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Kinosternon sonoriense, the desert mud turtle, photographed in Arizona. Photo © 2011 by Todd Pierson

featured species

Desert Mud Turtle, *Kinosternon sonoriense* (LeConte, 1854)

The Desert Mud Turtle

by M. A. Cohen

New World mud and musk turtles belong to the Kinosternidae, a family of chelonians which is indigenous to the Americas. Comprising some 25 species, mud turtles (*Kinosternidae*) and musk turtles (*Sternotherus*) are a remarkably diverse family of small to medium-sized chelonians. Among the members of this kinosternid group is the desert mud turtle, *Kinosternon sonoriense*.

Two Greek root words form the basis of the genus name *Kinosternon*: *kine-*, meaning movement, and *stern-*, meaning the breast or breastbone. The plastron of the desert mud turtle features two horizontal, movable hinges. The species name *sonoriense* means from Sonora, Mexico.

The desert mud turtle is not a species that has been extensively studied by scientists, and most of what is known about its natural history derives from research conducted in the state of Arizona.

Description

A medium-sized species, the desert mud turtle reaches a maximum carapace length of 6.9 inches (17.5 centimeters). The coloration of its domed carapace ranges from olive to dark brown with darker seams, and it may be smooth or may display one to three lengthwise keels.

The species' plastron is typically yellow to brown with darker shading at the seams. Two hinges run crosswise on the plastron on either side of the abdominal scutes, enabling the turtle to withdraw into its shell for protection from predators.

The skin of *K. sonoriense* is gray, and darker flecks dot the skin of the head, neck, and limbs. Several pairs of comparatively long barbels

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are present on the chin. There is webbing between the species' toes on all four feet.

Some sexual dimorphism is present within the species: the male is typically smaller and has a concave plastron and a longer, thicker tail than the female desert mud turtle.

Range

Historically, the desert mud turtle was recorded as a native of the U. S. states of California, Arizona, and New Mexico as well as northwestern Mexico. However, "the last known verifiable record along the Colorado River" of *K. sonoriense* was a sighting near the Laguna Diversion Dam in Imperial County, California in 1962 (Desert Mud Turtle — *Kinosternon sonoriense sonoriense*).

Chelonian researchers note that the species appears to be extinct in California, owing to the following factors: "introduced aquatic predators such as bullfrogs and Louisiana red swamp crayfish, introduced vegetation, especially salt cedar, and widespread water and land alterations along the Colorado River including reservoirs, dams, and agriculture" (Desert Mud Turtle — *Kinosternon sonoriense sonoriense*).

Viable (but near-threatened) populations of desert mud turtles continue to exist in the "lower Colorado and Gila rivers in Arizona and southwestern New Mexico southward to the Rio Yaqui basin of the Continental Divide, and eastward through the Rio Casas Grandes basin of northwestern Chihuahua, occurring at elevations that range from near sea level to 6,700 feet (2,000 meters) [*Kinosternon sonoriense*].

Habitat

Although it may seem to be a contradiction in terms, "arid wetland" describes the habitat in which the desert mud turtle is found. Desert mud turtles inhabit permanent creeks, ponds, streams, and springs in woodlands and areas of Sonoran Desert vegetation. The species may also inhabit ditches and the drinking basins of cattle called stock ponds.

The species prefers freshwater ecosystems with clear water, the bottoms of which are covered with gravel, rocks, or sand plus aquatic vegetation.

The physiology of *K. sonoriense* enables it to inhabit the unusual environment of the Montezuma Well in the Montezuma Castle National Monument. This unique ecosystem is characterized by a constant water temperature of 70° F (21° C) and a "remarkably high concentration of dissolved CO_2" in the aquatic environment. Scientists theorize that this ecosystem is inhospitable to fish and to some groups of aquatic insects due to its "highly carbonated environment" (Ernst & Lovich, 2009).

While the species sometimes enters temporary waterbodies, the desert mud turtle will migrate overland seeking a permanent water resource when the weather warms and its temporary dwelling begins to evaporate.

Subspecies

Science currently recognizes two subspecies of *K. sonoriense*.

Sonora mud turtle

K. sonoriense sonoriense, the scientific name of the Sonora mud turtle, is the more widespread of the two subspecies, inhabiting Arizona, New Mexico, and northwestern Mexico. While this subspecies was formerly identified as a California native turtle, it currently appears to be extinct in that state.

Sonoyta mud turtle

K. s. longifemorale, the Sonoyta mud turtle, inhabits a comparatively restricted range comprising only the Rio Sonoyta river basin in Pima County in southern Arizona and the adjacent state of Sonora, Mexico (*Kinosternon sonoriense*).

Feeding and Foods

As an opportunistic feeder, the desert mud turtle is primarily carnivorous but becomes omnivorous if flesh foods are limited. Consuming a variety of nutrient resources, the diet of *K. sonoriense* includes fish, crustaceans, snails, frogs, toads, tadpoles, lizards, snakes, and bird carrion (Ernst & Lovich 2009).

Plastron view of a desert mud turtle photographed in Santa Cruz County, Arizona. Notice the barbels on the turtle's chin. Photo © 2018 by William Flaxington.

