

Scientists announce top 10 new species for 2015

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New species of pufferfish, *Torquigener albomaculosus*: A male (right) biting on the left cheek of a female while they were spawning. Credit: Yoji Okata

A cartwheeling spider, a bird-like dinosaur and a fish that wriggles around on the sea floor to create a circular nesting site are among the

species identified by the SUNY College of Environmental Science and Forestry (ESF) as the Top 10 New Species for 2015.

Two animals—a frog that gives birth to tadpoles and a wasp that uses dead ants to protect its nest—are unusual because of their parenting practices. Also on the list are an animal that might surpass the new species distinction to be an entirely new phylum, a 9-inch walking stick and a photogenic sea slug. Rounding out the top 10 are a coral plant described as endangered almost as soon as it was discovered and a red-and-green plant used during Christmas celebrations in Mexico.

The list is compiled annually by ESF's International Institute for Species Exploration (IISE). The institute's international committee of taxonomists selected the Top 10 from among the approximately 18,000 new species named during the previous year. ESF released this year's list May 21 to recognize the birthday, May 23, of Carolus Linnaeus, an 18th century Swedish botanist who is considered the father of modern taxonomy. The annual list, established in 2008, calls attention to discoveries that are made even as species are going extinct faster than they are being identified.

"The last vast unexplored frontier on Earth is the biosphere. We have only begun to explore the astonishing origin, history, and diversity of life," said Dr. Quentin Wheeler, ESF president and founding director of the IISE. Scientists believe 10 million species await discovery, five times the number that are already known to science.

"An inventory of plants and animals begun in the 18th century continues apace with the discovery of about 18,000 additional species each year. The nearly 2 million species named to date represent a small fraction of an estimated 12 million. Among the remaining 10 million are irreplaceable clues to our own origins, a detailed blueprint of how the biosphere self-organized, and precious clues to better, more efficient,

and more sustainable ways to meet human needs while conserving wild living things. It is time to mount a mission to planet Earth to distinguish, describe, name and classify its life-forms before it is too late. The Top 10 is a reminder of the wonders awaiting us," Wheeler said.



New species of walking stick, *Phryganistria tamdaoensis*: female on arm. Credit: Jonathan Brecko

The Top 10 Species of 2015

Feathered Dinosaur: 'Chicken from Hell'

Anzu wyliei

Location: U.S.A.

How it made the Top 10: With a mixture of bird and dinosaur features, *Anzu wyliei* is from a bird-like group of dinosaurs that lived in North America. A contemporary of the more famous T. rex and Triceratops, this species made nests and sat on the eggs until they hatched. Among their bird-like features were feathers, hollow bones and a short snout with a parrot-like beak. These omnivores appear to have lived on floodplains eating vegetation, small animals and possibly eggs. Three well-preserved partial skeletons were discovered in North and South Dakota, in the Hell Creek Formation. Because some caenagnathids were chicken-sized, this new dinosaur was dubbed "chicken from Hell." However, at more than 10 feet in length (3.5m), 5 feet in height (1.5m) and 600 pounds (200-300kg), this was no chicken.

Coral Plant: Atypical Tubers

Balanophora coralliformis

Location: Philippines

How it made the Top 10: This parasitic plant, discovered and almost immediately considered endangered, has elongated, repeatedly branching, and rough-textured aboveground tubers. These peculiar tubers give this root parasite from the Philippines a coral-like appearance distinct from the more typical underground tubers of related species. Parasitic plants do not contain chlorophyll and are incapable of photosynthesis, so they draw their nutrition from other living plants. This species is, so far, known from fewer than 50 plants, all found between 4,800 and 5,600 feet (1,465 and 1,735 m) elevation on the southwestern slopes of Mt. Mingan in mossy forest areas. Because so few plants are known to exist, and the narrow area in which they live is unprotected, the scientists who described it consider the plant critically endangered.

Cartwheeling Spider: Spinning in the Sand

Cebrennus rechenbergi

Location: Morocco

How it made the Top 10: This agile arachnid from the desert uses a

gymnast's trick to escape from threatening situations: It cartwheels its way out of danger. When danger comes calling, the spider first assumes a threatening posture. If the danger persists, the spider runs and, about half the time that running turns into cartwheeling which is twice as fast. Terrain is not a challenge: the spider can spin across flat ground as well as up and down hills. Rather than attempting to cartwheel away, the spider propels itself toward the source of the threat, perhaps invoking the theory that the best defense is a good offense. In the barren sand dunes where the spider lives, running away can prove pointless because there is no place to hide. The high temperatures of its desert habitat would be fatal to the spider if it persisted in this high-energy routine for long, so cartwheeling is thought to be an escape option of last resort. Even before the spider had been officially named, its behavior inspired a biomimetic robot that can similarly walk or roll.

The X-Phyla: Mysterious Newcomers

Dendrogramma enigmatica

Location: Australia

How it made the Top 10: *Dendrogramma enigmatica* and a second new species, *D. discoids*, are multicellular animals that look rather like mushrooms, with a mouth at the end of the "stem" and the other end in the form of a flattened disc. The best information suggests that they are related to the phylum Cnidaria (jellyfish, corals, [sea anemones](#) and hydras) or Ctenophora (comb jellies) or both, but the new animals lack evolutionary novelties unique to either and could be an entirely new phylum. They also resemble fossils from Precambrian time, perhaps making them living fossils of sorts. The mystery surrounding this animal accounts for its name, and its relationships are likely to remain enigmatic until specimens can be collected suitable for DNA analysis. The new animal is small, with a stalk less than a third of an inch (8 mm) in length and a "cap" that measures less than a half-inch (11mm) across. It was found on the [sea floor](#), at a depth of about 3,200 feet (1,000 meters), off Point Hicks, Victoria.

