead to an increase in

local diversity in absolute numbers—North America has an estimated 20% more species now than it did before European colonization—on a global scale, unchecked invasions can lead to planetary homogenization. Just as global trade has allowed megabrands like Walmart and McDonald's to spread around the world, crushing local mom-and-pop shops, human activity has allowed "super species" like jellyfish and Argentine ants to invade new territory, displacing natives along the way. That's fine from a purely evolutionary perspective—survival of the fittest and all that. But something will be lost if our planet becomes as homogenized biologically as it is economically and culturally. "If we had unlimited resources, we could try to stop this change," says Davis. "But it's just not possible to do."

Human beings have become the dominant force on the planet, so much so that many scientists believe we've entered an entirely new geological epoch: the Anthropocene. We have already been shaping the planet unintentionally, through greenhouse-gas emissions and global trade and every other facet of modern existence. The challenge now is to take responsibility for that power over the planet and use it for the right ends—all the while knowing that there is no single correct answer, no lost state of grace we can beat back toward.

How we respond to the thickening invasions that we ourselves loosed will be a part of that answer—which is only just. There is one species that can claim to be the most dominant invasive of all time. From its origins in Africa, this species has spread to every corner of the world and every kind of climate. Everywhere it goes, it displaces natives, leaving extinction in its wake, altering habitat to suit its needs, with little regard for the ecological impact. Its numbers have grown nearly a millionfold, and its spread shows no sign of stopping. If that invasive species sounds familiar, it should. It's us. ■



### FOR FURTHER READING ON THIS TOPIC, SEE:

*The Sixth Extinction*  
by Elizabeth Kolbert

*Rambunctious Garden:  
Saving Nature in a Post-Wild World*  
by Emma Marris

*Super Species: The Creatures  
That Will Dominate the Planet*  
by Garry Hamilton

*Invasion Biology*  
by Mark A. Davis