The species also feeds on insects, such as water bugs, beetles, adult flies, and fly and mosquito larvae. Plant matter consumed by the species includes higher aquatic plants and grasses, and several species of green algae (Ernst & Lovich 2009).

The feeding behavior of the desert mud turtle involves slowly crawling along the bottom of the waterbody with its neck extended, moving its head from side to side. When prey is found, the turtle draws its head back and lunges, swallowing small prey whole or tearing apart larger prey to in order to chew it (Ernst & Lovich 2009).

Reproduction

In the wild researchers record mating in the water in April and May, and nesting typically occurs from May through September at lower elevations. At higher elevations nesting occurs only through July. Clutches vary in size from 1 to 11 eggs, and females may lay 1 to 4 clutches per year (Ernst & Lovich 2009).

Curiously, *K. sonoriense* eggs undergo an "embryonic diapause," requiring a period of chilling before development begins. Eggs may develop for almost a year prior to hatching. Scientists surmise that this diapause occurs so hatching will coincide with the following summer's rains (Ernst & Lovich 2009).

Temperature-dependent sex determination pattern 1a appears to govern the sex of *K. sonoriense* hatchlings. Research reveals that a higher proportion of female hatchlings will result from incubation temperatures of 84° F (29° C) or higher (Ernst & Lovich 2009).

Threats and Conservation

As with so many other turtle species, ecosystem degradation and destruction threaten the remaining populations of desert mud turtles. Local irrigation practices and water extraction and diversion projects adversely affect the fragile habitats of *K. sonoriense,* diminishing "groundwater and surface water availability as well as affecting riparian vegetation." Additionally, climate change is adversely impacting the deserts of the southwestern United States and northern Mexico (van Dijk, 2011).

Alien predators such as introduced bullfrogs and freshwater crayfish prey on juvenile desert mud turtles. Eggs and juveniles are likely the prey of many species of birds and mammals (Ernst & Lovich 2009).

Extensive water-diversion projects and environmental degradation are occurring in the range of *K. s. longifemorale*. Additionally, narcotics smuggling and human trafficking complicate conservation efforts in the habitat of the Sonoyta mud turtle (van Dijk, 2011).

Legal protection measures for *K. sonoriense* include the following:

Arizona does not allow exploitation of the species in areas of the state that are legally protected;

New Mexico has an annual bag limit of five turtles;

turtles are generally protected from exploitation by Mexican natural resource regulations, but enforcement is erratic; and

four entities, the Arizona Department of Game and Fish, the Arizona-Sonora Desert Museum, the Phoenix Zoo, and the National Park Service, are working together to maintain an assurance colony of *K. s. longifemorale* and improve the ecosystem at the Quitobaquito Oasis in Organ Pipe Cactus National Monument.

Under the U.S. Endangered Species Act, the Sonoyta mud turtle is listed as "endangered" wherever it is found. As of the last assessment in March 2011, the IUCN Red List describes the species as "near threatened" (van Dijk, 2011). No CITES protection has been given to the desert mud turtle as of 2020.

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‘Titanic challenge’ for an Italian hospital rescuing sea turtles from plastic published by Mongabay.com on 2 April 2020

◆ A sea turtle hospital in Brancaleone, Italy saves around 50 sea turtles every year.

◆ One out of every two of the turtles they save has ingested plastic, the team says.

◆ Every year, an estimated 5 million to 13 million tons of plastic end up in the oceans.

In late February, a three-legged turtle nicknamed Futura was released back into the sea by caregivers at the Sea Turtle Recovery Center of Brancaleone in Italy. Futura, a loggerhead sea turtle (*Caretta caretta*), had gotten caught in a web of nylon and rope that constricted one of her front legs. The hospital was forced to amputate the limb.

Fishing-related debris and plastics in the ocean are deadly for sea turtles. Turtles often mistake plastic for food —because it can both look like food and, as a recent study found, smell like food. Plastic can choke turtles, and puncture their internal organs. And when turtles get caught in nets, they often drown, unable to surface for air.

Every year, Brancaleone’s Sea Turtle Recovery Center rescues around 50 turtles. Half of them have eaten plastic, according to Filippo Armorio, who heads the center. Armorio’s observations echo the findings of a 2015 study that found that 52% of sea turtles have ingested plastic.

Armorio and his colleagues confront multiple challenges at once; turtles caught in fishing nets have often also eaten plastic. So in an effort to reduce the amount of plastic in the ocean, volunteers at the recovery center organize weekly beach cleanups.

Headshot of a loggerhead sea turtle, *Caretta caretta*. Photo © 2009 by Brian Gratwicke

Studies show beach cleanups have small, local benefits, but they don’t do much for the global plastic problem. Every year, an estimated 5 million to 13 million tons of plastic end up in the oceans. Still, researchers agree that beach cleanups are an important way to build awareness of the plastic pollution problem.

In Brancaleone, recovery center staff hope the public can help encourage companies to find alternatives to plastic packaging. A few years ago, a loggerhead sea turtle the recovery center was caring for died with a stomach full of plastic. The team found plastic bags, toothpaste caps and bottle caps in its stomach.