Bone-house Wasp: Morbid Motherhood

Deuteraenia ossarium

Location: China

How it made the Top 10: This insect, which tops out at about a half-inch (15mm) in length, has a unique way to protect its offspring. The wasp constructs nests in hollow stems with several cells, each separated by soil walls. The wasp kills and deposits one spider in each cell to provide nourishment for her developing young. Once her egg is laid, she seals off the cell and hunts a spider for the next cell. Rather than provisioning the final or vestibule cell with a spider, she fills it with as many as 13 bodies of dead ants, thus creating a chemical barrier to the nest. This is the first animal known to take this approach to securing the front door to a nest. This species, found in Gutianshan National Nature Reserve in eastern China, has significantly lower parasitism rates than similar cavity-nesting wasps. Camouflage is supplied by a veil of volatile chemicals emitted by the dead ants, thwarting enemies that hunt wasp larvae by scent.

Indonesian Frog: A Tad Unusual

Limnonectes larvaepartus

Location: Indonesia

How it made the Top 10: There's an exception to every rule and the newest species of fanged frog is such an exception. Unlike other frogs, *Limnonectes larvaepartus* from Sulawesi Island, Indonesia, gives birth to tadpoles that are deposited in pools of water. On one occasion, a female gave birth to a tadpole in the hand of a scientist at the moment she was captured. Fewer than a dozen of the world's 6,455 frog species have internal fertilization and all except this new species lay fertilized eggs or give birth to tiny froglets. The species, about 1.5 inches long (40mm), is found in the island's Northern Peninsula on the western edge of the Central Core. The region has not been fully explored for frogs, so the extent of this species' range is not yet known. The frogs live in natural and disturbed forest habitats, often in areas occupied by one to five other species of the same genus. The frogs are found above flowing streams in

leaf litter, grassy vegetation, or on rocky substrates.

Walking Stick: Not So Giant

Phryganistria tamdaoensis

Location: Vietnam

How it made the Top 10: While this new stick insect is not the world's longest, it belongs to a family known as giant sticks. At 9 inches in length, *Phryganistria tamdaoensis* is compelling evidence that, in spite of their size, more giant sticks remain to be discovered and our knowledge of these masters of camouflage is far from complete. This giant stick is common in the town of Tam Dao visited by many entomologists, yet it escaped notice until now. If you would like to see one of these big bugs up close, you are in luck. Living specimens are on display at the vivarium of the Royal Belgian Institute of Natural Sciences in Brussels. The newcomer gets its name from the beautiful Tam Dao National Park in a mountainous area in the northwestern part of Vietnam. By the way, the record is held by Chan's megastick, *Phobaeticus chani*, at more than 22 inches (567 mm), named in 2008 from Borneo.

Sea Slug: Beauty of the Deep

Phyllodesmium acanthorhinum

Location: Japan

How it made the Top 10: For this [sea slug](#), the Top 10 competition was more than a beauty contest. It is a "missing link" between sea slugs that feed on hydroids and those specializing on corals. Gastropods do not get more photogenic than sea slugs whose graceful lines and vivid coloration make them beauties of the deep. This new species, which photographs in shades of blue, red and gold, also contributed to a better understanding of the origin of an unusual symbiosis in other species of the genus. Related sea slugs have multi-branched guts in which algae called zooanthellae live. These algae have a primary symbiotic relationship with the corals on which the sea slugs feed. Once sequestered in the gut, the

photosynthetic algae produce nutrients of benefit to the host. The newly identified species is an inch long, more or less (17-28 mm), and resides in the Japanese islands.

Bromeliad: Feliz Navidad

Tillandsia religiosa

Location: Mexico

How it made the Top 10: During Christmas celebrations in Mexico, elaborate altar scenes or "nacimientos" depicting the birth of Christ are assembled by villagers. In Sierra de Tepoztlán, Tlayacapan, San José de los Laureles, and Tepoztlán, a beautiful bromeliad plant is frequently incorporated in the display. The plant turned out to be new to science. *Tillandsia religiosa*, with its rose-colored spikes and flat green leaves, can be found growing up to 5 feet tall (1.5m) in rocky habitat in northern regions of Morelos, Mexico. Stemless, solitary plants are found on cliffs and vertical walls in deciduous, coniferous, oak and cloud forests at altitudes between 6,000 and 7,000 feet (1,800 to 2,100 m) elevation, where they flower from December to March. The bromeliad is an example of a [species](#) long known to local inhabitants but only recently discovered by science.

Pufferfish: 'Crop Circles' under the Sea

Torquigener albomaculosus

Location: Japan

How it made the Top 10: Scientists recently solved a 20-year-old mystery under the sea and discovered a new fish. Intricate circles with geometric designs about six feet (2 meters) in diameter, found on the seafloor off the coast of Amami-Ōshima Island, were as weird and unexplained as crop circles. They turn out to be the work of a [new species](#) of pufferfish, *Torquigener albomaculosus*. Males construct these circles as spawning nests by swimming and wriggling in the seafloor sand. The nests, used only once, are made to attract females. The nests have double edges and radiating troughs in a spoke-like geometry. The

design isn't just for show. Scientists discovered the ridges and grooves of the circle serve to minimize ocean current at the center of the nest. This protects the eggs from the turbulent waters and possibly predators too. Yoji Okata, an underwater photographer, first observed the artistic behavior. Subsequently, a team of ichthyologists and a television crew carried out an expedition to record the phenomenon.

Provided by SUNY College of Environmental Science and Forestry

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