

= Beaded lizard =

The Mexican beaded lizard (*Heloderma horridum*) is the most famous of the four species of venomous beaded lizards found principally in Mexico and southern Guatemala . It and its congener the Gila monster (*Heloderma suspectum*) are the only lizards known to have evolved an overt venom delivery system . The beaded lizard is larger than the Gila monster , but has duller coloration , black with yellowish bands of differing width depending on the species . As it is a specialized predator that feeds primarily upon eggs , the primary use of its venom is still a source of debate among scientists . However , this venom has been found to contain several enzymes useful for manufacturing drugs in the treatment of diabetes , and research on the pharmacological use of its venom is ongoing .

Threatened throughout its range by overcollection and habitat loss , it is a CITES protected species . The Guatemalan beaded lizard (*H. charlesborgetti*) is one of the rarest lizards in the world , with a wild population of fewer than 200 .

= = Taxonomy = =

The beaded lizard has one close living relative , the Gila monster (*H. suspectum*) , as well as many extinct relatives in the Helodermatidae , whose genetic history may be traced back to the Cretaceous period . The genus *Heloderma* has existed since the Miocene , when *H. texana* ranged over most of North America . Because the helodermatids have remained relatively unchanged morphologically , they are occasionally regarded as living fossils . Although the beaded lizard appears closely related to the monitor lizards (varanids) of Africa , Asia , and Australia , the wide geographical separation and unique features not found in the varanids indicate the beaded lizard is better placed in a separate family .

The species was first described in 1829 by Arend Wiegmann as *Trachyderma horridum* , but he renamed it *Heloderma horridum* six months later . Its generic name *Heloderma* means " studded skin " , from the Ancient Greek words *hêlos* (????) ? the head of a nail or stud ? and *dérma* (?????) , meaning skin . Its specific name , *horr?dum* , is the Latin word meaning rough or rude .

= = Species = =

The four subspecies of beaded lizard , elevated to full species in 2013 , are :

= = Description = =

Adult beaded lizards range from 57 to 91 cm (22 to 36 in) in length . They are substantially larger than the Gila monster , which only reaches lengths of 30 to 56 cm (12 to 22 in) . The snout @-@ to @-@ vent length of a beaded lizard averages 33 to 48 cm (13 to 19 in) . The average body mass of an adult beaded lizard is 800 g (1 @.@ 8 lb) , about 45 % heavier than the average mass of a gila monster , with large specimens exceeding 2 @,@ 000 g (4 @.@ 4 lb) . Maximum weight known is 4 @,@ 000 g (8 @.@ 8 lb) Although males are slightly larger than females , the lizards are not sexually dimorphic . Both males and females are stocky with broad heads , although the males ' tend to be broader . The beaded lizard 's scales are small , beadlike , and not overlapping . Except for the lizard 's underside , the majority of its scales are underlaid with bony osteoderms .

Their base color is black and marked with varying amounts of yellow spots or bands , with the exception of *H. alvarezii* , which tends to be all black in color . The beaded lizard has a short tail which is used to store fat so it can survive during months of estivation . Unlike many other lizards , this tail does not autotomize and cannot grow back if broken . The beaded lizard has a forked , black tongue which it uses to smell , with the help of a Jacobson 's organ ; it sticks its tongue out to gather scents and touches it to the opening of the organ when the tongue is retracted .

= = Habitat and range = =

The beaded lizard is found in the Pacific drainages from southern Sonora to southwestern Guatemala and two Atlantic drainages , from central Chiapas to southeastern Guatemala . Their habitats are primarily in the desert , tropical deciduous forests and thorn scrub forests , but are found in pine @-@ oak forests , with elevations from sea level to 1500 m . In the wild , the lizards are only active from April to mid @-@ November , spending about an hour per day above the ground .

The Mexican beaded lizard *H. horridum* is found in Mexico , from Sonora to Oaxaca . The Rio Fuerte beaded lizard (*H. exasperatum*) is found from southern Sonora to northern Sinaloa . The Chiapan beaded lizard (*H. alvarezi*) is found in the northern Chiapas and the depression of the Río Lagartero in Huehuetenango to northwestern Guatemala . The ranges of these three species overlap , making them sympatric . The Guatemalan beaded lizard (*H. charlesbogerti*) is the only allopatric one , separated from the nearest population (*H. alvarezi*) by 250 km of unsuitable habitat . The Guatemalan beaded lizard is the most endangered of the species , if not of all lizards ; it is found only in the dry valley of the Río Motagua in northeastern Guatemala ; less than 200 are believed to exist in the wild .