“On average, we find only a few grams, about 10, 20, 30 grams,” or up to an ounce, Armorio said, describing how much plastic the team typically finds inside a turtle. “But in some cases, we found 70, 80 grams,” or nearly 3 ounces. “The challenge is truly titanic.”

Brancaleone is right on the Strait of Messina, a narrow stretch of the Mediterranean that separates mainland Italy from the island of Sicily. The region is rich in fish, attracting both turtles and fishers. Though plastic trash is a major concern for recovery center staff, caregivers say fishing is the main factor in most sea turtle fatalities.

Futura, the now three-legged turtle, narrowly escaped death. Sea turtles are unlikely to survive when they’re caught in a net because it impedes their ability to surface for air, and can impede their feeding. If the infection on Futura’s leg had spread, she wouldn’t have survived. After months of rehabilitation, she’s back in the wild.

“On the one hand, you’re sad to detach yourself from her,” said Giulia Mazzanti, who works at the turtle hospital. “But on the other hand, you are so happy because her life is starting again.”

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Brancaleone is a small municipality in the region of Calabria in coastal southern Italy.

While India is on quarantine, thousands of undisturbed sea turtles lay estimated 60 million eggs by Dan Bradford

The Coronavirus pandemic, and the consequent blocking of activities that has been implemented in many countries around the world, continue to have positive effects on nature, animals and the air we breathe. It seems that this dramatic situation has brought, in the midst of so many sufferings and deprivations, also a period of "breathing" and well-being to the planet that hosts us and to so many creatures that are often threatened by the presence of man.

In eastern India, what has not been seen for a long time has happened along the coast of the state of Odisha. Sea turtles, animals notoriously vulnerable and threatened by pollution and human activities, took advantage of the quarantine to take back their spaces without being disturbed.

We are talking about hundreds of thousands of Olive ridley sea turtles (*Lepidochelys olivacea*) who managed to reach the shore, on the beach of Rushikulya, to make their nests and lay their eggs in a few days. Everything happened in a safer and more protected way than the normal situation in which man, with his fishing and tourism activities, would certainly have disturbed this fascinating natural process.

In general, in fact, such an event would attract crowds of tourists eager to attend, with obvious disturbance to the turtles. Besides, there often are the acts of poaching: unscrupulous people stealing eggs from the beach and then reselling them in local markets. This year the splendid sea turtles were able to nest in complete tranquility.

According to [the newspaper] *The Hindu*, local protection authorities did their best to ensure that the spawning occurred in a protected way. The news comes after another mass nesting, which took place on Gahirmatha beach, was also successful. Adding the eggs laid by turtles with more security due to the blocking of activities by Coronavirus, the authorities have come to estimate that, in total, there will be about 60 million.

Really good news for these animals that hadn't even landed on Rushikulya beach last year. Nature, with man less present, is winning the battle. Don't you think this should always be guaranteed to it?

Originally published on the website Fun Owl and reprinted with permission from the author. Thanks to Valley chapter's Karen Berry for forwarding the link to this story.

The CTTC Orange County Chapter is happy to announce their 7th Annual Educational "Live Turtle and Tortoise Show"!

New changes, New look...Come join us!

Exhibitors, Animal Exhibits, Volunteers, and Vendors Wanted!

Everyone Welcome!

SAVE THE DATE... COME HELP US EDUCATE!!

- **NEW** Show Information...
- Date - **Saturday Aug. 29, 2020**
- Time - **10 a.m to 4 p.m.**
- Where - The La Habra Community Center
- 101 W. La Habra Blvd.
- City of La Habra, CA 90631
- Info - Orangecounty@tortoise.org

STAY
home
calm
healthy
hopeful
informed
safe
strong

Thank You
first responders
frontline healthcare workers
essential workers

Report: Refusal to Ban Trapping Threatens Turtles in 10 States, Enables Illegal Trade

CHARLESTON, South Carolina—20 February 2020—Ten states still allow unlimited commercial harvesting of some or all native turtle species, contributing to export practices that threaten the survival of wild populations, according to a new report by the Center for Biological Diversity.

The report, "Robbing the Wild: How 10 States' Refusal to Ban Trapping Is Hurting America's Wild Turtles," describes how laws that permit trappers to take unlimited numbers of turtles contributes to the export of hundreds of thousands of native turtles from the United States each year and enables illegal trade. The states with weak laws include Arkansas, Delaware, Louisiana, Maryland, Ohio, Oklahoma, South Carolina, Tennessee, Vermont and Wyoming.

Common snapping turtle, *Chelydra serpentina*, a turtle species endemic to several states that refuse to ban commercial exploitation of wild turtles. **Photo © 2009 by Brian Gratwicke**

"When turtles are ripped from the wild to meet the voracious demand of international markets, it has profound consequences for wildlife and wild places here at home," said Elise Bennett, a Center attorney dedicated to protecting imperiled reptiles and amphibians. "It's up to us, through our elected officials, to protect our most sensitive creatures. Unfortunately, too many states are falling behind when it comes to protecting wild turtles."

States with the weakest turtle trapping laws, like Louisiana and South Carolina, have been implicated in significant turtle trafficking operations that reach far beyond their borders, threatening wild turtles in surrounding states.

Today's report finds that 30 states prohibit commercial turtle trapping, eight states provide moderate protection through size and bag limits, and 10 states allow at least one species of turtle to be trapped in unlimited numbers.

Eastern box turtle, *Terrapene carolina carolina*, a turtle species endemic to several states that refuse to ban commercial exploitation of wild turtles. **Photo © 2008 by Doug Letterman**

"With more than 60% of turtle species at risk of extinction worldwide, we have to do all we can to protect our nation's turtle populations," Bennett said. "We see hope in recent actions from states like Texas and Missouri, where all commercial turtle trapping was banned in 2018. But we're disheartened that states like Louisiana and Maryland are continuing to ignore the facts and failing to protect their natural heritage."

There has been some important progress in curbing wild turtle trapping. Since 2008 the Center and partners have carried out a campaign to end trapping of wild turtles through legal petitions and advocacy. Of the 15 states where the Center petitioned or advocated to ban commercial trapping, five banned the practice and three adopted stronger protections.

South Carolina legislators are currently considering a bill that would position the state to join the majority of those that prohibit commercial wild turtle trade.

Turtles cannot withstand even low levels of commercial trapping because their survival depends on living long lives and having many opportunities to reproduce. One study of common snapping turtles found that removing as few as 10% of adults from a population could reduce the entire population by half in only 15 years.

Turtles are the oldest living group of reptiles on the planet. The ancestors of modern turtles survived the asteroid that killed the dinosaurs and evolved into more than 350 species living today — from the prehistoric-looking alligator snapping turtle in the United States to the brilliantly patterned Indian star tortoise in India. But human pressures have made them one of the most threatened groups of vertebrates in the world, with unrestrained commercial trapping and trade helping to drive their declines.

— Center for Biological Diversity press release

Click **Robbing the Wild** to download a PDF of the complete report

State Agency Recommends Advancing Protection for California's Joshua Trees

Iconic Desert Plant Threatened by Climate Change, Habitat Loss — Center for Biological Diversity press release

SACRAMENTO, California—13 April 2020—The California Department of Fish and Wildlife today recommended that western Joshua trees move toward protection under the state's Endangered Species Act. The iconic trees are threatened by climate change and habitat destruction from urban sprawl and other development in their Mojave Desert home.

"We're elated that Joshua trees are a step closer to protection," said Brendan Cummings, the Center's conservation director and a Joshua Tree resident. "These beautiful trees face huge threats that could drive them extinct in the wild. We urge the state to finalize these protections quickly so Joshua trees can survive and thrive in California for generations to come."

In October the Center petitioned the state to protect western Joshua trees under the California Endangered Species Act. In June California's Fish and Game Commission will decide whether to accept the department's recommendation and grant these imperiled plants candidate status under state law.

A candidate designation triggers a yearlong review of whether the species should be formally protected under the state act. The species is legally protected during the review period.

Recent studies show Joshua trees are dying off because of hotter, drier conditions, with very few younger trees becoming established. Scientists earlier this year projected that the Joshua tree will be largely gone from its namesake national park by the end of the century.

Last year the Trump administration denied federal protection for the species.

"California needs to ensure these spectacular trees remain part of

The western Joshua tree, *Yucca brevifolia*. Joshua tree woodland in the Cap Rock area of Joshua Tree National Park, CA. Public domain.

California's landscape in perpetuity," said Cummings. "The Trump administration has abdicated its responsibility to save Joshua trees and hundreds of other species threatened by climate change. The state must fill that void and lead efforts to ensure the Joshua tree's survival."

Climate change could wipe out western Joshua trees, which already are failing to reproduce at drier, lower elevations. Prolonged droughts are projected to be more frequent and intense over the coming decades, shrinking the species' range and leading to more tree deaths. Higher elevations, where Joshua trees might survive increasing temperatures and drying conditions, are at risk of fire due to invasive non-native grasses.

The western Joshua tree is also threatened by habitat loss and degradation. Approximately 40 percent of the western Joshua tree's range in California is on private land, with only a tiny fraction protected from development. Current projections show that virtually all of this habitat will be lost without stronger legal protections for the trees.

"The California Endangered Species Act may be the only hope for saving these iconic symbols of the Mojave Desert," said Cummings. "Joshua trees are uprooted or bulldozed on a daily basis to make way for roads, powerlines, strip malls and vacation rentals right up to the borders of our national parks. If these beautiful plants are to have any hope of surviving the difficult decades ahead, we have to stop killing them."

The Joshua tree has recently been recognized as composed of two distinct species, the western Joshua tree (*Yucca brevifolia*) and the eastern Joshua tree *(Y. jaegeriana*). The two species occupy different areas of the desert, are genetically and morphologically distinguishable, and have different pollinating moths.

Today's recommendation addresses the western species. The western Joshua tree has a boomerang-shaped range stretching from Joshua Tree National Park westward along the northern slopes of the San Bernardino and San Gabriel Mountains, through the Antelope Valley, northward along the eastern flanks of the southern Sierra Nevada and eastward to the edges of Death Valley National Park and into Nevada.

The eastern Joshua tree's range in California is centered in the Mojave National Preserve and extends eastward into Nevada, Arizona and Utah.