= = Ecology = =

= = = Diet = = =

The beaded lizard is a specialized vertebrate nest predator , feeding primarily on bird and reptile eggs . A semi @-@ arboreal species , it is found climbing deciduous trees in search of prey when encountered above ground . It occasionally preys upon small birds , mammals , frogs , lizards , and insects . Steve Angeli and Robert Applegate , noted captive breeders of the beaded lizard , have remarked that captive specimens do best on a diet of small vertebrates primarily mice and rats . Confiscated wild @-@ caught specimens can be made to feed by using egg on the prey item .

= = = Venom = = =

The venom glands of the beaded lizard are modified salivary glands located in the reptile 's lower jaw . Each gland has a separate duct leading to the base of its grooved teeth . When biting , the beaded lizard hangs on its victim and chews to get its venomous saliva into the wound . Although its jaw grip is strong , its unsocketed teeth are easily broken off at their bases . The beaded lizard 's venom is a weak hemotoxin , and although human deaths are rare , it can cause respiratory failure . It consists of a number of components , including L @-@ amino acid oxidase , hyaluronidase , phospholipase A , serotonin , and highly active kallikreins that release vasoactive kinins . The venom contains no enzymes that significantly affect coagulation . Almost all documented human bites (eight in the past century) have resulted from prodding captive lizards with a finger or bare foot .

While invertebrates are essentially immune to the effects of this venom , effects on vertebrates are more severe and varied . In mammals such as rats , major effects include a rapid reduction in carotid blood flow followed by a marked fall in blood pressure , respiratory irregularities , tachycardia , and other cardiac anomalies , as well as hypothermia , edema , and internal hemorrhage in the gastrointestinal tract , lungs , eyes , liver , and kidneys . In humans , the effects of bites are associated with excruciating pain that may extend well beyond the area bitten and persist up to 24 hours . Other common effects of bites on humans include local edema (swelling) , weakness , sweating , and a rapid fall in blood pressure . Beaded lizards are immune to the effects of their own venom .

The compounds in its venom have been studied have pharmacological properties relating to diabetes , Alzheimer 's disease , and even HIV . This hormone was named exendin @-@ 3 and is marketed by Amylin Pharmaceuticals as the drug exenatide . One study reported in 1996 revealed

that it binds to cell receptors from breast cancer cells and may stop the growth of lung cancer cells .

== = Reproduction == =

The beaded lizard becomes sexually mature at six to eight years and mates between September and October . Males engage in ritual combat that often lasts several hours ; the victor mates with the female . The female lays her clutch of two to 30 eggs between October and December , the clutch hatching the following June or July .

Young lizards are seldom seen . They are believed to spend much of their early lives underground , emerging at two to three years of age after gaining considerable size .

== = Conservation == =

The beaded lizard is surrounded by myth and superstition in much of its native range . It is incorrectly believed , for example , to be more venomous than a rattlesnake , can cause lightning strikes with its tail , or make a pregnant woman miscarry by merely looking at her . As a result of this superstition , locals often kill the lizard on sight .

The seldom @-@ seen lizard is poached and sold into the illegal exotic animal trade . It does not reproduce well in captivity , and its scarcity means a high price for collectors . As a direct result , the beaded lizard is protected by Mexican law under the category A (Threatened) , and it dwells within the range of several protected areas . In Guatemala , it is protected by national legislation , and part of its range is within protected areas . It is listed on Appendix II of CITES .

Fewer than 200 lizards remain in the dry forest habitat of the Motagua Valley , and this species of beaded lizard (*H. charlesbogerti*) was facing extinction due to local extermination and loss of habitat for agricultural purposes . A conservation effort has been launched known as Project Heloderma to preserve the semiarid habitat of the Motagua Valley by the Nature Conservancy and partners such as ZOOTROPIC , CONAP , the International Reptile Conservation Foundation , Lincoln Park Zoo , Zoo Atlanta , and the San Diego Zoo . This effort has been successful in getting the Guatemalan government to list the beaded lizard under the Convention on International Trade in Endangered Species as an Appendix I animal , making it illegal to export the species .

== = External == =

IRCF 's Guatemalan Beaded Lizard Conservation Project

Mexican Beaded Lizard at the LA Zoo

Mexican Beaded Lizard at the Saint Louis Zoo

[http : // www.helodermahorridum.com](http://www.helodermahorridum.com)

[http : // mobile.zooatlanta.org / home / conservation _ efforts / guatemalan _ beaded _ lizards _ conservation _ project ? utm _ referrer = http % 3A % 2F % 2Fwww.zooatlanta.org % 2Fhome % 2Fconservation _ efforts](http://mobile.zooatlanta.org/home/conservation_efforts/guatemalan_beaded_lizards_conservation_project?utm_referrer=http%3A%2F%2Fwww.zooatlanta.org%2Fhome%2Fconservation_efforts)