If Joshua trees win protection under California's Endangered Species Act, state and local agencies will have to manage threats to them, including developing a recovery plan outlining a strategy to protect the species in the face of climate change.

the Turtle's Garden
planting for chelonians
by M A Cohen

Zinnia species (Zinnia)

Zinnia elegans 'Magellan Starburst Mix' photographed in Santa Rosa, California. Photo © 2017 by Don McCully

Members of the sunflower tribe (Heliantheae) in the daisy or sunflower family (Asteraceae), zinnias are hot-weather annuals and perennials that are native to dry grasslands and scrub ecosystems from the Rocky Mountains in the United States to Chile in South America.

The genus name *Zinnia* derives from the last name of the German anatomist and botanist Johann Gottfried Zinn (1727–1759). The eminent botanist and taxonomist Carl Linnaeus coined the term 'zinnia' in honor of Dr. Zinn.

While there are some 20 species in the genus *Zinnia*, by far the most widely planted is *Zinnia elegans*, known by various common names including the common zinnia, youth-and-age, and the elegant zinnia.

Description

While some *Zinnia* species are perennials, especially in their hot-weather habitats, the commonly grown species in North American gardens are annuals, meaning they grow vegetatively, bloom, set seed and die in a single growing season. The original plant will not return, but, by allowing spent flowers to dry naturally or by harvesting its seeds, one can grow new plants from favorite varieties.

There are three basic forms of *Zinnia* flowers: single, double, and semi-double. The single form has a single row of petals and a visible center, while the double blossom has many petals and no visible center. The semi-double flower has both numerous petals and a visible center (Boeckmann).

Blooming one flower to a stem, zinnias are excellent as cut flowers. Depending on the variety, the brightly-colored zinnia flowers will average from about 1.25 inches to 3 inches (3 to 8 centimeters) in size with the largest flowers being up to 7 inches (18 centimeters) across. Likewise, the bright-green, paired zinnia leaves are typically 2 to 4 inches (5 to 10 centimeters) long.

Horticultural development of a variety of cultivars, from the 6 inch (15 centimeter) tall 'Thumbelina' to the 3 foot (0.9 meter) tall 'Giants of California,' gives gardeners numerous choices for including zinnias in their containers and landscapes. This array of cultivars provides selections ranging from ground covers to bedding and border varieties.

Cultivation

Tolerating many types of soil, zinnias grow rapidly and easily in the right conditions. While loam rich in humus (organic matter) is ideal, zinnias will grow in most soils with adequate drainage. Seedlings appear as soon as 4 to 7 days after planting from seed, and plants bloom in 8 to 12 weeks. Regardless of the type of soil in the garden, good drainage is essential, as is proper spacing of plants to promote good air circulation. The correct amount of spacing, from 4 to 24 inches (10 to 61 centimeters), depends on the mature size of the zinnia species (Boeckmann). Seed packets typically specify spacing information for the variety being grown.

Paired *Zinnia* leaves. Photo © 2013 by Aathavan jaffna

Because they do not adapt well to the root disturbance caused by transplanting, start zinnias from seed sown directly in a sunny location in the garden. Since zinnias do not perform in cold weather, sow the seeds after the last frost date in your area. The **California Average Last Frost Date Map** is available online.

If growing from seed sown directly in the garden is not an option, it is possible to start

seeds indoors and plant the seedlings outdoors when the weather warms. The use of peat pots (made from peat moss), poo pots (a.k.a. cow pots, made from composted cow dung), or other types of plantable pots is recommended. Using these types of seedling containers, the seedling and its pot are planted in the garden in late spring or early summer, a method that protects the seedling's roots from trauma during transplanting (Badgett).

To reduce the chances of developing fungal diseases such as powdery mildew, avoid overhead watering of zinnias. A better watering technique involves the use of a soaker hose that delivers water to the plants' roots without wetting the foliage or the flowers. If a soaker hose is unavailable, water early in the day to allow the plants to dry thoroughly before nightfall.

A Monarch butterfly (*Danaus plexippus*) sipping nectar from a *Zinnia* blossom. **Photo © 2011 by liz west**

Pollinators

Zinnias are "butterfly magnets," according to garden writer Karen Zaworski. Butterflies and moths relish the nectar-filled blossoms, as do bees and hummingbirds.

Zinnias are good companion plants in vegetable gardens, attracting predatory wasps and hover flies that eat pest insects which would otherwise damage vegetable and ornamental garden plants. In addition to the benefit of pollination, hummingbirds eat whiteflies that can cause much damage in the garden (Peterson).

Pests and Diseases

Several pests attack zinnia plants. Japanese beetles (*Popillia japonica*), 0.5–inch (1.28–centimeter) long, beetles with green heads, copper-colored backs, and tan wings favor zinnia flowers. Trapping these pests is the best way to rid the garden of them.

The common gastropod pests snails (shelled) and slugs (shellless) often graze on young, tender zinnia plants (Fell 1983). If you plan to feed zinnias to your tortoises **do not** use poisonous snail bait. Instead, collect the pests manually and give them to your box turtles who will enjoy feasting on them.

The following fungal pathogens are common diseases of zinnias. Several techniques are useful to combat these diseases on both zinnias and other garden ornamentals. [1] Avoid wetting zinnia leaves and flowers during irrigation. Both soaker hoses and drip irrigation will help to accomplish this. [2] Consistent garden hygiene, i.e., removal of fallen leaves and flowers, will help sidestep disease development. [3] Planting varieties of seeds and nursery starts that are specifically labeled as "disease-resistant" is an effective strategy for avoiding diseases.

Powdery mildew

A fungal disease caused by several pathogens, powdery mildew manifests as a white, powdery coating on leaves and sometimes on flowers. As the disease progresses, affected plants wilt and lose leaves.

Alternaria blight

At least 13 named varieties of the fungal pathogen *Alternaria* that attack various agricultural and ornamental plants. *Alternaria zinniae* is specific to zinnia plants, causing unsightly spotting on the leaves that damages the leaf surface.

A zinnia flower bud just beginning to open. **Photo © 2010 by Ton Rulkens**

Edibility

Only edible plants grown organically should be considered for eating purposes. This means that no insecticides, herbicides, fungicides, or any other horticultural chemicals are used during the growth process. There are some horticultural products that are approved for use in an "organic" garden, but there is no evidence that those products are safe for reptiles. If one is planning to feed a plant to pet reptiles, err on the side of caution and use NO horticultural chemicals. Period. Full stop. When grown without chemicals, both the leaves and the flowers of zinnias are edible.

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In Madagascar, revived environmental crime hotline leads to tortoise bust

written by Edward Carver and posted on 6 April 2020 on Mongabay.com

◆ A Malagasy civil society group recently relaunched a hotline for people to report environmental crimes while avoiding the reprisals that often follow when they make such reports to the authorities.

◆ The group hired four environmental lawyers to answer the phones and investigate the cases, referring some to government agencies for enforcement.

◆ An anonymous caller told hotline lawyers about a classified ad for endangered tortoises in a Malagasy newspaper. The call led to the arrest in March of the seller, a government worker who is now in prison awaiting trial.

◆ Many governments have online and telephone reporting options for environmental and wildlife crimes. However, in countries with corrupt institutions and weak law enforcement, NGOs and civil society groups often run the hotlines.

If someone in Madagascar spots illegal logging, mining or slash-and-burn farming, they often have difficulty reporting the crime to authorities. Wrongdoers can pressure or threaten them to stay silent, and in some cases, local authorities take bribes to look the other way or even prosecute whistleblowers.

Alliance Voahary Gasy (AVG), a leading civil society group based in the capital city of Antananarivo, recently relaunched a hotline that provides a safer alternative for reporting environmental crimes. The group, which has operated the "green line" since 2013, reinvested in the initiative after a period of relative inactivity by hiring four environmental lawyers to answer the phones and investigate the cases, referring some to government agencies for enforcement.

"We want to build a reporting system that endures," Ndranto Razakamanarina, president of AVG, told Mongabay. "Our main objective is to address corruption and trafficking in this country."

Radiated tortoise, *Astrochelys radiata*, photographed in Tsimanapetsotsa National Park on the southwest coast of Madagascar. Photo © 2018 by Charles J. Sharp.

The renewed focus on collecting tips from the public has already led to an arrest. In late January, an anonymous caller told AVG's lawyers about a classified ad for radiated tortoises (*Astrochelys radiata*) in a Malagasy newspaper, Vidy Varotra. The radiated tortoise is a critically endangered species endemic to southern Madagascar and selling it is strictly prohibited under Malagasy law. Its populations are declining because of habitat loss, domestic meat consumption, and trafficking; the tortoises are sold as pets, mainly in Asia.

Working with police, AVG found a fake buyer who communicated with the seller and set up a "purchase" in the middle of Antananarivo. During the sting, on March 7, police arrested the suspect, who in fact works as a clerk at the Ministry of Justice, Razakamanarina said.

Razakamanarina said the whistleblower remained anonymous, as is often the case. "[T]he whistleblowers dare not show themselves, their protection is not guaranteed," he told Mongabay in an email. "AVG tries to reassure them while sacrificing itself."

Citizen reporting across the planet

Many governments in more industrialized countries have online and telephone reporting options for environmental and wildlife crimes, as well as special brigades to police them, such as the Carabinieri Forestali in Italy. South Africa's Department of Environmental Affairs receives about 750 complaints per year through its hotline, a spokesperson told Mongabay.

However, in many countries with corrupt institutions and weak law enforcement, NGOs and civil society groups run the hotlines. In Cambodia, for example, a local team supported by the Wildlife Alliance, a New York-based conservation group, responds to calls about illegal logging and pet trading. Residents and tourists in Southeast Asia can also report on the illegal wildlife trade through the Wildlife Witness phone app.

Multilateral agencies such as Interpol have made an increasing effort to coordinate enforcement efforts across countries, most notably with the founding of the

International Consortium on Combating Wildlife Crime in 2010.

Much of the fight against illegal wildlife trafficking now takes place online. TRAFFIC, a U.K.-based NGO that monitors wildlife trade, helped form a coalition of tech companies dedicated to stopping the online wildlife trade that includes e-commerce firms eBay and Alibaba, social media platforms Facebook and Sina Weibo, and search engines Google and Baidu. TRAFFIC also trained citizen science volunteers to identify illegal online sales and report suspicious social media posts; they've reported more than 4,000 cases over the past four years, helping companies like Facebook to find posts and groups that should be removed, according to spokespeople from TRAFFIC and the international NGO WWF, which helped found TRAFFIC. In March, the coalition introduced an online form that allows anyone to report on suspicious activity.

Lawyers on call in Madagascar

There is no government hotline for environmental crimes in Madagascar, but to reach AVG, people in the country need only dial 5–1–2. The calls are free from two of the three main telecom carriers; AVG is still negotiating with the third. The group marketed the line in newspaper and social media ads earlier this year, and calls have increased: there were 344 tips over a recent two-week period, about half of which seemed to provide credible information, Razakamanarina said. The most common subject is illegal logging, though callers cover a variety of other topics, including land grabbing, he said.

AVG lawyers provide advice to callers and follow up by doing their own investigative work, seeking to verify important claims. When they have solid evidence of a crime, they share it with relevant government ministries and law enforcement agencies.

The work is now funded by the United States Agency for International Development (USAID), which launched its Madagascar conservation programs in September 2018 after closing related programs in 2009 due to political instability. AVG hired the four lawyers early this year and the funding will be in place until 2023, Razakamanarina said. AVG also used USAID funding to start a legal aid clinic for activists and concerned citizens in northeast Madagascar, where rosewood and other precious timber is subject to heavy illegal logging.

Razakamanarina said the hotline was a "big step" but that there's still a long way to go to address Madagascar's systemic corruption and governance issues that lead to environmental degradation. Though AVG can provide support, it will ultimately be up to Madagascar's government to enforce the law and police or deter environmental crimes.

Many Malagasy newspapers covered the radiated tortoise bust last month. The suspect reportedly tried to sell two tortoises for a total of 55 million ariary (about $15,000). He's now in prison awaiting trial. A court hearing scheduled for March 23 was postponed due to the coronavirus outbreak.

In a country where environmental activism is difficult and even dangerous, AVG prioritizes the safety of its staff. Its strategy is "to use credible information and always make VIPs and the international community aware of our actions," Razakamanarina said. "[These] may be the reasons I am still alive and not in jail. I received threats many times."

COVID-19 Delays Sea Turtle Nest Patrols on Upper Texas Coast—*Turtle Island Restoration Network press release*

GALVESTON, Texas — 27 March 2020 — To ensure the safety of volunteers and staff, Turtle Island Restoration Network and Texas A&M University at Galveston are delaying the start of sea turtle patrol on the upper Texas coast until May 1. The decision, which will be reevaluated every two weeks to determine a safe start date for nest patrols, comes as endangered sea turtles begin to nest amid the COVID-19 outbreak.

"Turtle Island has been part of the sea turtle nest patrol on the upper Texas coast since its inception in 2002, and we will continue to work to support the protection of nesting sea turtles and their eggs," said Joanie Steinahus, Turtle Island Restoration Network's gulf program director.

Three sea turtle species – the critically endangered Kemp's ridley, loggerhead and green – return to upper Texas coast beaches from April 1 to July 15 each year to lay their nests. With the help of hundreds of volunteers who patrol beaches, nests are located and the eggs are excavated and transferred to Padre Island National Seashore for incubation and release. In addition to looking for evidence of nesting turtles, nest patrol volunteers often find stranded turtles, and injured birds, dolphins, and other coastal wildlife.

As Texas beaches remain open, Turtle Island Restoration Network asks residents to call the Texas sea turtle hotline, 1-866-TURTLE-5 (1-866-887-8535), if they see a sea turtle, a nest, or tracks on the beach. Turtle Island Restoration Network has sponsored the 1-866-TURTLE-5 sea turtle hotline for the Texas coast for more than ten years, and continues to raise awareness of the need to report any nesting, injured or deceased sea turtle to the hotline along the entire Texas coast.

Mike's Turtle Net Picks by Michael J. Connor, Ph.D.

A varied selection of recent articles, stories and sites on the Web that some of you may find as interesting as I did. This list is also posted at **tortoise.org/turtlenetpicks/turtlenetpicks.html**

Benefits and Costs of Covid-19 to Turtles

Covid-19 restrictions on humans are reportedly benefiting leatherback sea turtles in Thailand from having fewer tourists on their nesting beaches.

And so are olive ridley sea turtles in India.

USA National Parks are finding less road-killed tortoises.

Covid-19 might push the planet to finally end wildlife trafficking.

Italian Woman Fined €400 for Walking Her Tortoise.

Giant-Tortoise-Drinking Video Goes Viral
One thing about living through a plague is that we all have more time to watch tortoises drink.

Diamondback Terrapin Natural History
Barbara Brennessel's 2006 book, *Diamonds in the Marsh: A Natural History of the Diamondback Terrapin*, is now available for free download at Wheaton College.

New Matamata Species
Meet the newly recognized Orinoco matamata, *Chelus orinocensis*, from the Orinoco and Río Negro river basins.

Manning River Turtles Hatched
Manning River turtles hatched at Australian Reptile Park as part of head-starting program.

Tamaulipas Beach Turtle Nesting Season
The Kemp's ridley nesting season started in April and *arribadas* will continue until August.

Eastern Pacific Leatherback Sea Turtles in Trouble
Enhanced, coordinated conservation efforts required to avoid extinction of critically endangered Eastern Pacific leatherback turtles. (pdf)

Tortoiseshell Trade
Yes, unbelievably Hawksbill turtles are still being killed for the ornamental value of their shells! *Read The Global Tortoiseshell Trade, April 2020.*

Latest State of the World's Sea Turtle Report
SWOT volume XV is now available for download.

Latest Marine Turtle Newsletter
MTN Issue Number 160 now available.

Clean Water Act Ruling
On April 23, the U.S. Supreme Court issued an important decision solidifying the Clean Water Act as one of the nation's most effective environmental laws. It stopped a Maui waste water plant from discharging pollutants into a water basin that flows into a bay used by sea turtles.

Planet of the Humans
This documentary doesn't features tortoises but it does review some of the Ivanpah Valley shenanigans. Watch it for free before it gets banned !

CTTC's Turtle And Tortoise Listserve
CTTC's Turtle and Tortoise list has now moved to io.groups. If you want to talk with other turtle and tortoise fans in a friendly atmosphere just send an email to: **<CTTC-TurtleAndTortoise-list+subscribe@groups.io>**

CTTC on Facebook
For breaking news updates visit and "like" us on Facebook!

Diamondback terrapin, *Malaclemys terrapin*. **Photo © 2013 by J.D. Willson**

"Reptiles and amphibians are sometimes thought of as primitive, dull and dim-witted. In fact, of course, they can be lethally fast, spectacularly beautiful, surprisingly affectionate and very sophisticated."

— Sir David Attenborough (b. 1926), English broadcaster and documentarian

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Meetings and Programs

Click on your Chapter's website link for the latest program information. Programs may be scheduled after newsletter publication.

Chino Valley
15 May; 19 June

Foothill
22 May; 26 June

High Desert
11 May; 15 June

Inland Empire
1 May; 5 June

Kern County
11 May; 15 June

Low Desert
1 June

Orange County
8 May; 12 June

Ridgecrest
11 May; 15 June

Santa Barbara-Ventura
Contact the chapter for meeting information.

Santa Clarita
16 May

TOOSLO (San Luis Obispo)
19 May; 16 June

TTCS (Long Beach)
16 May; 20 June

Valley
15 May; 19 June

Valley Chapter's Annual Show Postponed

Because of the coronavirus COVID-19 pandemic, the CTTC Valley chapter has postponed its annual show originally scheduled for 16 May 2020.

Valley's annual show has been tentatively rescheduled for September of this year. A final decision on holding the event will be made closer to September.

Classified Advertisements

Classified advertisements run for one issue at 5^{00} for up to four lines. Ads are accepted at the discretion of the Editor. Classified ads are available to members and subscribers only and are run as a service to our members. California Turtle & Tortoise Club is not responsible for merchandise placed for sale in the *Tortuga Gazette*.

Please make your check payable to the California Turtle & Tortoise Club.

Please send ad fee to: CTTC *Tortuga Gazette*, attn Treasurer, P. O. Box 7300, Van Nuys, CA 91409-7300.

Mail fee with ad copy to the *Tortuga Gazette* mailing address; OR, mail fee to the postal address above, and email the ad copy to the **Gazette Editor**.

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Membership in the CTTC and subscriptions to the *Tortuga Gazette* are handled through the CTTC Chapters. The Chapters also manage membership renewals (see postal addresses to the right).

Many members choose to join a nearby Chapter to participate in Chapter meetings and other activities. Print membership forms from the **CTTC website**.

Your Chapter and your renewal date (month/year) are displayed on your newsletter notification. Mail your new or renewal membership/subscription to the Chapter of your choice.

Membership fees

- **Student membership** 15^{00}
- **Individual membership** 25^{00}
- **Family membership** 35^{00}
- **Life membership** 500^{00}

CTTC Mailing Addresses

Chino Valley Chapter: P. O. Box 1753, Chino, CA 91708-1753

Foothill Chapter: P. O. Box 51002, Pasadena, CA 91115-1002

High Desert Chapter: P. O. Box 163, Victorville, CA 92393

Inland Empire Chapter: P.O. Box 2371, San Bernardino, CA 92406-2371

Kern County Chapter: P.O. Box 81772, Bakersfield, CA 93380-1772

Low Desert Chapter: P.O. Box 4156, Palm Desert, CA 92261

Orange County Chapter: P.O. Box 11124, Santa Ana, CA 92711

Ridgecrest Chapter: P. O. Box 1272, Ridgecrest, CA 93555

Santa Barbara-Ventura Chapter: P.O. Box 3086, Camarillo, CA 93011-3086

Santa Clarita Chapter: P.O. Box 4012, Castaic, CA 91310

TOOSLO Chapter: P.O. Box 763, Grover Beach, CA 93483

Turtle & Tortoise Care Society Chapter: P O Box 15953, Long Beach, CA 90815

Valley Chapter: P.O. Box 7364, Van Nuys, CA 91409-7364

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